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Same old, same old: daily sequence and well-being in later life using ecological momentary data

Tianyao Qu, PhD[1,2,*], Maleah Fekete, PhD[1], Siyun Peng, PhD[1,3], Adam R. Roth, PhD[1,4]

[1]Irsay Institute for Sociomedical Sciences Research, Indiana University, Bloomington, Indiana, United States
[2]School of Social Sciences, Singapore Management University, Singapore, Singapore
[3]School of Aging Studies, University of South Florida, Tampa, Florida, United States
[4]Department of Sociology, Oklahoma State University, Stillwater, Oklahoma, United States
*Address correspondence to: Tianyao Qu, PhD. E-mail: tqu@iu.edu

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Abstract

Objectives: **Understanding whether daily routine reflects adaptive stability or constrained opportunities for enrichment remains an open question in aging research.**

Methods: **This study develops a Weekly Routine Index (WRI) using Ecological Momentary Assessment (EMA) data from 253 older adults in the Social Environment and Cognitive Health in Urban and Rural Areas (SECHURA) to quantify within-person similarity in daily activities and co-presence with social partners (4,025 total EMAs). We computed pairwise similarities between each respondent's daily sequences to generate activity- and co-presence-based routine similarity measures.**

Results: **Regression and correlational analyses show that both routine similarities increase modestly with age and are higher among men and unmarried individuals. Importantly, stability in both activity and co-presence sequences is associated with lower cognitive functioning, more functional limitations, higher loneliness, and smaller, less diverse social networks.**

Discussion: **These findings suggest that stability in later life may not be uniformly beneficial; rather, highly routinized daily schedules may co-occur with limited exposure to socially and cognitively enriching experiences linked to healthy aging. This study also demonstrates the value of applying sequence analysis to EMA data to capture the temporal structure of later life.**

Keywords: Daily routine, Social sequence analysis, Cognitive aging, Social networks, Loneliness

How older adults structure their daily lives in relation to health and well-being has long been central to gerontology research (e.g., Aartsen et al., 2002; Luo et al., 2024). *Routine*, defined as the execution of behaviors or activities in the same way over time, is a key dimension of time use which has drawn renewed attention in the aging literature (Bouisson & Swendsen 2003; Brown et al., 2023; Heintzelman & King, 2019; Luo et al., 2023; Tournier et al., 2012; Yoshizaki et al., 2022). Some work suggests that predictable schedules promote cognitive engagement and emotional well-being, while others contend that overly regular patterns may signal withdrawal from cognitively demanding activities or reduced capacity to engage across diverse settings (Luo et al., 2025; Reich & Zautra, 1991; Tournier et al., 2012). Yet the health implications of routine in later life remain contested. Does routinized daily life reflect adaptive stability, or mark constrained access to enriching contexts?

This ambiguity stems partly from how routine has been measured. Studies typically rely on aggregate retrospective self-reports, such as the frequency of events at the same time of day (e.g., Monk et al., 1994), whether an activity is perceived as "part of one's routine" (Heintzelman & King, 2019), or stated preferences for routine (Bergua et al., 2006; Hou et al., 2019). These measures treat activities largely as discrete events, revealing little about the ordering, sequencing, and transitions that structure everyday life, or how activities and interactions unfold as integrated temporal sequences shaping exposure to cognitive and emotional resources (Cornwell et al., 2019; van Tienoven, 2017).

Departing from these approaches, this study conceptualizes routine through the order of events in daily life. Drawing on social sequence analysis, we treat daily activities and interactions as trajectories unfolding over time and define routine as the degree to which these trajectories repeat across days. Routine thus captures not just temporal regularity but also the extent of repeated exposure to the same or different social contexts. This conception is distinct from activity diversity (the number of different activities over a period) and day-to-day variability (how much activity type fluctuates). Two people can have identical diversity and similar variability yet differ sharply in whether their days recur in the same order or are arranged anew each time, a recurrence which frequency, diversity, and variability measures

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overlook, and whose association with later-life well-being remains largely unknown.

Consider two older adults who each have lunch with a companion, attend one organized activity, and make one phone call daily. The first does so identically: coffee with the same neighbor at 9 a.m., the same exercise class at noon, and an evening call to the same daughter. The second draws the same daily tally from a shifting set: lunch with a friend one day, a sibling the next; a book club on Monday, volunteering on Thursday; calls that rotate among contacts. Their activity and contact are equivalent in quantity, but the first person's days recur in the same order, while the second person's are arranged each day anew. Although both appear equally "social" by frequency measures, what differs is whether the daily arrangement recurs.

We argue this temporal structure matters for three reasons. First, maintaining a consistent daily sequence may reflect the self-regulatory and planning capacity tied to executive function, which would interpret stability as adaptive. Second, cross-day similarities reveal opportunity structures and constraints that shape how older adults allocate time. The order of social interaction reflects the social foci—settings that organize joint activity (Feld, 1981)—through which a person moves, so a fixed sequence of partners fixes the rotation of foci, bounding exposure to new contexts and unfamiliar others. Third, departures from the usual order matter. The unscripted choices and unplanned encounters of a rearranged day impose cognitive demands and expose older adults to novelty, which are enriching experiences less likely to occur on days that repetitively recur. Because this logic concerns specifically who is with rather than what is doing, we model activity and social interaction as separate sequences. A person may vary activities while cycling through the same partner or move through varied partners while repeating the same activities. As a result, we model the two separately so that we can identify whether it is regularity in activities, in co-presence, or in both that is associated with health. We then turn to two competing perspectives—continuity theory and the social enrichment perspective–that interpret what daily routines mean for health in later adulthood.

Routine as preference or adaptive strategy: a continuity theory perspective

From a continuity theory perspective, routines represent an adaptive strategy through which older adults maintain stable structures to bridge needs, resources, and constraints, particularly in the face of disruptive later-life transitions that might otherwise threaten social integration (Atchley, 1989; Grandin et al., 2006; Luo et al., 2024). After stressful life events such as retirement, widowhood, or illness, older adults often stabilize their days through predictable social engagement to restore emotional equilibrium and continuity (Åberg et al., 2004; Cornwell & Laumann, 2018; Dhand et al., 2019; Wang, 2013).

Empirical work aligns with this perspective. Many older adults prefer orderly, regular days (Reich & Zautra, 1991), a preference that may reduce cognitive load by minimizing decision-making demands, regulating emotion, and buffering against daily hassles (Danna-Lynch, 2010; Heintzelman & King, 2019). For instance, stable family routines, such as consistent meal times or caregiving practices, have been linked to greater life satisfaction among older adults (Coltrane, 2000; Fiese et al., 2002), and regular rhythms may protect psychological health by reinforcing valued social roles (Grandin et al., 2006; Luo et al., 2024). From this standpoint, routine functions as an adaptive strategy that helps older adults conserve energy, preserve identity, and navigate life transitions with psychological stability. Critically, this perspective does not necessarily treat routinization as a signal of vulnerability or adaptation or passive response to age-related disruptions such as family loss, retirement, or mobility limitations (Cumming & Henry, 1961). Predictable days can equally reflect lives organized around positive resources such as stable relationships, comfortable homes, and satisfying leisure, rather than imposed constraints.

Routine as constrained enrichment opportunity: a social enrichment perspective

By contrast, the social enrichment literature interprets highly routinized daily patterns as problematic, signaling reduced access to novel, diverse, or stimulating environments that matter for cognitive and emotional health (Cheng, 2016; Ellwardt et al., 2020; Evans et al., 2019; Stern, 2006). A lifestyle marked by sameness and repetition may arise from age-related constraints that narrow the range of feasible activities, including shrinking networks (Cornwell et al., 2008), mobility limitations or chronic illness that restrict movement beyond home (Litwin & Levinson, 2018; Rosso et al., 2013), and caregiving that imposes fixed schedules (Queen et al., 2019). These constraints may reduce exposure to new encounters and demands, limiting enriching experiences and emotional rewards alike.

Consistent with this view, evidence has shown that greater engagement in routinized behaviors is more common among older adults with cognitive decline, poorer attention and memory, and lower functional ability (Bergua et al., 2006; Bouisson & Swendsen, 2003; Tournier et al., 2012). Routine has also been linked to lower positive affect and happiness, and to higher anxiety and depressive symptoms, in part because predictable days may offer fewer opportunities for meaningful social contact and positive emotional experiences (Bouisson & Swendsen, 2003; Reich & Zautra, 1991).

Yet, as in the continuity account, the meaning of a routine may depend on older adults' socioeconomic resources and social capital (Bó, 2022; Pinquart & Sörensen, 2000). For the advantaged, a predictable day may reflect a well-managed rhythm selected from an abundance of options; for the disadvantaged, the same predictability may reflect cumulative constraint and a narrowed set of social ties (Bó, 2022).[1] A recurrent pattern may thus index either a freely chosen rhythm or a narrowed life with limited social capital. Although activity diversity and social participation are well-established supports for later-life health (Brown et al., 2023; Lee et al., 2018; Luo et al., 2023; Wong et al., 2024), few studies conceptualize routine itself as a form of exposure to, or insulation from, enriching contexts. Integrating these perspectives, this study hypothesizes that routinized daily patterns may signal constrained exposure to cognitive and emotional enrichment and may thus be associated with poorer later-life health.

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Adjudicating between these hypotheses requires capturing not just *what* older adults do, but *how their days unfold over time*. Yet existing research relies on aggregate indicators, such as the frequency of activity, self-reported preference, or retrospective time-use reports that collapse daily experiences into broad categories (Bouisson & Swendsen, 2003; Heintzelman & King, 2019; Yoshizaki et al., 2022). These measures are prone to recall bias and treat routine as either a stable individual trait or a set of discrete events, offering limited insight into how the temporal organization of daily life (i.e., the ordering, repetition, and rhythm of activities and co-presence) shapes exposure to social environments (Cornwell, 2018).

Examining temporal organization, therefore, adds a critical dimension for evaluating whether routine reflects adaptive stability or constrained engagement. Temporal structure helps distinguish whether regularity co-occurs with varied activities and diverse social partners or instead aligns with narrowed social participation. In this sense, modeling daily routines as repeated sequences complements existing approaches by enabling meaningful data reduction while retaining the temporal structure otherwise masked in aggregate measures. This sequence approach also distinguishes activity routines from co-presence routines, two related but distinct aspects of everyday life that may differentially shape exposure to cognitive, social, and emotional contexts and, in turn, health outcomes.

The present study

Building on this approach, this study integrates ecological momentary assessments (EMA) with sequence analysis to capture daily experiences as they unfold in real time. EMA reduces recall bias and provides nuanced information on the flow of activities, locations, and co-presence partners throughout the day. We apply the Longest Common Subsequence (LCS) metric to these repeated assessments to quantify within-person regularity in weekly patterns of activities and co-presence. Drawing on 4,025 EMA observations from 253 older adults in the SECHURA study, we constructed two measures of daily *activity routine* and *co-presence routine*, which capture repetition in what older adults do and with whom their days unfold. Methodologically, this approach demonstrates how combining EMA with sequence analysis can uncover dimensions of daily life with precision unavailable in traditional time-use data. Substantively, these routine measures reflect related but distinct aspects of everyday structure and offer insight into how temporal regularity may shape access to cognitively and emotionally enriching experiences, potentially contributing to unequal pathways of aging across social strata.

Data and method

This study uses data from the Social Environment and Cognitive Health in Urban and Rural Areas (SECHURA) study, a state-representative sample of Indiana residents aged 55 and older. Respondents were recruited through probability sampling to examine how social contexts shape cognitive health in urban and rural settings. SECHURA is well-suited for this study because it collects both person-level information on social networks and repeated real-time measures of activities and interactions via ecological momentary assessments. Between November 2023 and March 2024, 510 respondents enrolled and completed a computer-assisted personal interview (CAPI) survey, which included a personal network module and questions on sociodemographic characteristics, health, and social engagement. See Roth et al. (2026) for further details on the study design.

Ecological momentary assessments

Immediately after the CAPI, respondents were invited to a week-long ecological momentary assessment (EMA) module completed via smartphone. 273 respondents (53.5%) participated in the EMA module. EMAs collect repeated self-reports of activities, interactions, settings, and subjective states in real time through short, momentary surveys (Browning et al., 2024; Roth, 2024), capturing experiences across diverse contexts while minimizing recall bias in older adults. Administered via the LifeData app, EMAs prompted respondents four times a day at random between 8:00 a.m. and 8:00 p.m., spaced at least 2 hr apart.

Analytic sample

Of the 273 respondents who provided EMAs, 18 were excluded for missing momentary reports or sociodemographic covariates. 88 EMA prompts completed more than 20 min after issuance were also removed. The construction of the Weekly Routine Index (WRI; see details below) requires at least two valid EMA days per respondent. Thus, we restricted the analysis to weekdays (Monday–Friday), because weekends differ systematically from weekdays in activity composition, social partners, and discretionary time. This yielded a final analytic sample of 253 respondents and 4,025 valid EMA observations. Respondents excluded from the analytic sample did not differ significantly from included respondents in demographic characteristics (e.g., age, gender, and race) or health status (see Table S2).

Constructing the WRI

Data structure and sequence definition

At each EMA prompt, respondents reported in real time what they were doing (activity), who they were with (co-presence), and momentary well-being, via a touchscreen within a 20-min window with three reminders at 5-min intervals. Most EMAs (84.0%) were completed in under 2 min. From these reports, we constructed two Weekly Routine Indices capturing the cross-day regularity of respondents' daily lives.

The WRI is a measure of short-term cross-day regularity in the broad temporal template of daily life. For each day, four daytime periods (8–12, 12–14, 15–17, and 18–20) were coded by the respondent's reported primary activity (e.g., working, household chores, and eating/relaxing) and co-presence (e.g., alone, spouse/partner, child, friend, and co-worker), so each day forms a short categorical sequence of length four. Using a sequence similarity approach, we compared these daily sequences across the five workdays, with higher values indicating that a person's arranged sequence on one day more closely resembles those on other days. By retaining event order rather than counts or the presence or absence of states, the WRI is sensitive to whether the same

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states recur in the same relative arrangement across days. Missing slots were treated as temporal gaps rather than substantive states, so similarity was computed only on observed information and tolerates the intermittent nonresponse common to EMA.

The co-presence item records the social partner present at the moment of the prompt (e.g., alone, spouse/partner, and friend) rather than whether an actual social interaction took place. We therefore use "social partner," "co-presence," and "partner routine" for this measure, reserving "social interaction" for the broader construct of which co-presence is an observable indicator.

We constructed activity and co-presence sequences separately for both conceptual and methodological reasons. Conceptually, these two sequence indices capture distinct aspects of daily life that may diverge in their health correlates. Methodologically, combining the categories would expand the state space to roughly 170 joint states, rendering sequence comparison unstable at our sample size. The two indices thus provide a parsimonious, yet temporally informed measure of how reliably activities and social contexts recur throughout the observation week.

Sequential similarity using the LCS

To quantify how similar a person's days were to each other, we used the Longest Common Subsequence (LCS) similarity metric (Abbott & Hrycak, 1990; Gabadinho et al., 2011). The LCS identifies the longest ordered subsequence shared between two categorical sequences (two days of activity patterns for the same individual) while allowing for positional shifts and skipped elements. This feature makes LCS particularly suitable for EMA data, which may contain irregular gaps across time slots. Unlike exact slot-matching methods, which penalize every misalignment or missing report, the LCS approach focuses on the order rather than the exact position of activities, thereby preserving meaningful within-person temporal regularity that leverages the high-frequency but incomplete nature of EMA data.

To compare two day-sequences j and k of equal sequence length $m = 4$, the LCS-based distance is defined as:

$$d_{LCS}(j,k) = m - LCS(j,k), \;\; d_{LCS} \in [0,4].$$

where $LCS(j,k)$ counts the longest ordered overlap (allowing gaps/positional shifts). This distance was converted to a normalized similarity score, ranging from 0 (completely dissimilar) to 1 (identical).

$$s_{jk} = 1 - \frac{d_{LCS}(j,k)}{m} = \frac{LCS(j,k)}{m}.$$

Pairwise LCS similarities were computed between all valid weekdays for each individual using the TraMineR package in R (Gabadinho et al., 2011). The Weekly Routine Index (WRI) for individual i was then calculated as the mean pairwise similarity across all day-pairs:

$$\mathrm{WRI}_i = \frac{2}{n_i(n_i-1)} \sum_{j<k} s_{jk},$$

where n_i is the number of valid days reported by the individual. Thus, WRI_i represents how similar a person's daily activity sequences are to one another during the week.

Worked example: distance matrix

Consider one respondent with four valid days (D1–D4). Suppose their slot-level activity sequences are:

- D1: Working, Working, Working, and Eating/Relaxing
- D2: Working, Transporting, Working, and Eating/Relaxing
- D3: Working, Transporting, Working, and Socializing
- D4: Working, Working, Working, and MISSING

Using LCS, the pairwise distance matrix (lower triangle omitted for clarity) could look like:

$$\mathrm{D} = \begin{bmatrix} 0 & 1 & 2 & 1 \\ & 0 & 1 & 2 \\ & & 0 & 2 \\ & & & 0 \end{bmatrix}.$$

- $D_{12} = 1$ This means D1 *versus* D2 share an LCS of $4 - 1 = 3$ slots in order (highly similar).
- $D_{13} = 2$ This means they share $LCS = 2$ (moderately similar).
- $D_{14} = 1$ (highly similar), $D_{23} = 1$, $D_{24} = 2$, $D_{34} = 2$.

Then, we convert the distance matrix into a similarity matrix (divide by $m = 4$ and subtract from 1).

$$\mathrm{S} = 1 - \frac{\mathrm{D}}{4} = \begin{bmatrix} 1 & 0.75 & 0.50 & 0.75 \\ & 1 & 0.75 & 0.50 \\ & & 1 & 0.50 \\ & & & 1 \end{bmatrix}.$$

With $n_i = 4$ valid days, there are $\binom{4}{2} = 6$ day-pairs. The *Weekly Routine Index* is the mean of the upper-triangle similarities:

$$\mathrm{WRI}_i = \frac{2}{n_i(n_i-1)} \sum_{j<k} s_{jk} = \frac{0.75 + 0.50 + 0.75 + 0.75 + 0.50 + 0.50}{6} = \frac{3.75}{6} \approx 0.625.$$

Interpretation of WRI: mean within-person day-to-day similarity

The WRI score summarizes temporal stability in an individual's daily life on a 0–1 scale. Higher values indicate more similar daily sequences across days, reflecting greater repetition and predictability in activities or social partners. Lower values indicate greater day-to-day variation. For example, this WRI of 0.625 above represents moderately high routine: the older adult's activities tend to follow a similar order across days, though not perfectly so.

Cognitive function, mental health, and functional constraint

We consider cognitive, mental, and functional health in relation to routine in later life. We include two cognitive measures. The Montreal Cognitive Assessment (MoCA) is a widely used screen for cognitive impairment that performs well at detecting mild

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deficits (Nasreddine et al., 2005), providing a familiar benchmark for the sample's overall cognitive level. Because the MoCA is less sensitive to variation among cognitively healthy respondents, we also include the Rey Auditory Verbal Learning Test (AVLT), a working-memory measure assessing the rate of learning that captures finer cognitive variation through five presentations of a 15-word list, each followed by recall, plus an interference list, delayed recall, and recognition (Schmidt, 1996).

Mental health was assessed by the UCLA Loneliness Scale and the Geriatric Depression Scale (GDS-15). The three-item UCLA Loneliness Scale (Russell et al., 1980) asks how often respondents feel they (a) "lack companionship," (b) "feel left out," and (c) "feel isolated from others," with responses including "hardly ever or never," "some of the time," and "often." These items had a Cronbach's alpha of 0.80. Depressive symptoms were measured using the 15-item Geriatric Depression Scale (GDS-15), a validated screen for depression in older adults (Yesavage & Sheikh, 1986). GDS-15 asks whether, in the past week, respondents (a) are basically satisfied with their life; (b) have dropped many activities and interests; (c) feel their life is empty; or (d) often get bored, among other items. GDS scores ranged from 0 to 15. Functional disability was measured using the Activities of Daily Living (ADL) scale (Huisingh-Scheetz et al., 2014). Respondents reported how much difficulty ("no difficulty," "some difficulty," or "much difficulty") they had with nine activities, including walking one block, eating, and driving. These items had a Cronbach's alpha of 0.83, and we used the mean ADL score across these items.

Social network and sociodemographic characteristics

Social network size is the total number of people that respondents nominated across five name-generating prompts (e.g., discussing important matters, health matters, spending free time, exchanging support, and experiencing problems). We also included network diversity, defined as the number of distinct relationship types in the network (e.g., spouse/partner, children, siblings, friends, and neighbors). Both size and diversity were included because smaller and less varied networks are linked to poorer health in later life (e.g., Perry et al., 2022). We also adjusted for sociodemographic characteristics: age (in decades), gender (woman/man), race (white/non-white), college degree (yes/no), employment status (working, retired, or other), marital status (married, divorced, widowed, or never married), and urbanicity (urban/rural).

Analysis strategy

Analyses proceeded in six stages, with each WRI index treated as a continuous measure of within-person routine similarity. First, we reported unweighted descriptive statistics and compared activity and co-presence routines across age groups (53–65, 66–75, and 76–85), current workers, and current retirees. Two overall Sankey diagrams were plotted to depict the sequential transitions across activities and across co-presence partners among SECHURA respondents. Second, we estimated OLS regressions of each WRI on sociodemographic covariates. Because physical constraints likely preceded routine, we included ADL as a prior covariate. Third, we estimated partial correlations between each WRI and each health measure (MoCA, working memory, loneliness, ADL), net of age, gender, race, college degree, working status, and urbanicity. Finally, because ADL is associated only with co-presence routine and cognition is associated only with activity routine, we stratified the co-presence Sankey by high (more than 1 *SD* above the mean) versus no ADL and the activity Sankey by higher versus lower working memory (1 *SD* above vs below the mean AVLT).

All estimates were weighted by the inverse probability of EMA participation to address differential selection into the module based on age, gender, race, education, employment status, EMA invitation duration, total prompt attempts, computer-use frequency, and health. Table S2 reports the comparison of the EMA sample to the full SECHURA sample on these characteristics. Unweighted estimates yielded substantively similar results and are available on request. All analyses were conducted in Stata 18 and R 4.4.

Results

Table 1 presents descriptive statistics for the analytic sample. On average, respondents were 67.1 years old ($SD = 7.6$). Nearly 69% were women, and 92% identified as White. About 48% were retired, 36% were currently working, and 44% held a college degree or higher. Cognitive functioning was relatively high (MoCA: $M = 24.8$, $SD = 3.5$; working memory: $M = 7.8$, $SD = 2.2$). Functional limitations (ADL) were modest ($M = 0.22$, $SD = 0.30$), and loneliness (UCLA) was low to moderate ($M = 1.5$, $SD = 0.6$). Respondents nominated 5.7 network members ($SD = 3.1$) on average, across about 2.1 distinct relationship types ($SD = 0.8$).

Both routine indices showed moderate variation. The Weekly Activity Routine Index averaged 0.64 ($SD = 0.11$), and the Weekly Co-presence Routine Index was slightly higher at 0.71 ($SD = 0.12$). The two were moderately correlated ($r = 0.459$, $p < .001$), indicating related but distinct facets of daily structure. Co-presence routine increased across age groups and was higher among those not working or retired ($p < .001$), whereas activity routine did not differ by work or retirement status.

Figure 1A and B display daily activity and co-presence flows across four time blocks (8–12, 12–14, 15–17, and 18–20), showing considerable temporal stability. Eating, drinking, and relaxing dominated activities and rose in the evening, followed by working and household chores earlier in the day. Being alone was the largest co-presence share and likewise rose in the evening, while spouses or partners were the most common companions throughout. Co-presence with kin, friends, coworkers, and other non-kin was infrequent and concentrated at midday.

Sociodemographic and functional correlates of routine

Table 2 presents weighted regressions of routine similarity on sociodemographic and life-course characteristics and functional limitation. Routine similarity increased with age across both indices (e.g., co-presence $b = 0.039$ per decade, $p < .05$, fully adjusted), and women showed less repetitive co-presence routine than men ($b = -0.078$, $p < .01$). Functional limitation (ADL) was

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Table 1 Sample characteristics, $N = 253$.

Variables	*M* (*SD*) or %	Range	Activity WRI		Co-presence WRI	
			M [95% CI]	*p*	*M* [95% CI]	*p*
Weekly Activity Routine Index	0.64 (0.11)	0.35–1.00				
Weekly Co-presence Routine Index	0.71 (0.12)	0.28–1.00				
Age[a]	67.11 (7.64)	53.00–88.00		.004		<.001
53–65	45.70		0.61 [0.58, 0.63]		0.66 [0.63, 0.69]	
66–75	39.84		0.66 [0.64, 0.69]		0.70 [0.66, 0.74]	
76–85	14.45		0.68 [0.62, 0.73]		0.80 [0.75, 0.85]	
Female (Ref: male)	68.75					
White (Ref: non-White)	91.80					
College degree	43.75					
Current employment status				.813		.008
Working	35.94		0.64 (0.12)		0.68 (0.12)	
Not working	64.06		0.64 (0.11)		0.73 (0.13)	
Current retirement status				.358		.009
Retired	47.66		0.65 (0.12)		0.73 (0.13)	
Not retired	52.34		0.64 (0.11)		0.69 (0.12)	
Current marital status						
Married	48.05					
Divorced or annulled	28.12					
Widowed	16.41					
Never been married	7.42					
MoCA score	24.80 (3.53)	13.64–30.00				
Working memory	7.76 (2.24)	0.00–13.40				
Activities of daily living	0.22 (0.30)	0.00–1.67				
GDS-15	2.82 (2.81)	0.00–14.00				
UCLA loneliness	1.52 (0.63)	1.00–3.00				
Social network characteristics						
Network size	5.70 (3.06)	1.00–20.00				
Number of relationship types	2.10 (0.78)	1.00–4.00				

Note. WRI = Weekly Routine Index; MoCA = Montreal Cognitive Assessment; GDS-15 = 15-item Geriatric Depression Scale; UCLA = UCLA Loneliness Scale.
[a]Age-group routine similarity means are weighted using sampling weights adjusting for selection into the EMA module (95% confidence intervals [CIs]) in brackets).

associated with more repetitive co-presence routine (b = 0.060, $p < .05$) but not activity routine. Marital status was associated specifically with the co-presence routine. Divorced (b = 0.061, $p < .05$), widowed (b = 0.117, $p < .01$), and never-married (b = 0.099, $p < .01$) respondents showed more repetitive co-presence routines than married respondents. Urbanicity, educational attainment, and retirement status were not significantly associated with routine similarity.[2]

Routine and health

Table 3 reports partial correlations between routine and the health and network measures, adjusting for age, gender, race, college education, working status, and urbanicity. Both routine measures were negatively associated with social network size (activity $r = -.24$, $p < .001$; co-presence $r = -.16$, $p < .05$) and with the number of relationship types ($r = -.26$ and $-.18$, $p < .01$), indicating that older adults with more repetitive routines maintain smaller and less diverse networks. Moreover. Both routine measures were associated with more depressive symptoms (GDS-15: $r = .21$) and with smaller, less diverse networks (network size $r = -.24$ and $-.16$; relationship types $r = -.26$ and $-.18$). The cognitive and functional associations diverged by routine type. Cognition was associated with activity routine (MoCA: $r = -.14$, $p < .05$; working memory: $r = -.17$, $p < .01$) but not co-presence routine, whereas functional limitation (ADL) showed the reverse, which was associated with co-presence routine ($r = .16$, $p < .05$) but not activity routine. This divergence indicates that the two indices may capture distinct facets of health.

Daily flows by cognitive and functional status

To illustrate this divergence, we displayed group-level daily flows, pairing each routine with the health domain most strongly associated with it. Figure 2 contrasts activity flows for the upper versus lower tail of working memory (more than 1 *SD* above vs below the mean). Figure 3 contrasts co-presence flows for respondents with (more than 1 *SD* above the mean) versus without ADL limitations.

Figure 2 reveals that higher-working-memory respondents (right panel) move through a broader mix of activities across the day (e.g., work, household tasks, and socializing) with varied transitions between blocks, whereas lower-working-memory

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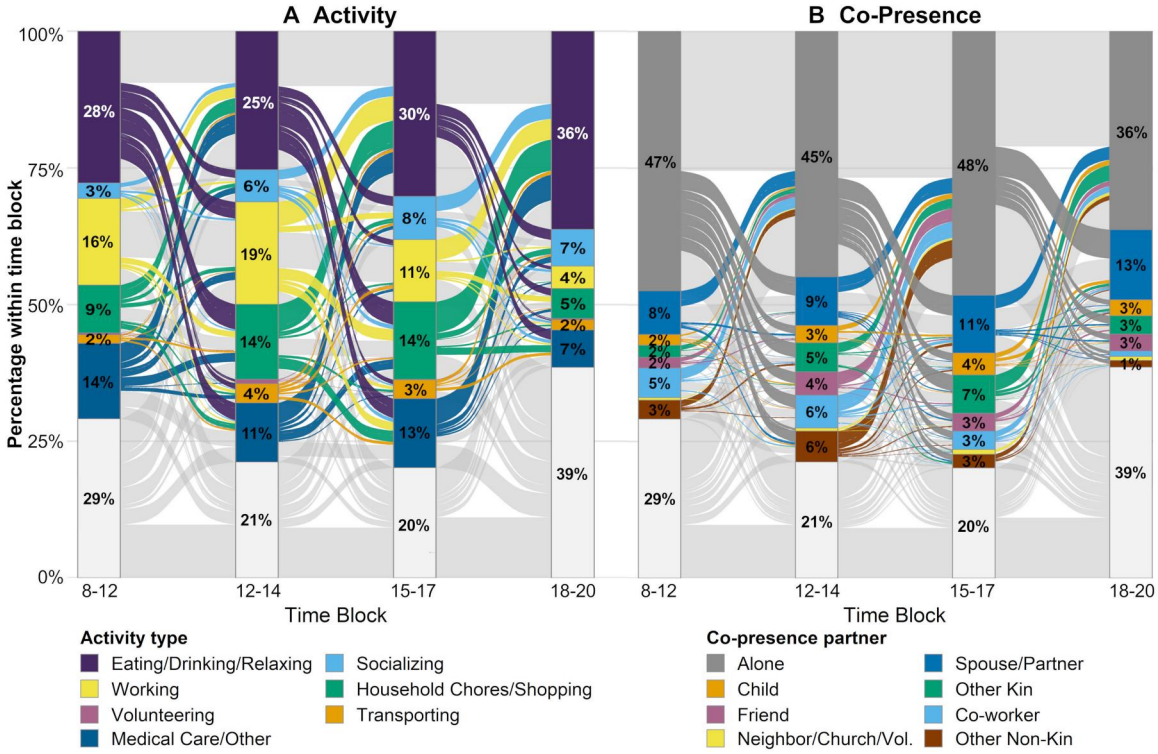


Figure 1 Daily activity and co-presence flows across time blocks in SECHURA.

The figure shows transitions across four daily time blocks (8–12, 12–14, 15–17, and 18–20) for the full analytic sample between (A) daily activities and (B) co-presence partners. Bars show the share of person-day EMA observations per block; streams show transitions between adjacent blocks. Light-gray streams = stayed in the same activity/partner into the next block; colored = switched activity/partner. White = missing; values <1% not labeled.

respondents (left panel) show narrower flows dominated by eating and relaxing, with heavier grey "stay" streams indicating repetition. Similarly, Figure 3 shows that respondents without ADL limitation (right panel) move among a wider range of partners, such as spouse, kin, and friends, while those with more limitations (left panel) spend more time alone, with partners concentrated in the household. Consistent with Table 3, lower cognition appeared as a narrowing of what people did, and greater limitation as a narrowing of whom they were with.

Supplementary and sensitivity analyses

We conducted several supplementary analyses. First, because marital status could structure the sizes and composition of older adults' everyday social activities and who is routinely co-present, we examined whether the routine–health associations for loneliness and depressive symptoms differ by marital status (Table S3). Among widowed respondents, more similar co-presence and activity routines were associated with higher loneliness, though we treat this as exploratory given the small subgroup ($n = 42$). Second, because employment externally organizes daily time and contact, we examined whether these associations differ by work and retirement status (Table S4). Again, moderation appeared only for the mental health outcomes. Among retired respondents, a higher co-presence routine was associated with more depressive symptoms ($r = .35$, $p = .026$) and greater loneliness ($r = .23$, $p = .013$). This might suggest that a repetitive social life may carry greater emotional weight once work no longer organizes daily contact. Polynomial and categorical age specifications revealed no non-linear age–routine association. Finally, we modeled selection into participation on baseline characteristics (Table S2). EMA respondents were younger, more educated, and more frequent computer users, but otherwise comparable. Unweighted estimates are substantively similar in the direction and magnitude of key estimates. We are therefore encouraged that observable selection does not drive our findings.

Discussion

This study examines how the temporal regularity of daily activities and social partners relates to cognitive and social well-being in later life using ecological momentary assessment (EMA) data. Two weekly indices capture routine within older adults' activity and co-presence sequences. Routine similarity increased modestly with age and was higher among men and unmarried respondents. It was also associated with smaller and less diverse social networks, lower cognitive performance, more functional limitations, more depressive symptoms, and higher loneliness.

Through the lens of a social enrichment perspective (Brown et al., 2023; Cheng, 2016), these results indicate that routine should not be understood as a universally adaptive strategy in later life. Instead, routine may index exposure to, or absence of, enriching experiences. Highly regular days appear to co-occur with fewer social partners and relationship types, and thus with fewer opportunities for social stimulation that sustain cognitive

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Table 2 Linear regression models predicting weekly routine similarity, $N = 253$.

Variables	Activity-based routine similarity				Co-presence-based routine similarity			
	(1)		(2)		(3)		(4)	
Age (in 10 years)	0.036**	(0.013)	0.037*	(0.015)	0.053**	(0.014)	0.039*	(0.016)
Female	−0.016	(0.020)	−0.021	(0.021)	−0.049*	(0.020)	−0.078**	(0.019)
White	0.039	(0.025)	0.040	(0.026)	0.042	(0.030)	0.050	(0.032)
Rural (Ref: urban)	−0.030†	(0.018)	−0.025	(0.018)	−0.041*	(0.021)	−0.023	(0.020)
Activities of daily living	0.031	(0.024)	0.019	(0.025)	0.079**	(0.023)	0.060*	(0.027)
College and more			−0.007	(0.018)			0.000	(0.020)
Retired (Ref: no)			−0.010	(0.019)			0.002	(0.027)
Divorced (Ref: married)			0.006	(0.021)			0.061*	(0.024)
Widowed			0.030	(0.032)			0.117**	(0.029)
Never been married			0.086*	(0.034)			0.099**	
Constant	0.378**	(0.085)	0.372**	(0.098)	0.332**	(0.087)	0.398**	(0.096)
Adjusted R^2	0.083		0.108		0.186		0.285	

Note. Estimates are weighted to adjust for selection into the EMA module relative to the full study sample. Standard errors are in parentheses.
†$p < .10$. *$p < .05$. **$p < .01$.

Table 3 Partial correlations adjusting for demographics and life-course experiences, $N = 253$.

Variables	Activity routine similarity	Co-presence routine similarity
Co-presence routine similarity	0.459***	
Montreal Cognitive Assessment (MoCA) score	−0.142*	−0.078
Working memory	−0.171**	−0.088
Activities of daily living	0.094	0.157*
15-Item Geriatric Depression Scale (GDS-15)	0.211***	0.205***
UCLA loneliness	0.122†	0.090
Network size	−0.237***	−0.162*
Diversity (relationship types)	−0.258***	−0.180**

Note. Partial correlations are adjusted for age, gender, race, college degree, working status, and urbanicity. Estimates are weighted to adjust for differential selection into the EMA subsample relative to the full study sample.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

health (Perry et al., 2022; Stern, 2006) and emotional well-being (Fingerman et al., 2020). We advance this interpretation cautiously. Because our data are cross-sectional, we cannot determine whether routine itself reduces enrichment or whether higher routine instead reflects underlying constraints, such as smaller networks and mobility limitations that shape both daily structure and health. Our findings should therefore be read as showing that highly routinized days are visible with fewer and less varied social contacts, not as evidence that routine is inherently detrimental or that disrupting it would improve health.

We also examined whether these associations differed by marital and employment status. Among widowed respondents, higher routine was associated with somewhat greater loneliness (Table S3). However, we make little of this given the small subgroup ($n = 42$), one significant coefficient of eight, and no information on time since bereavement. A clearer pattern emerged from employment. The link between co-presence routine and emotional well-being was more pronounced among retired respondents, for whom higher co-presence routine predicted more depressive symptoms and loneliness, whereas the association was null among the non-retired. Once work no longer organizes daily contact, repeatedly cycling through the same narrow social circle appears more closely tied to poorer emotional well-being, consistent with our co-presence and social-foci argument. Yet proper tests of these signals will require larger samples and longitudinal follow-up.

This study has several strengths. Especially noteworthy, it offers a novel approach that integrates sequence methods with EMA data. Real-time reporting reduces recall bias, and the sequence approach analyzes the order and rhythm of the day without collapsing activities or co-presence into broad categories. We thus show that the temporal structure of social life matters for later-life health beyond activity frequency or content.

Limitations and future directions

This study also has limitations. Although the Longest Common Subsequence metric handles missing reports by focusing on observed order, missing EMA records may still introduce bias. Future work should consider denser sampling and explicit missingness strategies. Moreover, the WRI is best understood as reflecting regularity within a single observation week of weekday reports, so routines on longer or non-daily cycles, such as weekly religious attendance or weekend gatherings, fall outside this window; collecting EMA across consecutive weeks would help separate stable rhythms from week-specific fluctuation. We also modeled activity and co-presence routines as separate indices rather than a single integrated sequence, partly due to sample constraints, but this strategy does not capture the coupling between what people do and with whom they do it. Jointly modeling both dimensions in larger samples is a useful next step.

Our data also reveal little about the origins of routine. An identical pattern may arise from freely chosen rhythms among

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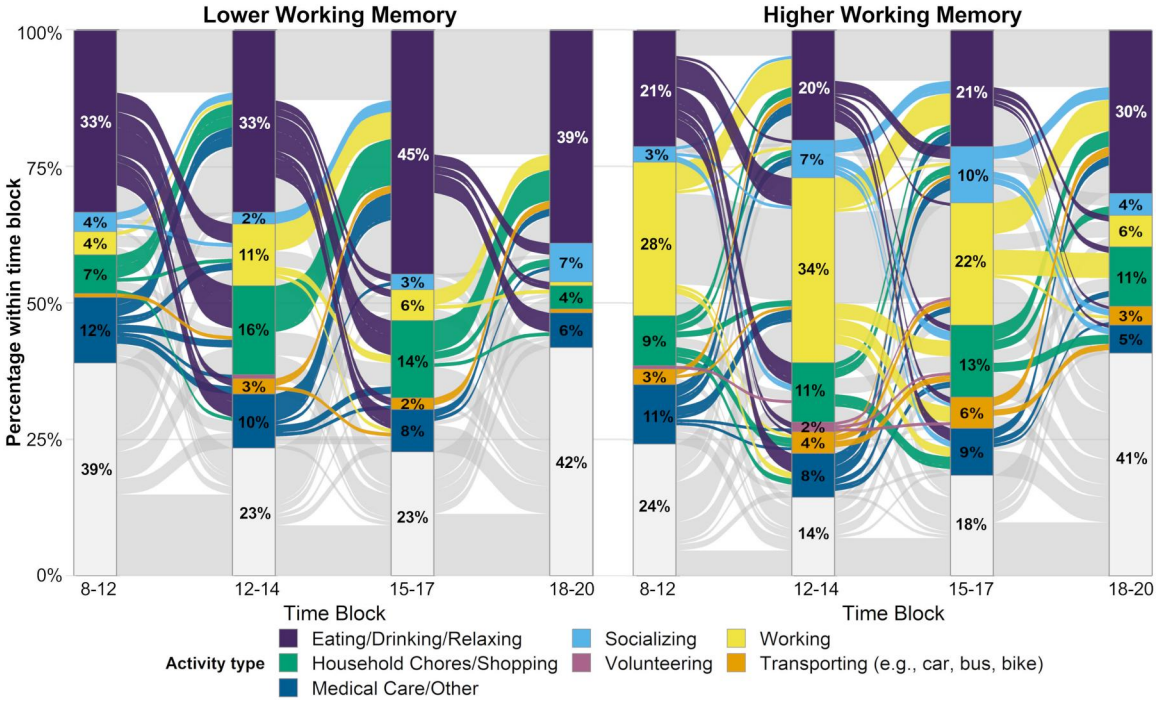


Figure 2 Daily activity flows across time blocks by working memory.

This figure shows how participants move between activity categories across four time blocks (8–12, 12–14, 15–17, and 18–20), comparing older adults with lower versus higher working memory (≤−1 *SD* vs ≥ +1 *SD* above mean). Bar heights give the share of person-day EMA observations in each activity per block. Streams show transitions. Light-gray streams = same activity into the next block; colored = activity changed. White = missing; values <1% not labeled.

the well-resourced or constrained options among those with fewer, a distinction with potentially opposite implications (Bó, 2022). Our models adjust for income, education, and related characteristics, so the associations are net of these resources, and a supplementary analysis showed that higher household income was associated with greater co-presence routine similarity at the bivariate level. Establishing these origins will require longitudinal data spanning later-life transitions. Sequential stability may also affect evaluative well-being, such as life satisfaction, as distinct from the momentary effect captured in this study; pairing sequence-based measures with evaluative outcomes is a priority for future work.

Moreover, we cannot establish causal directions between health and routine, though the associations are informative about plausible ordering. Functional limitations (ADL) are the domain most likely to precede routine, since physical constraints directly narrow feasible daily activities and encounters, and the positive ADL–routine association is consistent with constraint-driven routinization. The directions linking routine to cognition and loneliness remain genuinely ambiguous. We therefore frame our findings as associations whose most likely joint interpretation is that constrained social, health, and environmental resources shape both how routinized days are and the health outcomes we observe, rather than as evidence that routine per se erodes health.

Several sample features bound generalizability. SECHURA is drawn from a single U.S. state and skews toward women. The sample is also relatively young for a study of later-life routine (mean age about 67), and roughly half remained employed. Because work imposes a strong temporal structure, observed routines partly reflect work schedules rather than aging alone and may not extend to the oldest-old or fully retired. This may also explain why retirement status was unassociated with routine similarity after adjusting covariates, as non-retired respondents include heterogeneous work arrangements that do not uniformly regularize the daytime slots we observe. Another consideration is selection into the EMA module. Table S2 shows that EMA respondents are younger, more likely to hold a college degree, and report more frequent computer use. This pattern means that our findings underrepresent the older, less-resourced respondents who are most plausibly characterized by stable, highly routinized daily lives. Their underrepresentation would make our estimates conservative. Although inverse-probability-of-participation weights yielded results consistent with unweighted estimates, this selection on unmeasured aspects of digital literacy or social isolation cannot be ruled out.

Finally, this study has tentative policy implications. Because our analyses are associational, we frame them as hypotheses for future longitudinal or experimental work, not intervention recommendations. To the extent that routinization reflects constrained opportunity, programs expanding access to enriching contexts, such as flexible community activities, transportation, and caregiver support, may widen older adults' daily experiences. We emphasize expanding opportunity rather than disrupting routine, since stability may be valued and adaptive for many. Incorporating temporal structure into assessments of daily life could also yield early behavioral markers and help identify older adults in constrained environments who might benefit from support.

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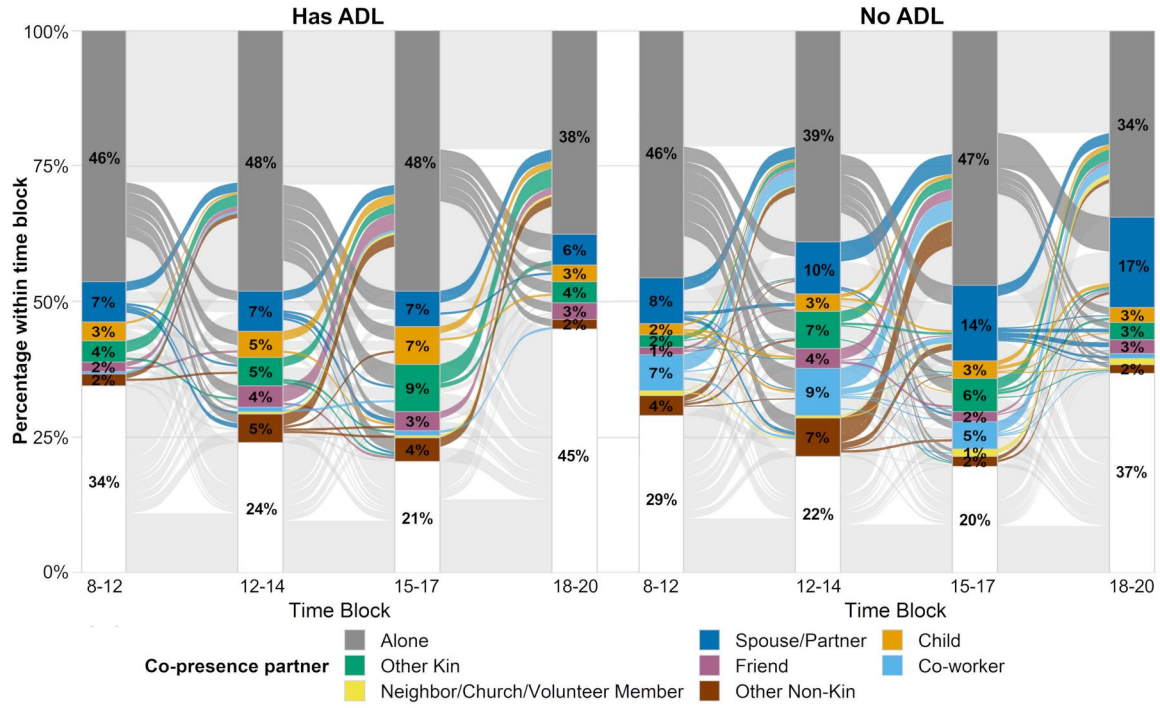


Figure 3 Daily co-presence flows across time blocks by functional health.

This figure shows how interaction partners shift across four time blocks (8–12, 12–14, 15–17, and 18–20) for older adults with versus without limitations in activities of daily living (ADL; with-limitation group ≥1 *SD* above the mean, without-limitation group = 0, right panel). Bar heights give the share of person-day EMA observations with each partner per block. Streams show transitions. Light-gray streams = same partner into the next block; colored = partner changed. White = missing; <1% not labeled.

Author notes

1. In a supplementary analysis, higher household income was associated with greater interaction-routine similarity, but this association was not statistically significant after adjusting for sociodemographic and life-course factors.
2. Retirement and working status are each significantly associated with co-presence routine until age is added to the model, after which the associations attenuate to non-significance.

Supplementary material

Supplementary material is available at *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* online.

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Conflicts of interest

A.R.R. is the organizer of the supplement in which this article is published but was not involved in the manuscript's review process or decision to accept it for publication. All other authors have no conflicts to declare.

Data availability

This study was not preregistered. The data underlying this article will be shared upon reasonable request to Adam R. Roth. Data will be made publicly available in late 2027.

Ethics approval

The SECHURA study was approved by the Institutional Review Board at Indiana University (IRB-IUB-16000) and exempted by the Institutional Review Board at Oklahoma State University (IRB-22-351).

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References

Aartsen, M. J., Smits, C. H. M., van Tilburg, T., Knipscheer, K. C. P. M., & Deeg, D. J. H. (2002). Activity in older adults: Cause or consequence of cognitive functioning? A longitudinal study on everyday activities and cognitive performance in older adults. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *57*, P153–P162. https://doi.org/10.1093/geronb/57.2.p153

Abbott, A., & Hrycak, A. (1990). Measuring resemblance in sequence data: An optimal matching analysis of musicians' careers. *American Journal of Sociology*, *96*, 144–185. https://doi.org/10.1086/229495

Åberg, A. C., Sidenvall, B., Hepworth, M., O'Reilly, K., & Lithell, H. (2004). Continuity of the self in later life: Perceptions of informal caregivers. *Qualitative Health Research*, *14*, 792–815. https://doi.org/10.1177/1049732304265854

Atchley, R. C. (1989). A continuity theory of normal aging. *The Gerontologist*, *29*, 183–190. https://doi.org/10.1093/geront/29.2.183

Bergua, V., Fabrigoule, C., Barberger-Gateau, P., Dartigues, J.-F., Swendsen, J., & Bouisson, J. (2006). Preferences for routines in older people: Associations with cognitive and psychological vulnerability. *International Journal of Geriatric Psychiatry*, *21*, 990–998. https://doi.org/10.1002/gps.1597

Bó, B. (2022). Good time, bad time: Socioeconomic status, time scarcity, and well-being in retirement. *American Journal of Sociology*, *128*, 323–364. https://doi.org/10.1086/720866

Bouisson, J., & Swendsen, J. (2003). Routinization and emotional well-being: An experience sampling investigation in an elderly French sample. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *58*, P280–P282. https://doi.org/10.1093/geronb/58.5.P280

Brown, C. J., Jeon, S., Ng, Y. T., Lee, S., Fingerman, K. L., & Charles, S. T. (2023). Switching it up: Activity diversity and cognitive functioning in later life. *Psychology and Aging*, *38*, 483–493. https://doi.org/10.1037/pag0000770

Browning, C. R., Pinchak, N. P., Calder, C. A., & Boettner, B. (2024). Leveraging experience sampling/ecological momentary assessment for sociological investigations of everyday life. *Annual Review of Sociology*, *50*, 41–59. https://doi.org/10.1146/annurev-soc-091523-013249

Cheng, S.-T. (2016). Cognitive reserve and the prevention of dementia: The role of physical and cognitive activities. *Current Psychiatry Reports*, *18*, 85. https://doi.org/10.1007/s11920-016-0721-2

Coltrane, S. (2000). Research on household labor: Modeling and measuring the social embeddedness of routine family work. *Journal of Marriage and Family*, *62*, 1208–1233. https://doi.org/10.1111/j.1741-3737.2000.01208.x

Cornwell, B. (2018). Network analysis of sequence structures. In G. Ritschard & M. Studer (Eds.), *Sequence analysis and related approaches: Innovative methods and applications* (pp. 103–120). Springer International Publishing.

Cornwell, B., Gershuny, J., & Sullivan, O. (2019). The social structure of time: Emerging trends and new directions. *Annual Review of Sociology*, *45*, 301–320. https://doi.org/10.1146/annurev-soc-073018-022416

Cornwell, B., & Laumann, E. (2018). Structure by death: Social network replenishment in the wake of confidant loss. In *Social networks and the life course: Integrating the development of human lives and social relational networks* (pp. 343–365). Cham: Springer International Publishing.

Cornwell, B., Laumann, E. O., & Schumm, L. P. (2008). The social connectedness of older adults: A national profile. *American Sociological Review*, *73*, 185–203. https://doi.org/10.1177/000312240807300201

Cumming, E., & Henry, W. E. (1961). *Growing old: The process of disengagement*. Basic Books.

Danna-Lynch, K. (2010). Switching roles: The process of mental weighing. *Poetics*, *38*, 166–184. https://doi.org/10.1016/j.poetic.2009.11.008

Dhand, A., Lang, C. E., Luke, D. A., Kim, A., Li, K., McCafferty, L., Mu, Y., Rosner, B., Feske, S. K., & Lee, J.-M. (2019). Social network mapping and functional recovery within 6 months of ischemic stroke. *Neurorehabilitation and Neural Repair*, *33*, 922–932. https://doi.org/10.1177/1545968319872994

Ellwardt, L., Wittek, R. P. M., Hawkley, L. C., & Cacioppo, J. T. (2020). Social network characteristics and their associations with stress in older adults: Closure and balance in a population-based sample. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *75*, 1573–1584. https://doi.org/10.1093/geronb/gbz035

Evans, I. E. M., Llewellyn, D. J., Matthews, F. E., Woods, R. T., Brayne, C., & Clare, L.; CFAS-Wales Research Team. (2019). Living alone and cognitive function in later life. *Archives of Gerontology and Geriatrics*, *81*, 222–233. https://doi.org/10.1016/j.archger.2018.12.014

Feld, S. L. (1981). The focused organization of social ties. *American Journal of Sociology*, *86*, 1015–1035. https://doi.org/10.1086/227352

Fiese, B. H., Tomcho, T. J., Douglas, M., Josephs, K., Poltrock, S., & Baker, T. (2002). A review of 50 years of research on naturally occurring family routines and rituals: Cause for celebration? *Journal of Family Psychology*, *16*, 381–390. https://doi.org/10.1037//0893-3200.16.4.381

Fingerman, K. L., Huo, M., Charles, S. T., & Umberson, D. J. (2020). Variety is the spice of late life: Social integration and daily activity. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *75*, 377–388. https://doi.org/10.1093/geronb/gbz007

Gabadinho, A., Ritschard, G., Müller, N. S., & Studer, M. (2011). Analyzing and Visualizing State Sequences in R with TraMineR. *Journal of Statistical Software*, *40*, 1–37. https://doi.org/10.18637/jss.v040.i04

Grandin, L. D., Alloy, L. B., & Abramson, L. Y. (2006). The social zeitgeber theory, circadian rhythms, and mood disorders:

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Review and evaluation. *Clinical Psychology Review*, *26*, 679–694. https://doi.org/10.1016/j.cpr.2006.07.001

Heintzelman, S. J., & King, L. A. (2019). Routines and meaning in life. *Personality & Social Psychology Bulletin*, *45*, 688–699. https://doi.org/10.1177/0146167218795133

Hou, W. K., Lai, F. T. T., Hougen, C., Hall, B. J., & Hobfoll, S. E. (2019). Measuring everyday processes and mechanisms of stress resilience: Development and initial validation of the Sustainability of Living Inventory (SOLI). *Psychological Assessment*, *31*, 715–729. https://doi.org/10.1037/pas0000692

Huisingh-Scheetz, M., Kocherginsky, M., Schumm, P. L., Engelman, M., McClintock, M. K., Dale, W., Magett, E., Rush, P., & Waite, L. (2014). Geriatric syndromes and functional status in NSHAP: Rationale, measurement, and preliminary findings. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *69*, S177–S190. https://doi.org/10.1093/geronb/gbu091

Lee, S., Koffer, R. E., Sprague, B. N., Charles, S. T., Ram, N., & Almeida, D. M. (2018). Activity diversity and its associations with psychological well-being across adulthood. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *73*, 985–995. https://doi.org/10.1093/geronb/gbw118

Litwin, H., & Levinson, M. (2018). The association of mobility limitation and social networks in relation to late-life activity. *Ageing and Society*, *38*, 1771–1790. https://doi.org/10.1017/S0144686X1700023X

Luo, M., Kim, E.-K., Weibel, R., Martin, M., & Röcke, C. (2025). Distance from home and working memory: Daily associations varying by neighborhood environments in community-dwelling older adults. *European Journal of Ageing*, *22*, 17. https://doi.org/10.1007/s10433-025-00841-5

Luo, M., Moulder, R. G., Breitfelder, L. K., & Röcke, C. (2023). Daily activity diversity and daily working memory in community-dwelling older adults. *Neuropsychology*, *37*, 181–193. https://doi.org/10.1037/neu0000878

Luo, M., Yordanova, K., Macdonald, B., & Hülür, G. (2024). Routineness of social interactions is associated with higher affective well-being in older adults. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *79*, gbae057. https://doi.org/10.1093/geronb/gbae057

Monk, T. H., Petrie, S. R., Hayes, A. J., & Kupfer, D. J.; New Collective Author. (1994). Regularity of daily life in relation to personality, age, gender, sleep quality and circadian rhythms. *Journal of Sleep Research*, *3*, 196–205. https://doi.org/10.1111/j.1365-2869.1994.tb00132.x

Nasreddine, Z. S., Phillips, N. A., Bédirian, V., Charbonneau, S., Whitehead, V., Collin, I., Cummings, J. L., & Chertkow, H. (2005). The Montreal cognitive assessment, MoCA: A brief screening tool for mild cognitive impairment. *Journal of the American Geriatrics Society*, *53*, 695–699. https://doi.org/10.1111/j.1532-5415.2005.53221.x

Perry, B. L., McConnell, W. R., Peng, S., Roth, A. R., Coleman, M., Manchella, M., Roessler, M., Francis, H., Sheean, H., & Apostolova, L. A. (2022). Social networks and cognitive function: An evaluation of social bridging and bonding mechanisms. *The Gerontologist*, *62*, 865–875. https://doi.org/10.1093/geront/gnab112

Pinquart, M., & Sörensen, S. (2000). Influences of socioeconomic status, social network, and competence on subjective well-being in later life: A meta-analysis. *Psychology and Aging*, *15*, 187–224. https://doi.org/10.1037//0882-7974.15.2.187

Queen, T. L., Butner, J., Berg, C. A., & Smith, J. (2019). Activity engagement among older adult spousal caregivers. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *74*, 1278–1282. https://doi.org/10.1093/geronb/gbx106

Reich, J. W., & Zautra, A. J. (1991). Analyzing the trait of routinization in older adults. *International Journal of Aging & Human Development*, *32*, 161–180. https://doi.org/10.2190/4pkr-f87m-uxeq-r5j2

Rosso, A. L., Taylor, J. A., Tabb, L. P., & Michael, Y. L. (2013). Mobility, disability, and social engagement in older adults. *Journal of Aging and Health*, *25*, 617–637. https://doi.org/10.1177/0898264313482489

Roth, A. R. (2024). Ecological momentary assessments in sociology. *Social Currents*, *11*, 103–111. https://doi.org/10.1177/23294965231203027

Roth, A. R., Peng, S., Jarin, J. N., Qu, T., Fekete, M., & Perry, B. L. (2026). Rationale and study design for the Social Environment and Cognitive Health in Urban and Rural Areas study. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, *81*, S245–S254 https://doi.org/10.1093/geronb/gbag184

Russell, D., Peplau, L. A., & Cutrona, C. E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*, *39*, 472–480. https://doi.org/10.1037//0022-3514.39.3.472

Schmidt, M. (1996). *Rey Auditory Verbal Learning Test: A handbook* (Vol. *17*). Western Psychological Services.

Stern, Y. (2006). Cognitive reserve and Alzheimer disease. *Alzheimer Disease & Associated Disorders*, *20*, 112–117. https://doi.org/10.1097/01.wad.0000213815.20177.19

Tournier, I., Mathey, S., & Postal, V. (2012). The association between routinization and cognitive resources in later life. *International Journal of Aging & Human Development*, *74*, 143–161. https://doi.org/10.2190/AG.74.2.c

van Tienoven, T. P. (2017). *Daily routines. Studying temporal structures and the organisation of everyday life* [doctoral thesis]. Department of Sociology, Vrije Universiteit Brussel.

Wang, M. (2013). *The Oxford handbook of retirement*. Oxford University Press.

Wong, J., Lu, S., Lou, Y., Zang, E., & Carr, D. (2024). A novel time use approach on daily active engagement with life: The intersectionality of race and gender. *The Gerontologist*, *65*, gnae150. https://doi.org/10.1093/geront/gnae150

Yesavage, J. A., & Sheikh, J. I. (1986). Geriatric Depression Scale (GDS): Recent evidence and development of a shorter version. *Clinical Gerontologist*, *5*, 165–173. https://doi.org/10.1300/J018v05n01_09

Yoshizaki, T., Ishihara, J., Kotemori, A., Kokubo, Y., Saito, I., Yatsuya, H., Yamagishi, K., Sawada, N., Iwasaki, M., Iso, H., & Tsugane, S; JPHC Study Group. (2022). Association between irregular daily routine and risk of incident stroke and coronary heart disease in a large Japanese population. *Scientific Reports*, *12*, 15750. https://doi.org/10.1038/s41598-022-20019-8

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