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Within-person associations between alcohol use and memory lapses among middle-aged and older adults

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Abstract

Introduction: Alcohol use has been linked to impairment in both short- and long-term measures of objective memory. However, limited research has investigated the association between alcohol use and subjective memory in everyday life. The study purpose was to investigate within- and between-person associations between daily alcohol use and prospective (i.e., forgetting an intended task) and retrospective (i.e., forgetting something learned in the past) memory lapses among middle-aged and older adults.

Methods: Participants ($n = 925$; $M_{age} = 55.2$) were non-abstaining adults from the Midlife in the United States (MIDUS) study or the MIDUS Refresher who participated in an 8-day telephone diary asking about their daily experiences.

Results: Multilevel models revealed that within-individuals, heavier-than-usual alcohol use (i.e., having more drinks than one's daily average number of drinks) was associated with greater odds of reporting any memory lapses (odds ratio [OR] 1.06; 95% confidence interval [CI] 1.01, 1.12), while associations at the between-person level were nonsignificant (OR 1.07; 95% CI 0.99, 1.16). When assessing retrospective and prospective lapses separately, alcohol use was only associated with prospective lapses and only at the between-person level (OR 1.10; 95% CI 1.01, 1.19). Finally, alcohol use was unassociated with reported irritation or interference from memory lapses ($p > 0.05$).

Discussion and Conclusions: Heavier-than-usual alcohol use may have acute effects on daily memory functioning. Future studies should assess how alcohol use relates to an individual's ability to meet daily cognitive demands, as these findings may have critical implications for harm reduction efforts targeting daily functioning among older adults.

KEYWORDS
alcohol, daily assessment, everyday memory, memory lapses, subjective memory

1 | INTRODUCTION

Alcohol use is highly prevalent, with past-year alcohol use reported by 69% of adults in the United States and by 43% of the global population aged 15+ years [1, 2]. In 2011, excessive alcohol use cost $223.5 billion in expenses related to criminal justice, health care and lost productivity in the United States [3]. There are also individual-level consequences of alcohol use, including increased risk of injuries and health conditions [4]. Compared to younger adults, older adults are particularly vulnerable to health consequences of alcohol use because of age-related physiological changes, comorbid conditions and prescription medication use [5]. Further, extensive literature has documented longitudinal associations between heavy alcohol use and increased risk of cognitive impairment and dementia in older adulthood [6].

1.1 | Alcohol use and memory

It is well established that heavy alcohol use is associated with memory impairment during intoxication, with effects ranging from mild deficits in memory at lower doses (e.g., spatial learning impairment) to 'blackouts' (i.e., alcohol-induced memory loss during drinking occasions) at higher doses [7]. However, outside of immediate intoxication, there are several gaps in our knowledge regarding associations between alcohol use and short- and long-term memory. First, findings on the effects of low-moderate alcohol use on memory once intoxication has ended have been mixed. For example, some studies have documented a neuroprotective effect of low-moderate alcohol use on memory and cognitive decline [8], while others have found no associations [9], increased risk [10] or differing risk for carriers/non-carriers of a genetic risk factor for Alzheimer's Disease [11]. While these studies examined differences in memory outcomes by average alcohol consumption, there has been little research assessing intraindividual coupling (i.e., within-person associations) of alcohol use and memory performance. Previous studies that do examine intraindividual coupling focus on the intoxication period using laboratory-based methods evaluating memory for information learned directly before or after alcohol intake (e.g., [12]), which do not reflect memory processes occurring in everyday life and thus lack ecological validity. Finally, the limited literature assessing daily-level associations between alcohol use and memory has predominantly focused on young adults (e.g., [13]). There is thus need for evaluating how intraindividual and interindividual differences in alcohol use relate to memory functioning in everyday contexts among middle-aged and older adults.

1.2 | Subjective memory

One method for assessing memory functioning in everyday life is to examine subjective memory, which refers to one's perceptions of their memory functioning [14]. Subjective memory is influenced by both exposure to memory problems and by concern about memory decline [15]. Several studies have linked poorer perceptions of memory to psychological distress and depressive symptomology [16]. Further, although correlations between subjective and objective memory are only weakly positive [17], changes in perceptions of subjective memory can reflect objective memory problems [18]. Accordingly, several studies have found associations between subjective memory impairment and risk of faster cognitive decline and future cognitive impairment [19, 20]. It would thus be informative to understand how alcohol use is linked to subjective memory, as this may have implications for both psychological and cognitive outcomes.

1.3 | Prospective and retrospective memory lapses

Subjective memory is best assessed at a daily level through reports of forgetfulness or memory lapses [21]. Daily memory lapse reports provide an ecologically valid assessment of subjective memory within a narrow time frame [22]. Memory lapses can fall into two categories: prospective and retrospective memory lapses. Prospective memory lapses refer to forgetting an intended task (e.g., appointments), while retrospective memory lapses involve forgetting something learned in the past (e.g., names) [23, 24]. Several cross-sectional and laboratory studies have documented associations between acute and chronic alcohol use and impaired prospective memory [25]. Prospective memory is highly relevant to everyday functioning, as one has to 'remember to remember' planned tasks throughout the day despite distractions and interruptions [26]. Further, prospective memory lapses can have consequences on managing instrumental activities of daily living, which often require remembering the order of events, goal-setting and monitoring health markers [27]. Accordingly, while retrospective memory lapses are reported more frequently than prospective memory lapses, prospective memory lapses are reported as being more impactful on daily life [22].

Cross-sectional surveys have found that individuals who report heavy alcohol use (>168 g/>112 g of alcohol per week for males/females) also report more prospective memory failures [28–30]. However, these studies only captured between-group differences in alcohol use and prospective memory issues and did not assess memory functioning in everyday contexts. To address this gap,

Leitz et al. assessed how acute alcohol use affected prospective memory performance in a virtual game reflecting daily prospective memory tasks. Study findings identified that the alcohol experimental group demonstrated greater impairment in prospective memory compared to the placebo group [31]. These findings were replicated by Paraskevaides et al. [32]. Another study using the same game found that heavy drinkers (scores ≥13/15 for females/males on the Alcohol Use Disorders Identification Test) performed worse on all prospective memory tasks [33]. While the 'virtual week' game provides a more ecologically valid measure of prospective memory than laboratory or cross-sectional surveys, it does not inform whether alcohol use is associated with prospective memory lapses in everyday contexts.

Further, despite the growing literature on alcohol use and deficits in subjective prospective memory, it is unclear whether alcohol use is also associated with perceptions of retrospective memory. Drinking large quantities of alcohol can lead to memory loss of events that occurred during drinking [34], and heavy drinking (7+/5+ drinks for males/females) is associated with poorer perceptions of next-day cognitive functioning (e.g., difficulty concentrating) [13]. However, it is unknown how these findings may relate to perceptions of retrospective memory lapses during or post-intoxication.

1.4 | Perceived impact

Alcohol use may also influence the perceived impact of daily memory problems. Although memory lapses are common experiences for adults of all ages [22], they may interfere with routines and be a source of worry. For instance, adults may fear that lapses are a sign of memory loss with negative consequences, including loss of independence, forgetting loved ones or cognitive impairment [35]. Accordingly, days with more memory lapses are characterised by greater negative affect and lower positive affect [22]. To date, no studies to our knowledge have tested associations between alcohol use and perceived impact of memory lapses. Memory lapses attributed to alcohol use may be perceived differently than memory lapses attributed to other sources (e.g., memory loss, busyness). Hence, it would be informative to assess if alcohol use is predictive of greater perceived impact of memory lapses.

1.5 | Current study

The current study extends previous literature using a daily diary design with a large, United States national sample to examine associations between alcohol use and subjective memory problems in everyday life. Daily diary designs reduce retrospective recall bias and allow researchers to assess the covariation of daily processes that change together in participants' everyday environments [36]. Specifically, our research aims were to: (i) examine associations between alcohol use and memory lapses; (ii) examine links between alcohol use and retrospective and prospective memory lapses; and (iii) examine associations between alcohol use and perceived impact of these memory lapses. As a secondary analysis, we also tested whether associations differed by participants' sex or age. The primary hypotheses were that: (i) individuals who report consuming more alcohol on average would report greater odds of any memory lapses (between-person); and (ii) on days when individuals consumed more alcohol than usual, they would report greater odds of any memory lapses (within-person).

2 | METHODS

2.1 | Sample and procedures

Data for the analyses are from a subsample of participants of two cohorts of the survey of Midlife in the United States (MIDUS) who were randomly selected to participate in a daily diary project ($n = 1731$). MIDUS is a cohort-sequential longitudinal study of the health and wellbeing of American adults [37]. For eight consecutive days, respondents completed short telephone interviews in 2012–2014 (cohort 1) or 2017–2019 (cohort 2) and received $25 for participation. Data collection was restricted to 8 days to limit participant burden. Interviews were conducted in the afternoon/evening, and respondents reported on alcohol use and memory lapse experiences since about the same time as the previous day.

The analytic sample in this study was restricted to 53% of participants ($n = 925$) who reported consuming alcohol during the 8 days ($M_{age} = 55$ years; range: 25–90). These respondents completed on average 7.8 of the 8 days of interviews, which resulted in 7209 interviews. Included participants were more likely to be White ($\chi^2(11723) = 12.98$; $p < 0.001$), male ($\chi^2(11731) = 58.25$; $p < 0.001$) and report a higher attained degree ($t(1728) = -8.74$; $p < 0.001$) than excluded participants. Additional demographics for the analytic sample are reported in Table 1.

2.2 | Measures

2.2.1 | Alcohol use

Alcohol use was assessed using a single variable asking participants, 'Counting a drink as a bottle of beer, a

TABLE 1 Demographics and descriptive statistics of study variables by biological sex.

Demographic characteristic	Total ($n = 925$)	Male ($n = 488$)	Female ($n = 437$)	X^2 or t
Baseline characteristics				
Age, *M* (SD)	55.2 (13.2)	55.3 (13.7)	55.1 (12.7)	−0.24
Race				9.88*
White, *n* (%)	835 (91)	440 (90)	395 (90)	
Black and/or African American, *n* (%)	32 (3.5)	12 (2)	20 (5)	
Native American or Alaska Native, *n* (%)	3 (0.3)	0 (0)	3 (1)	
Asian, *n* (%)	3 (0.3)	1 (0)	2 (0)	
Other, *n* (%)	49 (5)	32 (7)	17 (4)	
Marital status				12.26***
Married, *n* (%)	653 (71)	368 (75)	285 (65)	
Not married, *n* (%)	270 (29)	118 (24)	152 (35)	
Education				6.49
<High school degree, *n* (%)	22 (2)	9 (2)	13 (3)	
High school degree or GED, *n* (%)	126 (14)	57 (12)	69 (16)	
Some college but no degree, *n* (%)	241 (26)	128 (26)	113 (26)	
4-year college degree, *n* (%)	256 (28)	134 (27)	122 (28)	
At least some graduate school, *n* (%)	279 (30)	160 (33)	119 (27)	
Depression				3.97*
Did not meet criteria for depression, *n* (%)	834 (90)	449 (92)	385 (88)	
Met criteria for depression, *n* (%)	91 (10)	39 (8)	52 (12)	
Daily characteristics				
Average daily drinks, *M* (SD)	1.10 (1.17)	1.35 (1.34)	0.83 (0.85)	−7.15***
Average daily drinks on drinking days, *M* (SD)	1.90 (1.24)	2.13 (1.41)	1.64 (0.96)	−6.24***
Average number of drinking days, *M* (SD)	4.02 (2.52)	4.38 (2.55)	3.61 (2.43)	−4.65***
Memory lapses, *n* (%)	810 (88)	413 (85)	397 (91)	8.79**
Average daily memory lapses, *M* (SD)	0.71 (0.75)	0.65 (0.70)	0.78 (0.79)	2.77**
Average memory lapse days, *M* (SD)	3.25 (2.27)	3.05 (2.28)	3.47 (2.24)	2.85**
Irritation, *M* (SD)	2.67 (1.63)	2.54 (1.47)	2.82 (1.77)	2.43*
Interference, *M* (SD)	1.48 (0.87)	1.45 (0.82)	1.51 (0.92)	1.07
Prospective memory lapses, *n* (%)	635 (69)	310 (64)	325 (74)	13.00***
Average daily prospective lapses, *M* (SD)	0.29 (0.37)	0.25 (0.34)	0.33 (0.40)	3.53***
Irritation, *M* (SD)	2.55 (1.65)	2.43 (1.54)	2.67 (1.75)	1.82
Interference, *M* (SD)	1.53 (1.08)	1.53 (1.08)	1.54 (1.07)	0.14
Retrospective lapses, *n* (%)	720 (78)	370 (76)	350 (80)	2.44
Average daily retrospective lapses, *M* (SD)	0.42 (0.47)	0.40 (0.46)	0.45 (0.48)	1.56
Irritation, *M* (SD)	2.77 (1.80)	2.65 (1.68)	2.91 (1.92)	1.92
Interference, *M* (SD)	1.51 (0.97)	1.45 (0.86)	1.58 (1.08)	1.70

*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

glass of wine, or shot of liquor, how many drinks did you have since we spoke yesterday?' ($M = 1.09$, SD = 1.58, range: 0–16). On average, participants reported a daily average of 1.10 drinks (SD = 1.17; range: 0.06–11.63).

2.2.2 | Memory lapses

Memory lapses were assessed with nine items modelled after the Daily Memory Lapses checklist [22]. Prospective memory lapses were represented by lapses for errands/

chores, taking medications, finishing activities, attending events and reasons for entering a room. Retrospective memory lapses were represented by lapses for names, where something was put, words and information. Participants who endorsed any of the items were coded as having experienced at least one memory lapse since this time yesterday (0 = no; 1 = yes). Eighty-eight percent of the sample reported at least one memory lapse during the study period ($n = 810$). After each reported memory lapse, participants indicated perceived impact through level of irritation ('How much does forgetting [event] bother you now?'; range = 1 [not at all]–10 [very much]) and interference with daily routine ('How much did forgetting [event] interfere with your schedule?'; range = 1 [not at all]–10 [very much]).

2.2.3 | Covariates

Several covariates linked with alcohol use and subjective memory were assessed via self-reports. Older age predicts reporting more memory lapses [22], and poorer perceived memory is linked to depressive symptomology [16]. Being male, White, having higher education and being unmarried are associated with unhealthy drinking among older adults [38]. Covariates thus included sex (1 = male; 0 = female), age (mean-centred), race (1 = white; 0 = others), marital status (1 = married; 0 = not married) and education (1 = less than high school degree; 2 = high school degree/general equivalency diploma ('GED'); 3 = some college; 4 = 4-year college degree; 5 = graduate school). Depression (1 = met criteria; 0 = did not meet criteria) was measured using the Composite International Diagnostic Interview Short Form [39]. Overall cognitive functioning was assessed using a standardised composite score ($M = 0$, SD = 1) from the Brief Test of Alcohol Cognition by Telephone [40]. There were no differences in sex, race, education, depression or marital status between the two cohorts ($p > 0.05$). However, cohort 2 was older than cohort 1 ($p < 0.001$) and had poorer overall cognitive functioning ($p < 0.001$).

2.3 | Statistical analysis

Multilevel regression models were used to examine day-level associations using SASv9.4. Level 1 variables consisted of alcohol use and memory lapse variables nested within the Level 2 variables (e.g., sex). Within-person alcohol use was calculated by subtracting one's daily average number of drinks across the study period from their number of drinks that day. Between-person alcohol use was calculated by subtracting the sample's daily average number of drinks across the study period from one's daily average number of drinks. To address Aim 1, we fit a conditional multilevel logistic model testing associations between level of alcohol use and odds of memory lapses. For Aim 2, we used two multilevel logistic regression models to evaluate associations between level of alcohol use and odds of experiencing prospective and retrospective memory lapses separately. To address Aim 3, we used multilevel linear regression models to examine associations between level of alcohol use and perceptions of irritation and interference, which were person-mean centred in all analyses.

We also performed secondary analyses to test cross-level interactions between level of alcohol use and moderators (sex, age). Age was continuous and mean-centred for all analyses. For example, we specified the following multilevel model:

Level 1: $\text{Logit (Odds of Memory Lapse}_{ij}) = \beta_{0j} + \beta_{1j} (\text{Within-Person Alcohol Use})_{ij} + e_{ij}$.

Level 2: $\beta_{0j} = \gamma_{00} + \gamma_{01} (\text{Between-Person Alcohol Use})_j + \gamma_{02} (\text{Sex})_j + \gamma_{03} (\text{Race})_j + \gamma_{04} (\text{Education})_j + \gamma_{05} (\text{Age})_j + \gamma_{06} (\text{Marital Status})_j + \gamma_{07} (\text{Depression})_j + \gamma_{08} (\text{Cognitive Functioning})_j + U_{0j}$.

$\beta_{1j} = \gamma_{10} + \gamma_{11} (\text{Sex})_j + U_{1j}$.

Here, person j's odds of experiencing a memory lapse are a function of their reported number of drinks consumed that day (Within-Person), average number of drinks consumed across the study period (Between-Person) and covariates. Furthermore, the relationship between reported number of drinks consumed that day and odds of memory lapses is tested for moderation by the person's sex. All models included random effects for the intercept; moreover, likelihood ratio tests were used to evaluate the appropriateness of including a random slope for alcohol use in the models.

3 | RESULTS

3.1 | Demographics and descriptive statistics

Descriptive information are summarised in Table 1. Participants were on average 55.2 years old (SD = 13.2), 53% male and 91% White. On average, males compared to females reported fewer memory lapse days ($t(922) = 2.85$; $p = 0.004$), lower daily average memory lapses ($t(922) = 2.79$; $p = 0.005$), more alcohol use days ($t(923) = -4.65$; $p < 0.001$) and higher daily average alcohol use ($t(923) = -7.15$; $p < 0.001$).

3.2 | Alcohol use and memory lapses

Table 2 summarises the relationships between alcohol use and memory lapses (Aim 1). Within-person alcohol use significantly predicted odds of memory lapses (odds ratio

TABLE 2 Multilevel logistic regression predicting any memory lapses from alcohol use.

	Model 1		
	OR (95% CI)	SE	*p*-value
Level 1			
Within-person alcohol use	1.06 (1.01, 1.12)	0.03	0.014
Level 2			
Sex (1 = male)	0.72 (0.60, 0.87)	0.10	<0.001
Race (1 = White)	1.03 (0.76, 1.44)	0.16	0.778
Education	1.05 (1.12, 1.34)	0.05	<0.001
Age	1.22 (1.00, 1.01)	0.004	0.091
Cognitive functioning	1.01 (0.89, 1.16)	0.07	0.789
Marital status (1 = married)	1.02 (0.95, 1.43)	0.10	0.139
Depression (1 = met criteria)	1.17 (1.23, 2.28)	0.16	0.001
Between-person alcohol use	1.07 (0.99, 1.16)	0.04	0.100
Random effect (estimate)			
Intercept	1.17	0.10	
$-2LL$	29284.65		

Abbreviations: CI, confidence interval; OR, odds ratio.

[OR] 1.06; $p = 0.014$). Within-person results indicated when participants consumed more than their daily average number of drinks, every drink increase above their average was associated with 6% greater odds of reporting a memory lapse during that same reporting period. There were no significant differences in odds of memory lapses for individuals who consumed more than the sample average number of daily drinks across the study period (OR 1.07, 95% confidence interval [CI] 0.99, 1.16). There was not a significant difference between the within- and between-person daily drinks slopes ($b = -0.01$; SE = 0.05; $p = 0.923$). Model fit tests indicated that including the random slope did not significantly improve the model fit (χ^2_{diff} (2) = 0.1, $p > 0.05$), so the random slope was not included in any further models.

3.3 | Prospective and retrospective memory lapses

Table 3 summarises the findings of models predicting prospective and retrospective memory lapses. For prospective memory lapses (Model 2), only between-person differences in level of alcohol use were predictive of odds of experiencing prospective memory lapses. Specifically, individuals who reported consuming more drinks than the group-average reported greater odds of experiencing prospective memory lapses (OR 1.10; 95% CI 1.01, 1.19). As depicted in Model 3, neither within- nor between-person measures of alcohol consumption were predictive of retrospective memory lapses.

3.4 | Perceived irritation and interference from memory lapses

Table 4 summarises the findings of the models predicting perceived impact of memory lapses. Neither the within- nor between-person measures of alcohol consumption were associated with reported irritation or interference from memory lapse experiences.

3.5 | Secondary analyses

Finally, the secondary tests of moderation are summarised in Table S1, Supporting Information. The main effect of sex (Model 6) was significantly predictive of odds of memory lapses (OR 0.72; 95% CI 0.60, 0.87), such that on average, males demonstrated 28% reduced odds of experiencing a memory lapse compared to females. However, sex did not moderate the effect of daily drinking on memory lapses ($OR_{males} = 1.055$; $OR_{females} = 1.069$). Regarding age (Model 7), neither the main effect of age (OR 1.01; 95% CI 1.00, 1.01) nor the age moderation effect ($b = 0.00$; SE = 0.002) were significantly predictive of odds of memory lapses.

4 | DISCUSSION

The current study examined within- and between-person associations between level of alcohol use and memory lapses in a national sample of midlife and older adults. Study findings support a within-person covariation of alcohol use and memory lapses. At the daily-level, individuals were more likely to report memory lapses on days they consumed more alcohol than usual. At the person-level, individuals who consumed more alcohol relative to others were more likely to report prospective memory lapses. Neither within- nor between-person alcohol use was associated with perceived irritation or interference from memory lapses. Finally, the associations between alcohol use and memory lapses did not differ by sex or age.

Study findings identified that individuals are more likely to report memory lapses on days they report

TABLE 3 Multilevel logistic regression predicting prospective and retrospective memory lapses from alcohol use.

	Model 2: prospective memory lapses			Model 3: retrospective memory lapses		
Parameter	**OR (95% CI)**	**SE**	***p*-value**	**OR (95% CI)**	**SE**	***p*-value**
Level 1						
Within-person alcohol use	1.02 (0.96, 1.08)	0.03	0.496	1.05 (0.99, 1.10)	0.03	0.090
Level 2						
Sex (1 = male)	0.67 (0.55, 0.81)	0.10	<0.001	0.79 (0.65, 0.96)	0.10	0.016
Race (1 = White)	0.92 (0.67, 1.26)	0.16	0.595	1.00 (0.73, 1.39)	0.16	0.988
Education	1.14 (1.04, 1.25)	0.05	0.005	1.22 (1.11, 1.34)	0.05	<0.001
Age	1.00 (0.99, 1.00)	0.004	0.176	1.01 (1.00, 1.02)	0.004	0.016
Marital status (1 = married)	1.11 (0.91, 1.37)	0.11	0.305	1.13 (0.92, 1.39)	0.11	0.252
Depression (1 = met criteria)	1.69 (1.26, 2.29)	0.15	<0.001	1.61 (1.18, 2.20)	0.16	0.003
Cognitive functioning	0.98 (0.86, 1.12)	0.07	0.728	1.03 (0.90, 1.17)	0.07	0.704
Between-person alcohol use	1.10 (1.01, 1.19)	0.04	0.022	1.05 (0.97, 1.14)	0.04	0.204
Random effect (estimate)						
Intercept	0.96	0.09		1.15	0.10	
$-2LL$	30850.82			29943.19		

Abbreviations: CI, confidence interval; OR, odds ratio.

TABLE 4 Multilevel linear regression predicting perceived irritation and interference of memory lapses from alcohol use.

	Model 4: irritation			Model 5: interference		
Parameter	**Estimate**	**SE**	***p*-value**	**Estimate**	**SE**	***p*-value**
Level 1						
Within-person alcohol use	−0.02	0.03	0.553	−0.02	0.02	0.390
Level 2						
Sex (1 = male)	−0.24	0.11	0.038	−0.04	0.06	0.543
Race (1 = White)	−0.39	0.19	0.043	−0.34	0.11	0.001
Education	−0.03	0.05	0.565	0.04	0.03	0.236
Age	−0.01	0.005	0.102	−0.01	0.002	0.002
Cognitive functioning	−0.15	0.08	0.055	−0.12	0.04	0.004
Marital status (1 = married)	−0.03	0.12	0.815	−0.00	0.07	0.993
Depression (1 = met criteria)	0.41	0.18	0.021	0.32	0.10	0.001
Between-person alcohol use	−0.01	0.05	0.756	0.03	0.03	0.377
Random effect						
Intercept	1.48			0.34		
Residual	2.34			1.07		
$-2LL$	11419.6			8885.6		

consuming more alcohol than usual. Accordingly, providers should assess changes in daily alcohol use among patients reporting complaints of memory lapses, as poorer perceptions of subjective memory are associated with cognitive decline and future cognitive impairment [19, 20]. Further, evidence of associations between alcohol use and memory lapses can be incorporated into motivational interventions to emphasise the potential risks of drinking more than usual. Surprisingly, individuals who consumed more than the sample average did not report greater odds of memory lapses. Since reporting memory lapses requires recalling forgotten information, and heavy alcohol use is associated with short-term cognitive impairment [34], it may be that individuals who

consumed more alcohol than the sample average also remembered fewer of their memory lapses. Alternatively, combining the two types of lapses might have obscured the relationship, as overall daily alcohol use was separately related to prospective but not retrospective memory lapses, which suggests a degree of specificity for the impact of alcohol use on daily memory functioning.

Next, between-person differences in alcohol consumption were associated with increased odds of experiencing prospective memory lapses, which is consistent with existing laboratory and survey studies reporting associations between alcohol use and impairments in subjective prospective memory [28, 41]. Since prospective memory is essential for 'remembering to remember' planned tasks throughout the day, increased likelihood of prospective memory lapses with overall alcohol use could have significant implications for aging adults who have to manage instrumental activities of daily living [27]. However, the alcohol use measures were not associated with retrospective memory lapses. Based on these findings, it does not appear that alcohol use is linked to the recollection of memory lapses around previously learned information; however, these null findings should be interpreted cautiously.

Finally, neither within- nor between-person alcohol use was associated with perceived irritation or interference from memory lapses. Importantly, since the memory lapses were impactful enough to be recalled at the time of interview, this null finding should be interpreted cautiously. For example, instead of suggesting that memory lapses are not more disruptive or irritating during times of alcohol use, the null finding may instead suggest memory lapses are disruptive and irritating regardless of a precipitating event that increases their likelihood (in this case alcohol use). Future research should thus further evaluate the psychological impacts of these memory lapse experiences in general, as well as in the context of one's alcohol use.

4.1 | Limitations and strengths

Several study limitations should be noted. The MIDUS sample is predominately White, so the findings have limited generalisability to more diverse samples. The daily diary was also limited to participants' experiences over an 8-day period, which may not adequately capture the overall alcohol use patterns of individual participants. We can position this 8-day period as a random sample of daily experiences in each participant's life. Viewed this way, and in light of the large sample size and number of interview days, we expect to capture a range of typical experiences for the vast majority of participants. Regardless, future research should assess these associations for a longer duration of time.

Another limitation is that participants reported both alcohol use and memory lapses in one survey at the end of each day during the study period. Accordingly, the directionality of the associations is unclear, as participants may report experiences from today or after the prior day's interview. In other words, participants may have been more likely to drink more than usual on days with other negative experiences (e.g., stressors), including more memory lapses. Future daily diary research with additional information on the timing of events can utilise lagged analysis to assess how yesterday's alcohol use relates to today's experiences of memory lapses. Similarly, although end-of-day recall reduces retrospective recall bias, methods that survey participants multiple times per day (e.g., ecological momentary assessment) would allow for a better assessment of the ordering of events and further reduce the amount of information that participants are recalling. Moreover, in light of prior findings that individuals who consume heavier amounts of alcohol [29] and individuals with greater alcohol use severity performed worse on prospective memory tasks [33], it may be useful to explore multiple indices of alcohol use (e.g., binge drinking, alcohol use severity, or meeting criteria for alcohol use disorder) in future work exploring the role of alcohol use and memory lapses. Relatedly, although we included only individuals who reported at least one drinking day during the data collection period, all days (regardless of whether drinking occurred) were included in analyses to capture as many days as possible in this brief data capture period. While generally consistent results were found when using a dichotomous indicator of whether drinking occurred, it would be useful for future work using a larger data capture period to examine associations among only drinking days. Finally, the measures may have been influenced by social desirability biases, such that participants may have under-reported quantity of alcohol use and experiences of memory lapses.

5 | CONCLUSIONS

Limited research has evaluated how alcohol use is related to one's perceptions of their memory functioning, especially in everyday life. Study findings suggest a within-person coupling of alcohol use and experiences of memory lapses that warrants further exploration. In particular, days with heavier-than-usual alcohol use were associated with participants reporting greater odds of any memory lapses, and individuals who reported consuming more alcohol on average than others were more likely to

report prospective memory lapses. This suggests that even among a relatively light-drinking sample, alcohol use is related to perceptions of poorer daily memory functioning in everyday contexts, which may have implications for psychological distress and one's ability to meet daily cognitive demands.

AUTHOR CONTRIBUTIONS

Each author certifies that their contribution to this work meets the standards of the International Committee of Medical Journal Editors.

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CONFLICT OF INTEREST STATEMENT

None to declare.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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