Feasibility and Utility of Experience Sampling to Assess Alcohol Consumption Among Older Adults

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Abstract

In the literature on alcohol use and aging, drinking has often been conceptualized as a means of coping with negative feelings, such as stress, yet much of the literature on older adults and drinking has utilized cross-sectional or other data ill-suited for exploring dynamic processes. Experience sampling methods have the ability to measure and analyze dynamic processes in real time, such as relations between alcohol use and mood states. Nonetheless, these approaches are intensive and may burden respondents. Therefore, this study evaluated the feasibility, acceptability, and validity of a modified daily diary to measure alcohol use and explored alternate methods of collecting diary data. Findings suggest that a modified diary was acceptable and not burdensome. Respondents were reluctant to consider technology (e.g., cellphone)-based means of data collection. Measures of alcohol use showed little within-person variation suggesting that for those who drink at all, drinking is a daily habit.

Alcohol use among older adults is often conceptualized as a means of coping with painful life experiences such as losses related to aging and other forms of psychological distress (Blazer & Wu, 2009; Finney & Moos, 1984; Folkman, Bernstein, & Lazarus, 1987; Hunter & Gillen, 2006). The underlying thinking is that alcohol use occurs as a reaction to painful experiences and emotions. Two theories embody this approach to alcohol use: the self-medication hypothesis (Khantzian, 1985) and tension reduction theory (Cappell & Herman, 1972); they have provided a foundation for research on alcohol use among older adults including epidemiology (Platt, Solan, & Costanzo, 2010), treatment (Moos, 2007), and measurement (Blow et al., 1992). Research on the role of negative affective states in

drinking is long-standing but has been methodologically limited by cross-sectional or lengthy and burdensome longitudinal study designs.

Experience sampling (ES) methods are intensive longitudinal designs that involve multiple data collection points over hours or days. Methods for ES vary from paper-based diaries completed by research participants to electronic means for capturing data on a moment-to-moment basis (i.e., ecological momentary assessment). ES methods enable researchers to understand dynamic processes that unfold over shorter time frames than traditional longer-term longitudinal surveys. We sought to explore and test the feasibility of ES using a modified daily diary approach.

Background: Alcohol Use and Older Adults

Unhealthy alcohol use is a significant public health concern (Bartels, Blow, Brockmann, & Van Citters, 2005) for older adults. Heavy drinking among older adults is associated with increased risk of mortality (Holahan et al., 2010), stroke (Bazzano et al., 2007), injury (Sorock, Chen, Gonzalgo, & Baker, 2006), and memory impairment (Hendrie, Gao, Hall, Hui, & Unverzagt, 1996; Perreira & Sloan, 2001). Even moderate use of alcohol and certain medications may put older adults at risk (Moore, Whiteman, & Ward, 2007). Moreover, older adults may have medical conditions where the use of alcohol is contraindicated (Moore, Beck, Babor, Hays, & Reuben, 2002) Still, it is unclear the extent to which alcohol and medication co-use leads to clinically significant effects among low-risk drinkers who take medications as prescribed (Mallet, Spinewine, & Huang, 2007).

In a recent national survey, of those age 65 and older, 13% of men and 8% of women reported at-risk alcohol consumption and 14% of men and 3% of women reported binge drinking (Blazer & Wu, 2009). Rates of substance use disorders (Han, Gfroerer, Colliver, & Penne, 2009), past-year treatment (Sacco, Kuerbis, Goge, & Bucholz, 2013), and need for treatment (Gfroerer, Penne, Pemberton, & Folsom, 2003) among older adults are projected to increase in coming years as well. A plurality of approaches to treating older adults with alcohol-related problems has shown positive outcomes (Kuerbis & Sacco, 2013; Outlaw et al., 2012; Schonfeld et al., 2010).

There are, however, many older adults who consume alcohol regularly at a moderate level without experiencing negative effects (Sacco, Bucholz, & Spitznagel, 2009). In fact, moderate alcohol consumption may be associated with better health (Balsa, Homer, Fleming, & French, 2008; Mukamal, Robbins, Cauley, Kern, & Siscovick, 2007) and lower mortality (Klatsky & Udaltsova, 2007; Lee et al., 2009).

To determine drinking patterns, most studies in this area have used retrospective measurement that has numerous limitations. Those who drink infrequently may overreport their consumption, and heavy drinkers tend to underreport their consumption (Leigh, Gillmore, & Morrison, 1998; O'Hare, 1991; Townshend & Duka, 2002). When asked to recall affective states and thoughts, participant responses may involve recall bias influenced by their current emotional state (Ready, Weinberger, & Jones, 2007). Among older adults, the presence of cognitive impairments may also contribute to problems with recall that may impact the reliability of data.

ES methods offer an alternative approach to measuring drinking patterns; often described as intensive longitudinal design, in ES studies, a single construct (e.g., mood) is measured repeatedly either at regular time intervals or random times. ES methods move beyond simply testing the association between major depression and drinking because they capture within-person variation (e.g., does being lonely on a given day lead to consumption on that day) and allow investigators to assess between-person variation, in essence adjusting for within-person variation (e.g., does loneliness account for the variation in drinking between people).

Experience Sampling Methods

ES has been used extensively in studies of alcohol use among younger age groups (Leigh, 2000) and has been shown to be feasible among older adults (Cain, Depp, & Jeste, 2009). Nonetheless, ES approaches can be burdensome to research participants depending on the method. For example, older adults may find it difficult to respond to daily interactive voice response systems over the telephone. Paper diaries are inexpensive but present compliance issues with the requirement of completing multiple forms each day. This burden may lead participants to complete their responses at one time—either at the beginning or the end of the study (Litcher-Kelly, Kellerman, Hanauer, & Stone, 2007). Electronic means of collecting daily diary data, such as use of personal data assistants (PDAs), may outperform paper-based approaches in health-related studies for the general population (Dale & Hagen, 2007) but have challenges including the cost of electronic tools and data management (e.g., data loss due to hardware or software problems; Dale & Hagen, 2007).

Research suggests that respondents prefer to use electronic means over paper and pencil diaries, but the use of electronic diaries with older adult populations is an emerging approach and is relatively uncommon in studies with individuals over 75 (Cain et al., 2009). Although ES methods are a potentially powerful approach to research on drinking among older adults, the acceptability and feasibility of these approaches are relatively unexamined. In this study, we sought to explore one ES approach with three specific aims: (1) to evaluate the feasibility and acceptability of using a modified daily diary to measure alcohol use and daily variation in stress and mood, (2) to assess the concurrent validity of a modified diary method with a retrospective risk measure and measures of at-risk drinking, and (3) to explore the perceived acceptability of electronic means of data collection in a sample of older adults.

Method

Study Site

This study was conducted at a Continuing Care Retirement Community (CCRC) located in Maryland. This site was selected because the social context of drinking among the residents of the CCRC was fairly consistent as was the level of resident functioning. Similarly, we were aware that a plurality of residents identified as current drinkers. It was also appropriate because we were interested in the relationship between alcohol use, stress, and daily living in the context of a CCRC. The study was approved by a university Institutional Review Board.

Sample

We collaborated with the CCRC to recruit residents who consumed at least one drink in the past 2 weeks. Study personnel contacted residents, invited them to participate, obtained consent, and enrolled them into the study. Inclusion criteria included residing in independent living, ability to speak and hear over the phone, English proficiency, and lack of significant dementia. Dementia was assessed using the Mini-Cog screen (Borson, Scanlan, Chen, & Ganguli, 2003).

A total of 65 individuals were contacted by a licensed social worker with extensive experience as an interviewer. Under a Health Insurance Portability and Accountability Act (HIPAA) waiver, names of participants were identified by the primary care provider (PCP) as likely to be eligible. Among these individuals, 20 were not eligible to participate as they were nondrinkers ($n = 14$; 22%), could not hear or speak over the phone ($n = 2$; 3%), were not currently residing within independent living ($n = 3$; 5%), or were residing with a study participant ($n = 1$; 2%). Of the 45 eligible participants, 25 (56%) consented to participate, 11 individuals (25%) were not interested in participating, and 9 (24%) were unreachable by phone.

The demographic profile of the sample reflected that of CCRC residents (see Table 1). The average age of residents was 86 ($SD = 6.0$), and all the respondents had a college education or more. More than half of individuals were currently married and almost a third were widowed. These demographic characteristics approximate those of CCRC residents nationally but differ in certain respects. The average age of CCRC residents nationally is 84 years, 21% of residents are married and 23% of residents are male (Coe & Boyle, 2013). The difference may be a result of distinct profiles for current drinkers versus the overall population of CCRCs. For example, older men are more likely than women to be past-year consumers of alcohol (Moore et al., 2009). Of the 25 people in the study, 12% displayed significant depressive symptoms and a very small percentage (4%) were hazardous drinkers based on the Alcohol Use Disorders Identification Test (AUDIT) screening instrument.

Procedure

The study was conducted in three parts (see Figure 1). An initial in-person survey was completed that included sociodemographic information, the SF-12 Health Survey (Ware, Kosinski, & Keller, 1996), AUDIT (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001), and the Geriatric Depression Scale (GDS; Brink et al., 1982). Next, for 7 days, participants were surveyed via telephone about their alcohol consumption from the previous day including type of alcohol consumed, number of drinks, whether they were alone, when they drank, and the setting for alcohol consumption (i.e., at home, somewhere in the facility, or in the community).

Members of the research team, including MSW and PhD student trainees, conducted the phone interviews. In most cases, the same caller would contact the respondent each day. During the initial interview, a convenient time for the phone call was arranged with the participant, typically in the midmorning. If the interviewer was unable to contact the resident on the first call attempt, a phone message was left with a follow-up time. A total of three

attempts were made to reach the participant on a given day. If the interviewer was unable to contact after three attempts, no further attempts were made. During the daily phone calls, five-point Likert-scaled items were administered that focused on mood, stress level, and sleep problems during the previous day. After seven days of daily diary reports, participants took part in an open-ended qualitative interview focused on the acceptability and burden of the protocol as well as potential alternative approaches for data collection (e.g., interactive voice response and mobile devices).

Analysis

Univariate analysis of daily mood items and alcohol consumption were calculated to assess variation across the 7 days. Interclass correlation coefficients (ICC) were computed to assess the relationship of within- to between-person variation on constructs of interest. To assess the concurrent validity of retrospective data with daily diary reports, we conducted bivariate analysis of time-varying measures (e.g., Likert-scaled mood items) with retrospective measures (e.g., GDS) and alcohol consumption with AUDIT scores. To achieve this, we used multilevel models with a single predictor (e.g., each mood item predicting GDS score) to explore relations between time-varying daily diary items and invariant measures of related constructs. Quantitative data analysis was conducted using SAS 9.2 (SAS Institute, 2008) and STATA (Statacorp, 2011). Qualitative data were recorded, transcribed, and analyzed separately by two researchers. Major themes were identified independently, compared, and reconciled by the study team.

Results

Average alcohol use was approximately one drink per day (see Table 1), but variability was present among the participants in their levels of average consumption over the 7 days (see Figure 2). Across the 7-day ES period, people's stress level and mood varied but alcohol use was consistent (see Figure 3). ICCs suggest that within-person variability was higher for questions related to affect and mood than for those on drinking (see Table 2). Between 16% (stress) and 47% (loneliness) of the variance was explained by between-person variance in the mood and sleep items. Most of the variation in alcohol consumption and drinking alone was explained by differences between people; older adults drank in consistent ways during the data collection period, with some older adults drinking more than others but little binge drinking.

Concurrent Validity

AUDIT scores were significantly associated with daily reports of total drinks consumed during the day and drinking when alone (see Table 2). Conversely, measures of daily distress were not significantly associated with overall GDS score, but relationships were in the expected direction (e.g., daily loneliness was associated with higher GDS) and significant at $p < .10$.

Acceptability and Burden

Participants reported that the modified daily diary method was convenient, especially for those with physical limitations. Participants preferred to be called the next day rather than at

the end of their day and most reported no associated burden. Electronic daily diary collection, including e-mail or use of a touchscreen device was seen as problematic by participants. Many indicated a lack of familiarity with the technology:

> That's sort of a routine that would be good for younger people, who are computer-oriented. I'm not. I'm oriented to reading the newspapers, reading books, getting news, television …

Participants indicated that daily phone calls are advantageous as they afford an opportunity to develop a rapport. This may allow participants to be more forthcoming:

> Well if you use an automated…, where one of these canned voices that we're now learning to be used to ask questions and gives you alternatives to pick, "press 1," "press 2" and so forth, that is going to put a damper on any response because then you feel as though you aren't talking to a person you're just filling in a blank somewhere.

Discussion

Daily phone call diaries are a feasible method of assessment of alcohol use and emotional states among retired older adults. Participants did not find questions stigmatizing, and they did not report that daily phone calls were burdensome. In addition to reporting acceptability, missed data collection was very rare (3%). The potential for systematic bias with this approach should be noted as daily phone calls about drinking may influence whether individuals endorse drinking due to social desirability.

Based on data from qualitative interviews with respondents, the use of technology may be problematic in collecting daily diary data. This is in contrast to some other studies done with the "young–old," who may be more familiar with computers and handheld computing devices. In those studies, few concerns with the use of electronic means for ES were raised (Atienza, Oliveira, Fogg, & King, 2006), and authors recommended the use of electronic means as feasible (Cain et al., 2009). Participants in this study were older than those in prior studies; disparate findings may be the result of cohort differences. Someone who is aged 50 years may have greater comfort with technology than someone aged 75 because of exposure to computing in the workplace. Indeed, the study sample is not representative of the general population of older adults, a limitation of this study. Consequently, this modified diary approach may not be transferrable to other populations of older adults.

From a substantive perspective, patterns of alcohol use among CCRC residents are marked by consistency, although variability in mood and affective states was present. The daily phone call ES method performed well in this study and is a promising method for future research with the older–old population.

Acknowledgments

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Biographies

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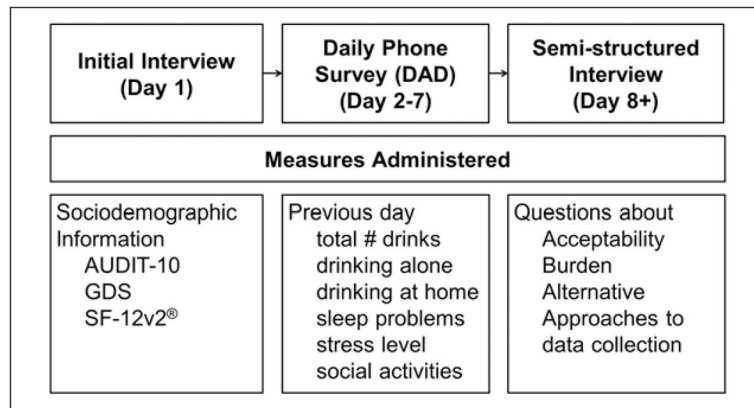
Initial Interview (Day 1)	→	Daily Phone Survey (DAD) (Day 2-7)	→	Semi-structured Interview (Day 8+)

Measures Administered

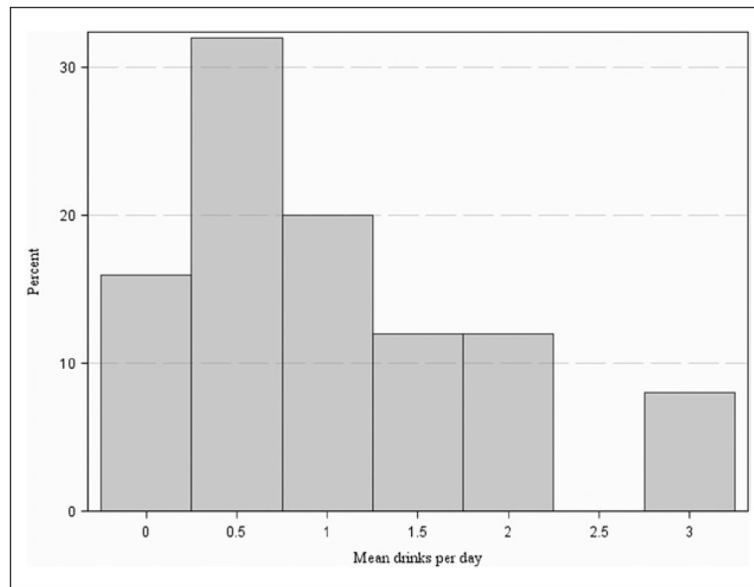| Sociodemographic Information
   AUDIT-10
   GDS
   SF-12v2®
	Previous day
	   total # drinks
	   drinking alone
	   drinking at home
	   sleep problems
	   stress level
	   social activities
		Questions about
		   Acceptability
		   Burden
		   Alternative
		   Approaches to
		   data collection

Figure 1.
Data collection procedure.

Figure 2.
Distribution of mean drinking among older adult CCRC residents ($n = 25$).
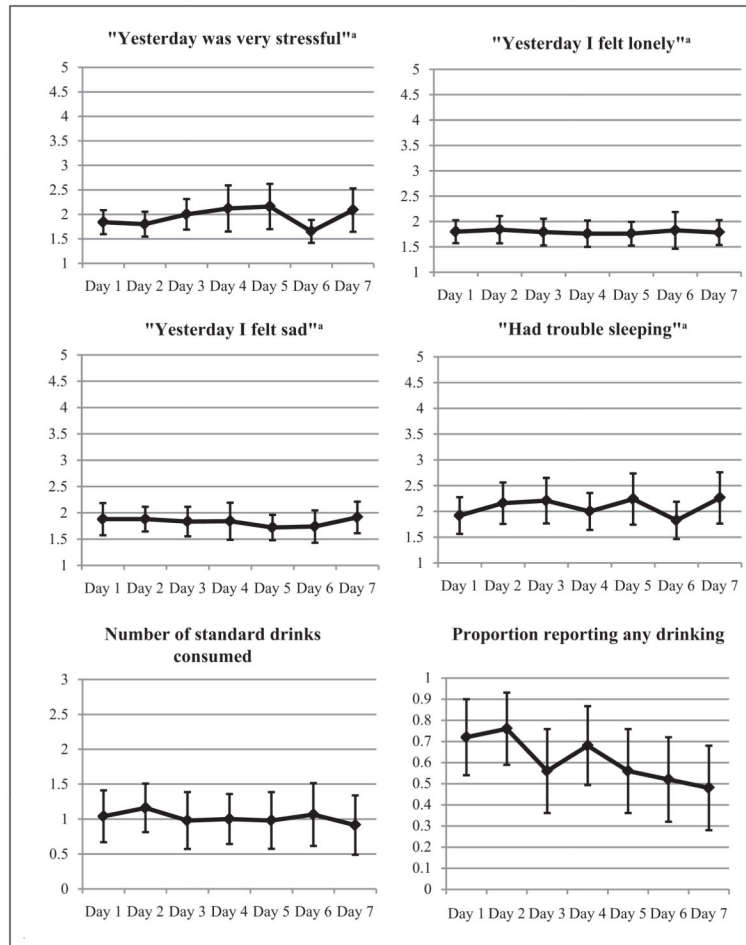*Note.* CCRC = Continuing Care Retirement Community.

Figure 3.
Means and standard errors of Likert-scaled items across days.
[a]1 = *strongly disagree*; 2 = *disagree*; 3 = *neutral*; 4 = *agree*; 5 = *strongly agree*.

Table 1

Sample Characteristics ($n = 25$).

Categorical measures	%
Demographic	
Male gender	56%
Marital status	
Married	56%
Widowed	28%
Never married	16%
Education level	
College	40%
Graduate or Prof. school	60%
Alcohol-related	
AUDIT score >8 (hazardous drinking)	4%
Health and mental health	
GDS (>4)	12%

Continuous measures	*M* (*SD*)
Demographic	
Mean age	85.9 (6.0)
Alcohol-related	
Mean daily alcohol cons.	.99 (.87)
Mean weekly alcohol cons.	6.9 (6.1)
AUDIT score	3.4 (1.5)
Health and mental health	
GDS (*M*)	2.0 (1.9)
SF-12 (Mental component)	53.9 (6.6)
SF-12 (Physical component)	45.0 (11.2)

Note. AUDIT = Alcohol Use Disorders Identification Test; GDS = Geriatric Depression Scale.

Table 2

Item ICC Values and Association With Retrospective Measures.

	ICC	Association with GDS Score	Association with AUDIT Score
"Yesterday was very stressful for me"	.162	−.060	.046
"Yesterday I felt lonely"	.473	.097[*]	−.096
"Yesterday I felt sad"	.263	.048	.223
"Yesterday I had trouble sleeping"	.206	.033	−.132
Day distress	.395	.116	−.359
Total reported drinks	.757	.094	.476[**]
Drinking alone	.918	.183	.499[**]

Note. ICC = intraclass correlation coefficient; GDS = Geriatric Depression Scale; AUDIT = Alcohol Use Disorders Identification Test.

[*] $p = .06$.

[**] $p < .001$.