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## Abstract

(1) *Objective:* The current study compares retrospective self-reports of quantity and frequency of drinking with the Timeline Followback (TLFB) method administered in groups or to individuals to determine the equivalence of these methods. (2) *Method:* Two-hundred and eleven male college students who reported drinking at least two times per week participated; 118 completed the TLFB in a group setting and 93 completed it individually. Drinking variables assessed were drinking days, average drinks and total drinks during a 30-day period. (3) *Results:* Pearson's correlation coefficients revealed significant correlations between single-item quantity and frequency measures and the TLFB on all three variables for the two administration styles. Further, the group TLFB yielded similar correlations to self-reports as the individual TLFB on drinking days and average drinks. However, the correlation between total drinks on the TLFB and the individual item report of drinking days was higher for individual administration than in the group administration. (4) *Conclusions:* The study suggests that the group TLFB yields an accurate portrayal of students' quantity, but not frequency, of use. In addition, the group-administered TLFB has the potential to parallel individual interviews and serve as an efficient means of collecting information, but further studies with modified research designs are necessary to validate this alternate method of TLFB administration.

The Timeline Followback (TLFB; Sobell & Sobel, 1992) is an assessment interview developed to assist individuals in recalling alcohol consumption. Researchers provide participants with a blank calendar and ask them to indicate which days they consumed alcohol and the number of beverages they drank. Generally, an interviewer leads a participant through each day of the recall period, cueing personally memorable events to aid recall. The TLFB displays high reliability and validity when individually administered by an interviewer (Sobell & Sobell, 1992; Sobell et al., 1988) and is reliable when given face to face first and then over the telephone (Sobell et al., 1996; Cohen & Vinson, 1995).

The TLFB is less reliable than a daily interactive voice response (IVR) system, where participants reported their drinking each day through an automated telephone call (Searles et al., 2000). However, the two techniques had equivalent estimates of alcohol use, supporting the TLFB's validity. In addition, drinking days reported by IVR and by TLFB were similar, indicating that the TLFB method is a useful and accurate retrospective drinking measure (Searles et al., 2002).

The TLFB has demonstrated adequate reliability with different populations and with other problematic behaviors besides alcohol use. Sobell and colleagues (1986) found the TLFB method reliably assessed recent drinking behavior for both male and female college students; Sacks and colleagues (2003) found it reliably assessed substance use in homeless and psychiatric populations. The TLFB displayed very strong correlations ($r > .83$) with a brief Drug Use Frequency (DUF) measure that assessed monthly use of several types of drugs (O'Farrell et al., 2003). Expansions of the TLFB technique include reliable and accurate assessments of smoking (Brown et al., 1998) and risky sexual behavior (Carey et al., 2001; Weinhart et al., 1998).

Independent of problem behavior, previous research that compared single, self-report items to a measure similar to the TLFB (event history calendars [EHCs]; Belli, 1998) showed EHCs were more reliable for recalling key social and economic events (moves, income, weeks unemployed, weeks missing work from illness or other reasons and illness of another) over one to two years (Belli et al., 2001). Compared to single item self-reports, Schober and Conrad (1997) reported that the flexible style of one-on-one interviews using EHCs improves the quality of recalled events by encouraging respondents during the task and by detecting inconsistencies in reported behavior.

Most previous research on the TLFB has focused on individual face-to-face or telephoned interviews. However, computer administrations of the TLFB did not differ from face-to-face interview administrations (Sobell et al., 1996). Even though the administration of the TLFB was done alone, the computer program prompted the individual to recall drinking activity for each day of a three-month period, starting with the previous day. While the TLFB method appears accurate when administered alone, either in an individual interview or via computer, it is undetermined whether the method is accurate in a group-administered format.

Previous studies have found higher estimates of drinking behavior on the TLFB when compared to single-item self reports (Sobell & Sobell, 1992; 2003). However, Sobell and colleagues (2003) concluded that a self-report quantity-frequency (QF) measure was statistically equivalent to the TLFB for nearly all drinking variables assessed. The exception was "days drinking per week/past year," which was found to be significantly higher on the TLFB than on the QF measure. To date, no study has examined the equivalency between self-reported individual items and TLFB reports of drinking using a group format.

The current study assesses an alternate method of administration for the TLFB by using two different samples of male college drinkers to determine if a group-administered TLFB yields equivalent profiles of drinking behavior to the individual interview TLFB, as well as to single-item self-report measures of recalled alcohol use. We expect the group TLFB to perform equally well to individual interview TLFB and, thus, provide similar data as the self-report measure within participants and similar correlations to self-report items across administration styles.

## Methods

### *Participants*

*Group Administration*: The first sample included 118 male college students at a private university who drank more than two or more days a week in the prior month. Forty-five responded to flyers that were displayed in dormitories seeking men to participate in discussions regarding drinking attitudes and habits. The remaining 73 students were mandated to participate by campus judicial officers as part of fulfilling sanctions for alcohol-related violations of campus policies, including underage drinking, fighting and vandalism. Both groups of students were part of a broader University-based motivational enhancement intervention aimed at reducing drinking. Participants received either a nominal stipend or campus judicial credit for participation. The students, with a mean (SD) of 18.46 (1.82) years of age, consisted of 100 Caucasians (85%), with the remaining 18 (15%), belonging to different ethnic backgrounds. There were no significant differences between volunteer and mandated participants on drinking days in the prior month ($t$ (115) = 2.01), average drinks per drinking occasion ($t$ (115) = .81) and total drinks per month ($t$ (115) = 1.63).

*Individual Administration*: The second sample consisted of 93 male students from two California universities (one private and one public) who responded to flyers seeking research participants for a study on attitudes and behaviors towards sex and drinking. Similar to participants in the group administration, inclusion criteria was at least two days of drinking per week over the previous month. These students were part of a broader motivational enhancement intervention to reduce problematic drinking and unsafe sex behavior among college males. They had a mean age of 20.58 (2.46) years and were again predominantly Caucasian (69%). Participants received nominal compensation for their involvement in the study. Self reported Quantity × Frequency was 88.28 (66.42) drinks in the last month.

The two samples differed in age ($t$ (209) = 8.02, $p < .001$) and ethnicity ($X^2$ (5) = 18.89, $p < .01$). They did not differ on self-reported drinking days, while they did differ on average drinks per drinking occasion ($t$ (209) = 4.05, $p < .001$) and total monthly drinks ($t$ (209) = 2.48, $p < .05$).

*Design and Procedure:*

Local institutional review boards approved the projects. All participants received similar instructions about the purpose of the study. They were assured of the confidentiality of their responses and gave informed consent for their participation. Judicial students received repeated assurance about confidentiality. They could refuse participation and undergo a different form of sanction. Further, they received assurances that nothing about their responses would be communicated to any person involved in the University. All participants completed a questionnaire that included demographic information as well as a self-report assessment of alcohol quantity and frequency over the past month. A similar measure has been used in

previous studies and appears to be a valid index of alcohol consumption (Earleywine & Martin, 1993).

Men in the group administration completed an initial questionnaire in a classroom setting with 10-12 participants. Two separate researchers trained in the administration of the TLFB instructed students as a group to fill out a TLFB calendar for the previous three months' drinking. The TLFB calendar highlighted holidays and memorable campus events. The facilitator displayed a calendar on an overhead projector, pointed out the highlighted days and instructed participants to fill in their own personal "marker" days (such as vacations, parties, etc.) to assist them in remembering. The facilitator assured participants that despite apprehension around their memory of drinking, they would be able to successfully remember their drinking activity. Then, using the calendar on the overhead, the facilitator led the participants back day-by-day to indicate drinking days and quantity of drinks consumed.

In the individual administration sample, after completing the questionnaire, one of two researchers similarly trained in TLFB administration led each individual through the protocol during a face-to-face interview. The interviewer prompted participants directly by going back over the calendar day by day and asking the participant to remember drinking activity over the past 3 months.

## Results

Analyses involved paired sample t-tests to determine differences between administration style on the single-item questions and TLFB. The most current month of the TLFB was compared to individual item self-reports of the previous month's behavior. Pearson's correlation coefficient (*r*) determined similarities among measures. Table 1

summarizes means and standard deviations of drinking variables in each sample, as well as differences in means between self-report and TLFB and correlation coefficients.

*Group Administration:* The group TLFB yielded significantly fewer reported drinking days than the individual self-report item (10.58 vs 13.61, $t$ (117) = 6.32, $p$ <.001). This difference in reported drinking days impacted the total number of drinks in the last month (Quantity × Frequency), with the participants reporting 22.26 ($t$ (117) = 3.46, $p$ <.01) fewer total monthly drinks on the TLFB than on the quantity-frequency self-report. Average drinks per drinking occasion did not differ significantly between the single-item assessment of quantity and the group TLFB. Despite the revealed differences, the two measures significantly correlated ($p$ < .001) on all three drinking variables (drinking days [$r$ = .52], average drinks [$r$ = .69] and Quantity × Frequency [$r$ = .65]).

*Individual Administration:* Consistent with previous research, no significant differences existed between self reported quantity-frequency items and individual interview TLFB reports of alcohol use over the previous month. Similar to the group administration, the individual TLFB and single-item self-report values were significantly correlated ($p$ < .001) for drinking days, average drinks and total drinks ($r$ = .57, .74 and .79, respectively).

*Comparing Correlations Between Administrations:* We hypothesized that equivalent correlations between single-item and TLFB measures would appear under both TLFB administration formats. Fischer's R-to-Z transformations revealed no differences between drinking days and average drinks correlations, but the correlation between the total drinks on the TLFB and total drinks on the individual item was significantly higher in the individual administration ($r$ = .79) than in the group administration ($r$ = .65) ($p$ < .05; See Table 1).

Since the two administration style samples were not equivalent on age or ethnic-makeup, further analyses attempted to control for these differences. Separate ANOVAs found no significant differences with ethnicity as the between groups factor on total drinks (quantity-frequency) for all participants within each administration style ($F$ (5, 111) = 1.45, $p$ = .212 for the group TLFB; $F$ (3, 89) = 1.41, $p$ = .247 for the individual TLFB). However, for all participants, there was a significant correlation between age and average drinks on both the self-report ($r$ (211) = -.236, $p < .01$) and the TLFB ($r$ (211) = -.178, $p < .05$). Younger participants consumed more drinks per drinking occasion than older participants. Nevertheless, within each administration style, there were no significant correlations between age and any drinking variable.

Partial correlations controlling for age are similar to non-corrected correlations (see Table I). Further, Fischer's R-to-Z transformations revealed no differences between correlations of self-report and TLFB for the group TLFB participants and the individual TLFB participants for drinking days ($r$ = .515 vs $r$ = .571, respectively) or average drinks ($r$ = .692 vs .738, respectively) using the age-controlled correlations, while there continued to be a difference between correlations for total drinks ($r$ = .794 vs $r$ = .652, respectively, $p < .05$).

## Discussion

The current study assessed the utility of a group-administered TLFB by comparing quantity-frequency items from the TLFB to self-reported individual items on quantity-frequency and by comparing the correlations between TLFB and self-report measures in group versus individual administrations of the TLFB. Regardless of administration style, individual self-report items and the TLFB yielded significantly correlated values ($p < .001$) for all drinking variables (drinking days, average drinks and total drinks). Further, the two

administration styles yielded similar correlations with self-report items for drinking days and average drinks per drinking occasion. However, the individually administered TLFB yielded a higher correlation with self-report items on total drinks in the previous month.

Despite the highly significant correlations between TLFB and self-reports, participants who received the group-administered TLFB reported significantly more drinking days and total drinks in the past month on the single-item self report than on the TLFB. There were no differences between measures on average number of drinks per drinking occasion. Further, the individually administered TLFB yielded values for drinking variables that did not significantly differ from the self-report items.

Previous research on the individual TLFB found similar inconsistencies for frequency of drinking (Sobell et al., 2003) and frequency of sexual behavior (Carey et al., 2001; Weinhart et al., 1998), although the drinking study sample consisted of adults with alcohol problems and the sexual behavior samples consisted of psychiatric outpatients and sexually active adults, respectively. When examining college student drinking, the current study suggests that a group TLFB may accurately assess quantity, while it may not adequately assess frequency. In contrast, an individual interview TLFB appears to accurately assess both in this population, based on comparison to reliable and valid self-reports (O'Hare, 1991). It is suggested that when using the group TFLB, facilitators pay particular attention to drinking days; making sure that administration covers each day of the assessed time period. Yet, the group format's seemingly accurate measurement of quantity may be of particular interest to researchers and college personnel, as reductions in quantity may be the most important aspect of reducing harm in this population.

Though differences appeared, the two measures (individual items and TLFB) were highly correlated for both the group TLFB sample and the individual interview TLFB sample. Single items may be used in surveys to obtain an accurate portrayal of drinking behavior in a large population, while it may be more beneficial to use the TLFB method during interventions, to provide individuals with a visual representation (a calendar) of their drinking behavior.

Several limitations mark the current study. The most evident is the use of two unequal groups for comparison. The two samples were from different campus environments and significantly differed in age and ethnicity, as well as in self-reported Quantity × Frequency. We attempted to control for age and ethnicity and found evidence that demographic differences between groups did not influence the differences found among drinking variables. While differences in age appears to help explain the observed differences in average drinks and total drinks between the samples, it does not appear to alter relationships between self-report and TLFB in either sample. Nevertheless, due to non-equivalent samples, any conclusions must be made tentatively. The differences and similarities found between the two administration styles may be attributed to the differences in the characteristics of the two samples. Modifications of the current study, specifically within-subjects designs that include both forms of administration with random assignment to conditions to control for order effects, are necessary to determine the reliability and validity of the group TLFB. Similarly, since the samples consisted of male college students, it would be helpful to replicate these findings in other populations, such as in the general population and with women, using the within-subjects study design. Further, it may be that memory or order of administration influences agreement

between the two measures. It would be worthwhile to counter-balance the self-report and the TLFB to determine if one measure influences the other.

There may also have been variance in the group administration of the measures despite efforts to verify consistency. Moreover, groups by their very nature may differ. Context effects may not have been as prevalent as presumed, since participants only varied in frequency of use and not quantity. Nonetheless, since group variance is a factor in this study, follow-up studies need to measure adherence to administration style in the group setting. Finally, although two measures of drinking were compared, both were retrospective. Thus, we have no absolute indicator of true drinking behavior (i.e., BAC levels). Previous research, however, has shown that both self-reports (O'Hare, 1991) and the TLFB (Sobell et al., 1986) are reliable and valid indicators of current alcohol use in college students.

Individual interview TLFB administration is an established and accurate portrayal of drinking behavior with college students (Sobell et al., 1986), as well as with a variety of adults (i.e., Sacks et al., 2003; Sobell et al., 1996; Sobell & Sobell, 1992; Sobell et al., 1988). Developing an accurate group TLFB in the college population would allow researchers to collect larger and potentially richer amounts of drinking data from groups. An honest assessment of and personal confrontation with drinking behavior is an essential part of several alcohol interventions including Motivational Interviewing (Miller & Rollnick, 2002). Group interventions involving the group TLFB may prove to be as effective as interventions performed during individual interviews. While this is the first study to use a group TLFB, further studies with modified research designs need to be performed to determine the accuracy of this alternative TLFB administration.

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# References

Belli, R.F., Shay, W.L., and Stafford, F.P. Event history calendars and question list surveys: A direct comparison of interviewing methods. Public Opinion Q. **65:** 45-74, 2001.

Belli, R. F. The structure of autobiographical memory and the event history calendar: Potential improvements in the quality of retrospective reports in surveys. Memory **6:** 383-406, 1998.

Brown, R.A., Burgess, E.S., Sales, S.D., Whiteley, J.A., Evans, D. M.,and Miller, I.W. Reliability and validity of a smoking Timeline Follow-Back interview. Psychol. Addict. Behav. **12:** 101-112, 1998.

Carey, M.P., Carey, K.B.,and Maisto, S.A. Assessing sexual risk behavior with the timeline followback (TLFB) approach: Continued development and psychometric evaluation with psychiatric outpatients. Int. J. STD AIDS **12**: 365-375, 2001.

Cohen, B. B.,and Vinson, D.C. Retrospective self-report of alcohol consumption: Test-retest reliability by telephone. Alcsm Clin. Exp. Res. **19:** 1156-1161, 1995.

Earleywine, M., & Martin, C.S. (1993). Anticipated stimulant and sedative effects of alcohol vary with dosage and limb of the blood alcohol curve. *Alcoholism: Clinical & Experimental Research, 17(1),* 135-139.

Miller, W.R.and Rollnick, S. Motivational interviewing: Preparing people for change (2nd ed.). New York: Guilford Press, 2002.

O'Farrell, T.J., Fals-Stewart, W.,and Murphy, M. Concurrent validity of a brief self-report drug use frequency measure. Addict. Behav. **28:** 327-337, 2003.

O'Hare, T. Measuring alcohol consumption: A comparison of the retrospective diary and the quantity

frequency methods in a college drinking survey. J Stud Alcohol **52:** 500-502, 1991

Sacks, J.Y., Drake, R.E., Williams, V.F., Banks, S.,and Herrell, J.M. Utility of the Time-Line Follow-Back to assess substance use among homeless adults. J. Nerv. Ment. Dis.**19:** 145-153, 2003.

Schober, M.F.,and Conrad, F.G. Does conversational interviewing reduce survey measurement error?. Public Opinion Q. **61:** 576-602, 1997.

Searles, J.S., Helzer, J.E., Rose, G.L.,and Badger, G.J. Concurrent and retrospective reports of alcohol consumption across 30, 90, and 366 days: Interactive voice response compared with the timeline follow back. J. Stud. Alcohol **63:** 352-362, 2002.

Searles, J.S., Helzer, J.E.,and Walter, D. E. Comparison of drinking patterns measured by daily reports and timeline follow back. Psychol. Addict. Behav. **14:** 277-286, 2000.

Sobell, L.C, Agrawal, S., Sobell, M.B., Leo, G.I., Young, L.J., Cunningham, J.A.,and Simco, E.R. Comparison of a Quick Drinking Screen with the Timeline Followback for Individuals with Alcohol Problems. J. Stud. Alcohol **64**: 858-861, 2003.

Sobell, L.C., Brown, J.,and Leo, G. I. The reliability of the alcohol timeline followback when administered by telephone and by computer. Drug Alcohol Depend. **42:** 49-54, 1996.

Sobell, L.C.and Sobell, M.B. Alcohol consumption measures. In: Allen, J.P. and Columbus, M. (Eds.) Assessing Alcohol Problems: A Guide for Clinicians and Researchers. National Institute on Alcohol Abuse and Alcoholism Treatment Handbook Series (2nd Ed.). Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 2003, pp 78-99.

Sobell, L.C.and Sobell, M.B. Timeline follow-back: A technique for assessing self-reported alcohol consumption. In R. Z. Littenand J. P. Allen (Eds.) Measuring alcohol consumption: Psychosocial and biological methods. Totowa, NJ: Humana Press, 1992, pp. 41-72.

Sobell, L.C., Sobell, M.B., Leo, G.I.,and Cancilla, A. Reliability of a timeline method: Assessing normal drinkers' reports of recent drinking and a comparative evaluation across several populations. Brit. J. Addict. **83:** 393-402, 1988.

Sobell, M.B., Sobell, L.C., Klajner, F., Pavan, D.,and Basian, E. The reliability of a timeline method for assessing normal drinker college students' recent drinking history: Utility for alcohol research. Addict. Behav. **11:** 149-162, 1986.

Weinhardt, L.S., Carey, M.P.,and Maisto, S.A. Reliability of the timeline follow-back sexual behavior interview. Ann. Behav. Med. **20:** 25-30, 1998.

Table 1

*Means and correlations comparing single-item questions and Timeline Followback (TLFB) among samples (N=211)*

| | Self-report M (SD) | TLFB M (SD) | Pearson's *r* | Age corrected Pearson's *r* |
|---|---|---|---|---|
| ***INDIVIDUAL ADMINISTRATION*** | | | | |
| *(n =93)* | | | | |
| Drinking days | 13.32 (4.23) | 13.11 (4.05) | .565** | .571** |
| Average drinks | 6.25 (2.72) | 6.42 (2.43) | .742** | .738** |
| QxF [a] | 88.28 (66.42) | 88.58 (58.56) | .792** | .794** |
| ***GROUP ADMINISTRATION*** | | | | |
| *(N=118)* | | | | |
| Drinking days | 13.61 (5.03) | 10.58 (5.56)** | .522** | .515** |
| Average drinks | 8.09 (3.55) | 8.17 (3.50) | .688** | .692** |
| QxF | 115.25 (84.06) | 92.99 (83.36)* | .652** | .652** |

[a] QxF = quantity x frequency (total amount of drinks consumed in one month)

* Significant difference at $p < .01$

** Significant difference or significant correlation at $p < .001$