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# A Group-Administered Timeline Followback Assessment of Alcohol Use

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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. The purpose of the study was to determine the comparability of group TLFB and individual TLFB. (2) *Method:* Two-hundred and eleven male college students participated. One hundred and eighteen completed the TLFB in a group setting and 93 completed it individually. (3) *Results:* Drinking variables assessed were drinking days, average drinks, and total drinks during a 30-day period. Pearson's correlation coefficients revealed strong correlations between single-item quantity and frequency measures and the TLFB on all three variables for the two administration styles. However, paired sample t-tests revealed that drinking days and total drinks were significantly lower on the group-administered TLFB than they were on the self-report. Potential underreporting on the TLFB and over-reporting on individual items are discussed. (4) *Conclusions:* The study suggests that the TLFB yields a rich portrayal of individuals' drinking behavior. In addition, the group-administered TLFB has the potential to parallel individual interviews and serve as an efficient means of collecting information.

Introduction

The Timeline Followback (TLFB, Sobell & Sobel, 1992) is an assessment interview developed to help individuals recall alcohol consumption over a previous time period; usually between one week and one year. Individuals receive a blank calendar and are instructed to indicate the days that they consumed alcohol as well as the number of drinks. Generally, an interviewer leads an individual participant through each day, cueing holidays, weekends, birthdays, etc. to aid memory for the number of days drank and the number of drinks consumed on each occasion. The TLFB displays high reliability and validity when given in a face-to-face setting by an interviewer (Sobell & Sobell, 1992; Sobell et. al., 1988). The TLFB is also reliable when given face-to-face first and then over the telephone (Cohen & Vinson, 1995; Sobell et. al., 1996).

Since the TLFB method relies on recall, daily prospective reporting is expected to be more reliable. Searles et. al. (2000) found the TLFB method less reliable than a daily interactive voice response system (IVR), where participants reported their drinking each day through an automated telephone call. The two techniques had comparable estimates of alcohol use, however, supporting the validity of the TFLB. In addition, Searles et. al. (2002) found that drinking days reported by IVR and by TLFB were similar, indicating that the TLFB method is an useful retrospective method to accurately help individuals remember what days they drank each month.

The TLFB method has demonstrated adequate reliability with different populations and with other problematic behaviors besides alcohol use. Sobell et. al. (1986) found the TLFB method to be a reliable means for recalling recent drinking behavior for both male and female college students, while Sacks et. al. (2003) found it to be reliable for assessing substance use in homeless and psychiatric populations. The TLFB displayed very strong correlations ($\geq$.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 assessments of smoking and risky sexual behavior, showing good reliability and accuracy for both (Brown et. al., 1998; Weinhart et. al., 1998; Carey et. al., 2001).

Of note, the TLFB method, when compared to a single item self-report measure of sexual activity, displayed frequencies slightly less than self-reports.

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 to be more reliable in 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). Similar to the TLFB method, administration of the EHCs relied on cuing individuals with distinctive events from their own past to facilitate memory of specific social and economic events. 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 allowing interviewers to encourage respondents during the task and by detecting inconsistencies in reported behavior so that different events do not overlap.

Most of the previous research on the TLFB has focused on face-to face interview application or telephoned interview sessions. However, Sobell et. al. (1996) found that when self-administered by a participant using a computer, reported drinking data did not significantly differ from face-to-face interview administrations. 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. The finding that self-administered application of this method is comparable to face-to-face or telephone interviews is important to examine further, as this has implications for self-administered use in situations where face-to-face interviewing may prove difficult. 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 format. To date, no study has examined the equivalency between self-reports and TLFB reports of drinking using a group setting.

The current study seeks to demonstrate that the TLFB, whether administered during face-to-face interviews or in a group setting, displays an accurate and rich profile of an individual's drinking behavior; one that converges with single-item self-report measures of recalled alcohol use. We expect

the group TLFB to perform equivalently to individual interview TLFB and, thus, provide similar data as the self-report measure. If accurate, group TLFB administration would have the advantage of allowing researchers to collect large amounts of drinking data from groups. Clinically, group interventions involving the TLFB method may prove to be as reliable and valid as those interventions performed during individual interviews.

<div align="center">Methods</div>

*Participants*

  *Group Administration*: The first sample included 118 male college students at a private university. 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 by campus staff to participate in similar discussions. The students were part of a broader University-based responsible drinking project and received a nominal stipend or campus judicial credit for participation. The students, averaging 18.46 (SD = 1.82) years of age, consisted of 100 Caucasian (85%), with the remaining 18 (15%), belonging to different ethnic backgrounds, classified as "non-Caucasian." All participants reported drinking at least two standard drinks per week (one drink = 12 oz. beer, 4 oz. wine, 8 oz. mixed drink, or 1.5 oz. of liquor).

  *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. Inclusion criteria included drinking on average at least twice each week and having more than two sexual partners in the past two months. These students were part of a broader intervention to reduce problematic drinking and unsafe sex behavior among college males. They had a mean age of 20.58 years (SD = 2.46) and were again predominantly Caucasian (69% Caucasian, 31% non-Caucasian). Participants received nominal compensation for their involvement in the study.

*Design and Procedure:*

.Local IRB review boards approved the projects and all participants gave informed consent. They completed a pre-intervention assessment questionnaire including demographic information as well as self-report measures of alcohol use, asking how many times they drank alcohol in the past month and the average number of drinks they had each time they drank alcohol. In addition, participants indicated their intended drinking behavior over the next month (days per week intending to drink, days in the next month intending to drink, average drinks intended when drinking, and maximum amount of drinks intended at one time). They then completed the Timeline Followback (TLFB).

Men in the group administration completed the initial questionnaire individually in a classroom setting with 10-12 participants.  A trained clinical psychologist or clinical psychology doctoral candidate then instructed students as a group to fill out a TLFB calendar for the previous three months' drinking behavior. The TLFB calendar highlighted holidays and memorable school, national, and religious dates. The facilitator displayed a calendar on an overhead projector, pointed to the highlighted days, and instructed participants to fill in their own personal "marker" days (such as birthdays, vacations, special parties, etc) to assist them in remembering. The facilitator assured participants that despite any apprehension; 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 having them indicate a drinking day with an "A," as well as notating the number of drinks they drank on that day.

In the individual administration sample, participants filled out the initial questionnaire independently. After completing the questionnaire, a trained clinical psychologist gave the TLFB to the participant during a face-to-face interview following established guidelines (Sobel & Sobel, 1992). This approach allowed the interviewer to prompt the student to remember drinking by going back over the calendar day-by-day, asking the student to remember drinking activity over the past three months.

<center>Results</center>

Analyses involved paired sample t-tests to determine differences between administration style on the single-item questions and TLFB. 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 revealed significantly fewer 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 x frequency), with the participants reporting 22.26 ($t$ (117) = 3.46, $p$ <.01) fewer total drinks in the month on the TLFB than on the quantity-frequency items. The number of drinks students reported drinking each drinking day (average drinks) was not significantly different between the single-item assessment of quantity and the group TLFB. This finding is inconsistent with previous research that indicated higher estimates of drinking behavior on the TLFB when compared to single item self-reports (Sobell & Sobell, 1992, 1995, 2003). Despite the revealed differences, the two measures strongly correlated on all three drinking variables (drinking days ($r$ = .52), average drinks ($r$ = .69), and total drinks in the last month ($r$ = .65)). Correlations with intended consumption in the next month were also high and significant, offering some evidence for convergent validity of the group-administered TLFB. (See Table 2).

*Individual Administration:* Consistent with previous research, there were no significant differences found between quantity-frequency items and individual face-to-face interview TLFB reports of alcohol use for the past month. Individuals who took the self-report measure and TLFB calendar face-to-face with an examiner reported similar responses in regards to drinking days (difference of .21) and the amount of drinks consumed each time drinking occurred (difference of .17), as well as the total number of drinks consumed in the month. As in the previous sample, the TLFB and single-item values were highly correlated for drinking days, average drinks, and total drinks ($r$ = .57, .74, and .79 respectively). As in the group administration, correlations with intended drinking in the next month were also high and significant. (See Table 2.)

*Comparisons Between Administrations:* We hypothesized that comparable correlations between single-item and TLFB measures should appear in both groups. Fischer's R-to-Z transformations revealed only one correlation that differed in the two groups. The correlation between

the total drinks computed from single items and the total drinks in the TLFB was significantly higher in the individual administration (.792) than in the group administration (.652), $p < .05$. No other correlation among drinking measures or between drinking measures and intentions was significantly different across groups.

## Discussion

The current study compared two measures of retrospective recall for drinking behaviors (self-report and TLFB) between two different approaches to administration (individual interviews and group administration). Regardless of administration style, self-report and the TLFB yielded strongly correlated values ($p < .001$) for all drinking variables (drinking days, average drinks, and total drinks). Despite the strong correlations, some differences emerged between single-item questions and data collected through the group-administered TLFB. Participants who received a group-administered TLFB reported significantly more drinking days 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 face-to-face administration of the TLFB yielded values for drinking variables that did not significantly differ from the self-report items.

Sobell and Sobell (1992, 1995, 2003) suggested that the TLFB is a more thorough measure of drinking behavior because it is more sensitive to erratic days of heavy drinking, or even to drinking days that are not products of cues (holidays, weekends, etc.). Similarly, although Sobell et. al. (2003) found a quantity-frequency measure (QF) to be statistically similar to the TLFB for nearly all drinking variables assessed, "days drinking per week/past year" was found to be significantly different among the two measures. Although single item self reports may be as accurate as TLFB in assessing quantity of drinks, it may not be as reliable a portrayal of an individual's day to day drinking behavior (measured by the number of days drank per week/month/year). Perhaps drinking days, an important representation of daily drinking behavior, are better assessed using the TLFB method, but modifications of group TLFB are necessary to provide fully accurate representations of drinking days.

The differences on drinking days between individual items and the group-administered TLFB may be attributed to either over-reporting on the individual items or underreporting on the TLFB. Single items ask for an average of drinking behavior over a time, while the TLFB allows individuals to provide a day-by-day account of drinks consumed. Sobell and Sobell (1992, 1995, 2003) suggest that single item questions regarding the amount of drinking days in the past month may be more difficult to accurately recall than actively looking at a calendar with cues (such as birthdays or weekends). In the current study, however, individuals administered the TLFB by interview did not differ in their reported drinking behavior, suggesting that self-reports and TLFB yield equivalent data and that the group setting of the TLFB contributed to the variance.

In group settings, instructions for the TLFB calendar are given broadly to the whole group and it is the individual's responsibility to fill out the calendar as accurately as possible. In individual settings, face-to-face instructions leave room for more dialogue with the examiner, which can have an impact on the amount of recalled drinking behavior. Interviewers in individual settings can make sure that participants are thoroughly filling out the TLFB, which is not completely possible in the group setting. It may be beneficial to modify the group format used in the current study, either by providing participants with more individual attention or by reducing the number of participants per group. This approach could also help overcome apprehension that participants may feel about being able to accurately remember behavior over previous months by providing more on-on-one reassurance that the task is possible to accomplish.

It is also important to remember that the correlations between the two measures (individual items and TLFB) were highly correlated for both the group TLFB sample and the face-to-face TLFB sample. Due to the comparable effect sizes, in situations where TLFB is not possible or probable to administer, it appears that single item questionnaires are comparable. 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 present study. 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. 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.

Although correlations between intended drinking behavior and TLFB reported drinking were high in both samples, it is unclear how similar the samples actually were. Age and ethnic differences may have contributed to the variance here. There also might have been variance in the group administration of the measures despite efforts to verify consistency. Two trained facilitators led the group administrations, while only one facilitator conducted the individual interview administrations. Moreover, groups of their very nature may differ, and although participants were encouraged to sit quietly as they filled out the TLFB, this ideal was not always followed. Additionally, although two measures of drinking were compared, both were retrospective thus, we have no absolute indicator of true drinking behavior.

The current findings support previous research that shows the TLFB to be a valid and reliable assessment measure for recalling activity across a number of problem behaviors - drinking (Cohen & Vinson, 1995; Sobell et. al., 1996; Sobell & Sobell, 1992; Sobell et. al., 1988), smoking (Brown et. al., 1998), and risky sexual behavior (Carey, et. al. 2001; Weinhart, et. al. 1998). Self-reported drinking behavior and TLFB drinking behavior were strongly correlated in individual and group administration of the TLFB. Despite these strong correlations, differences were found between drinking variables in the group setting. Although hypotheses about these differences are discussed, it is not known what contributed to these differences. Nonetheless, the TLFB method yields a rich and potentially more-thorough portrayal of individuals' recalled behavior. In addition, it appears that the TLFB given in a group setting is nearly comparable to individual administration, yielding similarly strong correlations to self-report data. With some modifications to the group administration, particularly more individual attention and encouragement, group TLFB may become as reliable and valid as individual TLFB.

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Table 1

*Means and correlations comparing single-item questions and Timeline Follow-back (TLFB) among*

*samples (N=211)*

| | Self-report | TLFB | Mean difference | Pearson's *r* |
|---|---|---|---|---|
| | M (SD) | M (SD) | | |
| *INDIVIDUAL ADMINISTRATION* | | | | |
| *(n =93)* | | | | |
| Drinking days | 13.32 (4.23) | 13.11 (4.05) | .21 | .565** |
| Average drinks | 6.25 (2.72) | 6.42 (2.43) | .17 | .742** |
| QxF [a] | 88.28 (66.42) | 88.58 (58.56) | .30 | .792** A |
| *GROUP ADMINISTRATION* | | | | |
| *(N=118)* | | | | |
| Drinking days | 13.61 (5.03) | 10.58 (5.56) | 3.03** | .522** |
| Average drinks | 8.09 (3.55) | 8.17 (3.50) | .08 | .688** |
| QxF | 115.25 (84.06) | 92.99 (83.36) | 22.26* | .652** A |

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

* Significant at p < .01

** Significant at p < .001

A= These two correlations differ at p < .05.

Table 2

*Correlations for TLFB and Intended Drinking Behavior for Interviewed Males (n=93) and Groups*

*Males (n=118)*

Individual Males:

| | TLFB | | | Intentions | |
|---|---|---|---|---|---|
| | Drinking Days | Average Drinks | QxF | Days/mo | Average drinks |
| TLFB Drinking Days | -- | .455** | .760** | .455** | .399** |
| TLFB Average Drinks | .455** | -- | .892** | .354** | .721** |
| TLFB QxF | .760** | .892** | -- | .468** | .706** |
| Intended Days/mo | .455** | .354** | .468** | -- | .467** |
| Intended Average Drinks | .399** | .721** | .706** | .467** | -- |

Group Males:

| | TLFB | | | Intentions | |
|---|---|---|---|---|---|
| | Drinking Days | Average Drinks | QxF | Days/mo | Average drinks |
| TLFB Drinking Days | -- | .339** | .798** | .470** | .345** |
| TLFB Average Drinks | .339** | -- | .784** | .275** | .728** |
| TLFB QxF | .798** | .784** | -- | .432** | .605** |
| Intended Days/mo | .470** | .275** | .432** | -- | .368** |
| Intended Average Drinks | .345** | .728** | .605** | .368** | -- |

** significant at $p < .01$

Correlations did not differ across the two administrations.