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# Development and Validation of the East Africa Alcohol Expectancy Scale (AFEXS)

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**ABSTRACT. Objective:** The purpose of this study was to develop and validate the East Africa Alcohol Expectancy Scale (AFEXS), a measure of alcohol expectancies for use with HIV-positive adults in East Africa. **Method:** The study was conducted in several phases. The first involved development of the scale and an exploratory factor analysis (EFA) with a total of 209 HIV-positive, Ugandan men ($n$ = 120) and women ($n$ = 89). The second phase involved a confirmatory factor analysis (CFA) as well as validity analyses with a second, demographically similar, sample of 181 HIV-positive Ugandan men ($n$ = 109) and women ($n$ = 72). All participants were recruited from two ongoing cohort studies taking place at an HIV clinic in rural southwestern Uganda. **Results:** The EFA resulted in a 13-item, three-factor scale that explained 67% of the variance and showed excellent internal consistency ($\alpha$ = .89). The CFA showed good model fit with a final 11-item scale, $\chi^2(41) = 68.60$, $p$ = .004; comparative fit index = .97; root mean square error of approximation = .06, 90% CI [.03, .09], that again showed excellent internal consistency and yielded the following three factors: sex-related ($\alpha$ = .94), release of inhibition ($\alpha$ = .61), and negative expectancies ($\alpha$ = .73). **Conclusions:** The AFEXS is the first psychometrically validated alcohol expectancy scale available for use in Africa. The extent to which the AFEXS can be used with other populations and with adults from countries outside of East Africa requires ongoing validation. (*J. Stud. Alcohol Drugs, 76,* 336–343, 2015)

SIMILAR TO OTHER COUNTRIES in sub-Saharan Africa, Uganda's generalized HIV epidemic is accompanied by one of the highest levels of per capita alcohol consumption in the world (World Health Organization [WHO], 2014). Although 40% of Ugandans self-report as abstainers, the per capita yearly consumption among drinkers is exceptionally high at 23.7 liters of pure alcohol. This is almost double the level of consumption among drinkers in the United States (13.3 L) and similar to levels found in Russia (22.3 L) (WHO, 2014). Alcohol use is associated with greater odds of HIV infection in sub-Saharan Africa (Woolf-King et al., 2013), and the heavy, episodic pattern of consumption that characterizes alcohol use in this region is associated with many negative HIV-related consequences (Hahn et al., 2011). For example, alcohol use is associated with an increased likelihood of engaging in condomless sex, lower odds of achieving adequate levels of antiretroviral therapy (ART) adherence, and potentially hastened HIV disease progression (Hahn et al., 2011).

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The co-occurrence of ART nonadherence and sexual risk behavior in heavy-drinking, HIV-positive adults increases the likelihood of onward transmission via high viral load coupled with an increased likelihood of engaging in unprotected sex. Given that HIV-infected persons represent a much smaller population than all of those at risk for HIV, prevention efforts geared toward reducing onward transmission (i.e., "positive prevention") have been recognized as cost-effective and efficient means of reducing HIV incidence, particularly in resource-limited settings such as sub-Saharan Africa (Bunnell et al., 2006). Positive prevention can include biomedical interventions, such as provision of ART and uptake of HIV testing, as well as behavioral interventions aimed at increasing adherence to ART and decreasing sexual risk behavior (Bunnell et al., 2006). Alcohol's effects on adherence and sexual risk behavior make it an important target for HIV prevention efforts. In countries such as Uganda, where the HIV epidemic co-occurs with a high prevalence of alcohol misuse, understanding the psychological determinants of alcohol use among HIV-positive persons is needed to inform the development of behavioral interventions that optimize biomedical HIV prevention efforts in the region.

The beliefs an individual has about the effects of alcohol use (i.e., alcohol expectancies) are robust predictors of quantity and frequency of alcohol consumption (Goldman et al., 1999; Lee et al., 1999). In particular, sex-related expectancies are strongly associated with sexual risk behavior that increases the likelihood of HIV transmission and acquisition, a phenomenon that is well documented in the United States

(Hendershot et al., 2007; LaBrie et al., 2005; Maisto et al., 2004). Only two studies have examined the role of alcohol expectancies in relation to sexual risk taking among HIV-negative persons in sub-Saharan Africa, both of which were conducted in South Africa (Kalichman et al., 2007, 2008). Although these findings demonstrate the potential relevance of alcohol expectancies in this region, the assessment instrument used in these studies was not subjected to psychometric evaluation, did not include negative expectancies, and was not administered to people living with HIV/AIDS (Kalichman et al., 2007, 2008).

Further research is needed to examine the reliability and validity of measures of alcohol expectancies in sub-Saharan Africa. Indeed, the measurement of alcohol expectancies has yielded a well-developed literature in the United States, which has produced several psychometrically validated scales available for use with adults and adolescents (Brown et al., 1987; Leigh, 1990; Leigh & Stacy, 1993) and people living with HIV/AIDS (Maisto et al., 2010). No such validated scale has been tested with HIV-positive adults, or any population, in sub-Saharan Africa. To address this gap in the literature, the purpose of this study was to develop and psychometrically validate an alcohol expectancy scale, measuring both positive and negative expectancies, for use with HIV-positive, alcohol-consuming adults from Uganda. The study proceeded in four phases. First, the East Africa Alcohol Expectancy Scale (AFEXS) was developed using prior research and cognitive interviewing techniques, resulting in a 17-item scale measuring both positive and negative expectancies. Second, an exploratory factor analysis (EFA) of the AFEXS was conducted with a sample of HIV-positive Ugandans from the Biomarker Research of Ethanol Among Those with HIV (BREATH) cohort. Third, a confirmatory factor analysis (CFA) of the version of AFEXS that resulted from the EFA was conducted with a second sample of HIV-positive Ugandans from the Urban Alcohol Research Collaboration on HIV/AIDS (ARCH) Uganda cohort. Last, validity and reliability analyses were conducted on the final form of the scale with participants from the Urban ARCH Uganda cohort.

## Method

All procedures were approved by the Institutional Review Board at the University of California, San Francisco (UCSF), the Mbarara University of Science and Technology (MUST), and the Uganda National Council for Science and Technology (UNCST). Data for this study were collected as part of two ongoing longitudinal studies examining alcohol use among HIV-positive Ugandan men and women. The two studies were designed to answer different, but related, research questions regarding alcohol use and HIV, and thus the inclusion criteria were slightly different for each cohort. Cohort 1 was designed to examine changes in alcohol consumption among self-reported drinkers over time, beginning at clinic enrollment, the pre-ART period, and through the first year of HIV care. Cohort 2 was designed to examine the impact of alcohol use on HIV disease progression in the pre-ART period, and thus included both drinkers and abstainers.

### *Description of Cohort 1*

The BREATH Study (Cohort 1) was designed to measure changes in alcohol consumption over time among HIV-positive, Ugandan adults who had consumed alcohol within the past year and who were new to HIV care. Eligibility criteria for enrollment included age 18 years or older, fluency in either English or Runyankole (the local language in the Mbarara region of Uganda), being capable of providing informed consent, self-report of any alcohol use in the prior year, being new to HIV care, and residency within 60 km of the Immune Suppression Syndrome (ISS) Clinic in Mbarara, Uganda. Participants were required to be new to HIV care in order to examine how patterns of alcohol consumption change within the early phases of HIV treatment.

BREATH cohort participants were administered a structured interview consisting of measures of numerous variables, which included demographics, alcohol use, and other psychosocial variables related to alcohol use (e.g., depression). Interviews were conducted in a private room in either English or Runyankole, based on the participant's preference. Baseline data collection occurred from July 2011 through September 2013.

### *Description of Cohort 2*

The Urban ARCH Uganda study (Cohort 2) is a cohort of 450 people designed to examine the effect of heavy alcohol consumption on HIV disease progression before ART initiation. Participants were recruited from the same clinic as the BREATH study, but the inclusion criteria differed in the following ways: (a) alcohol consumers and abstainers were both included in Urban ARCH Uganda, and (b) only patients who were not yet scheduled to start ART, regardless of how long they were patients at the ISS clinic, were eligible. Baseline interview content and procedures involved the administration of a quantitative structured interview that measured many of the same demographics, alcohol use, and other psychosocial variables as the BREATH study. Baseline study recruitment occurred from April 2012 through August 2014.

### *Measures*

*Development of the East Africa Alcohol Expectancy Scale.* Leigh and Stacy (1993) proposed the following desirable qualities of an alcohol outcome expectancy scale that were considered during the development of the AFEXS: (a) items should be phrased in the first person, (b) items should

Table 1. Original 17-item East Africa Alcohol Expectancy Scale (AFEXS)

| Item | Description |
|---|---|
| 1. | It's easier for me to talk to people. |
| 2. | I get mean. |
| 3. | I am more likely to do things I normally wouldn't do. |
| 4. | I feel sad. |
| 5. | I feel sick the next day. |
| 6. | I feel sick (at the time I'm drinking). |
| 7. | I become more extroverted. |
| 8. | I feel ashamed of myself. |
| 9. | I am able to take my mind off my problems. |
| 10. | I become more aggressive. |
| 11. | I feel closer to a sexual partner. |
| 12. | I am less nervous about sex. |
| 13. | I find it harder to say no to sexual advances. |
| 14. | I am a better lover. |
| 15. | I am more sexually responsive. |
| 16. | I am less likely to use a condom. |
| 17. | I enjoy sex more than usual. |

clearly refer to specific outcomes of drinking (rather than, for example, cultural attitudes related to drinking behavior), (c) items should represent both positive and negative expectancies, and (d) items should be measured using a unipolar, multiple-response format (i.e., Likert-type scale). Using Leigh's previous work (Leigh, 1990; Leigh & Stacy, 1993), in combination with Kalichman et al.'s (2007) alcohol expectancy research in South Africa, we created an 18-item draft version of the AFEXS that included both positive and negative outcome expectancies related to sexual enhancement, social facilitation, release of inhibitions, tension reduction, and emotional and physical consequences of alcohol use. We chose to create our own scale using items from existing alcohol expectancy scales (as opposed to simply translating an existing scale) in order to capitalize on the alcohol expectancy research conducted in both South Africa and the United States.

Because all of the alcohol expectancy research in Africa has been in the context of HIV-related sexual risk behavior, and the significant public health implications of alcohol-associated sexual risk behavior within this context, the sex-related expectancy items were overrepresented in the development of the AFEXS. The sex-related items included three domains consistent with Leigh's (1990) original sex-related alcohol expectancy scale: enhanced sex (e.g., I am more sexually responsive), decreased anxiety (e.g., I am less nervous about sex), and increased riskiness (e.g., I am less likely to use a condom).

The AFEXS was forward and backward translated into Runyankole, and cognitive interviewing was used to establish face validity of the translated instrument. A total of 39 HIV-positive Ugandan adults participated in cognitive interviewing for one or more of the quantitative measures that were used in the BREATH Study. Of these 39 participants, 7 were given cognitive interviews regarding the original AFEXS. Cognitive interviewing consisted of administering the questionnaire, and if the participant paused at a question or looked confused, the participant was probed by asking him or her to "repeat the question in your own words" or "tell me what you were thinking about when I asked the question."

Based on feedback from the cognitive interviews, one item ("I feel less stressed") was dropped because of difficulty with cultural translation (i.e., the word "stressed" was difficult to translate). In addition, the wording of the following three items was modified to enhance translatability and cultural equivalence: Item 7, "I am more outgoing," was changed to "I become more extroverted"; Item 5, "I get a hangover," was changed to "I feel sick the next day"; and Item 6, "I feel sick," was changed to "I feel sick while drinking." This 17-item version of the AFEXS was the version all participants received at their BREATH and Urban ARCH Uganda study visits and is the primary focus of this validation study (Table 1).

*Alcohol use.* Alcohol use over the last year was assessed with the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993). In addition, frequency of intoxication was measured by asking each participant how often in the last 3 months he or she became "drunk or intoxicated by alcohol." Response options ranged from 1 = *never in the last 3 months* to 7 = *every day or nearly every day.*

*Most Recent Sexual Event Questionnaire.* The MRSEQ was designed to assess the circumstances (e.g., partner type, presence of alcohol use) of a sexual event and was adapted from Brown and Vanable's (2007) existing sexual event questionnaire. We modified the response options for level of alcohol consumption from "how many drinks did you have" during your most recent sexual event to a 6-point Likert-type scale measuring symptoms of intoxication. This scale (described below) is currently being used in the BREATH and Urban ARCH Uganda studies due to the difficulty of assessing beverage quantities and alcohol concentrations (which are highly variable) in Uganda. For the purposes of this study, the following two questions from the MRSEQ were used: During your most recent sexual experience, (a) did you use any amount of alcohol before sex and (b) which best describes how you felt from taking alcohol (1 = *you did not feel the effects of alcohol,* 2 = *you felt mild pleasurable effects of alcohol,* 3 = *you felt uninhibited in which you felt a sense of security and confidence,* 4 = *it was difficult to think clearly,* 5 = *you had difficulty speaking or seeing clearly,* or 6 = *you became unconscious or stuporous*)?

### *Statistical analyses*

*Exploratory factor analysis.* Informed by the "best practice guidelines" for EFA published by Costello and Osborn (2005) and standards in the field of psychometrics, the EFA occurred in several phases. First, the type of EFA (e.g., maximum likelihood, principal axis) was selected based on the skew of responses to survey items. The number of fac-

tors retained for rotation was determined by examination of scree plots and eigenvalues greater than 1.00. Subsequently, a rotation method was selected to account for correlations among the factors. After rotation, individual item loadings were explored to determine the following: (a) if the loadings were greater than .40, and (b) if there were any cross-loadings (i.e., loading > .32 on two factors). The EFA and validity analyses were conducted with IBM SPSS Statistics Version 22 statistical software (IBM Corp., Armonk, NY).

*Confirmatory factor analysis.* The CFA was conducted with data from Cohort 2 on the 13-item, three-factor version of the AFEXS that resulted from the EFA. The following indices were used to examine model fit: a nonsignificant chi-square test statistic, a root mean square error of approximation (RMSEA) value less than .06, and a comparative fit index (CFI) value greater than .95 (Hu & Bentler, 1998). All CFA analyses were conducted with Mplus Version 6.11 statistical software.

*Validity analyses.* We calculated the correlation of the total score and each factor from the AFEXS with the total AUDIT score, frequency of intoxication, the two questions from the MRSEQ described previously, and age using Spearman's rank correlation coefficients in the sample from Cohort 2.

## Results

### *Participants*

*Cohort 1: The BREATH Study.* A total of 209 HIV-positive Ugandan adults who reported drinking in the last year and completed the baseline survey provided data for these analyses. Table 2 provides a summary of participant characteristics. The sample was 57% male ($n$ = 120), almost exclusively ART-naive (i.e., had not been started on ART medication), had a mean age of 31.9 years (range: 18–69), and was mostly Protestant (55%). In terms of alcohol use, participants reported an average score of 8.1 ($SD$ = 7.6) on the AUDIT, and 22% of the sample reported consuming alcohol during their most recent sexual event.

*Cohort 2: The Urban ARCH Uganda study.* At the time of these analyses, 404 participants had completed a baseline study visit. Of these participants, 11% ($n$ = 45) were co-enrolled in the BREATH study, and 44% ($n$ = 178) reported not consuming any alcohol in the last year and were thus excluded from these analyses. The final sample included 181 participants who were demographically similar to the participants from Cohort 1 (Table 2).

Table 2. Participant characteristics for Cohort 1 ($n$ = 209) and cohort 2 ($n$ = 181)

| Variable | Cohort 1 $n$ (%) | Cohort 2 $n$ (%) |
|---|---|---|
| Sex | | |
| Male | 120 (57%) | 109 (60%) |
| Female | 89 (43%) | 72 (40%) |
| Age, $M$ ($SD$) | 31.9 (9.40) | 35.0 (10.24) |
| Religion | | |
| Protestant/Anglican | 115 (55%) | 95 (52%) |
| Catholic | 87 (41%) | 77 (53%) |
| Muslim | 5 (2%) | 5 (3%) |
| Seventh Day Adventist | 2 (1%) | 2 (1%) |
| Mean AUDIT (last year) | 8.1 (7.60) | 7.8 (5.5) |
| Consumed alcohol during most recent sexual event | 45 (22%) | 36 (20%) |

*Notes:* AUDIT = Alcohol Use Disorders Identification Test. Mean AUDIT (last year) for Cohort 1 participants includes only $n$ = 122 participants because the full AUDIT was not added until later study phases.

### *Exploratory factor analysis*

Each item on the scale was tested for normality, which revealed significant skew for a majority of the items. Principal axis (PA)-EFA (as opposed to maximum likelihood) was therefore used for the main analyses (Costello & Osborne, 2005). The factors were all highly correlated (range: $r$ = .37–.57, $p$ <.01), necessitating use of an oblique (rather than orthogonal) rotation for subsequent analyses.

The first PA-EFA was run without forcing any solution to see how many factors emerged. Results suggested a three-factor solution based on both eigenvalues > 1.00 and examination of the scree plot. The PA-EFA was then run a second time, forcing a three-factor solution with an oblique (promax) rotation. Items 8 and 9 did not load significantly (i.e., >.40) on any factor and were thus omitted from subsequent analyses. Another PA-EFA with a forced three-factor solution and oblique (promax) rotation was conducted on the 15-item scale. Item 16 cross-loaded on Factors 1 and 2, and Item 2 did not load significantly on any factor. A final PA-EFA with a forced three-factor solution and oblique (promax) rotation was conducted with a 13-item version of the scale omitting Items 2, 8, 9, and 16. The resulting factor loadings are presented in Table 3. This 13-item version of the AFEXS explained 67% of the variance and showed excellent internal consistency ($\alpha$ = .89), and all of the items loaded >.40 with no cross-loadings. The three derived factors (Factors 1, 2, and 3) also showed excellent to good internal consistency ($\alpha$'s = .91, .72, and .70, respectively) and were labeled as sex-related expectancies (Factor 1), release-of-inhibition expectancies (Factor 2), and negative expectancies (Factor 3).

*Gender differences.* To determine if the factor structure of the scale was comparable between men and women, the final PA-EFA with a forced three-factor solution and oblique (promax) rotation with the 13-item version of the scale was conducted separately for each gender. For women ($n$ = 89), the percent variance explained increased by 6% to 73%, the alphas for the total scale and for each factor slightly increased, and Item 3 ("I am more likely to do things I normally wouldn't do") did not load significantly on any factor. Items 4 and 5 also cross-loaded on two factors; however, the

TABLE 3. Final exploratory factor analysis on 13-item AFEXS with Cohort 1 ($n$ = 209)

| Description | Full scale Item no. | Sex-related (Factor 1) | Release of inhibition (Factor 2) | Negative (Factor 3) |
|---|---|---|---|---|
| It's easier for me to talk to people. | 1 | .011 | .536 | -.131 |
| I am more likely to do things I normally wouldn't do. | 3 | .148 | .521 | .071 |
| I become more extroverted. | 7 | -.009 | .757 | -.045 |
| I become more aggressive. | 10 | -.018 | .587 | .152 |
| I feel sad. | 4 | .184 | -.132 | .513 |
| I feel sick the next day. | 5 | -.125 | -.060 | .877 |
| I feel sick while drinking. | 6 | .041 | .257 | .589 |
| I feel closer to a sexual partner. | 11 | .710 | -.010 | .086 |
| I am less nervous about sex. | 12 | .863 | -.115 | .134 |
| I find it harder to say no to sexual advances. | 13 | .618 | .101 | .129 |
| I am a better lover. | 14 | .952 | -.065 | .011 |
| I am more sexually responsive. | 15 | .910 | .047 | -.132 |
| I enjoy sex more than usual. | 17 | .776 | .170 | -.144 |
| Cronbach's α | .89 | .91 | .72 | .70 |

*Notes:* Total variance explained = 67%. AFEXS = East Africa Alcohol Expectancy Scale; no. = number.

factor loadings were still highest for Factor 3, which is consistent with the primary EFA inclusive of both genders. The overall factor structure was also largely the same for the men ($n$ = 120). All of the items loaded on the same factors as in the primary EFA, although the loadings were not significant for Items 1 ("It's easier for me to talk to people") and 4 ("I feel sad"). All of the alphas, except for Factor 1, went down slightly, and the percent variance explained decreased from 67% to 64%.

### *Confirmatory factor analysis*

The CFA was first conducted on the 13-item AFEXS that resulted from the EFA, and model fit was moderate: $\chi^2(62) = 120.56$, $p < .001$, CFI = .93, RMSEA = .07, 90% CI [.05, .09], $p = .03$. Items 1 (.13, $p = .24$) and 4 (.20, $p = .03$) had low loadings and were thus dropped from subsequent analyses. All other loadings were high and significant, ranging from .45 to .90. A second CFA was conducted without Items 1 and 4, resulting in an 11-item, three-factor scale, with good internal consistency (α = .88) and model fit: $\chi^2(41) = 68.60$, $p = .004$, CFI = .97, RMSEA = .06, 90% CI [.03, .09], $p = .22$. All items loaded significantly and ranged from .43 to .90, and alphas for each factor were as follows (Table 4): Factor 1 (sex related) = .94; Factor 2 (release of inhibition) = .61; and Factor 3 (negative) = .73.

### *Validity analyses*

Although we were not able to create variables for the specific purpose of providing evidence for validity of the expectancy factors derived from the AFEXS (i.e., our validity

TABLE 4. Confirmatory factor analysis on 11-item AFEXS with Cohort 2 ($n$ = 181)

| Description | Full scale Item no. | Sex-related (Factor 1) | Release of inhibition (Factor 2) | Negative (Factor 3) |
|---|---|---|---|---|
| I am more likely to do things I normally wouldn't do. | 3 | | .56*** | |
| I become more extroverted. | 7 | | .52*** | |
| I become more aggressive. | 10 | | .71*** | |
| I feel sick the next day. | 5 | | | .83*** |
| I feel sick while drinking. | 6 | | | .70*** |
| I feel closer to a sexual partner. | 11 | .79*** | | |
| I am less nervous about sex. | 12 | .83*** | | |
| I find it harder to say no to sexual advances. | 13 | .82*** | | |
| I am a better lover. | 14 | .86*** | | |
| I am more sexually responsive. | 15 | .90*** | | |
| I enjoy sex more than usual. | 17 | .86*** | | |
| Cronbach's α | .88 | .94 | .61 | .73 |

*Notes:* AFEXS = East Africa Alcohol Expectancy Scale; no. = number.
***$p < .0001$.

Table 5. Validity coefficients for 11-item AFEXS with Cohort 2 ($n$ = 181)

| Criterion | Full scale Total score | Factor 1 Sex-related expectancies | Factor 2 Inhibition release | Factor 3 Negative |
|---|---|---|---|---|
| AUDIT Total Score | .36*** | .26** | .34*** | .30*** |
| Frequency of drinking to intoxication (last 3 months) | .35*** | .21* | .45** | .36** |
| Consumed alcohol during MRSE | .14 | .13 | .14 | .04 |
| Level of intoxication during MRSE | .42* | .32 | .38* | .23 |
| Age | .003 | .03 | .02 | -.03 |

*Notes:* AFEXS = East Africa Alcohol Expectancy Scale; AUDIT = Alcohol Use Disorders Identification Test; MRSE = most recent sexual event.
*$p$ < .05; **$p$ < .01; ***$p$ < .001.

analyses were secondary), we did make a priori predictions based on the existing expectancy literature conducted in both the United States (Leigh & Stacy, 1993; Maisto et al., 2010; McMahon et al., 1994) and South Africa (Kalichman et al., 2007). Based on this previous research and the final three factors that emerged from the EFA, our hypotheses for the validity analyses were as follows:

(a) The total score was expected to positively correlate with the AUDIT, frequency of intoxication, and the two items from the MRSEQ. This is based on the previously cited research showing alcohol expectancies to be correlated with quantity and frequency measures of alcohol use (e.g., Goldman et al., 1999; Lee et al., 1999).

(b) The negative expectancies factor was expected to positively correlate with the AUDIT and frequency of intoxication, but no significant correlations were expected for the MRSEQ items given the content of the negative expectancy items (i.e., negative physical and emotional effects of alcohol use). This is based on research showing negative expectancies to be positively related to consumption among social drinkers (McMahon et al., 1994), presumably because individuals who drink more heavily are more likely to have experienced the negative consequences of alcohol use, and thus expect those consequences to happen more frequently (Lee et al., 1999).

(c) The release of inhibition factor was expected to positively correlate with the AUDIT, frequency of intoxication, and both MRSEQ items. This is based on research showing that expectancy items related to "reduced inhibitions" have been shown to positively correlate with both the AUDIT and sexual risk behavior (Maisto et al., 2010).

(d) The sex-related expectancies factor was not expected to significantly correlate with the AUDIT but was expected to be positively correlated with frequency of intoxication and both MRSEQ items (Kalichman et al., 2007).

(e) Neither the factors nor the total score was expected to significantly correlate with age.

The validity coefficients for the total score and for each factor are presented in Table 5. The total score and each factor of the AFEXS were positively and significantly correlated with the AUDIT and frequency of intoxication. Thus, the validity hypotheses were generally supported, with two exceptions: (a) sex-related expectancies were not correlated with level of intoxication during the most recent sexual event, although there was a trend for significance in the expected direction ($\rho$ = .32, $p$ < .10), and (b) the total score and the three factors were not significantly correlated with whether alcohol was used during a most recent sexual event, although level of intoxication during the most recent sexual event was positively and significantly associated with the AFEXS total score and the release-of-inhibition factor (as hypothesized).

## Discussion

The AFEXS is the first psychometrically validated alcohol expectancy scale available for use with HIV-positive adults in sub-Saharan Africa. The 11-item scale measures positive expectancies related to sexual enhancement and release of inhibition, as well as negative expectancies related to the physical and emotional effects of alcohol use. Forward and backward translation and cognitive interviewing ensured that all items developed with U.S.-based populations were culturally equivalent and appropriate for an HIV clinic in Uganda. The AFEXS showed excellent internal consistency, the three-factor solution was consistent with the design of the scale, and the percent variance explained was comparable to other published alcohol expectancy research with U.S.-based HIV-positive study participants (Maisto et al., 2010). Although the three derived factors—sex-related, negative, and release-of-inhibition expectancies—were consistent with previously published alcohol expectancy research (Kalichman et al., 2007; Leigh & Stacy, 1993; Maisto et al., 2010), it is noteworthy that the sex-related expectancies and release of inhibitions formed unique factors in our sample. This may be because most of the sex-related items in the AFEXS were similar to what Maisto et al. (2010) labeled as "more open to sexual pleasure" (i.e., participants expected that alcohol would make them more open than if they were sober) rather than "reduced inhibitions about sex," allowing

the formation of two distinct factors related to release from inhibitions and sexual enhancement.

The validity correlations for the AFEXS were generally in the expected direction. The total score and all three factors were significantly correlated with both the AUDIT and frequency of intoxication in the last 3 months, providing evidence that the AFEXS is a valid measure of alcohol expectancies. One exception was that sex-related expectancies were not significantly associated with alcohol consumption during the most recent sexual event. Lee et al. (1999) also found alcohol expectancies related to sexual enhancement to be unrelated to alcohol consumption and hypothesized that people who have had "real-life indicators" of change in sexual functioning as a result of very heavy alcohol consumption (e.g., inability to sustain an erection) may be less likely to engage in alcohol-involved sexual events. Our cross-sectional data obviously cannot describe the temporal or causal relationship between sex-related expectancies and sexual behavior; however, future work with alternative study designs (e.g., longitudinal and event-level) and data collection methods (e.g., daily diaries) could more fully describe this relationship.

The psychometric properties of the AFEXS must be considered in the context of the sample with which it was developed. The men and women who participated in this study were HIV positive and ART naive, a status that is, and will continue to become, increasingly rare as HIV treatment becomes more accessible and is started earlier in accordance with WHO (2013) guidelines. It is possible that alcohol expectancies may differ among long-term ART users who have had the opportunity to confirm or contradict alcohol expectancies, particularly expectancies (e.g., "I feel sick the next day") that may be related to the popular misconception that consuming alcohol while on ART is "toxic" (Kalichman et al., 2009). The performance of the AFEXS may also differ by age, particularly if the scale is used with an adolescent sample (Brown et al., 1987). Similarly, expectancy research in the United States has found that the development of expectancy scales should incorporate both drinkers and nondrinkers in order to be applicable to populations with a wide range of drinking habits (Brown et al., 1987). Although the participants in our sample were not uniform in the quantity and frequency of their alcohol use, they were all prior-year drinkers and may differ considerably from the 40% of Ugandans who self-report as abstinent (WHO, 2014). Last, there is an enormous amount of variability in language, culture, and socioeconomic status both within Uganda and across sub-Saharan Africa. The scale we constructed requires ongoing validation with diverse samples of individuals and should be tailored accordingly.

In summary, the AFEXS is the first validated measure of alcohol expectancies for use with HIV-positive adults from Uganda. Given the similarities in drinking patterns (e.g., heavy, episodic) across other countries in the region, the AFEXS has potential to be useful to a wide range of researchers across sub-Saharan Africa, provided ongoing validation occurs. Implementing psychometrically validated measurement tools in research and clinical practice can enhance our understanding of how alcohol expectancies affect HIV care among people living with HIV in this region. For example, "expectancy challenge" interventions, which have been shown to be efficacious for reducing alcohol consumption among heavy drinking men in the United States (Labbe and Maisto, 2011), may provide one avenue for reducing both alcohol use and other associated behaviors (e.g., nonadherence, sexual risk behavior) that increase the likelihood of onward transmission. Such behavioral interventions are an important component of HIV prevention efforts and have the capacity to augment biomedical HIV "treatment as prevention."

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