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A Beverage-Specific Measure of Expectancies for Malt Liquor: Development and Initial Testing

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Abstract

Malt liquor (ML) is a unique, high alcohol content beverage marketed to encourage heavy drinking. We developed the Malt Liquor Expectancy Questionnaire (MLEQ), a beverage-specific measure of alcohol expectancies and examined its association with ML use, total alcohol use and alcohol problems. Forty positive and 40 negative expectancy items were administered to a sample of 639 young adults who regularly consumed ML. Exploratory and confirmatory factor analyses led to the development of the 30-item MLEQ. The MLEQ consists of two positive (i.e., Social Facilitation and Enjoyment, Enhanced Sexuality) and two negative factors (i.e., Aggression and Negative Consequences; Impairment and Physical Symptoms) that possess good internal consistency, test-retest reliability, and convergent validity. The psychometrically sound MLEQ contributes to the limited research on beverage-specific expectancies and heavy drinking.

Keywords

malt liquor; positive expectancies; negative expectancies; alcohol use; factor analysis

Expectancies are cultural beliefs or expectations about the effects of alcohol (cf. MacAndrew & Edgerton, 1969), which have proven to be important cognitive constructs for understanding drinking behavior (Goldman, Del Boca, Darkes, 1999; Leigh & Stacy, 1993).

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They typically are defined as cognitive representations of an individual's past direct and indirect learning experiences with alcohol (Connors & Maisto, 1988) and are said to be stored in long-term memory (Rather & Goldman, 1994; Stacy, 1997). Expectancies have been associated with alcohol use and alcohol problems (Goldman et al., 1999; Guarna & Rosenberg, 2000).

Expectancies for Different Types and Doses of Alcoholic Beverages

Expectancies vary with a number of individual and contextual variables, including the type of alcoholic beverage (Collins, Lapp, Emmons, & Isaac, 1990; Devoulyte, Stewart, & Theakston, 2006; Guarna & Rosenberg, 2000; Lang, Kass, & Barnes, 1983; Pedersen, Neighbors, & Larimer, 2010). For example, Guarna and Rosenberg (2000) randomly assigned DUI offenders to complete a separate copy of the same expectancy measure for each of five different alcoholic beverages. Participants endorsed significantly more positive expectancies for beer and mixed drinks and more negative expectancies for liquor. Devoulyte, et al. (2006) found that their all female sample of problem drinkers reported the strongest positive expectancies (e.g., global positive, social/sexual enhancement) for a social context in which they were drinking beer as compared to wine or hard liquor. Most recently, Pedersen et al. (2010) reported that young adults held different expectancies for wine compared to beer and hard liquor. In all of these studies, different types of alcohol were associated with different expectancies, possibly as a function of the individual's views of the potency and positive aspects of different types of alcohol (Carey & Johnson, 1994; Lang et al., 1983; Pedersen et al., 2010), as well as the social and cultural referents.

Dose of alcohol also may be related to alcohol expectancies (Collins et al., 1990; Connors, Maisto, & Watson, 1988; Fromme, Stroot, & Kaplan, 1993; George & McAfee, 1987; Southwick, Steele, Marlatt, & Lindell, 1981). Typically, results indicate that a large dose is seen as producing more behavioral impairment and less positive effects relative to a moderate dose of alcohol. In some cases (e.g., Collins et al., Southwick et al.) drinking habits influenced expectancies such that heavier drinkers expected greater levels of positive effects, compared to lighter drinkers. Connors et al., (1988) reported that the expected alcohol effects were more strongly related to the dose of alcohol than to the participant's drinking pattern.

Malt Liquor is a Unique Alcoholic Beverage that is Associated with Heavy Drinking

Among alcoholic beverages, malt liquor (ML) can be distinguished from most domestic beers because: 1) it has a higher alcohol content by volume (6%–11%); 2) it is packaged in large (typically 40 oz = 3.3 to 6 standard drinks) containers that cannot be resealed, thereby promoting heavy drinking; and 3) it is inexpensive (sold for as little as 99¢ per 40 oz bottle). Popular brands of ML include *Colt 45*, *St. Ides*, and *Olde English 800*. Prevalence data indicates that approximately 7% of the population drink ML (Greenfield, Taylor, & Bond, 2001), a level of use that is higher than the prevalence of the use of most illicit drugs, other than marijuana. The majority of ML drinkers are male, young adults (age 18–34 years). About one third of ML drinkers are African-American, much in excess of the African-American representation in the U.S. population (approximately 13%; Greenfield et al., 2001).

The combination of ML's high volume packaging, high alcohol content, and low price may contribute to its appeal to individuals with limited finances, including adolescent and young adult drinkers (Chen & Paschall, 2003; Greenfield et al., 2001; Hill & Casswell, 2001) who tend to see ML as a cheap way to get drunk quickly (Bradizza, Collins, Vincent & Falco, 2006). To capitalize on these qualities, ML is marketed almost exclusively in low-income urban and minority communities (Jones-Webb et al., 2008) and is advertised using images

(e.g., macho masculinity, misogyny, aggression) and cultural referents (e.g., urban, hip hop culture) that appeal to younger drinkers (Chen, Miller, Grube, & Waiters, 2006). Such marketing is likely to shape drinker's perceptions of ML's availability and its effects (Hacker, Collins, & Jacobsen, 1987; Hill & Casswell, 2001). The pharmacokinetics of ML may confer additional risk for heavy drinking because compared to a similar volume of ethanol in diet soda, ML is absorbed more slowly yet drinkers do not report significantly different subjective effects (Taylor et al., 2008).

Despite its unique characteristics, researchers have only recently begun to examine ML use as separate from drinking regular beer and other alcoholic beverages (e.g., Bluthenthal, Taylor, Guzman-Becerra, Robinson, 2005; Bradizza et al., 2006; Chen & Paschall, 2003; Collins, Bradizza, & Vincent, 2007). Many studies have focused on young-adult (e.g., age 18 to 35 years) drinkers because heavy drinking and/or ML use tends to occur among these younger age groups (Bradizza et al., 2006; Chen & Paschall, 2003; Collins et al., 2007; Greenfield et al., 2001). Data from a variety of convenience samples suggest that ML drinkers tend to drink heavily and as a consequence report more alcohol problems than those who do not drink ML (Chen & Paschall, 2003; Greenfield et al., 2001; Vilamovska, Taylor, & Bluthenthal, 2009). No studies have examined the beverage-specific expectancies that ML drinkers may hold.

Measurement of Positive and Negative Alcohol Outcome Expectancies

Researchers have developed a number of self-report measures of positive (i.e., beliefs associated with drinking more) and negative (i.e., beliefs associated with drinking less) alcohol expectancies (e.g., Fromme et al., 1993; Leigh & Stacy, 1993; Rohsenow, 1983; Southwick et al., 1981; Stacy, Widaman, & Marlatt, 1990). Positive expectancy factors include enhanced sexual functioning, social and physical pleasure, and tension reduction (Brown, Goldman, Inn, & Anderson, 1980), sociability and courage (Fromme et al., 1993), as well as fun (Leigh & Stacy, 1993). Negative expectancy factors (cf. Jones, Corbin & Fromme, 2001; Jones & McMahon, 1998; McMahon & Jones, 1993) include behavioral impairment (e.g., clumsy, poor coordination; Rohsenow, 1983; Southwick et al., 1981), careless unconcern (Rohsenow, 1983); cognitive and motor impairment (Brown, Christiansen, & Goldman, 1987; Christiansen, Goldman, & Inn, 1982; Fromme et al., 1993; Leigh & Stacy, 1993), risky behavior/aggression (Fromme et al., 1993) and negative emotions (Fromme et al., 1993; Leigh & Stacy, 1993).

Gender and Ethnic Differences in Malt Liquor Use and Alcohol Expectancies

ML drinkers seem to be predominantly male (Chen & Paschall, 2003; Collins et al., 2007; NIAAA, 2000). Although gender differences typically are not found for self-reported alcohol expectancies (e.g., Fromme et al., 1993; George et al., 1995), the gender difference in the preference for ML could produce gender differences in ML expectancies. The drinking of ML may predominate among nonEuropean ethnic groups, possibly due to the marketing of ML in urban and low-income communities (Chen et al., 2006; Chen & Paschall, 2003; Greenfield et al., 2001; Jones-Webb et al., 2008; NIAAA 2000; Vilamovska et al., 2009). Studies of ethnic differences in alcohol expectancies have produced mixed findings in children (e.g., Corvo, 2000; Chung, Hipwell, Loeber, White, & Stouthamer-Loeber, 2008), college students (e.g., McCarthy, Miller, Smith, & Smith, 2001) and immigrants (e.g., Oei & Jardim, 2007).

The Present Study

The many unique characteristics of ML may contribute to alcohol expectancies that are different from those held for the generic alcoholic beverages that are assessed by existing alcohol expectancy measures. When individuals report their generic alcohol expectancies,

their reports could be based on combining the different types of alcohol that they consume or on the alcoholic beverage(s) that they most frequently consume. In either case, potentially important beverage-specific beliefs are not being captured. Given the contextual factors that can influence the nature and content of alcohol expectancies as well as the recognition of the usefulness of beverage-specific expectancy measures (e.g., Guarna & Rosenberg, 2000; Pedersen et al., 2010), we developed the Malt Liquor Expectancy Questionnaire (MLEQ). The MLEQ was designed to provide a new measure of beliefs about the cognitive, social, and behavioral effects of ML. We identified positive and negative ML expectancy factors and examined their psychometric (reliability, validity) properties. We also examined the role of demographics (i.e., gender, ethnicity/student status) and dose instructions (large vs. moderate) in responses to the MLEQ items. Knowledge of ML expectancies can enhance our understanding of the drinking behavior and problems associated with ML and other high alcohol content beverages.

Method

Participants

We used print advertisements in community and college newspapers as well as posted fliers to recruit young adults in the Buffalo, New York, metropolitan area. The ads read, *Do you drink 40s?*, referring to 40 oz bottles of ML. Participants were screened for inclusion criteria, including: age (18–35 years), education (at least 5th grade), city residency, and regular consumption of ML (at least 40 oz/week), no history of alcohol treatment, no legal, psychological (e.g., major mental illness) or medical contraindications to drinking alcohol, and no regular (i.e., $\geq$ monthly) use of heroin or crack. Each participant received \$30 USD. This research was approved by the IRB at the University at Buffalo, SUNY.

The final sample ($N = 639$) consisted of 456 (71%) men and 183 (29%) women with a mean age of 22.9 years ($SD = 4.2$). Participants were predominantly European American ($n = 368$, 58%) and African American ($n = 186$, 29%), with smaller percentages of Latinos ($n = 36$, 6%), and other ethnicities ($n = 49$, 7%). They were mostly single ($n = 595$, 93%) and nearly two-thirds ($n = 398$, 63%) reported a gross annual income of less than \$20,000. About one-half ($n = 327$, 51%) of the sample was currently enrolled in school, with most ($n = 308$, 94%) attending a 2- or 4-year college. Ethnicity and student status were significantly associated, such that European Americans (74%) were more likely to be currently enrolled in school than were minorities (26%), $\chi^2(1, N = 638) = 54.91, p < .001$.

Procedure

Development of malt liquor expectancy items: Prior to the current study, we conducted 10 focus groups with 53 regular (at least 40 oz/week) ML drinkers to identify positive and negative beliefs about the effects of ML (Bradizza et al., 2006; cf. Vogt, King, & King, 2004). Based on Leigh and Stacy (1993, 1994), we asked each participant to list up to 10 *[good or pleasant/bad or unpleasant] things that might happen to you as a result of drinking malt liquor*, with order counterbalanced across groups. Participants' beliefs about ML's effects were independently coded by three raters to capture the widest range of specific behaviors and discrepancies were resolved by discussion with the first author. Based on the coding, we developed an 80-item preliminary Malt Liquor Expectancy Questionnaire (MLEQ).

Measures—At the Research Institute, small groups of participants completed the psychometrically-sound questionnaires described below as well as the preliminary MLEQ. Questionnaire order was counterbalanced across participants.

General Information Questionnaire (GIQ; Collins et al., 1990): We used the GIQ to assess demographics (e.g., gender), drinking history (e.g., age of first drink), and use of alcohol and other substances. Participants read the definition of a standard drink (e.g., 1 standard drink = 12 oz. beer) for alcoholic beverages such as beer, wine and ML. The GIQ included the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985), a commonly used measure of typical drinking, with good psychometric properties (Collins, Koutsky, Morsheimer, & MacLean, 2001). We used the DDQ to compute the participants' weekly quantity of alcohol consumed during the past month. Due to skew, this variable was square-root transformed prior to analyses.

Malt Liquor Questionnaire: (MLQ; Collins et al., 2007). The MLQ assessed various aspects of ML consumption. From the MLQ, we computed participants' typical weekly quantity of ML. Due to skew, this variable was log transformed prior to analyses.

Malt Liquor Expectancy Questionnaire (MLEQ): The 80-item preliminary MLEQ consisted of 40 positive and 40 negative expectancies about ML. Participants completed the MLEQ twice, once for a "large" amount and once for a "moderate" amount of ML. Instructions were as follows: "*We are interested in what you think might happen if you consume a large (or moderate) amount of malt liquor...[indicate] how much you agree or disagree with each statement.*" In the analyses to develop the MLEQ, we focus on expectancies for a "large" amount of ML in part because this dose best reflected the participants' typical ML intake.¹ All items were worded in the first person (e.g., *I lose coordination.*) and were rated on a six-point Likert scale (1 = Strongly disagree, 6 = Strongly agree).

Comprehensive Effects of Alcohol (CEOA; Fromme et al., 1993): The 38-item CEOA was modified to measure general alcohol expectancies for a large (or moderate) dose of alcohol and the participants completed the CEOA twice. They were told to consider "*what you expect to happen if you were to drink ... a large (or moderate) amount of alcohol.....*" All CEOA items were worded in the first person (e.g., "I would enjoy sex more.") and were rated on a four-point Likert scale (1 = Disagree, 4 = Agree). Subjective evaluations were not measured. The scores for the four positive scales and three negative scales were computed by summing the appropriate items. CEOA scales had adequate internal consistency ($\alpha = .69$ to $.90$).

Drinking Motives Questionnaire (DMQ; Cooper, 1994): The 20 items of the DMQ assess four sets of motives for drinking (social, coping, enhancement, conformity). Using a 1 (*Almost never*) to 4 (*Almost always*) scale, participants indicated how often they drink for each reason (e.g., "Because it's fun."). The DMQ factors were internally consistent ($\alpha = .81$ to $.85$). To reduce skew, the conformity scale was log-transformed.

Malt Liquor Motives (MLM; Collins et al., 2007): The six items ($\alpha = .75$) of the MLM assess reasons for drinking ML (e.g., its quick effect). Each item is rated on a 6-point scale (1 = *Not at all influential*, 6 = *Very influential*).

Rutgers Alcohol Problems Index (RAPI; White & Labouvie, 1989): The 23 items of the RAPI (e.g., "Had a bad time") describe alcohol problems in areas such as social relationships and delinquent behavior. Participants indicated the number of times (0 = *Never*, 4 = *More than 10 times*) each problem occurred to them while drinking or due to

¹On the MLEQ, participants also were asked to indicate the number of 40-oz. containers of ML that constituted a "moderate" or a "large" amount, for them. They reported that a large amount of ML was approximately three 40-oz containers, which closely matched the participants' consumption on a typical drinking occasion (7 or more drinks).

alcohol use during the past 12 months. Responses were summed to derive a RAPI total score ($\alpha = .92$), with higher scores reflecting more problems. Due to skew, RAPI scores were square-root transformed.

Malt Liquor-Short Inventory of Problems (ML-SIP): The 15-item SIP (Miller, Tonigan, & Longabaugh, 1995) was reworded to assess negative consequences of consuming ML (e.g., *had money problems*) during the past month. Each item was rated on a four-point Likert scale (0 = *Never*, 3 = *Daily or Almost daily*). Higher summed total ML-SIP scores ($\alpha = .92$), reflected more frequent problems. Due to skew, ML-SIP scores were log transformed.

Results

We describe the participants' typical alcohol use and alcohol problems and then we present details of item reduction, the sample split, and data screening. We report exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) results. Finally, we describe the reliability and validity of the MLEQ and its relation to ML dose.

Alcohol and Malt Liquor Use and Problems

Participants were heavy drinkers. On the DDQ, most (70%) reported consuming ≥ 12 drinks per week and typical weekly alcohol use was $M = 30.24$ drinks ($SD = 19.03$; $Mdn = 26$). On the MLQ, typical weekly ML use was $M = 17.12$ drinks ($SD = 16.05$; $Mdn = 13$). The M total score on the RAPI (i.e., alcohol problems during the past 12 months), was 20.64 ($SD = 16.16$), close to those for young adult clinical samples (men = 21.0 and women = 26.0; White & Labouvie, 1989). The M total score on the ML-SIP (i.e., negative consequences of consuming ML during the past month), was 6.24 ($SD = 7.00$).

Item Reduction to Develop the MLEQ

After examining inter-item correlations and item-to-total correlations, one item was removed from each pair of highly correlated ($r \geq .70$) items. As a result, six items (*It's easier for me to socialize, I say things that I do not mean, I get into a fight, I lose my temper, Sex is better, and I vomit*) were removed. We dropped one item (*I get into a car accident*) due to a low rate of endorsement and high skew (skew = 2.34; skew/SE = 24.10). Another item (*I become more creative.*) was dropped due to an item-to-total correlation $\leq .20$. Once a total of eight items were removed, 72 items (35 negative; 37 positive) remained.

Sample Split and Data Screening

Sample split—We randomly split the total sample into two subsamples with stratification on gender and ethnicity (minority vs. European American).² One subsample (EFA sample; $N = 304$) was used for EFA and the other subsample (CFA/cross-validation sample; $N = 335$) was used for validation of the factor structure (MacCallum, Browne, & Sugawara, 1996).³

Data screening—The two subsamples were evaluated separately for normality and outliers. The Kaiser-Meyer-Olkin (Kaiser, 1974) measure of sampling adequacy was .90,

²Stratification was performed to ensure that gender and ethnic groups were represented in each subsample in approximately the same proportion as in the total sample. Also, thirty-two participants (5%) reported "other ethnicity" on the General Information Questionnaire (GIQ). To maximize sample size, these participants were randomly assigned to either the minority or European-American groups.

³The size of the EFA ($n = 304$) and CFA ($n = 335$) subsamples was not equal because the random sampling approach we used in SPSS involved a random number generator, which did not allow us to specify exact sample sizes.

suggesting the EFA subsample data were ideal for factor analysis. Within each subsample, skewed items were square-root transformed and transformed scores were used in analyses. No univariate outliers were detected. We used Mardia's coefficient of multivariate kurtosis to evaluate multivariate normality. There were little missing data ($\leq 1\%$ missing per item), so EFA analyses used listwise deletion. For CFA analyses, we used the Full Information Maximum Likelihood algorithm for missing data; since results were the same as when using robust maximum likelihood estimation with listwise deletion, so we report the latter.

Exploratory Factor Analysis

Consistent with previous alcohol expectancy research (e.g., Leigh & Stacy, 1993), we conducted EFA of positive and negative expectancy items together using SPSS (Version 15). To determine the number of factors, multiple methods are recommended (Fabrigar, Wegener, MacCallum, & Strahan, 1999). For the items remaining after item reduction, Cattell's (1966) scree test suggested retaining four factors. From parallel analysis (PA; Horn, 1965; O'Connor, 2000), a highly accurate method for determining the number of factors (Hoyle & Duvall, 2004; Russell, 2002), a common factor analysis approach suggested eight factors. Thus, we compared principal axis factoring (PAF) solutions ranging from four to eight factors. We used oblique rotation (promax) because we expected first-order expectancy factors to be interrelated. Item content and loadings were carefully examined. Solutions with five or more factors suggested overfactoring: they involved minor, specific factors (e.g., a 2-item marijuana/other drug use factor) that were difficult to interpret, involved too few indicator items, and explained trivial variance. We considered a four-factor solution most interpretable and used it as a starting point. As a result of this process, 17 items with cross-loadings ($\geq .30$) were dropped, without affecting the conceptual meaning of the factors. One cross-loading item (*I have unprotected sex*) was retained for its public health importance and to have four item indicators for that factor. To reduce scale length without compromising content validity, we dropped 20 items due to fairly low pattern matrix loadings ($< .50$). To further minimize redundancy, we dropped four more items with the lowest factor loadings on the larger factors. A PA with the remaining 31 items indicated that four factors should be retained. All but one item (*I have unprotected sex*) loaded $\geq .50$ on one of the four factors. Based on item content, we labeled the two positive expectancy factors, "Social Facilitation and Enjoyment" and "Enhanced Sexuality", and the two negative expectancy factors, "Aggression and Negative Consequences" and "Impairment and Physical Symptoms".⁴ Promax pattern coefficients and extracted item communalities are presented in the Table 1 (column 1). The four-factor solution accounted for 52% of the variance in the items.

Confirmatory Factor Analysis

To conduct CFA, we used Mplus version 5.0 (Muthén & Muthén, 2007). Since Mardia's coefficient was initially high [standardized (std.) estimate = 43.69], robust maximum likelihood estimation was used. In Mplus, the mean-adjusted or robust χ^2 in Mplus is equivalent to the Satorra-Bentler scaled χ^2 (Satorra, 2000; Satorra & Bentler, 2001) and appropriate when data are not multivariate normal. In addition to χ^2 , we used multiple fit indices and examined consistency among them (cf. Cliff, 1983). Following Hu and Bentler's (1999) recommendations, we report the std. root mean square residual (SRMR), the root-mean-square error of approximation (RMSEA), and the comparative fit index (CFI). Modification indices (MIs) were examined. Based on the EFA results, we used the CFA subsample to test a CFA model with four expectancy factors. Each item was an indicator of its corresponding factor. The first loading for each factor (i.e., reference indicator) was

⁴When the EFA analyses were repeated using non-transformed items, the factor structure remained the same.

arbitrarily fixed to 1.0 in order to set the scale for the factor. Consistent with simple structure, items were allowed to load on only one factor. Residual covariances were fixed to zero. In the initial CFA, MIs indicated a fairly strong correlated error between two items (*I get a headache* and *I experience a hangover*). The first item was dropped to reduce redundancy and a 30-item, four-factor model was estimated. All fit indices met criteria for adequate fit: adjusted χ^2 (399, $N = 307$) = 817.76, $p < .001$, SRMR = .08, RMSEA = .06, CFI = .90. The SRMR was $\leq .08$, indicating good fit to the data (Hu & Bentler, 1999). The RMSEA was $\leq .06$ (Hu and Bentler, 1999), and the CFI was $\geq .90$, reflecting acceptable fit (Bentler & Bonett, 1980; Hu & Bentler, 1998). Although a CFI $\geq .95$ is the current convention for good fit (Hu & Bentler, 1998, 1999), this more stringent value may be more difficult to obtain in practice (Marsh, Hau, & Wen, 2004; Russell, 2002). MIs were trivially small relative to the model χ^2 ; therefore, no further modifications were considered justifiable.

Overall, our *a priori* four-factor model had adequate fit to the data. The magnitude and statistical significance of individual parameter estimates also supported the four-factor model. Table 1 (see column 2) presents the std. factor loadings of the positive and negative expectancy factors. Nearly all of std. loadings were large (.60 to .82), with only five moderate loadings ($< .60$). All loadings were statistically significant ($p < .001$), indicating reliable indicators. Model comparisons are briefly summarized. A useful comparison is a one-factor model to test how well a common factor accounts for item covariation. A one-factor model provided poor fit; the χ^2 dif test indicated that the four-factor model fit the data significantly better than did the one-factor model, χ^2 (6, $N = 307$) = 615.53, $p < .001$. Based on prior research and theory, we also tested a second-order CFA model with one general positive expectancy factor and one general negative expectancy factor. Although the first-order four factor model was preferred, the second-order model had merit.

Demographic differences on the MLEQ—Relatively small subgroup sizes in the CFA subsample (e.g., 98 women) precluded testing the invariance of the factor structure across demographic subgroups. Controlling for typical weekly ML quantity, we used MANCOVA with the four MLEQ scales as the dependent variables, to examine whether there were gender, ethnic, or student status differences on the MLEQ. For gender, the multivariate F (Wilks' Lambda) was not significant, $F(4,292) = 1.64$, $p > .05$, suggesting no gender differences in the MLEQ factors. Student status and ethnicity were confounded, so we examined them in the same model. For student status, the multivariate F was not significant, $F(4, 291) = 1.28$, $p > .05$, suggesting that when ethnicity and typical weekly quantity of ML was held constant, MLEQ scores did not vary as a function of student status. For ethnicity, the multivariate F was significant, $F(4, 291) = .88$, $p < .001$, suggesting that when student status and typical weekly quantity of ML were held constant, MLEQ scores varied as a function of ethnicity. Follow-up univariate analyses indicated that European Americans endorsed more expectancies for Social Facilitation and Enjoyment and Impairment and Physical Symptoms than did minority participants. There were no ethnic differences in Aggression and Negative Consequences or Enhanced Sexuality.

Reliability of the MLEQ

Internal consistency for the MLEQ factors was generally good ($\alpha = .78$ to $.93$). Correlations among the four MLEQ factors ranged from $r = .14$ to $.50$, all $ps < .001$. Approximately 2 weeks after the initial questionnaire session, 50 participants returned to complete the preliminary 80-item MLEQ a second time. Pearson correlations for the MLEQ factors ($r = .74$ to $.87$, all $ps < .001$) indicated good stability over a short time interval.

Convergent Validity of the MLEQ

We examined associations between MLEQ expectancies, general alcohol expectancies (CEOA), and drinking motives (DMQ and ML motives). The findings provided support for the convergent validity of the MLEQ. MLEQ factors (see Table 2) showed strong positive relationships with corresponding CEOA factors ($r = .59$ to $.70$, all $ps < .001$). As expected, MLEQ factors also showed significant, positive associations with DMQ factors ($r = .20$ to $.55$, all $ps < .001$) and ML motives ($r = .21$ to $.37$, all $ps < .001$).

Concurrent Validity of the MLEQ

To examine concurrent validity, we used hierarchical regression analyses to test whether ML drinkers' beliefs about the effects of ML were directly related to their typical ML and total alcohol use⁵ (i.e., typical weekly quantity from the MLQ and GIQ, respectively) during the past month, as well as alcohol problems (RAPI). Results are presented in Table 3. Predictors were entered in two steps, with demographics entered simultaneously on Step 1 and the four MLEQ scales entered on Step 2. Effect sizes (Cohen's d) were calculated using the formula $d = 2t/\sqrt{df}$ (Rosenthal & Rosnow, 1991), with effects of $.2$ considered small, $.5$ = medium, and $.8$ = large (Cohen, 1992). Gender was associated with typical weekly quantity of alcohol, with men reporting heavier drinking than women. European Americans reported heavier drinking and more alcohol problems than did minority participants and nonstudents reported drinking greater quantities of ML than did students. After controlling for demographics, MLEQ-Social Facilitation and Enjoyment was not associated with typical ML use, but was positively related to total alcohol use and alcohol problems. The MLEQ Enhanced Sexuality factor was positively related to alcohol problems only. The MLEQ Aggression and Negative Consequences factor was positively related to all three alcohol outcomes, with the association with alcohol problems corresponding to a large effect. The MLEQ Impairment and Physical Symptoms factor was not related to alcohol outcomes. After controlling for demographics, the MLEQ Social Facilitation and Enjoyment and Aggression and Negative Consequences factors explained a small (4 – 5%) proportion of additional variance in typical ML and total alcohol use and 34% of additional variance in alcohol problems (i.e., RAPI, ML-SIP).⁶

Malt Liquor Expectancies as a Function of Dose

We examined the MLEQ factors in relation to the moderate vs. large dose ML instructions. Alphas for the four moderate dose MLEQ factors were good to excellent ($\alpha = .77$ to $.91$). Paired t-tests revealed that participants more strongly endorsed expectancies of Social Facilitation and Enjoyment, Aggression and Negative Consequences, and Impairment and Physical Symptoms for a large dose versus a moderate dose (see Table 4). Expectancies for Enhanced Sexuality did not vary by ML dose.

Discussion

The 30-item MLEQ is a new, psychometrically sound, beverage-specific measure of positive and negative outcome expectancies for ML. Rather than adapting a general alcohol expectancy measure to examine beverage-specific beliefs (e.g., Pedersen et al., 2010), we used focus groups to generate the MLEQ items, conducted exploratory and confirmatory analyses, and examined the internal consistency, test-retest reliability, and validity of the

⁵Although the sample was comprised of regular ML drinkers, most of the sample (86%) reported that half or more of the alcohol they consume is *not* ML. Since ML drinkers consume other alcoholic beverages, we also examined total alcohol use as an outcome.

⁶Based on reviewer feedback, we re-ran the hierarchical regression analysis using the ML-SIP (i.e., ML problems) as the outcome measure. For this sample, the ML-SIP and RAPI had a fairly high correlation ($r = .62$, $p < .001$) and the regression analysis for the ML-SIP produced a pattern of results similar to that found for the RAPI.

resulting measure. The resulting measure is unique and addresses three issues in the current literature on alcohol expectancies. First, it responds to the need for beverage-specific measures of alcohol expectancies, given the accumulating evidence that the content and predictive utility of alcohol expectancies can vary as a function of the nature of the alcoholic beverage being rated (e.g., Guarna & Rosenberg, 2000; Pedersen et al., 2010). To date, a key drawback of beverage-specific assessments of alcohol expectancies has been the adaptation of general alcohol expectancy measures to measure beliefs about different alcoholic beverages. Second, given the unique characteristics of ML, we developed a new measure based on MLEQ items generated in focus groups of ML drinkers (cf. Vogt et al., 2004). This approach provided a way to enhance the content validity and potential meaningfulness of using ML-specific items. Third, the MLEQ provided a measure of alcohol expectancies with which to explore the nature of the expectancies for ML, thereby improving our understanding of ML use. This latter issue is important because of the link between ML use and heavy drinking and problems, as well as the concern about the marketing of ML to vulnerable populations such as young adults and residents of urban, low income communities (e.g., Hacker et al., 1987; Jones-Webb et al., 2008).

Our large sample of ML drinkers provided adequate subsamples with which to conduct both exploratory and confirmatory factor analyses, from which we developed the four factors of the MLEQ. In CFA, we achieved adequate indices (see Bollen, 1989; Marsh et al., 2004), comparable to those for other measures of alcohol expectancies. In addition, the use of an ethnically diverse sample of young-adult community residents and college students enhances the generalizability of the findings, particularly as compared to expectancy measures that were developed using only college students (e.g., Fromme et al., 1993; Southwick et al., 1981).

The MLEQ was found to consist of two positive expectancy factors (a total of 16 items) that encompass 1) Social Facilitation and Enjoyment and 2) Enhanced Sexuality, which form a single second-order positive factor. It also includes two negative expectancy factors (a total of 14 items) that encompass 1) Aggression and Negative Consequences and 2) Impairment and Physical Problems, which form a single second-order negative factor. Among ML drinkers, positive expectancies mainly focused on the facilitation of social interactions and the enhancement of sexual experience. Although items related to positive and negative effects found in general expectancy measures (e.g., escape from troubles) were generated in the focus groups, they did not meet statistical criteria for inclusion in the final MLEQ.

Positive expectancies, including beliefs about the social effects of drinking, typically are related to alcohol use (cf. Brown et al., 1980; Fromme et al., 1993; Leigh & Stacy, 1993). In the case of the MLEQ, the Social Facilitation and Enjoyment factor (e.g., *I become more talkative*) was related to total alcohol use and problems. The Enhanced Sexuality factor (e.g., *I enjoy sex more*.) was associated with alcohol problems only. The lack of a significant relationship between the Enhanced Sexuality factor and consumption of ML and other alcoholic beverages is not consistent with previous research and difficult to explain. Generally speaking, it may be that the participants viewed negative outcomes, rather than positive outcomes, as more strongly associated with their typical consumption of ML and alcohol in general. Since ML is a high volume, high alcohol-content beverage, drinking ML inherently involves consumption of a “large dose” of alcohol. Past research indicates that large doses of alcohol are more strongly associated with negative, than positive, beliefs about the effects of alcohol (e.g., Collins et al., 1990; Southwick et al., 1981). Thus, findings from the present study are fairly consistent with research on dose-related expectancies.

The two negative MLEQ factors had varying significant relationships to ML use. Namely, the MLEQ Aggression and Negative Consequences factor (e.g., highest loading item = *I am*

violent.) showed fairly strong positive associations with all three alcohol-related outcomes, particularly alcohol problems. It is worth noting that the MLEQ Aggression and Negative Consequences items seemed to reflect greater severity than do the Risk and Aggression items of the CEOA (e.g., highest loading item = *I would take risks.*). In this way, our understanding of ML drinking, and possibly heavy drinking in general, is enhanced by deriving and examining ML-specific expectancies. Interestingly, Fromme et al. (1993) found that the Risk and Aggression scale of the CEOA loaded on both the positive and negative value factors, “suggesting an ambivalence with which these effects are considered” (p. 24). Such ambivalence may help explain why these seemingly negative behaviors were associated with greater ML and alcohol consumption in the present study. This positive association also may be a function of the heavy drinking associated with consuming ML.

To address whether there may be sample differences in MLEQ aggression expectancies, we examined whether ML aggression expectancies varied by subsample (gender, ethnicity, and student status). In bivariate analyses, demographic differences did emerge. For example, men more strongly endorsed ML aggression expectancies than did women. However, the demographic subgroups also differed in their typical ML consumption. With typical weekly ML use was entered as a covariate in the models, subsample differences in the endorsement of ML aggression expectancies were not statistically significant, further emphasizing the link between heavy drinking and aggression-related expectancies.

The Impairment and Physical Symptoms factor (e.g., *I lose coordination.*) was not significantly associated with ML use and problems. Physical problems have not consistently emerged in measures of general alcohol expectancies, even when such measures include negative expectancies. We compared MLEQ factors for a “large” versus “moderate” dose and found greater endorsement of one positive (Social Facilitation and Enjoyment) factor and both negative (Aggression and Negative Consequences, Impairment and Physical Symptoms) MLEQ factors. The latter finding is consistent with previous research that examined dose effects for self-reported alcohol expectancies (cf. Collins et al., 1990; Southwick et al., 1981), and more recent laboratory research examining alcohol dose and aggression (Duke, Giancola, Morris, Hilt, & Gunn, 2011).

We conducted extensive tests of the psychometric properties of the MLEQ. Similar to other measures of general expectancies, the MLEQ factors were highly internally consistent, showed appropriate interrelationships, and showed good test-retest reliability over 2-weeks. Tests of convergent validity supported the expected significant positive associations with factors of a general measure of alcohol expectancies (the CEOA) and with drinking motives (DMQ, ML motives). Tests of concurrent validity revealed that the relationships between the MLEQ factors and typical ML use were fairly consistent with the relationships found in previous research on general alcohol expectancies and typical alcohol use.

The MLEQ shares the limitations of other expectancy measures, beginning with the use of self-report data. Other limitations are related to our use of advertising to recruit a convenience sample of young-adult ML drinkers. Although our sample is relatively large, we do not know its representativeness, nor do we know the extent to which the results would generalize to a sample of older ML drinkers. Our sample was mainly composed of European Americans and African Americans. The relatively small subgroup sizes in the CFA sample precluded testing the invariance of the factor structure with respect to gender and ethnicity. However, demographic characteristics (gender, ethnicity, student status) were included as an initial step in regressions to test the relationships between ML expectancies and ML intake as well as total alcohol use. We found the expected relationships; that is, men drank more than women, European Americans drank more heavily overall than did minorities, and minorities/nonstudents drank more ML than European Americans/students. This is a cross-

sectional study in which we did not include a number of variables (e.g., personality factors) that could be associated with alcohol expectancies and/or ML use and problems. It is possible that such variables could serve as confounding/third variables that explain our findings.

With regard to methodological limitations, we conducted test-retest reliability with a small subgroup of 50 participants. We also used self-defined doses which introduces error, but “allowed us to assess expectancies for psychologically equivalent amounts across participants.” (see Guarna & Rosenberg, 2000, p. 344). To match the two doses for completing the MLEQ and CEOA, we modified the instructions for the CEOA, which might be seen as a limitation. Because the participants completed the MLEQ in reference to their ML use, but the CEOA in reference to their general alcohol use, direct comparisons between the two measures and their relation to ML and alcohol use would be misleading. We also did not assess the subjective evaluation (cf. Fromme et al., 1993) of the MLEQ items, a limitation that should be addressed in future research.

Even with these limitations, the MLEQ is the first beverage-specific measure of expectancies to date, which was developed using the procedures and criteria recommended for the development of a psychometrically-sound measure. Even given some expected overlap between the content of the MLEQ items and items from general expectancy measures, it is important to understand the ML-specific beliefs that contribute to ML use, especially among young adults. Thus, the MLEQ can serve as a useful beverage-specific measure that provides useful information related to preventing and/or treating problems related to excessive intake of ML and other high-alcohol-content malt beverages. Future research should focus on independent validation of the factors of the MLEQ using different samples (e.g., middle-age and older adults) of ML drinkers. It also would be useful to include subjective evaluations of the MLEQ items and to assess sample characteristics that might serve as possible confounding/third variables in the relationships among the MLEQ factors, ML-specific outcomes, and other alcohol-related outcomes.

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Table 1

Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) Loadings for MLEQ

Factor 1: Social Facilitation and Enjoyment ($\alpha = .93$)	EFA	CFA
I become more talkative	.79 (.55)	.77
I become more social	.78 (.65)	.80
I enjoy myself more	.77 (.60)	.78
I have fun	.75 (.56)	.81
I have fun with friends	.74 (.54)	.74
It makes me feel good	.72 (.49)	.79
I bond with my friends	.69 (.48)	.72
I laugh more often	.69 (.49)	.64
I have a good time	.68 (.53)	.70
I spend time with friends	.68 (.44)	.77
It is easier for me to loosen up and talk	.64 (.46)	.72
It is easier for me to meet new people	.61 (.50)	.67
Factor 2: Aggression and Negative Consequences ($\alpha = .90$)		
I am violent	.88 (.69)	.74
I get into arguments	.81 (.65)	.72
I get arrested	.77 (.52)	.68
I get in trouble with the law	.77 (.55)	.73
I injure others or myself	.75 (.55)	.67
I break things	.73 (.58)	.82
I offend others	.69 (.55)	.72
I become more depressed	.59 (.45)	.59
Factor 3: Impairment and Physical Symptoms ($\alpha = .79$)		
I lose coordination	.75 (.59)	.80
I oversleep/I am tired the next day	.67 (.49)	.62
I experience a hangover	.64 (.38)	.49
It puts me to sleep	.62 (.30)	.50
I slur my words	.62 (.52)	.74
I get sick and throw up	.55 (.39)	.51
Factor 4: Enhanced Sexuality ($\alpha = .78$)		
I enjoy sex more	.85 (.65)	.68
It enhances my sexual desires	.75 (.69)	.80
I get laid	.55 (.49)	.73
I have unprotected sex	.30 (.36)	.57

Note. MLEQ = Malt Liquor Expectancy Questionnaire. EFA values represent promax pattern coefficients from four-factor solution using principal axis factoring extraction. Extracted item communalities (h^2) are shown in parentheses. CFA values represent std. estimates of factor loadings. Statistical significance of the first loading for each factor was not tested because it was fixed at 1.00 for identification purposes. Factor loadings for all other item indicators were statistically significant at $p < .001$.

Table 2
Associations Among Malt Liquor Expectancies, General Alcohol Expectancies and Drinking Motives

	MLEQ-Social Facilitation and Enjoyment (+)	MLEQ-Enhanced Sexuality (+)	MLEQ-Aggression and Negative Consequences (-)	MLEQ-Impairment and Physical Symptoms (-)
MLEQ scale sum	53.38	13.68	20.21	23.48
MLEQ scale SD	12.61	5.38	9.33	6.69
CEOA-Sociability (+)	.70***	.36***	.16***	.25***
CEOA-Tension Reduction (+)	.36***	.15***	-.07	.01
CEOA-Liquid Courage (+)	.51***	.40***	.35***	.31***
CEOA-Sexuality (+)	.44***	.70***	.22***	.16***
CEOA-Cognitive-Behavioral Impairment (-)	.29***	.12**	.37***	.60***
CEOA-Risk and Aggression (-)	.39***	.38***	.59***	.43***
CEOA-Self-Perception (-)	.01	.17***	.46***	.31***
DMQ-Social	.55***	.35***	.20***	.32***
DMQ-Coping	.35***	.34***	.38***	.23***
DMQ-Enhancement	.51***	.35***	.27***	.34***
DMQ-Conformity	.22***	.27***	.34***	.20***
ML Motives	.23***	.21***	.37***	.33***

Note. MLEQ scale scores were computed by summing appropriate items. Pearson correlations are presented. MLEQ = Malt Liquor Expectancy Questionnaire. CEOA = Comprehensive Effects of Alcohol Questionnaire. ML = Malt Liquor. MLEQ-Social and MLEQ-Aggression scales were square-rooted transformed prior to analyses; DMQ-Conformity was log-transformed prior to analyses. $N = 565$ based on listwise deletion

**
 $p < .01$.

 $p < .001$.

Table 3
Summary of Hierarchical Regression Analysis: Malt Liquor Expectancies Predicting Malt Liquor Use, Alcohol Use, and Problems

Variable	Typical Malt Liquor Use				Typical Alcohol Use				Alcohol Problems			
	β	T	d		β	t	d		β	t	d	
Step 1 ^a												
Gender	.07 [†]	1.74	.15		.21***	5.30	.44		.07 [†]	1.76	.15	
Ethnicity	-.02	-.51	.05		.13**	3.07	.26		.14***	3.31	.28	
Student status	-.18***	-4.33	.37		-.02	.58	.05		.06	1.37	.12	
Step 2 ^b												
MLEQ-SOC (+)	.06	1.19	.10		.13**	2.61	.22		.14***	3.36	.28	
MLEQ-ENH SEX (+)	.00	-.07	.01		.02	.50	.04		.08*	1.94	.16	
MLEQ-AGGRESS(-)	.21***	4.19	.35		.20***	4.14	.35		.48***	11.84	.98	
MLEQ-IMPAIR (-)	-.09	-1.77	.15		-.07	1.37	.12		.07	1.79	.15	

Note. Sample sizes for analyses were as follows: $N = 575$ for Typical Malt Liquor Use; $N = 588$ for Typical Alcohol Use; $N = 590$ for Alcohol Problems. Gender: 0 = female, 1 = male. Ethnicity: 0 = minority, 1 = European American. Student status: 0 = non-student, 1 = student. MLEQ = Malt Liquor Expectancy Questionnaire.

^a $R^2 = .04$ for Typical Malt Liquor Use; $R^2 = .06$ for Typical Alcohol Use; $R^2 = .03$ for Alcohol Problems.

^b $\Delta R^2 = .04***$ for Typical Malt Liquor Use; $\Delta R^2 = .05***$ for Typical Alcohol Use; $\Delta R^2 = .34***$ for Alcohol Problems.

**
 $p < .01$.

 $p < .001$.

Table 4

Malt Liquor Expectancies as a Function of Malt Liquor Dose

	Moderate Dose		Large Dose		Paired <i>t</i> (df)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
MLEQ – Social Facilitation and Enjoyment (+)	51.78	11.28	53.56	12.58	–4.40 (594) ***
MLEQ – Enhanced Sexuality (+)	13.34	5.06	13.68	5.40	–2.59 (619)
MLEQ – Aggression and Negative Consequences (–)	16.40	7.34	20.24	9.38	–14.55 (603) ***
MLEQ – Impairment and Physical Symptoms (–)	17.57	6.12	23.53	6.70	–22.12 (618) ***

Note. *N* = 594–620. MLEQ = Malt Liquor Expectancy Questionnaire.***
p < .001.