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***Abstract***

*This study examined the prevalence of high potency (liquor, malt liquor, fortified wine) and other alcoholic beverage consumption (beer, wine/wine coolers) among adolescents, the impact of gender and ethnicity, and the risk and protective factors that predicted consumption. A confidential survey revealed that, among eighth grade students, wine/wine coolers were the most popular alcoholic beverages, with the highest levels of lifetime use, and the greatest current frequency and quantity of use, followed closely by beer and liquor. Minor gender differences were found, as well as notable ethnic differences, in consumption. Intentions and attitudes were important predictors of use across beverages. Different factors may need to be targeted depending upon the type of beverage that is addressed in future prevention programs.*

## INTRODUCTION

High potency beverages have either higher than typical alcohol content (e.g., high proof liquor) or are sold in larger than average serving sizes (e.g., 40 ounce malt liquor) and thus, have a higher than typical potential for abuse. Wine coolers, high proof liquor, malt liquor, and fortified wines have become increasingly popular with adolescents (Boys, Marsden, Stillwell, Hutchings, Griffiths & Farrell, 2003; McBride, Midford, Farringdon, & Phillips, 2000), and in recent years, the alcohol industry has intensified the development and marketing of these types of drinks to the youth market (Center on Alcohol Monitoring and Youth, 2002; Hughes, MacKintosh, Hastings, Wheeler, Watson, & Inglis, 1997; Jackson, Hastings, Wheeler, Eadie, & MacKintosh, 2000; Martin et al., 2002; McKeganey, Forsyth, Barnard, & Hay, 1996). Only wine advertisements targeted adults more than youth (Garfield, Chung, & Rathouz, 2003). For example, according to the Center on Alcohol Marketing and Youth at Georgetown University, 45 percent more beer and 27 percent more distilled spirits advertisements targeted youth than adults in 2001.

Although the exact amounts can vary, the Indiana Prevention Resource Center (Bailey, 1998) reports that the percent alcohol by volume is 4-4.5 percent for beer, 5-8 percent for wine coolers (specialty wine coolers can be up to 20%), and 8-12 percent for wine. Malt liquors are as high as 8 percent, fortified wines are almost 20 percent, and high proof liquors can be over 75 percent alcohol by volume. The fact that beer and wine coolers are both often sold in 12 ounce bottles, for example, can create an erroneous perception that the two drinks are equivalent, while in fact a 12 ounce wine cooler is one-and-a-half times more potent than a 12 ounce beer. A 40-ounce bottle of malt liquor, as it is often sold and consumed, has the equivalent amount of alcohol of approximately six beers. Given this large range of alcohol content and serving sizes, it is critically important that researchers carefully define and measure high potency beverages. Furthermore, it is important that research-

ers examine individual beverage types separately, as the patterns of consumption are likely to vary widely, as are the consequences of their use.

Little research has been conducted in the area of high potency alcohol consumption by adolescents. However, one study (McBride et al., 2000) found that wine and regular beer were preferred among a 13-year-old sample when initially surveyed, but that when surveyed a second time later in the school year, the preference for spirits and alcoholic sodas had increased. A qualitative analysis by Hughes and colleagues (1997) found that most adolescents were acquainted with the so-called designer drinks (defined by the researchers as a range of fortified wines including MD 20/20 and white ciders such as White Lightning). Fourteen and fifteen year old participants reported consuming almost anything that was "relatively strong, inexpensive, and pleasant tasting" (all characteristics of designer drinks). In contrast, 16- to 17-year-olds tried to appear mature and experienced with alcohol, and opted for spirits and bottled beers. A quantitative analysis of 12- to 17-year-olds (Hughes et al., 1997) indicated that designer drinks peaked in popularity between 13 and 16 years of age. The results suggested that consumption of designer drinks was related to higher rates of alcohol consumption and greater loss of control.

Part of the reason for over-consumption appears to be that the alcohol content of many alcoholic beverages, especially high potency beverages, is commonly estimated incorrectly (Giacopassi & Stein, 1991; Kaskutas & Graves, 2000; Lemmens, 1994; Martin, Liepman, Nirenberg, & Young, 1991). For example, Martin and colleagues (1991) found that accuracy rates for alcohol content among a college students were lowest for malt beverages (17.4%), followed by fortified wines (27.9%), wines (36.0%), and distilled spirits (40.7%). Giacopassi and Stein (1991) found that college participants overestimated the strength of the majority of alcoholic beverages they were questioned about, yet underestimated the strength of wine coolers.

There also appear to be differences in the perceived consequences

associated with the use of various types of alcoholic beverages. Klein and Pittman (1990), for example, found that most adult drinkers perceived beer, distilled spirits, wine, and wine coolers to be equally harmful. Those who did not, however, perceived beer and/or distilled spirits to be most associated with negative consequences. Wine and wine coolers, despite being relatively high in alcohol content, were perceived as being less harmful. Due to these perceptions, people may be more likely to consume wine and wine coolers, and less likely to adequately consider their potential for negative consequences. Although the above studies involved adult participants, it could be argued that adolescents would be even less accurate in estimating alcohol content and in judging potential negative consequences of alcohol use.

Lacking in research literature to date is an examination of beverage-specific consumption rates and patterns of use for high potency and other alcoholic beverages. Many researchers lump beverages together, especially high potency beverages, when it is likely that there are differences between them. There were two purposes in the present study. The first was to examine the prevalence of adolescent lifetime and current consumption of a number of specific alcoholic beverages (i.e., beer, wine/wine coolers, liquor, malt liquor, and fortified wine), and to investigate the impact of gender and ethnicity on consumption. The second was to determine the risk and protective factors that were predictive of current use of individual alcoholic beverages.

## METHOD

### Participants

The participants were 454 8th grade students from an inner-city ($n$ = 183), suburban ($n$ = 110), and rural ($n$ = 161) middle schools in northeast Florida. Recruitment took place in the fall of 2001. The sample was 62% female, and the average age was 13.3 years ($SD$ = .51). The majority were White (51%), followed by Black (36%), and other ethnicities (13%). Over half (56%) lived with both parents, 32% lived with just their mother, and the remainder lived with

just their father (7%) or with someone else (5%). More than one-third (38%) had a close family member with alcohol or drug problem, and almost one-third (29%) were in the free or reduced lunch program at their school, indicating that their families were economically disadvantaged.

**Materials**

The Youth Alcohol & Health Survey (YAHS; Werch, 2000) was used to collect data on alcohol and drug use, and alcohol use risk and protective factors. The questionnaire takes approximately 25 minutes to complete. It has undergone extensive pilot testing, resulting in a psychometrically sound and highly comprehensible instrument for research with adolescents. The YAHS, along with standardized procedures for implementation, have been employed in previous preventive intervention trials. An alcohol "dip stick" saliva pipeline procedure (Alco Screen, Chematics, Inc.) was also used to increase the validity of responses.

Consumption measures used in the present analyses included lifetime use of specific alcoholic beverages and drugs; 30-day frequency and quantity of alcohol use; 30-day frequency of drug use; and alcohol use risk and protective factors. The measures of lifetime use asked: "Have you ever done any of the following?" (Yes or no). The measures of alcohol and drug frequency asked: "During the past 30 days, how many days did you use" each substance. There were seven response options, from 0 days to all 30 days. The measure of alcohol quantity asked: "During the past 30 days, how much did you usually drink at one time?" There were six response options, from "I did not drink" to "5 or more drinks."

The risk and protective factors that were measured reflect constructs from a number of well-known psychosocial theories, including Social Cognitive Theory (Bandura, 1986), Health Belief Model (Becker, 1974), Behavioral Self-Control Theory (Kanfer, 1975), Social Bonding Theory (Hirschi, 1969), and Theory of Planned Behavior (Ajzen, 1991). Measures of alcohol use risk factors included *intention to drink, smoke, and use marijuana, willingness to drink, positive outcome*

*expectancy beliefs (pros) about alcohol use, perceived peer prevalence of alcohol use, influenceability, attitudes related to alcohol use, peer and parental alcohol norms.* Intention to use alcohol and drugs were measured by three questions asking "Do you plan to drink alcohol/smoke cigarettes/ use marijuana in the next 6 months?" One item measured willingness, and asked: "How willing are you to drink alcohol in the next 6 months?" Expectancy beliefs about the positive outcomes of alcohol use were measured by 11 items from the Alcohol Expectancy Questionnaire (Brown, Christiansen & Goldman, 1987), alpha = .88. The measure of perceived peer prevalence of alcohol use asked: "How many of your friends drink alcohol?" Three items measured influenceability to alcohol use offers and alcohol-related media messages (alpha = .79). For example, one item read: "If someone gave me alcohol, I would drink it." Four items comprised an attitude measure based on the Theory of Planned Behavior (alpha = .89). The items asked participants to respond to the following statement: "For me, drinking alcohol in the next month would be...". Response options were on 4-point scales from "very healthy" to "very unhealthy," "very smart" to "very dumb," "very good" to "very bad," and "very important" to "very unimportant." Three items measured peer norms, and what friends and most young people think about drinking (alpha = .80). For example, one item read: "My friends think that it's okay for me to drink alcohol." Parental norms were measured with two items, and were based on the Theory of Planned Behavior (alpha of .84). One item asked "How would your parents feel if they found out you drank alcohol?" and the other asked participants to respond to the statement: "My parents think it's okay for me to drink alcohol."

Measures of alcohol use protective factors included *willingness to avoid alcohol, negative outcome expectancy beliefs (cons) about alcohol use, resistance self-efficacy, self-control practices to avoid alcohol use, perceived susceptibility to alcohol-related health consequences, parental monitoring, parent child communication, parent-child relationship, parent-child alcohol communication, parent bonding, school bonding, and value incompatibility with alcohol use.* The willingness to avoid measure asked "How willing are you to stay away from drinking alcohol during the next 6 months?" Expectancy be-

liefs about the negative consequences of alcohol use were measured by 11 items developed for the Alcohol Expectancy Questionnaire (Brown et al., 1987). The alpha coefficient of these items was .88. The three self-efficacy items represent various situations in which adolescents might be offered alcohol. They were developed in previous research (Ellickson & Hays, 1991). These items, which had an alpha coefficient of .86, read: "How sure are you that you can stay away from using alcohol, if asked to use it ... By friends?, At a party?, On a date?" Self-control was measured from one item with 13 responses, used in previous research concerning behavioral and cognitive practices for avoiding alcohol (Werch & Gorman, 1986). This item read: "Have you used any of the following to help you stay away from alcohol during the last year?" and had an alpha coefficient of .88. The measure of perceived susceptibility was adapted from previous research examining psychosocial factors in cigarette use (Kviz, Crittenden, Belzer, & Warnecke, 1991). This item asked: "If you drank alcohol, would you have health problems?" Three items measured youths' perceptions of the frequency with which their parents engaged in certain behaviors within the last 30 days, with parental monitoring measuring knowing who their kids were with, and where they went out (alpha = .81), parent-child communication measuring spending time talking, and sharing ideas with the child (alpha = .81), and parent-child relationship measuring how much parents praised and hugged their children (alpha = .75). In addition, two items measured the frequency of parent alcohol communication with the child during the last 30 days regarding avoiding alcohol, and disapproval of their adolescent drinking alcohol (alpha = .88). Two items each measured parent and school bonding. Alpha coefficients for these measures were .77 and .86, respectively. Parent bonding items were worded: "My parents/guardians support me to be a success," and "My parents/guardians are people I can count on to help me." School bonding items were worded similarly, but with teachers substituted for parents/guardians. The measures of value incompatibility were "Will drinking alcohol get in the way of reaching your goals or dreams?" and "Drinking alcohol fits with the type of life I want to live."

Finally, various sociodemographic factors were measured. These were: ethnicity, gender, age, participation in a free/reduced lunch program, living situation (who the adolescent lived with), history of alcohol or drug problems, and father, mother and siblings drinking habits.

### Design and Procedure

The results presented here are from the baseline survey of a randomized controlled trial previously reported by Werch, Moore, DiClemente, Owen, Jobli, and Bledsoe (2003). In this trial, students were recruited to take part in an alcohol and drug use prevention research project addressing sports and exercise, sleep, and eating habits. Parental consent and student assent were obtained prior to participation. Trained research staff conducted each data collection session, following a standardized protocol, with participants completing the surveys at their schools. It was emphasized that the project was voluntary and that all results would be kept confidential. Students were assigned code numbers and names were not included on any of the materials, and only the research staff had access to completed surveys. Students were given nominal incentives for participating in the study. The university's institutional review board approved the research protocol prior to implementation.

## RESULTS

The first analysis examined lifetime use of specific alcoholic beverages by gender and ethnicity. Table 1 shows that beer and wine/wine coolers were the beverages of choice, with 33.7% and 40.4% use across the sample, respectively. Ever use of liquor was the next highest (24.2%), followed by malt liquor (11.0%) and fortified wine (8.4%). The only significant gender difference was found for lifetime malt liquor use, $c^2$ (1) = 6.20, $p$ = .01. A higher percentage of males (15.7%) reported drinking malt liquor than females (8.2%). There were also significant differences by ethnicity for lifetime use of wine/wine coolers, $c^2$ (2) = 9.63, $p < .01$, liquor, $c^2$ (2) = 27.11, $p < .001$, malt liquor, $c^2$ (2) = 9.74, $p < .01$, and fortified wine,

$c^2$ (2) = 9.34, $p < .01$. For all beverages, other ethnicities (Hispanics, Asians, Native Americans, Mixed, and "other"), who were combined due to small numbers of participants within each category, had the highest percentages of use, followed by White and then Black participants. Greater proportions of Whites than Blacks drank wine/wine coolers (40.2% vs. 30.5%) and liquor (30.0% vs. 10.9%). Greater proportions of Blacks (11.5%) than Whites (7.8%) drank malt liquor, while the two groups had similar proportions of fortified wine use (6.7% vs. 7.0%).

A second analysis examined mean current (30-day) frequency and quantity of consumption of specific alcoholic beverages by gender and ethnicity. Table 2 indicates that, overall, wine/wine coolers were consumed with the highest frequency ($M = 1.23$, $SD = .76$) and in the greatest quantity ($M = 1.24$, $SD = .73$). Beer ($M = 1.16$, $SD = .62$) and liquor ($M = 1.17$, $SD = .68$) were consumed with the next highest frequency, while quantity levels were similar for all four other beverages (i.e., $M$s = 1.16-1.19, $SD$s = .68-.75). Independent samples $t$-tests indicated that there were no significant gender differences in frequency or quantity measures, but a series of ANOVAs revealed significant differences by ethnicity for the 30-day frequency measures of beer, $F(2) = 3.02$, $p < .001$ and liquor, $F(2) = 3.54$, $p = .03$. Post-hoc tests revealed that White ($M = 1.22$, $SD = .73$) and "other" ($M = 1.32$, $SD = .88$) participants had significantly greater frequency of beer consumption than Black ($M = 1.01$, $SD = .11$) participants did ($p$'s = .002), and White ($M = 1.24$, $SD = .84$) participants had significantly greater frequency of liquor ($p = .03$) consumption than Blacks did ($M = 1.06$, $SD = .36$). There were also significant differences by ethnicity for the 30-day quantity measures of beer, $F(2) = 3.79$, $p = .02$, wine/wine coolers, $F(2) = 4.08$, $p = .02$), and liquor, $F(2) = 3.93$, $p = .02$ use. Post-hoc tests indicated that Whites consumed significantly higher quantity of beer ($M = 1.25$, $SD = .88$; $p = .02$) and liquor ($M = 1.27$, $SD = .93$; $p = .02$) than Blacks did ($M$s = 1.05 & 1.06, $SD$s = .42 & .34), and "others" ($M = 1.41$, $SD = .85$) had significantly higher quantity of wine/wine cooler consumption than Blacks ($M = 1.12$, $SD = .42$; $p < .02$).

**Table 1. Lifetime Alcohol Use by Beverage Type, Gender, and Ethnicity**

| Beverage | Gender | | | | Ethnicity | | | | | | | Total Sample ($n$=454) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male ($n$ = 172) | | Female ($n$ = 282) | | Black ($n$=165) | | White ($n$=230) | | Other ($n$=59) | | | | |
| | % | $n$ | % | $n$ | % | $n$ | % | $n$ | % | $n$ | | % | $n$ |
| **Lifetime Use** | | | | | | | | | | | | | |
| **Beer** | | | | | | | | | | | | | |
| Yes | 38.4 | 66 | 30.9 | 87 | 27.3 | 45 | 37.0 | 85 | 39.0 | 23 | | 33.7 | 153 |
| No | 61.6 | 106 | 69.1 | 195 | 72.7 | 120 | 63.0 | 145 | 61.0 | 36 | | 66.3 | 301 |
| **Wine/Wine Coolers** | | | | | | | | | | | | | |
| Yes | 39.8 | 68 | 40.8 | 115 | 34.5 | 57 | 40.2 | 92 | 57.6 | 34 | ** | 40.4 | 183 |
| No | 60.2 | 103 | 59.2 | 167 | 65.5 | 108 | 59.8 | 137 | 42.4 | 25 | | 59.6 | 270 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Liquor** | | | | | | | | | | | | | |
| Yes | 26.2 | 45 | 23.0 | 65 | | 10.9 | 18 | 30.0 | 69 | 39.0 | 23 | *** | 24.2 | 110 |
| No | 73.8 | 127 | 77.0 | 217 | | 89.1 | 147 | 70.0 | 161 | 61.0 | 36 | | 75.8 | 344 |
| **Malt Liquor** | | | | | | | | | | | | | |
| Yes | 15.7 | 27 | 8.2 | 23 | * | 11.5 | 19 | 7.8 | 18 | 22.0 | 13 | ** | 11.0 | 50 |
| No | 84.3 | 145 | 91.8 | 259 | | 88.5 | 146 | 92.2 | 212 | 78.0 | 46 | | 89.0 | 404 |
| **Fortified Wine** | | | | | | | | | | | | | |
| Yes | 9.3 | 16 | 7.8 | 22 | | 6.7 | 11 | 7.0 | 16 | 18.6 | 11 | ** | 8.4 | 38 |
| No | 90.7 | 156 | 92.2 | 260 | | 93.3 | 154 | 93.0 | 214 | 81.4 | 48 | | 91.6 | 416 |

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

**Table 2. Current Alcohol Use by Beverage Type, Gender and Ethnicity**

| Measure/Beverage | Gender | | | | Ethnicity | | | | | | | Total Sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | | Female | | Black | | White | | Other | | | | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | | *M* | *SD* |
| **30-Day Frequency** | | | | | | | | | | | | | |
| Beer | 1.22 | .70 | 1.12 | .57 | 1.01 | .11 | 1.22 | .73 | 1.32 | .88 | *** | 1.16 | 0.62 |
| Wine/ Wine Coolers | 1.30 | .89 | 1.20 | .67 | 1.18 | .72 | 1.24 | .76 | 1.39 | .87 | | 1.23 | 0.76 |
| Liquor | 1.20 | .75 | 1.16 | .63 | 1.06 | .36 | 1.24 | .84 | 1.22 | .65 | * | 1.17 | 0.68 |
| Malt Liquor | 1.17 | .74 | 1.07 | .39 | 1.08 | .43 | 1.13 | .65 | 1.14 | .43 | | 1.11 | 0.55 |
| Fortified Wine | 1.16 | .78 | 1.06 | .38 | 1.08 | .57 | 1.09 | .56 | 1.17 | .56 | | 1.09 | 0.57 |
| **30-Day Quantity** | | | | | | | | | | | | | |
| Beer | 1.23 | .80 | 1.15 | .68 | 1.05 | .42 | 1.25 | .88 | 1.25 | .73 | * | 1.18 | 0.73 |
| Wine/Wine Coolers | 1.25 | .73 | 1.23 | .74 | 1.12 | .42 | 1.28 | .85 | 1.41 | .85 | * | 1.24 | 0.73 |
| Liquor | 1.19 | .69 | 1.19 | .78 | 1.06 | .34 | 1.27 | .93 | 1.24 | .73 | * | 1.19 | 0.75 |
| Malt Liquor | 1.18 | .75 | 1.14 | .74 | 1.08 | .56 | 1.19 | .85 | 1.24 | .75 | | 1.16 | 0.75 |
| Fortified Wine | 1.19 | .66 | 1.17 | .70 | 1.11 | .52 | 1.20 | .76 | 1.29 | .77 | | 1.18 | 0.68 |

* $p \leq .05$ ** $p \leq .01$ ***$p \leq .001$

***References for Table 2***

| *Frequency:* | *Quantity:* |
|---|---|
| 1= 0 days | 1= I did not drink |
| 2= 1-2 days | 2= 1 drink |
| 3= 3-5 days | 3= 2 drinks |
| 4= 6-9 days | 4= 3 drinks |
| 5= 10-19 days | 5= 4 drinks |
| 6= 20-29 days | 6= 5 or more drinks |
| 7= All 30 days | |

A final analysis involved a series of stepwise discriminant analyses, and was conducted to determine predictions of current use of each of the five beverages examined above. Several theoretically-based risk (n=10) and protective (n=12) factors were used as predictors. Table 3 presents the standardized function coefficients and correlation coefficients of risk and protective factors by beverage type. There was one significant canonical discriminant function generated for each beverage: L = .580, $c^2$ (6, $N$ = 407) = 218.65, $p < .001$ for beer; L = .663, $c^2$ (5, N = 407) = 165.27, $p < .001$ for wine/wine coolers; L= .552, $c^2$ (5, N = 407) = 239.15, $p < .001$ for liquor; L = .694, $c^2$ (4, N = 407) = 147.45, $p < .001$ for malt liquor; and L = .598, $c^2$ (5, N = 407) = 206.68, $p < .001$ for fortified wine. The canonical correlations, as well as the percentages of variance explained for each beverage, were: .67 (45%) for liquor, .65 (42%) for beer, .63 (40%) for fortified wine, .58 (34%) for wine/wine coolers, and .55 (30%) for malt liquor. The discriminant analyses were supported by confirmatory logistic regression analyses, which produced similar results for each beverage type.

Based on standardized discriminating function coefficients, the most important variables entered into the function for each beverage (using a cut-off of .30), were: for beer, attitudes (.36) and intention to smoke (.32); for wine/wine coolers, perceived peer prevalence of alcohol use (.34) and attitudes (-.34); for liquor, intention to drink (.34), attitudes (.34), and intention to smoke (.30); for malt liquor, intention to smoke (.54) and perceived susceptibility to alcohol (-.30); and for fortified wine, willingness to drink (.35), perceived susceptibility to alcohol (-.35), and intention to smoke (.32).

## Table 3. Discriminant Analyses of Risk and Protective Factors by Beverage Specific Current Use

| | Beer[1] | | Wine/Wine Coolers[2] | |
|---|---|---|---|---|
| | Corr. Coeff. | St. Fxn Coeff. | Corr. Coeff. | St. Fxn Coeff. |
| **Risk factors:** | | | | |
| Plan to drink[b] | .722 | .197 | -.764 | -.256 |
| Plan to smoke[b] | .570 | .317 | -.457 | |
| Plan to use marijuana[b] | .421 | | -.432 | |
| Willing to drink[b] | .719 | .294 | -.580 | |
| Expectancy beliefs (pro)[a] | -.483 | | .562 | |
| Peer prevalence alcohol[a] | -.508 | | .732 | .339 |
| Influenceability[b] | .603 | | -.683 | |
| Attitudes[b] | .735 | .357 | -.762 | -.341 |
| Peer norms alcohol[b] | .465 | | -.620 | |
| Parent norms (alcohol)[b] | .456 | .176 | -.369 | |
| **Protective factors:** | | | | |
| Willing to avoid alcohol[a] | -.524 | | .483 | |
| Expectancy beliefs (con)[a] | -.290 | | .321 | |
| Resistance self-efficacy[a] | -.483 | | .628 | .196 |
| Self-control[a] | .158 | | -.210 | |
| Perceived susceptibility alcohol[a] | -.482 | | .646 | .267 |
| Parental monitoring[b] | .160 | | -.300 | |
| Parent-child communication[b] | .030 | | -.113 | |
| Parent-child relationship[b] | .130 | | -.189 | |
| Parent-child alcohol communication[b] | .099 | | -.189 | |
| Parent bonding[b] | .248 | | -.325 | |
| School bonding[b] | .224 | | -.341 | |
| Value incompatibility alcohol[a] | -.528 | -.231 | .397 | |

[a] High score = High risk [b] Low score = High risk

[1] 90.2% of cases correctly classified (91.6% no, 76.7% yes)

[2] 84.9% of cases correctly classified (87.1% no, 71.9% yes)

[3] 92.0% of cases correctly classified (93.2% no, 81.4% yes)

[4] 92.4% of cases correctly classified (94.1% no, 66.7% yes)

[5] 89.5% of cases correctly classified (90.3% no, 81.8% yes)

| Liquor[3] | | Malt Liquor[4] | | Fortified Wine[5] | |
|---|---|---|---|---|---|
| Corr. Coeff. | St. Fxn Coeff. | Corr. Coeff. | St. Fxn Coeff. | Corr. Coeff. | St. Fxn Coeff. |
| .778 | .338 | .736 | .285 | .651 | |
| .586 | .304 | .776 | .539 | .541 | .319 |
| .546 | .233 | .462 | | .374 | |
| .697 | .283 | .530 | | .746 | .353 |
| -.441 | | -.491 | | -.497 | |
| -.526 | | -.713 | -.282 | -.511 | |
| .590 | | .557 | | .703 | .196 |
| .693 | .337 | .526 | | .730 | .268 |
| .452 | | .536 | | .519 | |
| .328 | | .389 | | .348 | |
| -.508 | | -.488 | | -.502 | |
| -.262 | | -.306 | | -.324 | |
| -.494 | | -.538 | | -.510 | |
| .158 | | .148 | | .183 | |
| -.451 | | -.570 | -.301 | -.656 | -.350 |
| .153 | | .201 | | .208 | |
| .052 | | .114 | | .069 | |
| .167 | | .167 | | .187 | |
| .071 | | .129 | | .170 | |
| .268 | | .356 | | .290 | |
| .189 | | .292 | | .269 | |
| -.364 | | -.387 | | -.389 | |

The most important variables entered into the function for each beverage, based on correlation coefficients (cut-off set at .50), were: for beer, attitudes (.74), intention to drink (.72), willingness to drink (.72), influenceability (.60), intention to smoke (.57), value incompatibility with alcohol (-.53), willingness to avoid alcohol (-.52), and perceived peer prevalence of alcohol use (-.51); for wine/wine coolers, attitudes (-.76), intention to drink (-.76), perceived peer prevalence of alcohol use (.73), influenceability (-.68), perceived susceptibility to alcohol (.65), self-efficacy (.63), peer norms for alcohol (-.62), and willingness to drink (-.58), positive expectancy beliefs (pro) (.56); for liquor, intention to drink (.78), willingness to drink (.70), attitudes (.69), intention to smoke (.59), influenceability (.59), intention to use marijuana (.55), perceived peer prevalence of alcohol use (-.53), and willingness to avoid alcohol (-.51); for malt liquor, intention to smoke (.78), intention to drink (.74), perceived peer prevalence of alcohol use (-.71), perceived susceptibility to alcohol (-.57), influenceability (.56), peer norms for alcohol (.54), self-efficacy (-.54), willingness to drink (.53), and attitudes (.53); for fortified wine, willingness to drink (.75), attitudes (.73), influenceability (.70), perceived susceptibility to alcohol (-.66), intentions to drink (.65), intentions to smoke (.54), peer norms for alcohol (.52), perceived peer prevalence of alcohol use (-.51), self-efficacy (-.51), and willingness to avoid alcohol (-.50).

## DISCUSSION

Wine/wine coolers, and to a lesser extent beer and liquor, were the beverages of choice overall among participants in this study. These beverages had the highest levels of lifetime consumption, as well as being among those beverages with the highest current frequency and quantity of consumption. Malt liquor and fortified wine were consumed by a smaller proportion of youth in their lifetime overall, although the current quantity of use was similar to beer and liquor. The reason for the high frequency and quantity of consumption of wine/wine coolers, in particular, may be their sweet and pleasant taste, which can lead to the perception that their consumption does not have harmful consequences (Graves & Kaskutas, 2002;

Klein & Pittman, 1990; Osaki, Minowa, Suzuki & Wada, 2003). Furthermore, the alcohol level of wine coolers is commonly underestimated (Giacopassi & Stein, 1991). Given these findings, these beverages in particular should be targeted by prevention researchers. Unfortunately, one limitation of this study was that wine and wine coolers were not separated, but were combined into one beverage category. Therefore it is difficult to ascertain which of the two beverages adolescents are consuming, and if it is primarily one more than the other.

The only notable gender difference was in lifetime use for malt liquor. Females were less likely than males to have ever consumed malt liquor, possibly because malt liquor manufacturers target males in their advertisements (Alaniz & Wilkes, 1998; Chen & Paschall, 2003), and possibly because malt beverages may be seen as more "masculine." There were also ethnic differences in beverage consumption. Whites were more likely than Blacks to have consumed wine/wine coolers and liquor, while Blacks were more likely to have consumed malt liquor. Again, the fact that malt liquor advertisers target African-Americans in general, and African-American males in particular (Alaniz & Wilkes, 1998; Chen & Paschall, 2003), may explain these gender and ethnicity differences. However, participants from other ethnicities were consistently more likely to have consumed all of the beverages measured. Unfortunately the sample, while reflective of the demographics of the northeast Florida region, lacked significant numbers of adolescents representative of minority races. Similarly, the sample population while recruited from three demographically diverse school setting, can not be generalized to other adolescent samples and is not comparable to other national or regional studies (i.e., Youth Risk Behavior Survey and Florida Youth Substance Abuse Survey) until further research is conducted will larger youth populations. In addition, there are very few studies that have addressed specific alcohol beverages paralleling our study.

The discriminant analyses revealed that there were several risk and protective factors that were important for predicting current use across a variety of beverages. The two most important factors,

across all beverages, based on the standardized discriminating function coefficients, were intention to smoke, which predicted use of four out of the five beverages (beer, liquor, malt liquor, and fortified wine), and attitudes, which predicted use of three beverages (beer, wine/wine coolers, and liquor). Both of these factors are from the Theory of Planned Behavior. Perceived susceptibility to alcohol (from the Health Belief Model) predicted use of malt liquor and fortified wine. These same variables were also important in predicting consumption of most beverages based on the correlation coefficients. In addition, factors emanating primarily from the Theory of Planned Behavior and Social Cognitive Theory, including intention to drink, perceived peer prevalence of alcohol use, influenceability, and willingness to drink predicted use of all five beverages, while willingness to avoid alcohol, peer norms for alcohol, and self-efficacy predicted consumption of three beverages each based on the correlation coefficients.

Examining beverages separately, there were at least two factors for each that were important based both on the standardized discriminating function coefficients and the correlation coefficients. They were: for beer, intention to smoke and attitudes; for wine/wine coolers, perceived peer prevalence of alcohol use and attitudes; for liquor, intention to drink, intention to smoke, and attitudes; for malt liquor, intention to smoke and perceived susceptibility; and for fortified wine, intention to smoke, willingness to drink, and perceived susceptibility to alcohol.

Thus, while there is some overlap across beverages, there are also differences. Also, it should be noted that the risk and protective factors included in the discriminant analyses accounted for relatively small amounts of variance across beverages (i.e., a low of 30% for malt liquor to a high of 45% for liquor). Thus, there are other important risk and protective factors mediating alcohol use among adolescents, which need to be studied in future research. Some of these factors may be those identified in other studies but not measured in this study, such as perceived severity (Kauffman, Silver &

Poulin, 1997), behavioral capability (Werch, Moore, DiClemente, Owen, Jobli & Bledsoe, 2003), and sensation seeking (D'Silva et al., 2001).

One serious limitation of this study was that the data were cross-sectional. Longitudinal analyses are necessary to determine the patterns of use of individual beverages, identify true causation and the factors that underlie changes over time. However, the utility of cross-sectional design in this study is that it showed significant associations between variables and was able to provide a quantitative description of the magnitude of beverage-specific alcohol consumption among adolescents and the determination of consumption patterns across gender and ethnicity. In addition, cross-sectional study is a cost-effective design to generate new hypotheses that can be tested in future studies (Friis & Sellers, 1999). Another limitation is that this study relied upon self-report data. However, considerable care was taken to ensure honest responses by assuring confidentiality. Also, as stated earlier, the sample was somewhat limited as far as ethnic diversity. While we did find differences from other ethnicities on some measures, the small numbers of participants in the subgroups made comparisons tenuous.

In conclusion, this study was a first step toward determining the prevalence of consumption of specific alcoholic beverages by adolescents. There were important differences in consumption found across beverage type, as well as by gender and ethnicity. Furthermore, risk and protective factors were identified that proved important in predicting use across all beverages, as well as for individual beverages. These results have the following implications for future prevention efforts: 1) Programs need to examine specific beverage use, specifically high potency alcohol beverages as these pose greater risk of harm; 2) Preventive intervention messages should have components that are tailored to gender and ethnicity; and 3) Prevention messages should be aimed at influencing beverage-specific risk and protective factors mediating alcohol use among adolescents.

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