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## Youth Exposure to Alcohol Use and Brand Appearances in Popular Contemporary Movies

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### Abstract

**Aims**—To describe alcohol use and alcohol brand appearances in popular movies and estimate adolescents' exposure to this alcohol-related content.

**Design and setting**—Nationally representative, random-digit dialed survey in the United States and content analysis of alcohol depictions in the top 100 U.S. box office hits each year from 1998 to 2002 and 34 top movies from early 2003.

**Participants**—6522 U.S. adolescents aged 10-14.

**Measurements**—Frequency of alcohol use and brand appearances in movies by Motion Picture Association of America (MPAA) rating. Estimated exposure to minutes of movie alcohol use and brand appearances among U.S. adolescents in this age group.

**Findings**—Most movies (83%, including 57% of G/PG-rated movies) depicted alcohol use and 52% (including 19% of G/PG movies) contained at least one alcohol brand appearance, which consisted of branded use by an actor 30% of the time. These movies exposed the average U.S. adolescent 10-14 years of age to 5.6 (95% CI 5.4,5.7) hours of movie alcohol use and 244 (95% CI 238,250) alcohol brand appearances (5 billion in total), mostly from youth-rated movies. Exposure to movie alcohol content was significantly higher among African American youth than youth of other races.

**Conclusions**—Alcohol use and brand appearances are frequently portrayed in popular U.S. movies (which are distributed worldwide). Children and adolescents in the U.S. are exposed to hours of alcohol use depictions and numerous brand appearances in movies and most of this exposure is from movies rated for this segment of the population.

### Keywords

Alcoholic beverages; adolescent; mass media; ethnic groups

### Introduction

Early use of alcohol (before age 14) is associated with adverse outcomes, including risk of later alcohol abuse,(1-5) alcohol-related injuries,(6-8) and health risk behavior.(9, 10)

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Recent reports suggest young people worldwide are adopting potentially harmful patterns of alcohol consumption.(11-13) Effective, efficient interventions and policies require understanding of the multiple personal, social, and cultural influences on adolescent alcohol use(14, 15) and identification of influences most amenable to change—the most promising targets for intervention.(16)

As sources for observational learning,(17) movies provide information about the prevalence, acceptability, and function of alcohol in social life. Movie alcohol exposure could influence adolescents' beliefs about drinking, making them more likely to use alcohol. For example, perceiving alcohol use as normative predicts intentions to use,(18) binge drinking, and experiencing negative consequences related to drinking.(19) Alcohol use is common in popular American movies and exposure to these depictions is related to adolescent drinking behavior.(20) Moreover, appearances of alcohol brands in movies may be a type of promotional exposure akin to alcohol advertising; such exposure is associated with adolescent alcohol use (see Collins et al.(21) for a review). We know that U.S. adolescents regularly watch movies,(22) that alcohol use is frequently portrayed in American movies, (20, 23-25) and that American movies are distributed and watched worldwide.(26-28) However, the amounts of alcohol use and alcohol brand appearances adolescents see in movies have never been estimated in a nationally-representative sample.

In the current study, we measured alcohol use and alcohol brand appearances in 534 top movies and used a novel survey technique (in a representative sample of U.S. adolescents) to determine national estimates of exposure to movie alcohol use and movie alcohol brand appearances. Previous studies have analyzed movies for alcohol content but we are unaware of studies estimating youth exposure to alcohol brand appearances in movies.

## Methods

### Movie Sample Frame and Content Analysis

We analysed the 100 top-grossing movies released each year from 1998 through 2002 and 34 movies from early 2003 for alcohol content. The 100 top grossing movies each year were determined using U.S. box office revenues reported by Worldwide Box Office(29) on March 1 of the following year; movies from 2003 were those grossing over US\$ 15 million in the first quarter of 2003 (i.e., immediately before administration of the survey).(30) Trained coders recorded: a) whether beer, wine, or liquor was used during the film, b) whether any character was intoxicated by alcohol, c) the duration of alcohol use, and d) any alcohol brands which appeared and the type of appearance (in the background, a mention, or actual use by an actor).

*Alcohol use* was defined as real or implied use of an alcoholic beverage by a character, including purchasing alcohol and occasions where an alcoholic beverage was clearly in the possession of a character (e.g., sitting at dinner with filled wine glasses). Empty alcoholic beverage containers (e.g., bottles) and those that were displayed but not implied as being consumed by a character (e.g., in stores, bars) were not counted as alcohol use. Alcohol use was timed in seconds, from the moment the alcohol appeared on screen. Coding the type of alcohol being consumed often proved difficult. Therefore, we coded only the presence or absence of beer, wine, and liquor use in each movie.

We defined an *alcohol brand appearance* as any appearance of an alcohol brand or recognizable logo (e.g., a character drank a specific type of beer, an alcohol brand was featured on a billboard in the background), or any verbal mention of an alcohol brand. All appearances of beer and liquor brands (including “coolers” and malt beverages) were coded, whether in use by a character or not. Wine brands were not coded (labels were difficult to

identify). For each brand appearance coders noted whether the brand was placed in the background, was visible on a product being used by an actor, or was mentioned verbally.

Two raters independently coded a random subset (10%) of the movies. Krippendorff's  $\alpha$  for whether beer, wine, and liquor were used, and whether anyone had been intoxicated were .86, .81, .78, and .74, respectively. For seconds of alcohol use, Cohen's kappa = .79. Krippendorff's  $\alpha$  for whether alcohol brands appeared in a movie was .78.

### Survey Assessment of Exposure to Movie Alcohol Content

A random-digit dial (RDD) telephone survey of 6522 U.S. adolescents aged 10-14 was conducted between June and October, 2003 (cooperation rate: 32%, CASRO response rate: 66%). The survey was approved by institutional review boards at Dartmouth Medical School and Westat (Rockville, MD); full details of the survey methods have been previously reported. Unweighted sample distributions for age, sex, household income, and census region were consistent with the U.S. Census; overrepresentation of Hispanics and underrepresentation of Blacks was adjusted using a post-stratification weighting procedure. (30)

We used a movie title recognition method to estimate adolescent exposure to the 534 movies described above. Respondents were asked whether they had seen each of 52 movie titles; all respondents were asked about Hannibal(31) and Blade(32)<sup>i</sup>, 50 titles were randomly selected from the remaining pool of movies. Thus, each adolescent responded to a unique list of 50 titles; each title appeared on an average of 613.0 (std error = 1.2) surveys. We have previously reported the accuracy of adolescents' recall of movie titles.(33)

We quantified exposure to movie alcohol content by determining the average exposure (mean duration of movie alcohol use; mean number of brand appearances seen) for each 10-14 year-old in the sample. We determined the number of seconds of alcohol use each child saw from the movies included on his/her list and divided this by the seconds of alcohol use each child would have seen had he/she seen all the movies on his/her list. This proportion (seconds reported/maximum possible report) was multiplied by total duration of alcohol use in the 534 movies (approx. 29 hours) to estimate reported alcohol exposure had each child been asked about all 534 movies. Child survey weights were then applied to estimate exposure in the population. Population exposure was divided by the estimated number of children 10-14 in the U.S., yielding mean seconds of movie alcohol use seen by each adolescent in the U.S. Parallel calculations were used to estimate mean number of brands seen.

Marketers define the number of times an advertisement (or group of advertisements) is seen as gross impressions.(34) To permit comparisons between measures of movie alcohol exposure from these movies and this traditional measure of advertising success, we calculated gross impressions for alcohol brand appearances. We multiplied the number of brand appearances in a movie by the movie's audience size (the number of 10-14 year olds in the U.S. who had seen it) and summed the products for all 534 movies.

### Demographic differences in exposure

Prior research has documented that youth exposure to alcohol advertising varies by race(35) and gender.(36) Analogously, demographic characteristics might moderate levels of exposure to alcohol use in movies. Following our examination of exposure among youth in general, we examined whether exposures varied as a function of age, gender, race/ethnicity

<sup>i</sup>These movies were included in all surveys for reasons unrelated to the current study.

(Caucasian, African American, Hispanic, or other racial/ethnic background), and household income (as a proxy for socioeconomic status).

### Statistical Analysis

**Movie content**—Categorical outcomes were analyzed using Chi-square tests. Duration of alcohol use and number of appearances were analyzed using ANOVA, with scores normalized to correct for negative skew (descriptive statistics are reported as raw means for ease of interpretation).

We conducted tests of differences in outcomes across Motion Picture Association of America (MPAA) ratings<sup>ii</sup>; post hoc comparisons were used to test differences between G/PG, PG13 and R movies (G and PG movies were combined, due to the small number of G-rated movies and similar alcohol content in these two rating categories). Alphas were set at  $p = .05$  for overall comparisons and  $p = .01$  for post-hoc analyses.

**Population exposure**—Survey data were weighted to adjust for sampling, response, and coverage errors. Household weights accounting for RDD sampling (adjusted for unknown residential and eligibility status, nonresponse to initial screening interview, and multiple residential phone numbers) were used to calculate adolescent-level weights adjusting for subsampling of adolescents within households, producing estimates consistent with those in the 2001 American Community Survey (ACS) public use file, using age, gender, race/ethnicity, whether adolescent's home was rented or owned, household income, and region. Data on exposure to movie alcohol use and brand appearances were analyzed using Generalized Estimating Equations, allowing for weighted analysis of within-subjects factors such as MPAA rating.

## Results

### Frequency and nature of alcohol use (Table 1)

Overall, 83.0% of the movies contained at least one occurrence of alcohol use, but this differed across MPAA rating category,  $p < .0001$ . G/PG movies were less likely to contain alcohol use than PG13 or R movies,  $ps < .0001$ , but there was no difference between PG13 and R-rated movies,  $p = .47$ . PG13 or R movies were also more likely to depict beer, wine, and liquor use than were G/PG movies,  $ps < .0001$ , and R movies were more likely to depict beer use than were PG13 movies,  $p = .03$ . The median duration of alcohol use per movie was 136.0 seconds (interquartile range: 40.0 – 271.8). Duration of alcohol use per movie differed by rating category,  $p < .0001$ . Post-hoc comparisons revealed that duration of alcohol exposure was higher in PG13 and R movies compared with G/PG movies,  $ps < .0001$ , but that PG13 and R movies were not different from each other,  $p = .34$ . Portrayal of alcohol intoxication occurred in 15.2% of G/PG movies and differed by rating,  $p < .0001$ , with some 40% of PG13 and R movies depicting intoxication.

### Alcohol brand appearances (Table 1)

Overall, 52.1% of movies contained one or more alcohol brand appearances; the proportion of movies containing at least one alcohol brand appearance did not differ between PG13 and

<sup>ii</sup>MPAA ratings are G, PG, PG13, and R. According to the MPAA, "A G-rated motion picture contains nothing in theme, language, nudity, sex, violence or other matters that, in the view of the Rating Board, would offend parents whose younger children view the motion picture." In the content of a PG movie "parents may consider some material unsuitable for their children." PG13 is considered "a sterner warning by the Rating Board to parents to determine whether their children under age 13 should view the motion picture, as some material might not be suited for them." Finally, "An R-rated motion picture may include adult themes, adult activity, hard language, intense or persistent violence, sexually-oriented nudity, drug abuse or other elements, so that parents are counseled to take this rating very seriously." [44]

R movies,  $p = .44$ , but G/PG movies were less likely to contain a brand appearance than were PG13 or R movies,  $ps < .0001$ .

The most commonly depicted brands (Figure 1) included Miller and Budweiser beers, which comprised 41.5% of all alcohol brand appearances. Examination of brand appearance share by rating category revealed that Miller and Budweiser were the most frequently depicted brands in all rating categories and appeared over four times as frequently as the third most common brand (Figure 1). The ten most frequently coded brands accounted for over half of appearances. The remainder of appearances represented 134 other beer and liquor brands, each having less than 17 appearances (1.4% of total).

Alcohol brands were most often in the background of a scene (64.1% of all appearances), but use of branded alcohol by an actor was notable (29.9% of all appearances, and in 58.3% of all movies having brand appearances). Both types of appearances were less likely in G/PG movies than PG13 or R movies,  $ps < .0001$  (PG13 and R movies did not differ,  $ps < .20$ ). Verbal mentions of alcohol brand names were relatively infrequent (72 mentions, 6.1% of all appearances); the most commonly mentioned brand was Budweiser (12 mentions, 16.7% of all mentions), followed by Heineken and Jack Daniels (each with 5 mentions, 6.9% of all mentions).

### Population exposure estimates

On average, 26.0% of U.S. adolescents had seen each movie (range: 0.6% to 95.1%), but this differed by MPAA rating,  $p < .0001$ . The mean percentage of U.S. adolescents viewing G/PG movies (48.9%) was higher than the mean percentage viewing PG13 movies (27.4%,  $p < .0001$ ), which was higher than the percentage viewing R movies (14.0%,  $p < .0001$ ).

**Exposure to movie alcohol use**—Using weighted audience estimates, we estimate that at the time of the survey, 10-14 year-old adolescents living in the U.S. had seen a mean of 334.7 minutes (95% CI: 327.0,342.4) of movie alcohol use from the 534 movies in our sample. When examined by rating category, movies rated PG13 accounted for more minutes of alcohol use exposure (184.7; 180.5,189.1 minutes per child) than movies rated G/PG (58.0; 56.8,59.3 minutes per child) or R (99.5; 95.8,103.3 minutes per child),  $ps < .0001$ . G/PG and R movies also differed,  $p = .0001$ . We examined this pattern of exposure (G/PG < R < PG13) as a function of age, gender, household income, and ethnocultural background. For all ages, genders, incomes, and races, exposure was greatest from PG13 movies, with less exposure from R movies, and the least from G/PG movies. Regardless of rating, increasing age was associated with higher exposure,  $p < .0001$ ; however, the positive relation between age and exposure increased in strength from G/PG to PG13 to R movies. Girls had higher G/PG and PG13 exposure than boys, but boys had higher R exposure than girls,  $ps < .0001$ . Household income was related to exposure from R (but not G/PG or PG13) movies, such that higher income predicted less exposure,  $p < .0001$ . Exposure differed as a function of ethnocultural background (Figure 2), with African American youth reporting higher exposure than the other three groups,  $ps < .0001$ , which did not differ from each other. However, the form of racial differences in exposure differed by rating; relative to their peers, African American youth were more exposed to R-rated movie alcohol use and Caucasian youth were more exposed to G/PG-rated movie alcohol use. Exposure to PG13 use did not differ as a function of race.

**Exposure to alcohol brand appearances**—On average, adolescents in our study were exposed to a mean of 243.8 (237.8,249.9) alcohol brand appearances from the 534 movies in our survey. When examined by rating category, movies rated PG13 accounted for the highest exposure to alcohol brand appearances—a mean of 150.6 (146.9,154.3) per child,

with both G/PG (32.7; 31.5,33.8) and R (66.5; 63.8,69.3) movies accounting for significantly fewer exposures,  $ps < .0001$ . We report the mean number of times an adolescent was exposed to appearances of some of the most commonly coded brands in Figure 3.<sup>iii</sup>

Patterns of exposure to brand appearances across age, gender, household income, and race were similar to those observed for exposure to alcohol use. Again, across ratings, increasing age was associated with seeing more brands,  $p < .0001$ , and this was particularly true for PG13 and R movies. Boys were exposed to more appearances in R-rated movies than were girls,  $p < .0001$ ; exposures to appearances in G/PG and PG13 movies did not differ by gender. Higher household income predicted less exposure to brands in R movies,  $ps < .002$ . Racial differences in exposure to brand appearances varied by movie rating: for G/PG, Hispanic youth saw significantly fewer brand exposures than their peers in the other 3 racial groups,  $ps < .004$  which did not differ from one another. For PG13 movies, Caucasian youth saw fewer brand appearances than African American youth ( $p = 0.002$ , who did not differ from youth of other races). Finally, for R movies, African American youth saw significantly more appearances than youth in other racial groups,  $ps < .0001$ , and Caucasian youth saw significantly fewer appearances than both African American and Hispanic,  $p < .0001$  youth.

**Gross impressions**—Our estimate of gross impressions (movie reach x number of brand appearances in the movie) across all 534 movies revealed that the 20.9 million U.S. adolescents who were aged 10-14 at the time of our survey had been exposed to a total of 5.1 billion alcohol brand appearances from these movies; 1.5 billion of which depicted branded alcohol use by a movie character.

## Discussion

This is the first study to estimate exposure to movie alcohol use and brand appearances in a representative national sample of adolescents. Of the movies in our sample, 83% contained alcohol use and 52% contained at least one alcohol brand appearance. Movies rated PG13 contained as much alcohol use and as many brand appearances as R-rated movies. However, because U.S. adolescents are more likely to view PG13 movies than R movies, PG13 movies accounted for a greater proportion of alcohol exposure. Also, though G/PG movies contained significantly less alcohol use than PG13 and R movies, over half of the G and PG movies (which are specifically marketed to children and young adolescents) portrayed alcohol use and almost one in five featured an identifiable alcohol brand. The results of the current content analysis are consistent with our findings from a sample of 601 popular movies released between 1988 and 1999(20) and are largely consistent with those of previous researchers using older, smaller, or more restricted media samples. These include G-rated films from 1937 through 2000 (47% showed alcohol use),(37) 200 top video rentals in 1996 and 1997 (93% contained alcohol, 85% contained actors using alcohol, and 9% showed characters under 18 using alcohol),(25) 200 top grossing movies from 1983 to 2003 (32% depicted alcohol intoxication),(38) and 43 movies from 1999-2001 featuring teens as central characters (40% of whom used alcohol).(24) Importantly, characteristics of the viewers had an impact on their exposure to alcohol-related content in movies. Unsurprisingly, older adolescents had more exposure. However, we also found that exposure to alcohol depictions in R-rated movies was disproportionately high among boys, minority youth, and youth living in low-income families. This is consistent with prior research

<sup>iii</sup>Fewer students are asked about movies containing less common brands. To reduce bias, individual brand data is reported only for brands that all respondents were asked about (i.e., brand appeared in at least one movie on all surveys). Brand appearances are less frequent in G/PG movies, and not all movie lists contained a G/PG movie with the top 2 brands; estimates for G/PG movies in Figure 3 include data from 5705 respondents.

demonstrating, for example, that African American young people are exposed to higher levels of alcohol advertising in print media than are their peers.(35)

We estimated that 10-14 year olds in the U.S. were exposed to over 5 billion gross impressions of alcohol brands from this sample of movies. How does this compare to the reach of traditional alcohol advertising? A pitch-side advertising board shown once during the broadcast of the 2006 FIFA (Fédération Internationale de Football Association) World Cup,(39) would have generated over 600 million impressions to in-home viewers worldwide. In the U.S., a *Bud Light* advertisement shown during the 2007 Super Bowl was seen by 97.7 million people over age 2 (reported cost of the ad: US\$2.6 million).(40) For the year 2002, exposure to alcohol ads on television was estimated at an average of 253.5 ads per person (among 12-20 year olds in the U.S.);(41) note that this estimate includes older adolescents, repeated viewing of the same advertisement, and all television programming.

Product placement occurs when a product manufacturer (or marketer) pays the film producer (or other agent) to depict a brand in the movie. For example, the auto firm Aston Martin paid the makers of the film “Die Another Day” to ensure that lead character James Bond would drive an Aston Martin—a reported \$70 million was paid by firms who placed products in that film alone.(42) We are unable to distinguish between brand appearances and product placements by identifying which brand appearances were paid for by manufacturers and which were not, and thus cannot draw conclusions regarding advertising strategies or expenditures. The U.S. Federal Trade Commission (FTC) noted in 1999(43) that some companies in the alcoholic beverage industry have denied requests to place alcohol products in films portraying underage drinking, but that alcohol products have nevertheless appeared in PG and PG13 films. In this same report, the FTC recommended that alcohol product placement be restricted to R and NC17 rated movies. The current results reveal that alcohol products continued to appear in films rated G, PG, and PG13 through 2003, and that young adolescents were exposed to these brand images.

We content analyzed and surveyed respondents about movies released between 1998 and 2003, and cannot estimate exposure to alcohol content in movies outside this time period. Therefore, we have not measured adolescents’ total lifetime exposure to alcohol content in movies; rather, we have estimated their lifetime exposure to depictions of alcohol use and alcohol brands in this sample of over 500 popular contemporary movies. Also, we did not account for repeated viewing of movies (and any associated alcohol content). Therefore we have likely underestimated the true extent of exposure overall and probably also for this sample of movies. Nevertheless, our study demonstrates that youth are indeed being exposed to movie depictions of alcohol use and brand appearances and that much of the exposure comes from movies rated in the U.S. as suitable for adolescents. Our study is representative of adolescents in the U.S.; it is unclear whether the results will generalize to youth in other countries. American movies are distributed and are popular worldwide, but we cannot speak to levels of exposure in other populations where viewing rates may be different and where locally-produced films may contain different amounts of alcohol use and brand appearances. Also, film rating systems differ across jurisdictions; these differences may result in different patterns of exposure to movie depictions of alcohol use.

Given that alcohol-related content is prevalent in current popular movies and youth are being exposed to this content, movies may serve as a source of information regarding the prevalence, acceptability, and function of alcohol in social life. Our study did not assess the context of the alcohol depictions (e.g., if the drinkers are rewarded for their drinking) or adolescents’ interpretations of these depictions. We did evaluate whether movies included depictions of alcohol intoxication and found that this occurs in a sizable minority of films. We look forward to future research that carefully examines audience interpretations of

media alcohol use and their implications for alcohol use behavior. Recent research has found an association between exposure to movie alcohol use and alcohol initiation in a sample of adolescents from Northern New England.<sup>(20)</sup> Further research is needed to establish whether the effect replicates in representative samples of adolescents worldwide, whether the effect is causal, and what psychosocial processes underlie any causal effect. In the interim, practitioners may wish to alert parents that PG13 movies contain as much alcohol-related content as R movies, in order that they might make informed parenting decisions regarding media.

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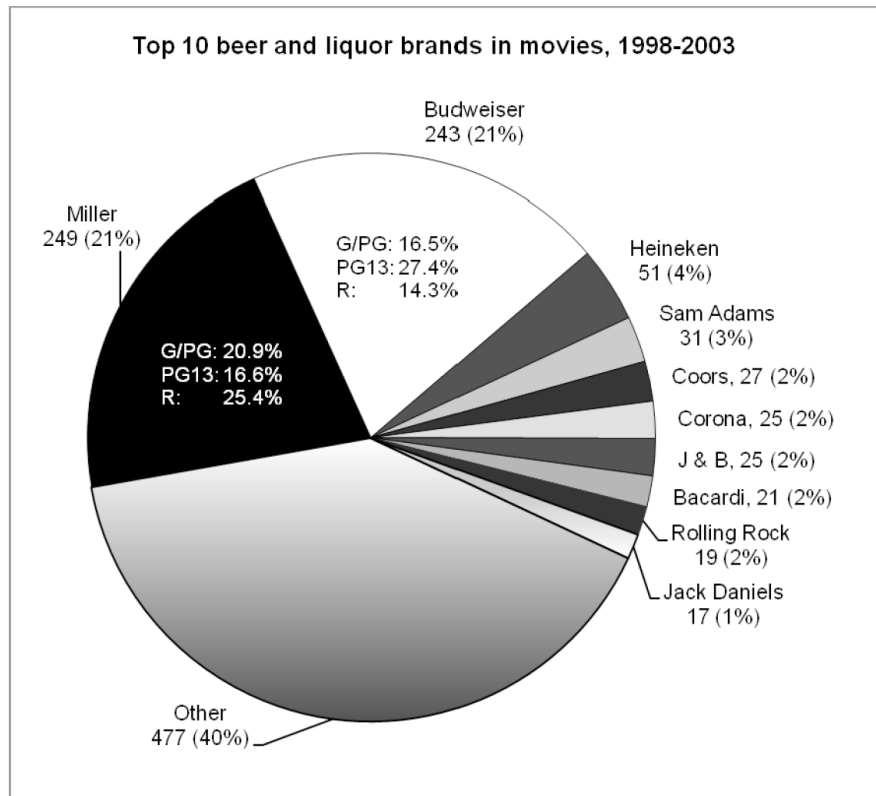
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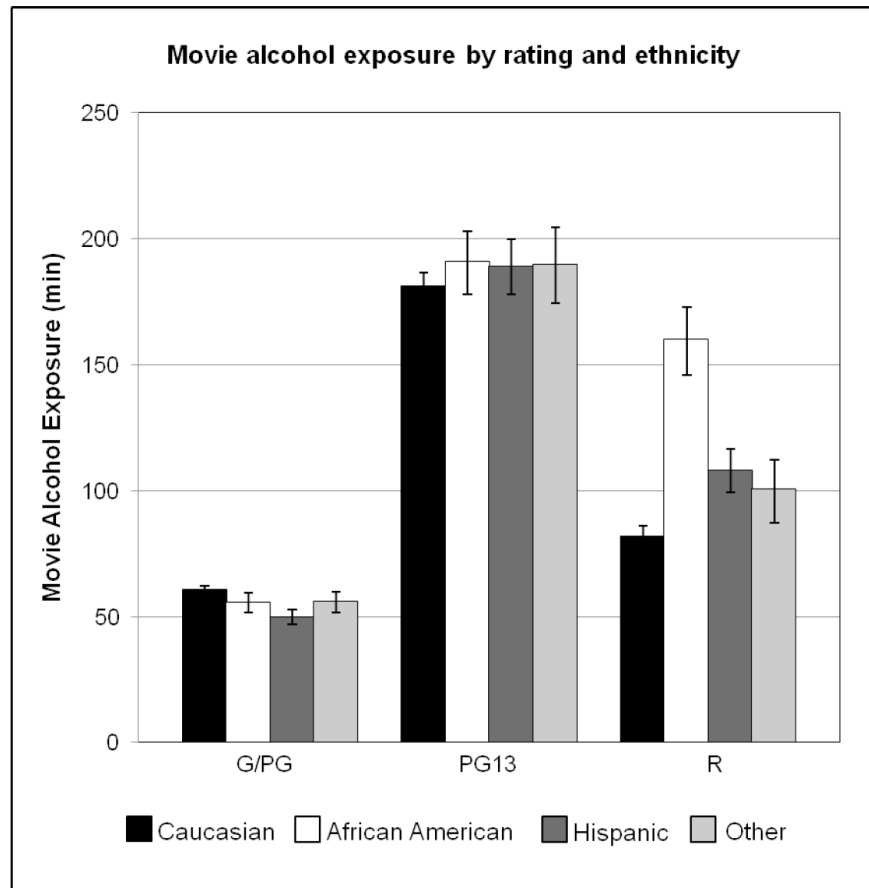


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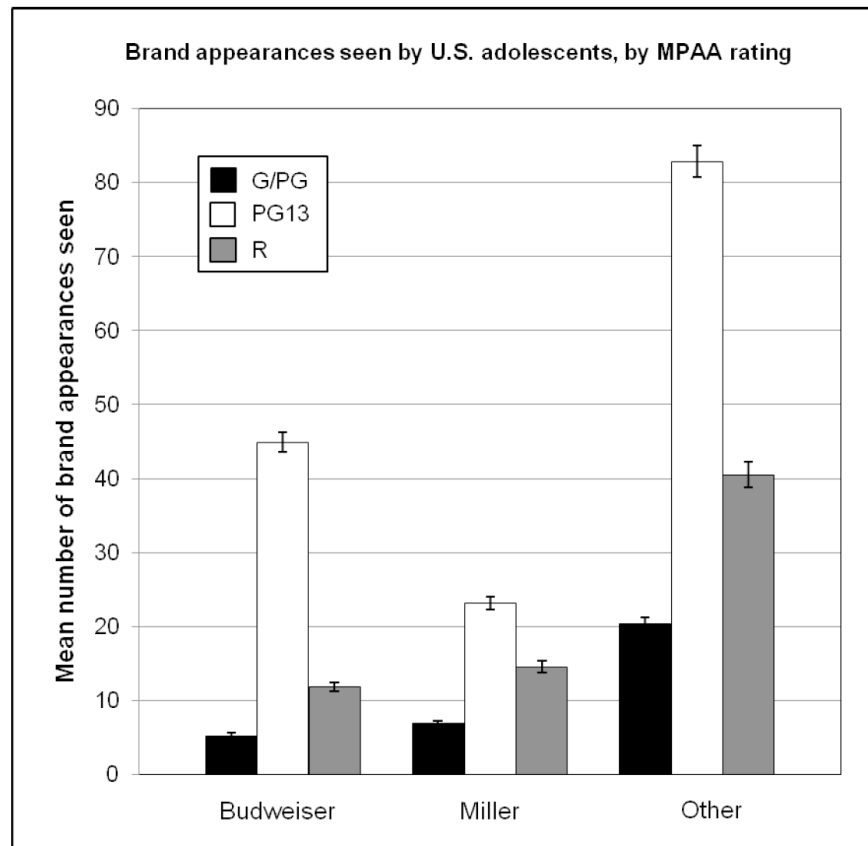
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**Figure 1.**  
 Brand share for alcohol brand appearances in movies  
 Note: Number of appearances (percentage of all appearances) follows the brand name.  
 “Other” includes 134 other brands of beer and liquor, each representing less than 1.4% of appearances.



**Figure 2.**  
Mean minutes of movie alcohol use seen by U.S. adolescents, by race.



**Figure 3.**

Mean number of brand appearances seen by U.S. adolescents.

Note: Estimated number of exposures per child for the most common brands identified in the movie sample. "Other" includes 134 other brands of beer and liquor. Error bars represent the 95% confidence interval around the mean.

**Table 1**

Alcohol use and alcohol brand appearances by MPAA rating category

|                                       | <b>G/PG</b> | <b>PG-13</b> | <b>R</b>   | <b>Total</b> |
|---------------------------------------|-------------|--------------|------------|--------------|
| Number of movies coded (%)            | 99 (18.5)   | 220 (41.2)   | 215 (40.2) | 534          |
| Any alcohol use in movie (%)          | 56 (56.6)   | 194 (88.2)   | 193 (89.8) | 443 (83.0)   |
| Mean alcohol use (seconds)            | 83.4        | 212.4        | 230.1      | 195.6        |
| Anyone intoxicated in movie (%)       | 15 (15.2)   | 93 (42.3)    | 86 (40.0)  | 194 (36.3)   |
| <i>Types of alcohol used in movie</i> |             |              |            |              |
| Beer (%)                              | 25 (25.3)   | 149 (67.7)   | 166 (77.2) | 340 (63.7)   |
| Wine (%)                              | 49 (49.5)   | 158 (71.8)   | 151 (70.2) | 358 (67.0)   |
| Liquor (%)                            | 35 (35.4)   | 166 (75.5)   | 176 (81.9) | 377 (70.6)   |
| <i>Alcohol brand appearances</i>      |             |              |            |              |
| One or more appearances (%)           | 19 (19.2)   | 127 (57.7)   | 132 (61.4) | 278 (52.1)   |
| Branded use by an actor               | 9 (9.1)     | 83 (37.7)    | 70 (32.6)  | 162 (30.3)   |
| Background                            | 17 (17.2)   | 95 (43.2)    | 106 (49.3) | 218 (40.8)   |
| Verbal mentions of use                | 3 (3.0)     | 38 (12.7)    | 31 (8.5)   | 72 (9.2)     |