

Similarities Between Alcohol and Tobacco Advertising Exposure and Adolescent Use of Each of These Substances

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ABSTRACT. Objective: Underage alcohol use is a major public health problem and substantial corporate money supports alcohol advertising across multiple venues. A diverse research literature demonstrates that adolescent exposure to such advertising is associated with drinking attitudes and behavior, but no scientific body has determined these associations to be causal. The objective of this study was to assess the association between alcohol advertising and teen drinking in the context of the “Analogy” criterion of the Bradford Hill criteria and consider a determination that the association between exposure to alcohol advertising and alcohol use is causal. **Method:** This study was a narrative review on the association between adolescent exposure to alcohol advertising and subsequent alcohol use in the context of domains utilized in the Surgeon General’s 2012 Report, *Preventing Tobacco Use Among Youth and Young*

Adults, which concluded, “Advertising and promotional activities by tobacco companies have been shown to cause the onset and continuation of smoking among adolescents and young adults.” **Results:** In every aspect compared (i.e., adolescent knowledge; attitudes toward; initiation of use; continuation of use; mediums of advertisement; the use of mascots, celebrities, and themes; and frequency and density of advertisements and retailers), the findings for both tobacco and alcohol and their association with exposure to advertising are analogous. **Conclusions:** Application of the Analogy criterion of the Bradford Hill criteria comparing alcohol and tobacco supports a judgment that the association between exposure to alcohol advertising and increased adolescent knowledge, attitudes toward, initiation, and continuation of alcohol use are causal in nature. (*J. Stud. Alcohol Drugs, Supplement 19, 97–105, 2020*)

CORPORATE ADVERTISING has long been an essential element in how goods are produced and sold in the United States and elsewhere. Approximately \$195 billion was spent on advertising in the United States in 2016 (Statista, 2018), of which \$17 billion was devoted specifically to youth advertisement (Shah, 2010). The nature of advertising has evolved with new techniques and new media but always with the goal of favorably positioning a product and brand in the eyes of a targeted consumer group (Kim, 1992; Tellis & Ambler, 2007). Whether advertisements are actually influential in shaping consumers’ purchasing behaviors has long been debated. With respect to alcohol, this is a crucial public health issue. Youth are particularly vulnerable to the influence of image advertising owing to their high involvement with social media (where alcohol marketing is increasingly found), their potential for forming brand loyalties at an early age (Babor et al., 2017), and the limited skepticism they bring to their evaluation of advertisements.

A number of cross-sectional and longitudinal research studies have examined the relationship between exposure to marketing and alcohol consumption. Because it is difficult

to infer causality from any one observational study, the scientific community has established criteria for a consensus causality judgement. The Bradford Hill criteria were proposed by Sir Austin Bradford Hill to guide epidemiological investigations and aid in drawing causal inferences based on observational studies (Fedak et al., 2015). The Hill criteria have been crucial and widely used tools in establishing causality for more than half a century and have played an important role in developing and implementing prudent evidence-based public health regulations (Doll, 2002; Hill, 1965). Many of the criteria apply to summarizing results from multiple observational studies. However, the “Analogy” criterion is unique in that it applies when an analogous causal relationship exists for similar agents or exposures and their demonstrated association with a similar behavior or disease. In his classic 1963 speech at the Royal Society of Medicine, Hill (1965) pointed to the causal effect of rubella on congenital malformations in the newborn as a situation in which we would accept “slight but similar evidence with another drug or another viral disease in pregnancy” (p. 299). Subsequently, a number of viruses have been causally implicated in congenital newborn problems.

The relationship between advertisement exposure and youth consumer behaviors has been studied most extensively for tobacco. The tobacco industry has a long history of using advertising and promotions to directly target youth, which has persisted despite the 1998 Master Settlement Agreement that placed limitations on cigarette marketing (e.g., use of cartoons, placement of ads in outdoor

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areas). The Master Settlement Agreement, the Surgeon General's 2012 *Report on Preventing Tobacco Use Among Youth and Young Adults*, and the subsequent National Cancer Institute Monograph (National Cancer Institute, 2008) all concluded that the evidence was strong enough to infer that there is a causal relationship between cigarette advertisements and the initiation and continuation of tobacco use by adolescents. The Surgeon General provides the public with the very best scientific information available on how to improve their health and reduce the risk of illness and injury. The 2012 report used a four-level hierarchy system to classify the strength of causal inferences based on available evidence, as well as statistical estimation and hypothesis testing of association. The conclusion that the observed associations between exposure to tobacco advertising and adolescent tobacco use are causal in nature allowed for evidence-based policy development that justified further regulation of tobacco advertising aimed at youth and set the framework for the investigation of a potentially analogous relationship with alcohol to be established.

What follows is a description of ways in which alcohol and tobacco advertising and their association with adolescent attitudes and behaviors are analogous, using an assessment of the same categories used by the Surgeon General to evaluate that the relationship between tobacco advertising and adolescent smoking is causal in nature.

Method

Peer-reviewed literature was searched for using three databases: PubMed, Google Scholar, and Cochrane. No date or geographic limitations were used in the search, but it was limited to peer-reviewed journals in English. Searching was conducted from January to April 2018, using the following search terms: "advertising/advertisements," "consumer behavior," "young adult/adolescent/child," "underage drinking," "alcoholic beverages," "television," "alcohol drinking," "perception," "social media," "commerce," "intention," "attitude to health," "choice behavior," "motion pictures," "cues," and "smoking," in accordance with the Surgeon General categories.

Results

Tobacco and alcohol advertisements strategies

In the 1998 Master Settlement Agreement, the major cigarette companies agreed to some limitations on advertising and promotions targeted directly at youth, such as the elimination of cartoons and advertisements in outdoor areas (e.g., billboards and public transit). A decade later, the 2009 Family Smoking Prevention and Tobacco Control Act provided comprehensive regulation of marketing tobacco products to youth, including banning tobacco-brand sponsorships of

sports and entertainment events, free giveaways of cigarettes, and sales in vending machines.

In contrast, there are currently few limitations on alcohol advertisements in the United States (Ross et al., 2016), beyond the alcohol industry's 2011 self-regulatory code to not advertise on television programs in which more than 28.4% of the audience is younger than 21 years of age. Currently, however, in the 25 largest television markets in the United States, approximately one in four alcohol advertisements still has an audience in which more than 30% are underage youth (Centers for Disease Control & Prevention, 2013), and the majority of alcohol advertisements contain themes that are reminiscent of those used for tobacco and youth (Noel et al., 2017).

Themes. Consistent with almost all advertising, tobacco advertising relies on imagery to appeal to a potential consumer's desires, rather than provide factual information about the product. Childhood is a critical period of identity formation and tobacco companies have knowingly used themes of independence, athleticism, social acceptability, sexuality, popularity, wealth, power, rebelliousness, and adventurousness to fulfill adolescent aspirations (Davis et al., 2008). In fact, youth are three times more responsive to tobacco advertisements than are adults (Pollay et al., 1996).

To appeal to youth aspirations, alcohol advertising likewise relies heavily on a number of themes and types of images that are virtually identical to those used by the tobacco industry, including high energy, sexuality, popularity, attractiveness, fame, humor, friendship, and sociability (Aitken et al., 1988; Grube, 1993; Madden & Grube, 1994; Morgenstern et al., 2015). Alcohol advertisements associate drinking with adventurous and potentially hazardous activities, such as driving, swimming, or boating (Grube, 1993), thus appealing to the risk-taking behavior that is so often present among adolescents and young adults. Even if actual consumption is not shown, viewers interpret the advertisements to imply that drinking is associated with the activity (Atkin & Block, 1970).

Movies. The tobacco industry has had a long and mutually beneficial relationship with Hollywood filmmakers that started in the 1970s. Tobacco and alcohol use in movies and television is subtle and includes powerful forms of promotion that use product placement and celebrity use and endorsement. From 2000 to 2002, there was an exponential decline in the number of smoking incidents in movies (from 98 to 22 appearances in the top 100 box-office hits), but there has been little change since then, despite declining tobacco use and increasing public understanding of the dangers of smoking (Bergamini et al., 2013). Meanwhile, alcohol brand placements, which have been subject only to self-regulation, increased significantly in youth-related movies from 1996 to 2009 (Bergamini et al., 2013). In a sample of the 25 top box-office hits released each year from 1988 to 1997, 87% of the movies portrayed tobacco use, with a

median of 5 occurrences per year. R-rated movies had the greatest number of occurrences and were most likely to feature major characters using tobacco (Dalton et al., 2002). Similarly, out of a sample of the 100 top box-office hits each year between 1998 and 2002, 83% contained alcohol use and 52% contained at least one alcohol brand appearance; there was no difference between PG-13- and R-rated movies (Dal Cin et al., 2008).

Results of a number of correlational and longitudinal studies have confirmed that exposure to images of smoking on television and in movies is one of the risk factors for onset of tobacco use among adolescents (Dalton et al., 2003; Davis et al., 2008; Sargent et al., 2004), and, according to a meta-analysis, it may account for nearly half of adolescent smoking initiation (Dalton et al., 2006). Again, a similar pattern for alcohol is clear from the research. Multiple longitudinal studies indicate that watching more depictions of alcohol in movies or on television is strongly predictive of drinking onset and binge drinking among adolescents (Greenberg et al., 2009; Primack et al., 2009; Wills et al., 2009).

Mascots. Before the 1998 Master Settlement Agreement, which prohibited tobacco companies from using animated mascots to appeal to children, multiple studies found that children as young as 3 years of age were familiar with these mascots and associated them with particular tobacco brands. For example, more than 90% of all 6-year-old children correctly connected a picture of Joe Camel to a picture of a cigarette (Fischer et al., 1991). Children learned to trust these mascots, such that the advertisements influenced them on an emotional level. Arnett and Terhanian (1998) reported that more than 50% of middle and high school students believed that Joe Camel made smoking more appealing, and 40% believed the same about the Marlboro Man (Arnett & Terhanian, 1998).

As in the case of Joe Camel and cigarettes, the elements of alcohol advertisements that youth find most appealing often feature leading animal characters, such as the Budweiser Ferret or the Bud Light Mouse (Chen et al., 2005). In a study of more than 3,500 students, 75% of fourth graders and nearly 90% of ninth graders recognized the Budweiser ferret ad (Collins et al., 2005). Another study found that a sample of 9- to 10-year-olds could identify the Budweiser frogs nearly as frequently as they could identify Bugs Bunny (Leiber, 1996).

Sporting events. Similarly, before federal prohibitions typified by the Master Settlement and the Family Smoking Prevention and Tobacco Control Act, specific sports figures and sporting venues were frequently used to advertise cigarettes and other forms of tobacco to the public in general and adolescents in particular. Louis Sullivan, the former Secretary of Health and Human Services, once said, "When the tobacco industry sponsors an event in order to push their deadly product, they are trading on the health, the prestige

and the image of the athlete to barter a product that will kill the user" (Crompton, 1993, p. 152). Alcohol advertisements still are often centered on sporting events in order to engage young, specifically male, target audiences to form connections between teams and brands (Kelly et al., 2015). Approximately 700 alcohol commercials are broadcast in every 450 hours of televised sporting events (Madden & Grube, 1994). There are no comparable data for cigarettes since tobacco commercials were banned from electronic media in 1971, but nonstandard tobacco advertisements still exist, such as on stadium signs and vestibule posters. When major professional sports events were examined, nonstandard tobacco advertising occurred 1.5 times per hour and nonstandard alcohol advertising occurred 3.3 times per hour (Madden & Grube, 1994).

Frequency and density of tobacco and alcohol advertisements and retailers

The findings in this area for tobacco and alcohol are substantially alike. Higher tobacco retail density results both in greater exposure to tobacco advertising and easier access to tobacco procurement. Not only is there an overwhelming number of tobacco retailers with tobacco advertising inside and outside their stores (Girlando et al., 2007), but also the density of tobacco advertising and tobacco retailers has been found to be greater near schools (Pucci et al., 1998; Ross et al., 2014a), and even more so in minority, low-income neighborhoods (Cruz et al., 2010; Henriksen et al., 2012; Laws et al., 2002). In fact, 41% of U.S. adolescents live within half a mile of a tobacco outlet, and 44% attend a school that is less than 1,000 feet from a tobacco outlet (Schleicher et al., 2016). As a consequence, studies looking at the relationship between tobacco retail density and youth smoking have consistently found an association between density of retailers and/or proximity to youth homes and increased smoking rates (Henriksen et al., 2008; Leatherdale & Strath, 2007; Lipperman-Kreda et al., 2014; Novak et al., 2006; West et al., 2010), increased susceptibility to smoking (Chan & Leatherdale, 2011), and increased rates of experimental smoking (McCarthy et al., 2009; Pokorny et al., 2003).

These relationships, as they pertain to alcohol advertising and youth again are extraordinarily similar to those found for tobacco. Neighborhoods with large numbers of alcohol outlets provide more opportunities for youth to purchase alcohol (Paschall et al., 2007). Many alcohol advertisements are also in close proximity to areas with a high concentration of youth, such as on the transit system or near schools (Gentry et al., 2011; Kwate et al., 2007; Nyborn et al., 2009). As a consequence, underage youth are only slightly less likely than adults of legal drinking age to see alcohol advertisements (Tanski et al., 2015). Furthermore, although the literature focusing on the relationship between alcohol retail density and adolescent alcohol consumption is mixed,

for the most part it concludes that density is positively and significantly correlated with younger age at drinking initiation, increased procurement of alcohol (Chen et al., 2009), and lifetime and recent heavy alcohol use (Shih et al., 2015).

Before the federal restrictions on tobacco advertisement, cigarettes advertisements were widely prevalent during youth-oriented television shows. Magazines with high youth readership still have a particularly high volume of tobacco advertisements, as well as alcohol advertisements (Alpert et al., 2008; King et al., 1998; Ross et al., 2014c). Alcohol advertisements still are frequently featured during youth-oriented shows and sports programming, such that the top 15 youth-oriented television programs all contain alcohol advertisements. In 2011, alcohol brands that were more popular with minors exposed underage magazine readers to the same levels or perhaps higher levels of alcohol advertising as their legal-age adult readers (Ross et al., 2014c).

Brand-specific advertising, recognition, and preferences

Again, the findings for tobacco and alcohol are uncannily similar. Tobacco companies insist that the sole purpose of advertising is to retain and encourage brand loyalty, despite how financially infeasible such an approach would be (Tye et al., 1987). Despite this, for the majority of smokers, brand loyalty is usually established with the first cigarette smoked; even if adolescents experiment with a variety of other brands, they often return to the same brand as their first cigarette (DiFranza et al., 1994). Brand switching is also very limited, with only 10% of smokers switching brands per year (Gardner, 1985). Furthermore, youth are more likely to smoke tobacco brands that they have seen advertised or that have higher rates of advertisement (Pierce et al., 1998; Pucci & Siegel, 1999).

Brand-specific alcohol advertising among youth has been found to be significantly associated with brand-specific alcohol use and with the number of drinks of that same brand consumed (Rogers et al., 1995; Ross et al., 2014a, 2014b, 2015). In fact, many adolescents have already formed brand preferences before they have started drinking (Aitken et al., 1988; Morey et al., 2017), and, as a consequence, by age 21, those adolescents tend to be heavier drinkers exhibiting more alcohol-related aggressive behaviors (Casswell & Zhang, 1998). Alcohol companies capitalize on this by having alcohol brands associated with sporting and entertainment industries (Casswell, 2004; Jackson et al., 2000). There is a robust relationship between youth's brand-specific exposure to alcohol advertising and their consumption of those same alcohol brands (McClure et al., 2018; Ross et al., 2014a; Siegel et al., 2016; Tanski et al., 2011). Knowing that adolescents place a high value on brands and labels, the National Academy of Sciences' Committee on Developing a Strategy to Reduce and Prevent Underage Drinking recommended in 2002 that the federal government survey underage drinkers

and collect data on alcohol advertising by brand regularly via annual surveys (National Research Council and Institute of Medicine Committee on Developing a Strategy to Reduce and Prevent Underage Drinking, 2004). This recommendation has yet to be implemented.

Advertising and adolescents' perceptions toward tobacco and alcohol

An extensive body of research demonstrates that adolescents find cigarette advertisements appealing. These advertisements depict smoking as alluring, and therefore adolescents find smoking to be more enticing. In a randomized study, adolescents who were given magazines containing tobacco advertisements reported more positive attitudes toward smoking than adolescents who were given magazines without any advertisements (Turco, 1997). Further research in this arena (Pechmann & Knight, 2002; Pechmann & Ratneshwar, 1994) ultimately concluded that advertising and promotion influence behaviors and intentions in a direction that increases the susceptibility of adolescents to start smoking. In fact, the National Cancer Institute Monograph 19 concluded, after weighing all the evidence from multiple types of studies conducted by investigators from different disciplines and around the world, that there is a causal relationship between tobacco advertising and promotion and increased tobacco use (National Cancer Institute, 2008).

The ways in which alcohol is depicted in the media also can influence the perception and receptivity that youth have toward alcohol. Receptivity is the development of a positive affect toward marketing and promotions. Receptivity to tobacco marketing has been consistently shown to be a risk factor for smoking initiation (Pierce et al., 1998; Sargent et al., 2000), and similar research has been uncovered for alcohol (Unger et al., 2003). For example, never drinkers who reported high receptivity to alcohol marketing at baseline were 77% more likely to begin drinking at follow-up than those who were not receptive (Henriksen et al., 2008). Most notably, exposure to alcohol advertisements is linked to increased positive perceptions toward alcohol (Grube & Wallack, 1994) and a desire to emulate characters and mascots seen in alcohol advertisements (Grenard et al., 2013). The ultimate conclusion was that attitudes mediate the path through which alcohol advertising influences alcohol use (Austin et al., 2006; Morgenstern et al., 2011).

Advertising and adolescents' initiation of tobacco and alcohol use

Perhaps most important of all are the findings that demonstrate associations between advertising exposure and initiation and ongoing use of both of these agents. The evidence of the association of exposure to advertising of tobacco and alcohol and initiation of the use of each is both extraordi-

narily similar and compelling. Analyses of trends in the age at smoking initiation have demonstrated high correlations between the timing of particular advertising campaigns and increases in the rates at which adolescents take up smoking (Pierce et al., 1994). Even when confounders such as exposure to other smokers in their social network are controlled for, adolescents have been found to be two to four times more likely to be susceptible to smoking, depending on their frequency of exposure, than adolescents who were not exposed to advertisements at all (Evans et al., 1995). Seven longitudinal studies have also reported a dose-response relationship between adolescent exposure to cigarette advertising and cigarette uptake (Lovato et al., 2003), which has been continually supported by cross-sectional studies (Aitken et al., 1986; DiFranza et al., 1991; Kaufman et al., 2002; Zulu et al., 2009).

Although parenting styles, peer drinking, and personality traits have all been found to increase the risk of underage drinking, alcohol advertisement has also been shown to be an independent risk factor, both in cross-sectional and longitudinal studies. Researchers have been searching for a means to convincingly demonstrate a causal relationship between the two since the early 1990s. One of the first studies (Grube & Wallack, 1994) used structural equation modeling to demonstrate that data from cross-sectional studies fit their hypothetical model, in which advertising affected future drinking initiation. Since then, the literature has continued to grow. Out of the 25 longitudinal studies investigating the relationship between increased alcohol advertisement exposure and drinking initiation, 24 have found evidence supporting this relationship (Anderson et al., 2009; Jernigan et al., 2017), and at least two of these also identified a dose-response relationship (Hanewinkel et al., 2008; Sargent et al., 2006). In fact, it has been found that for each additional hour of television viewing and movie alcohol exposure per day, the risk of drinking initiation increases 9% (Robinson et al., 1998) and 15% (Sargent et al., 2006), respectively. Multiple studies have continued to support this (Ellickson et al., 2005; McClure et al., 2006; Robinson et al., 1998) and a similar relationship between advertisement and initiation of binge drinking (Morgenstern et al., 2014; Tanski et al., 2015).

Advertising exposure and the amount of adolescent consumption of tobacco and alcohol

A voluminous research literature, again consisting of both cross-sectional and longitudinal studies, has examined the relationship between exposure to cigarette advertisements and changes in the consumption of cigarettes. Surveys among adolescents who had experimented only with smoking found that exposure to marketing increased the likelihood that those same adolescents would progress to established smoking 18–36 months later (Biener & Siegel, 2000; Choi

et al., 2002). The majority demonstrate that such exposure is associated not only with ongoing use but also with increased consumption (Tye et al., 1987).

A smaller number of studies has assessed whether the quantity of advertising exposure is associated with the total quantity of alcohol consumed by underage youth, and they too have found a positive relationship between past-year exposure to advertising and the total quantity of alcohol consumed in the past 30 days, even after consumption of nonadvertised brands was controlled for (Naimi et al., 2016; Snyder et al., 2006). One additional study surveyed a cohort of adolescents over 2 years and found that awareness of marketing at baseline was associated with an increased frequency of alcohol use at follow-up (Gordon et al., 2010).

Discussion

These results, when taken in the context of the Analogy criterion of the Bradford Hill criteria, indicate that on all domains examined using the categories employed by the Surgeon General's 2012 *Report on Preventing Tobacco Use Among Youth and Young Adults*, the advertising approaches and associated adolescent knowledge, attitudes toward, and behaviors are remarkably similar for both alcohol and tobacco. These findings, using the Analogy criterion of the Hill criteria, add to the evidence needed to convince the scientific and public health communities that these associations, as concerns adolescents and alcohol advertising, are causal in nature.

Why is regulating adolescent use of alcohol important for public health? There are numerous health-related similarities between tobacco and alcohol use during adolescence. In the United States, the peak years for initiation of use of each are comparable (ages 13–14 years for alcohol and ages 11–13 years for tobacco; Miech et al., 2016), and a broad spectrum of untoward health consequences are more likely and more severe the earlier use begins for either agent (Institute of Medicine Committee on the Public Health Implications of Raising the Minimum Age for Purchasing Tobacco Products et al., 2015; Li, 2003). Each substance has a potential for addiction that is very difficult to overcome beginning shortly after initiation of use. Use of each during adolescence can result in potentially permanent structural changes in the brain and in permanent cognitive impairment (Benowitz, 2010; Kandel & Kandel, 2014; White, 2003). Both drinking and smoking among youth are considered gateways to a number of other negative consequences, including risky sex, illicit drug use, and poor academic performance. Another reason why adolescent alcohol use is a major public health problem is that alcohol is a clear contributor to mortality among adolescents (e.g., motor vehicle accidents, suicides), whereas tobacco use is not associated with mortality during this time of life.

In conclusion, the association of alcohol and tobacco advertising exposure and adolescent perceptions, knowledge of, and use of these substances are remarkably analogous, adding much-needed evidence to conclude that the association between alcohol advertising exposure and adolescent alcohol use is causal in nature. These findings indicate there is a need for similar analyses regarding commercial advertising and its relationship to other deleterious child and adolescent behaviors, such as consumption of fast foods and sugar-based beverages. In addition, the development of scientific and public health consensus on the causal nature of adolescent exposure to such advertising and consumption of these products may enable the implementation of evidence-based efforts to reduce advertising that influences adolescent alcohol use. This could have profound consequences on the health of adolescents and the public as a whole.

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