CAPT Decision Support Tools

Factors Associated with Binge Drinking Among Adolescents and Young Adults

Using Prevention Research to Guide Prevention Practice

SAMHSA's Center for the Application of Prevention Technologies
October, 2013

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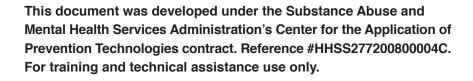SAMHSA's Center for the Application of Prevention Technologies
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Substance Abuse and Mental Health Services Administration
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FACTORS ASSOCIATED WITH BINGE DRINKING IN ADOLESCENTS AND YOUNG ADULTS: USING PREVENTION RESEARCH TO GUIDE PREVENTION PRACTICE

As part of a strategic planning process, practitioners need to identify the underlying factors that influence the likelihood that an individual will develop a substance abuse or related behavioral health problem. This document presents risk and protective factors associated with binge drinking, as identified in the prevention research literature. It also provides recommendations for using the prevention research to inform the selection and prioritization of factors.

Other tools in this toolkit include:

- *Strategies to Prevent Binge and Heavy Episodic Drinking Among Adolescents and Young Adults: Using Prevention Research to Guide Prevention Practice*

HOW WE IDENTIFIED THE FACTORS INCLUDED IN THIS DOCUMENT

The risk and protective factors included in this document were culled from articles published between 2007 and 2012. This timeframe was dictated by available resources, and the view that more recent (post-2006) articles would be more relevant for planning current prevention activities. The review focused on U.S. and international samples of adolescents and young adults (including college students).

The search was conducted using PSYCHINFO, PUBMED, and SocINDEX databases for articles published between 2007 and June 2012. Search terms included "**binge drinking**" OR "**heavy episodic drinking**," AND "**review**" OR "**meta***[1]" in combination with these additional terms: "adolescents," "older adults," "elderly," "young adults," "emerging adults," "college," "risk factors," "risk perception," "predictors," "protective factors," "deterrents," "availability," "access," "community," "norms," "family," "parent*," "school," "unemployment," "economic stress," "peers," "peer use," "marketing," "advertising," "expect*," attitude*," "strategy," "prevention," and "intervention."

Articles were selected based on the following criteria:

- The full text was available in English or with translation.

- The article was published in a peer-reviewed journal.

[1]* represents a multiple letter "wildcard character" (e.g., meta* would include the terms: meta-analysis, meta-analytic, meta-analyses)

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- The study had clearly identified methodologies and results, or was a comprehensive and well-researched literature review.

- The study specifically addressed risk and protective factors associated with binge drinking or, in the case of a literature review, included a section, in the review, on factors associated with binge drinking.

- At least one of the main findings was specifically related to binge or heavy episodic drinking among adolescents or young adults (including college students). Articles that assessed general alcohol use, problem alcohol use, or other alcohol outcomes without any outcomes specific to binge drinking were not included.

- Meta-analyses and systematic reviews (definitions are provided in the *Glossary*) were examined to determine the level of evidence to support a relationship between risk and protective factors and binge drinking.

In addition, relevant longitudinal and cross-sectional studies summarized in the *Annotated Bibliography of Alcohol, Other Drug, and Violence Prevention Resources 2006–2008*, a literature review compiled by the Higher Education Center for Alcohol and Other Drug Abuse and Violence Prevention (HEC) in 2009, were included.

CAVEATS TO THE SELECTION PROCESS

1. The findings are limited to the time frame, libraries, and search parameters described above.

2. The body of research on risk and protective factors associated with binge drinking is relatively young, so that one or a few studies could dramatically shape our understanding of the association between a risk or protective factor and binge drinking (either positively or negatively). The difficulty with a consistent definition of binge drinking has contributed to relatively few well-designed studies. As a result, the fact that a given risk or protective factor does not have multiple, well-designed research studies establishing a strong, uni-directional relationship with binge drinking may say less about whether that factor is a potent driver of the problem and more about the current paucity of related literature.

3. The methodological rigor of the studies reviewed varies widely. For example, some studies used longitudinal designs that followed individual subjects over time, but most used cross-sectional designs that cannot determine whether a causal relationship exists between a risk or protective factor and binge drinking.

4. Most of the published literature in peer-reviewed journals around the risk and protective factors for binge drinking focuses on adolescents or emerging adults; very little has been published about young adults over age 21. The reader is encouraged to pay special attention to the population studied for each risk and protective factor. There is a separate risk/protective factor review for older adults available by request from the CAPT.

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USING THESE RESOURCES TO GUIDE PREVENTION PRACTICE

This document contains two tables:

- *Table 1: Brief Descriptions*, provides a snapshot of identified strategies and interventions, organized by the domains of the socio-ecological model: Individual, family, school, peer community/environment.

- *Table 2: Detailed Summaries*, provides a detailed description of each article identified in the search, including sample characteristics, study design, outcome measures, key findings, and study limitations.

Although there are several ways to approach and use these tables, the following are suggested steps or guidelines.

- **Start with a needs assessment.** It's important to examine local quantitative and qualitative data to identify the risk and protective factors that drive binge drinking in your community. Factors driving binge drinking in your community may differ from the factors driving it in another community. For example, high school students in your community may have low perceptions of the risks associated with binge drinking. However, this risk factor may not be a driving factor in a similar community experiencing high rates of binge drinking due to a long-standing local educational program addressing the dangers of heavy drinking.

- **Once you have identified local risk and protective factors, use *Table 1: Brief Summaries* to determine which of those factors are addressed in the literature.** Targeting factors supported by evidence-based research will increase the likelihood that the strategies you select will affect binge drinking in your community. You can quickly identify factors in the literature by examining the columns labeled Risk Factor(s) and Protective Factor(s) in Table I. Scan the entire column since a single factor, such as "low perception of risk," may appear in several places. To help expedite the search, Table 1 is subdivided by the associated domain (Individual, Family, School, Peer, Community/Environment) in which the different risk factors operate.

  Targeting other risk and protective factors that appear in the same row (in relation to the same study) is ideal, particularly if they were also identified during your local needs assessment. Implementing a single intervention that impacts multiple associated factors is a cost-effective approach to prevention. For example, if "favorable attitudes toward use" and "easy access of alcohol" are risk factors for binge drinking in your community, a single, well-designed community education and enforcement intervention could address both factors.

  The risk and protective factors in your needs assessment may be labeled differently from how they are in the table. The labels used in the summaries reflect the language used in the articles. Therefore, they may not correspond exactly to more commonly used "standard" terms (see, for example, National Research Council and Institute of Medicine, 2009, *Preventing mental, emotional, and behavioral disorders among young people: Progress and possibilities*. Washington, DC: The National Academies Press). If you are not certain whether language in the table represents the same factor(s) of interest to you, you may be able to resolve the issue by examining the entry for the article in *Table 2: Detailed Summaries*. If the risk or protective factor identified in your local needs assessment is not addressed in this review, consider conducting additional research. If evidence is limited, consider shifting to another factor that is supported by the literature, even if the results from your community needs assessment did not indicate a strong association with binge drinking.

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There are some risk and protective factors listed that prevention interventions cannot change (race, gender, age, school or college grade level) or are not easily changed (socio-economic status, rural location). These background or demographic factors may be very useful for selecting those individuals and/or groups, such as females or Whites, which an intervention should focus on or emphasize.

The column labeled *Population* may help you decide how relevant the risk or protective factor (in the same row) is to your local conditions. A study focusing on binge drinking among high school students may not be relevant if your local assessment has determined that college students are your target population. However, you may have to "settle" for a study that provides support for a risk or protective factor for a population that doesn't match yours, but does identify a risk or protective factor selected based on your needs assessment.

Similarly, the *Outcome Measure(s)* column can help determine which articles provide the most direct support for the risk or protective factor(s) in which you are interested (see detailed summaries for more information or refer to full article.) For example, some studies may show that peer use and peer approval of use are risk factors directly associated with binge drinking. However, other studies may provide less support, indicating that these risk factors are linked to "heavy drinking" or "underage drinking" in general, but not whether they are linked specifically to "binge drinking".

Suppose you have identified two or more local risk factors, but your assessment doesn't clearly indicate which factor(s) were most important, and your community doesn't have the resources to address all the factors. It may be tempting to select those that Table 1 shows are associated with the highest number of studies. However, this solution is too simplistic for a number of reasons:

o First, some of the sources in Table 1 are literature reviews that include multiple studies that may also appear separately, elsewhere in the table. Therefore, you could be double-counting some studies.

o Second, a risk factor supported by multiple studies that are all relatively weak (e.g., cross-sectional surveys that cannot determine causality) may not be as strongly linked to binge drinking as a risk factor supported by a single, more methodologically rigorous study (e.g., one that studied the same subjects over time, showing the risk factor preceded binge drinking).

Comparing and weighing the evidence for different studies is beyond the scope of this document. Some limitations of the studies are listed in the detailed summaries and some of the dimensions to consider (if you seek out the original articles) are discussed in SAMHSA's Center for Substance Abuse Prevention's 2009 *Identifying and Selecting Evidence-Based Interventions Revised Guidance Document for the Strategic Prevention Framework State Incentive Grant Program*. It is best, however, to leave comparing the rigor of different studies to researchers, evaluators, or others with appropriate training and experience. Fortunately, in responses to conditions of SAMHSA-funded initiatives, such as the Strategic Prevention Framework State Incentive Grant, many states have Evidence-Based Workgroups that can help assess the literature.

Ultimately, the best method for limiting the number of risk factors to target in your community is to reexamine the assessment data (both quantitative and qualitative) and select those factors that seem to be most important contributors to binge drinking locally, accepting that the selection process is often imprecise.

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The process may be strengthened by convening key community stakeholders to review the data and select the risk factors.

- **Use the detailed summaries to examine entries for relevant studies,** as they can help you decide whether to focus on one or a few risk and/protective factors. The detailed summaries provide additional information on each of the studies included in Table 1:

    o A full citation (so you can locate the original article)

    o Other (apart from risk and protective factors) independent variables assessed (e.g., settings with high rates of binge drinking)

    o Sample characteristics (e.g., non-random cross sectional sample of three high schools in one school district)

    o The study design including the instrument and time frame (e.g., a 2012 student survey administered in four rural college settings using the CORE survey)

    o Outcomes measured (e.g., use of binge drinking in last 30 days)

    o Key findings (e.g., male college students in fraternities are more likely to binge drink than male married college students)

    o Study limitations (e.g., cross-sectional data does not allow causal inference

TABLE 1: BRIEF SUMMARIES

Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
INDIVIDUAL					
Individual	Perceived Risk of Use		30-day prevalence measures of: (1) smokeless tobacco use, (2) cigarette use, (3) alcohol use, (4) binge drinking, (5) marijuana use, (6) inhalant use	8th and 10th grade students in southeast state (N=15,376)	Collins, D., Johnson, K., & Becker, B. 2007
Individual	Favorable attitudes toward use		30-day prevalence measures of: (1) smokeless tobacco use, (2) cigarette use, (3) alcohol use, (4) binge drinking, (5) marijuana use, (6) inhalant use	8th and 10th grade students in southeast state (N=15,376)	Collins, D., Johnson, K., & Becker, B. 2007
Individual	Drinking Motives 1. Reduction in negative affect 2. Pleasure/fun 3. Facilitate social ease		Heavy episodic drinking	Review of studies about adolescent drinkers in Europe and Western countries	Stolle, M., Sack, P. M., & Thomasius, 2009

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Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Individual	Drinking Motives 1. Reduction in negative affect 2. Fitting in with peer group		Risky single occasion drinking (RSOD)	Review of 65 articles across European college student populations	Wicki, M., Kuntsche, E., & Gmel, 2010
Individual	Personality characteristics 1. Impulsivity		Heavy episodic drinking	Animal model studies	Crews, F. T., & Boettiger, 2009
Individual	Personality characteristics 1. Sensation seeking		Risky single occasion drinking (RSOD)	Review of 65 articles across European college student populations	Wicki, M., Kuntsche, E., & Gmel, 2010
Individual	Personality characteristics 1. Impulsivity and sensation seeking		Heavy drinking/binge drinking	Review of studies on alcohol use in college freshmen	Borsari, B., Murphy, J. G., & Barnett, 2007

Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Individual	Personality Characteristics 1. Impulsivity and sensation seeking		Heavy episodic drinking	Review of studies about adolescent drinkers in Europe and Western countries	Stolle, M., Sack, P. M., & Thomasius, 2009
Individual		Personality Characteristics 1. Low sensation seeking	Frequency of alcohol use, heavy episodic drinking, and marijuana use during the transition out of high school	319 students transitioning from high school to college	White, H., McMorris, B., Catalano, R., Fleming, C., Haggerty, I., & Abbott, 2006
Individual	Personality Characteristics 1. Low self-control		Binge drinking	693 students from four southern universities proclaimed to be college sports fans	Higgins, G., Tewksbury, R., Mustaine, 2007

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Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Individual	Self-regulation, impaired control, impulsiveness, reasons for drinking (motives)		Number of drinks consumed on each day in typical week and heaviest week, Number of types consumed 5/4 drinks in the past month, drinking days in the last month, peak quantities of alcohol consumption and typical time spent drinking	183 undergrads recruited from a psych course; 64% Female 83% Caucasian, 77% freshman, 20% Greek membership	Neal and Carey, 2007
Individual	High attachment avoidance		High risk drinking for former high school and collegiate athletes compared to students not identifying as athletes	249 freshmen students in public northwestern university	Doumas, D., Turrisi, R., & Wright, 2006
Individual	Low importance of religion		Heavy drinking/binge drinking	Review of studies on alcohol use in college freshmen	Borsari, B., Murphy, J. G., & Barnett, 2007
Individual	Low importance of religion		Binge drinking	Review of 35 studies published between 1994-2008 examining risk factors for binge drinking in young adults	Courtney, K. E., & Polich, 2009

Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Individual		Higher levels of religiosity	Frequency of alcohol use, heavy episodic drinking, and marijuana use during the transition out of high school	Students transitioning from high school to college	White, H., McMorris, B., Catalano, R., Fleming, C., Haggerty, I., & Abbott, 2006
Individual		Personal religious commitment	Heavy drinking/binge drinking	Review of studies on alcohol use in college freshmen	Borsari, B., Murphy, J. G., & Barnett, 2007
Individual		Attendance at religious services	30-day use of: (1) heavy episodic drinking, (2) cigarette smoking, (3) marijuana use, (4) delinquent-type behavior (e.g., stealing, cheating)	College age students in Colorado (N=975)	Jessor, R., Costa, F., Krueger, P., & Turbin, 2006
Individual		Strong religious affiliation	Risky single occasion drinking (RSOD)	Review of 65 articles across European college student populations	Wicki, M., Kuntsche, E., & Gmel, 2010

Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Individual	Low efficacy to refuse alcohol or to stop drinking		Binge Drinking	Review of 35 studies published between 1994-2008 examining risk factors for binge drinking in young adults	Courtney, K. E., & Polich, 2009
Individual		Fewer positive expectations of alcohol	Binge Drinking	Review of 35 studies published between 1994-2008 examining risk factors for binge drinking in young adults	Courtney, K. E., & Polich, 2009
Individual	Positive expectations of alcohol		Risky single occasion drinking (RSOD)	Review of 65 articles across European college student populations	Wicki, M., Kuntsche, E., & Gmel, 2010
Individual	Cigarette smoking and illicit drug use		Risky single occasion drinking (RSOD)	Review of 65 articles across European college student populations	Wicki, M., Kuntsche, E., & Gmel, 2010

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Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Individual	Cigarette smoking and marijuana use		30-day use of (1) heavy episodic drinking, (2) cigarette smoking, (3) marijuana use, (4) delinquent-type behavior (e.g., stealing, cheating)	College age students in Colorado (N=975)	Jessor, R., Costa, F., Krueger, P., & Turbin, 2006
PEER					
Peer	Alcohol use by peers		30-day prevalence measures of : (1) smokeless tobacco use, (2) cigarette use, (3) alcohol use, (4) binge drinking, (5) marijuana use, (6) inhalant use	8th and 10th grade students in Kentucky (N=15,376)	Collins, D., Johnson, K., & Becker, 2007
Peer	Alcohol use by peers		Heavy episodic drinking	Review of studies about adolescent drinkers in Europe and Western countries	Stolle, M., Sack, P. M., & Thomasius, 2009
Peer	Alcohol use by peers		Risky drinking	High school students in Wales (N=530)	Gilligan, C., Kypri, K., & Lubman, 2012

Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Peer	Alcohol use by peers		Binge Drinking	Review of 35 studies published between 1994-2008 examining risk factors for binge drinking in young adults	Courtney, K. E., & Polich, 2009
Peer	Alcohol use by peers		30-day use of: (1) heavy episodic drinking, (2) cigarette smoking, (3) marijuana use, (4) delinquent-type behavior (e.g., stealing, cheating)	College age students in Colorado (N=975)	Jessor, R., Costa, F., Krueger, P., & Turbin, 2006
Peer		Fewer friends who use substances	Frequency of alcohol use, heavy episodic drinking, and marijuana use during the transition out of high school	Students transitioning from high school to college	White, H., McMorris, B., Catalano, R., Fleming, C., Haggerty, I., & Abbott, 2006

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Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Peer	Perceived alcohol use by peers		30-day use of heavy drinking (5 or more drinks at a single sitting) over six measurement periods; measured descriptive norms (e.g., when your close friends drink, how much do they drink) and injunctive norms (e.g., how do most of your friends feel about drinking?)	489 young adults participating in an 11-year university study with six waves of data	Parra, g., Krull, J., & Sher, K., & Jackson, 2007
Peer	Perception of friends' acceptability of their heavy drinking		Past-28 day use of: (1) how many days they consumed at least one drink of beer, wine, or liquor, (2) number of days when they drank that they had one or more drinks, (3) number of days when they drank that they had three or more drinks, (4) number of days that they drank that they had six or more drinks.	620 under-graduates (mean age 20) completed an internet questionnaire	Reed, M., Lange, J., Ketchie, M., Clapp 2007

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Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
FAMILY					
Family	Permissive parental style		30-day prevalence measures of: (1) smokeless tobacco use, (2) cigarette use, (3) alcohol use, (4) binge drinking, (5) marijuana use, (6) inhalant use	8th and 10th grade students in southeast state (N=15,376)	Collins, D., Johnson, K., & Becker, 2007
Family	Tolerant attitudes toward positive use		Heavy episodic drinking	Review of studies about adolescent drinkers in Europe and Western countries	Stolle, M., Sack, P. M., & Thomasius, 2009
Family	Family history of alcoholism		Binge drinking	Review of 35 studies published between 1994-2008 examining risk factors for binge drinking in young adults	Courtney, K. E., & Polich, 2009

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Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Family		Parents disapproval of substance abuse and other deviant behavior	30-day use of: (1) heavy episodic drinking, (2) cigarette smoking, (3) marijuana use, (4) delinquent-type behavior (e.g., stealing, cheating)	College-age students in Colorado (N=975)	Jessor, R., Costa, F., Krueger, P., & Turbin, 2006
Family		Higher levels of parental monitoring	Frequency of alcohol use, heavy episodic drinking, and marijuana use during the transition out of high school	Students transitioning from high school to college	White, H., McMorris, B., Catalano, R., Fleming, C., Haggerty, I., & Abbott, 2006
SCHOOL					
School	Low commitment to school		30-day prevalence measures of: (1) smokeless tobacco use, (2) cigarette use, (3) alcohol use, (4) binge drinking, (5) marijuana use, (6) inhalant use	8th and 10th grade students in southeast state (N=15,376)	Collins, D., Johnson, K., & Becker, 2007

Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
School	Poor academic performance (including skipped days)		30-day prevalence measures of: (1) smokeless tobacco use, (2) cigarette use, (3) alcohol use, (4) binge drinking, (5) marijuana use, (6) inhalant use	8th and 10th grade students in southeast state (N=15,376)	Collins, D., Johnson, K., & Becker, 2007
SOCIAL/SCHOOL					
Social/school	Member of fraternity/sorority		Binge drinking	Review of 35 studies published between 1994-2008 examining risk factors for binge drinking in young adults	Courtney, K. E., & Polich, 2009
Social/school	Involvement in Greek Life		Heavy drinking/binge drinking	Review of studies on alcohol use in college freshmen	Borsari, B., Murphy, J. G., & Barnett, 2007

Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Social/school	Living in student housing or with roommate		Risky single occasion drinking	Review of 65 articles across European college student populations from 1989 to 2009	Wicki, M., Kuntsche, E., & Gmel ,2010
		Prosocial activities including volunteering	Binge drinking in past two weeks, frequent binge drinking (three or more times in past two weeks), any alcohol use in past year, number of drinking occasions in past 30 days, number of drunken occasions in past 30 days, usual number of drinks on a drinking occasion	About 50,000 students from 120 colleges in the USA	Wechsler, H. & Nelson, 2008
Social/school	Lifetime prevalence of school absenteeism/ truancy; Academic failure; Suicidal thoughts; Violence at school in form of aggressive behavior by teachers	1. Low socioeconomic status 2. Importance of religion	30-day prevalence of alcohol use in last 30 days, and if yes, frequency of consumption of five or more drinks in a row	44610 9th grade German students (average age 15 and 51% male)	Donath, C., Grabel, E. Baier,D., Pfeifer, 2012

Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
School/social	Settings where alcohol is served; Religiosity; GPA; University characteristics		Drinking settings. Students were asked whether they went to each of the six settings where alcohol use may occur: (1) frat/sorority party, (2) residence game hall, party, (3) campus event (football game), (4) off-campus party, (5) bar/ restaurant, (6) outdoor setting. Alcohol use. How many days in last 28 days did you drink 1, 2, 3, 6, and 9 alcoholic beverages? Alcohol expectancies: Students were asked how likely 9 positive events and 9 negative events would happen to them if they drank 3 or 4 drinks. Religiosity. How religious are you, with 4 choices. GPA, health indicators, demographics, survey mode, university	10,152 students from 14 California public universities who completed a Web-based or mailed survey; participants more likely to be underage of 21 (55%) and white (55%)	Paschall & Saltz, 2007

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Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
			characteristics		
COMMUNITY					
Community	Wet environments (college settings); BYOB parties		Used items from College Alcohol Risk Assessment but added items to assess environmental characteristics of student drinking events; also got context items such as sample of drinking contexts among college students. Context items began predictor variables for the concurrent drinking behaviors reported occurring at the last drinking event.	400 students telephoned randomly from graduate and undergrad students	Clapp, J., Reed, M., Holmes, j., Lange, J., & Vaos, 2006

Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Community	Perceived availability		30-day prevalence measures of: (1) smokeless tobacco use, (2) cigarette use, (3) alcohol use, (4) binge drinking, (5) marijuana use, (6) inhalant use	8th and 10th grade students in southeast state (N=15,376)	Collins, D., Johnson, K., & Becker, 2007
Community	Rate of binge drinking in setting (community and college)		Binge drinking in past 2 weeks; frequent binge drinking (3 or more times in past 2 weeks); any alcohol use in past year; number of drinking occasions in past 30 days; number of drunken occasions in past 30 days; usual number of drinks on a drinking occasion	About 50,000 students from 120 colleges	Wechsler, H & Nelson, 2008

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Domain (Individual, Family, School, Peer, Community/Environment)	Risk Factor(s)	Protective Factor(s)	Outcomes	Population(s)	Source
Community	High alcohol outlet density		Binge drinking in past 2 weeks; frequent binge drinking (3 or more times in past 2 weeks); any alcohol use in past year; number of drinking occasions in past 30 days; number of drunken occasions in past 30 days; usual number of drinks on a drinking occasion	About 50,000 students from 120 colleges	Wechsler, H & Nelson, 2008
Community	Ease of access to alcohol		30-day use of: (1) heavy episodic drinking, (2) cigarette smoking, (3) marijuana use, (4) delinquent-type behavior (e.g., stealing, cheating)	College age students in Colorado (N=975)	Jessor, R., Costa, F., Krueger, P., & Turbin, 2006
Community	Exposure to alcohol merchandise		Initiation of drinking, heavier drinking among existing drinkers	13 studies with follow up of over 38,000 adolescents	Anderson, P., de Bruijn, A., Angus, K., Gordon, R., & Hastings, 2009

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DETAILED SUMMARIES

Systematic Review

Anderson, P., de Bruijn, A., Angus, K., Gordon, R., & Hastings, G. (2009). Impact of alcohol advertising and media exposure on adolescent alcohol use: a systematic review of longitudinal studies. *Alcohol and Alcoholism, 44*(3), 229-243.

Domain	Community
Risk Factors	Exposure to mass media advertising; Exposure to alcohol merchandise
Protective Factors	N/A
Other Independent Variables	Alcohol promotion (giveaways or products with industry logos)
Sample Characteristics	Thirteen studies identified with age groups varying from 10-21. Ten studies conducted in US, one in Belgium, one in Germany, and one in New Zealand. Baseline sample sizes ranged from 630-6522 with a total of over 38,000 at follow up across the 13 studies.
Study Design	Heterogeneity among study designs. Variety of follow up measurement time points usually from 12-24 months
Outcome Measure(s)	Self-reported drinking status including baseline and follow-up measures
Limitations of the Studies	Attrition rates were high; some samples had randomly selected students, schools and others were cohorts and/or subgroups of cohorts; exposure to advertising defined differently; reliance on self-reported measures of exposure to advertising (validity of accurately recalling exposure to advertising)

Key Findings

Thirteen longitudinal studies published between 1990 and 2008 found that greater exposure to alcohol related merchandise is associated with binge drinking. Twelve of the 13 studies found a relationship between exposure to alcohol advertising and increased levels of consumption among drinkers after controlling for potential confounds (e.g., family, peer drinking, relevant demographics). However, the majority of studies (10 out of 13) did not report outcomes for binge drinking specifically.

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Literature Review

Borsari, B., Murphy, J. G., & Barnett, N. P. (2007). Predictors of alcohol use during the first year of college: implications for prevention. *Addict Behav, 32*(10), 2062-2086

Domain	Individual	School
Risk Factors	Impulsivity and sensation seeking; Low importance of religion	Involvement in Greek Life
Protective Factors	Personal religious commitment	
Other Independent Variables	Demographic characteristics such as gender and race where white males are most likely to binge drink. Other moderators of first year alcohol use include sensation seeking, precollege use, and parental influences	
Sample Characteristics	Review of the literature on alcohol use among first year college students. Authors identified aspects of the social and/or peer environment of college students that are significantly associated with binge drinking	
Study Design	Literature review of studies on alcohol use among first-year college students	
Outcome Measure(s)	Alcohol use in first year college students	
Limitations of the Studies	Gives little information about the specific studies; most are cross-sectional designs so cannot examine changes over time	

Key Findings

Review of studies on alcohol use in college freshmen. Identified moderators of use in addition to specific mediators such as drinking motives, alcohol expectancies, perceived norms, coping, and drinking games.

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Meta-analysis

Collins, D., Johnson, K., & Becker, B. J. (2007). A meta-analysis of direct and mediating effects of community coalitions that implemented science-based substance abuse prevention interventions. *Substance Use Misuse, 42*(6), 985-1007.

Domain	Individual, family, school, peer, community
Risk Factors	Perceived risk of use; favorable attitudes toward use; alcohol use by peers; permissive parental style; low commitment to school; poor school performance; perceived availability
Protective Factors	N/A
Other Independent Variables	Number of evidence-based interventions
Sample Characteristics	8th and 10th grade students in Kentucky (N=15,376)
Study Design	Pre-post matched control-group design using Communities that Care survey to assess risk and protective factors
Outcome Measure(s)	Risk and Protective Factors from Hawkins and Catalano
Limitations of the Studies	Sample limited to 8th and 10th grade students in Kentucky; many of the effect sizes are small
Related Strategy	The number of science based programs did not moderate the effects of the prevalence of drug use. Authors point out that no measures of fidelity were done to assess programs' fidelity.

Key Findings

Short-term effects showed no reductions in use and a significant increase in inhalants (though small) among in the intervention group.   Sustained effects (10th grade students) were small but significant for reductions in cigarette, alcohol and binge drinking.

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Literature Review

Courtney, K. E., & Polich, J. (2009). Binge drinking in young adults: Data, definitions, and determinants. *Psychol Bull, 135*(1), *142-156.*

Domain	Individual	Family	School	Peer
Risk Factors	Low efficacy to refuse alcohol or to stop drinking; Low importance of religion	Family history of alcoholism	Member of fraternity/sorority; Poor academic success	Alcohol use by peers
Protective Factors	Fewer positive expectations of alcohol use	N/A	N/A	N/A
Other Independent Variables	Discuss differentiation among alcohol abuse, dependence, and binge drinking (DSM-IV)			
Sample Characteristics	Review of 35 studies published between 1994-2008 examining risk factors for binge drinking in young adults (including college students)			
Study Design	Some information about design; measures include various surveys and neuropsychological tests			
Outcome Measure(s)	Binge drinking in young adults including college populations			
Limitations of the Studies	Table 1 gives general information about the 35 studies			
Related Strategy	Highlights results of six neuropsychological studies of binge drinking			

Key Findings

Summarizes key findings and viewpoints from the scientific binge-drinking literature including epidemiological findings (white males are highest risk), social issues (importance of fitting in, especially in college), and cognitive and physiological effects (poor planning, memory)

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Literature Review

Stolle, M., Sack, P. M., & Thomasius, R. (2009). Binge drinking in childhood and adolescence: epidemiology, consequences, and interventions. *Dtsch Arztebl Int, 106*(19), 323-328.

Domain	Individual	Family	Peer
Risk Factors	Drinking Motives: 1. Reduction in negative affect 2. Pleasure/fun Facilitate social ease Personality Characteristics: Impulsivity and sensation seeking	Tolerant attitudes toward positive use	Alcohol use by peers
Protective Factors	N/A	N/A	N/A
Other Independent Variables	Use of other substances and early onset of patterns of excessive drinking		
Sample Characteristics	Mainly reviews of studies on epidemiology, consequences, and interventions with adolescents living in Germany		
Study Design	Review of studies about adolescent drinkers in Europe and Western countries		
Outcome Measure(s)	Total amount of alcohol consumed per week and 30-day prevalence of binge drinking		
Limitations of the Studies	Not an empirical study but more review of literature/studies from Germany		
Related Strategy	Article also reports on USA data showing the effectiveness of Brief Motivational Interventions (BMI)		

Key Findings

Summarizes key findings and variables related to binge drinking in adolescents in Germany. Reports risk factors across domain for binge drinking (e.g., impulsivity, drinking among peers, inconsistent parenting style and use by parents, drinking motives).

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Literature Review

Wicki, M., Kuntsche, E., & Gmel, G. (2010). Drinking at European universities? A review of students' alcohol use. *Addictive Behaviors, 35*(11), *913-924.*

Domain	School
Risk Factors	Drinking motives reduction in negative affect; Fitting in with peer group
Protective Factors	N/A
Other Independent Variables	N/A
Sample Characteristics	Article presents 65 studies that have a variety of studies that searched by a) frequency of alcohol consumption, b) volume or "level of drinking", c) Risky single occasion drinking (ROSD) or drinking to intoxication, and d) frequency of having six or more drinks on one occasion. Demographics (age, gender), and key variables (i.e., physical activity, personality) were reported on these four variables above.
Study Design	65 articles published in the last 20 years using European students populations
Outcome Measure(s)	Four aspects of alcohol consumption (1) frequency of consumption, (2) average amount of alcohol consumed, (3) ROSD or drinking to intoxication, and (4), indicators of alcohol use disorders based on Alcohol Use Disorders Identification Test (AUDIT) findings.
Limitations of the Studies	N/A
Related Strategy	Students tended to overestimate the extent of their fellow students' alcohol consumption

Key Findings

Key findings include: (1) Male students tend to drink more (2) students consume alcohol mostly for social and enhancement motives during social gatherings, (3) students living in less controlled situations without family obligations consume more alcohol.

Cross-sectional Study

Clapp, J., Reed, M., Holmes, M., Lange, J., & Voas, R. (2006). Drunk in public, drunk in private: The relationship between college students, drinking environments and alcohol consumption. *American Journal of Drug and Alcohol Abuse, 32*(2), 275-285*.*

Domain	School, peer, community
Risk Factors	Wet environments (college settings); BYOB parties
Protective Factors	N/A
Other Independent Variables	Playing drinking games, and having illicit drugs available contribute to heavier drinking
Sample Characteristics	400 students telephoned randomly from graduate and undergraduate populations from two universities in Southwest US. Students who reported a drinking occasion in the last 28 days were included in the study and asked to report the type(s) of drinking environments.
Study Design	Telephone interviews were conducted and included a series of questions about drinking contexts.
Outcome Measure(s)	Some items from the College Alcohol Risk Assessment; students we asked the last time they attended a social event where alcohol was present as well as other personal characteristics.
Limitations of the Studies	Self-reported drinking events of college students needs to be corroborated with more observational and biological measures.
Related Strategy	There are unique effects of drinking locations beyond variables related to student characteristics.

Key Findings

For both underage and legal age students, drinking in a bar was associated with a higher level of consumption relative to drinking in a private setting. For both location types and age groups, there were higher levels of consumption when "many intoxicated students" were present. Both drinking games and availability of illicit drugs were associated with greater consumption only at private parties.

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Cross-sectional Study

Donath, C., Grabel, E., Baier, D., Pfeiffer, C., Bleich, S., & Hillemacher, T. (2012). Predictors of binge drinking in adolescents: ultimate and distal factors-a representative study. *BMC Public Health, 12,* 1-15.

Domain	School
Risk Factors	School absenteeism/truancy; Academic failure; Suicidal thoughts; Aggressive behavior of teachers
Protective Factors	Low socioeconomic status; Importance of religion
Other Independent Variables	Study confirmed model set forth by Petraitis showing importance of social/interpersonal, attitudinal/environmental, and intrapersonal fields
Sample Characteristics	44,610 9th grade German adolescents along with their parents agreed to participate in a survey to test the theory of triadic influence developed by Petraitis, et al.
Study Design	Random selection of 9th grade students stratified by school type in urban and rural districts; return rates were between 75 and 92%
Outcome Measure(s)	Survey developed from the German Federal Center for Health Education which defined binge drinking as 5 or more standard drinks at one setting. Students were asked 30-day prevalence and if yes, asked how many days they had consumed 5 or more drinks in a row.
Limitations of the Studies	Sample only relevant to those living in Germany. Only includes 9th graders and self-report limitations.

Key Findings

Prevalence of binge drinking was 52.3%; with males (56.9%) higher than females (47.5%).

Cross-sectional Study

Doumas, D., Turrisi, R., & Wright, D. (2006). Risk factors for heavy drinking and associated consequences in college freshmen: Athletic status and adult attachment. The *Sport Psychologist*, *20*, 419-434.

Domain	Individual
Risk Factors	High attachment avoidance
Protective Factors	N/A
Other Independent Variables	Examined attachment as an interpersonal risk factor for heavy drinking and associated consequences during the transition to freshman year.
Sample Characteristics	249 college freshmen (70% female/90% Caucasian) enrolled in a general psych class. Self-identified as former high school athletes (49%), current college athletes (23%), or non-athletes (28%).
Study Design	Cross- sectional study using Daily Drinking Questionnaire (DDQ) to measure consumption, Rutgers Alcohol Problem Index (RAPI) to measure alcohol-related consequences, and Relationship Questionnaire (RQ) to assess attachment style. All measures collected in fall of freshman year.
Outcome Measure(s)	(1) DDQ to measure self-reported drinking quantity and frequency, (2) RAPI to measure alcohol-related consequences (including school-related), and, (3) RQ to indicate low attachment avoidance and high attachment avoidance
Limitations of the Studies	Limited generalizability of the findings given similar demographics; cross- sectional study and difficult to claim causal direction between attachment and alcohol use

Key Findings

The authors concluded that those with high attachment avoidance may use drinking as a coping strategy to manage negative emotions in social situations.

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Cross-sectional Study

Gilligan, C., Kypri, K., & Lubman, D. (2012). Changing parental behaviour to reduce risky drinking among adolescents: current evidence and future directions. *Alcohol and Alcoholism, 47*(3), 349-354.

Domain	Peer
Risk Factors	Alcohol use by peers
Protective Factors	N/A
Other Independent Variables	Parental social networks as a way to decrease access to alcohol
Sample Characteristics	530 high school students in Wales
Study Design	Cross sectional survey of 7 high schools in Wales and Australia
Outcome Measure(s)	Nature of parental supply of alcohol to adolescents age 13-17; number of close friends using alcohol; and self-report of risky drinking by students
Limitations of the Studies	Minimal discussion of how parental networks are formed and sustained; review of studies do not seem very consistent
Related Strategy	This review gives a comprehensive picture of parental supply of alcohol and how the volume and context of parental supply relates to alcohol initiation

Key *Findings*

Age of first drunkenness and number of times of intoxication prior to age 16 may be more important than age of first drink for predicting adult alcohol problems.

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Longitudinal Study

Jessor, R., Costa, F., Krueger, P., & Turbin, M. (2006). A Developmental Study of Heavy Episodic Drinking Among College Students: The Role of Psychosocial and Behavioral Protective and Risk Factors. *J. Studies on Alcohol, 67,* 67-94.

Domain	Individual	Peer
Risk Factors	Use of cigarettes and marijuana; Perceived ease of access to alcohol; Social pressure to drink	Peer use of alcohol
Protective Factors	(1) Conventional beliefs held by parents (e.g., parents disapproval of substance use and other deviant behavior), (2) Attendance at church services	
Other Independent Variables	Family and peer contexts emerged as salient, suggesting that protection through support decreases the likelihood of heavy episodic drinking	
Sample Characteristics	College age students in Colorado (N=975; 548 men) who reported ever drinking during three waves of data collection. Sample consisted mostly white males recruited using mail, email, and flyers.	
Study Design	2-year, three-wave longitudinal study of alcohol use among college freshmen in Boulder, Colorado	
Outcome Measure(s)	30-day use of (1) heavy episodic drinking, (2) cigarette smoking, (3) marijuana use, (4) delinquent-type behavior (e.g., stealing, cheating)	
Limitations of the Studies	Subjects were from one university; sample was not random; measurement of several variables relied on a single item	
Related Strategy	Significant moderator effects for peers and family suggesting that positive adult influences (support and models) can diminish the impact of risk factors on heavy episodic drinking among college students.	

Key Findings

Data showed that psychological and behavioral risk and protective factors can account for cross sectional and developmental variation in heavy episodic drinking; Findings were across genders. Social and individual controls (parental sanctions and attitudinal intolerance of deviance) and other models of

risk (peers) and behavioral protection (attendance at religious services) predicted heavy episodic drinking.

Cross-sectional Study

Neal, D., & Carey, K., (2007). Association between alcohol intoxication and alcohol related problems: An event analyses. *Psychology of Addictive Behaviors*, *21*(2), 194-204.

Domain	Individual
Risk Factors	Self-control, drinking motives, demographics, self-regulation questionnaire, impaired control scale, impulsiveness scale, reasons for drinking.
Protective Factors	N/A
Other Independent Variables	
Sample Characteristics	183 undergrads recruited from a psychology course; 64% female; 83% Caucasian, 77% freshmen, 20% Greek membership
Study Design	Looked at diaries that gave prospective event level data on daily drinks, time spent drinking, and negative consequences related to each drinking event
Outcome Measure(s)	Number of drinks consumed on each day in typical week and heaviest week. Number of types consumed 5/4 drinks in the past month, drinking days in the last month, peak quantities of alcohol consumption and typical time spent drinking
Limitations of the Studies	Daily diaries may not have been honest/accurate tools; consequences had to be related to alcohol use, so participants had to decide whether the consequence occurred due to alcohol use. Sample had mostly younger students (freshmen) who were heavy drinkers
Related Strategy	Men reported drinking more frequently, as well as consuming more drinking on an average drinking day. Over 82 % of women and 92% of men were classified as binge drinking during the monitoring period. This is higher than data found in representative surveys (Wechsler, 2002). Drinking to relieve boredom, tension, or sadness does not lead to increased risk of consequences

Key Findings

Heavy drinking students experience a myriad of alcohol-related negative consequences. Use of event data allows predictions to be made regarding the likelihood of alcohol-related consequences occurring after specific drinking events.

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Longitudinal Study

Parra, G., Krull, J., Sher, K., Jackson, K. (2007). Frequency of heavy drinking and perceived peer alcohol involvement: Comparison of influence and selection mechanisms from a developmental perspective. *Addictive Behaviors, 32*(10), 2211-2225.

Domain	Peer
Risk Factors	Perceive alcohol use by peers
Protective Factors	N/A
Other Independent Variables	
Sample Characteristics	489 young adults (93% white) participating in an 11-year longitudinal study. Sample characterized by positive/negative Family History (FH) for alcoholism; 124 FH+ men, 113 FH- men, 132 FH+ women, 118 FH- women. Average age 29
Study Design	Selection of young adults who completed diagnostic interview and paper/pencil survey at baseline and then on 5 occasions over next 10 years
Outcome Measure(s)	Frequency of heavy drinking included days of alcohol use with 5 or more drinks at single sitting; perceived peer alcohol involvement included 6 item scale assessing descriptive and injunctive norms.
Limitations of the Studies	Students were asked to report on their perception of peers' alcohol involvement which tends to be inaccurate; students were mostly white and initial baseline year were first-time college freshmen making generalizability tentative.

Key Findings

Latent growth curve models show two different periods when frequency of heavy drinking and perceived peer alcohol involvement occur (college and post college years).

Cross-sectional Study

Paschal, M., & Saltz, P. (2007). Relationships between college settings and student alcohol use before, during, and after events: a multi-level study. *Drug and Alcohol Review, 26*(6), 635-644.

Domain	Individual	School
Risk Factors	GPA; Religiosity	University characteristics; Settings where alcohol is served
Protective Factors	N/A	N/A
Other Independent Variables	N/A	
Sample Characteristics	10,152 students from 14 California public universities who completed a web-based or mailed survey; participants more likely to be under the age of 21 (55%) and white (55%).	
Study Design	Descriptive analyses that used survey data analyzed as part of a larger effectiveness trial of community-wide alcohol abuse prevention (14,072)	
Outcome Measure(s)	All self-report measures including: GPA; religiosity; past month alcohol use; drinking occasions at settings and events; alcohol expectancies; health indicators; demographics	
Limitations of the Studies	Response rate was 50%; all schools in California with greater ethnic diversity than other parts of the country	
Related Strategy	Article suggests the implications for intervention strategies targeting different types of settings	

Key Findings

Highest drinking levels were reported at all settings except campus events, with most drinks consumed at off-campus parties, followed by residence halls and frat/sorority parties. Number of drinks before frat/sorority party was higher than other settings/events.

Cross-sectional Study

Reed, M., Lange, J., Ketchie, J., & Clapp, J. (2007). The relationship between social identity, normative information, and college student drinking. *Social Influence, 2*(4), 269-294.

Domain	Peer
Risk Factors	Perception of friends' acceptability of their heavy drinking
Protective Factors	N/A
Other Independent Variables	Social identity with groups including friends, college peers at same university, members of fraternities/sororities
Sample Characteristics	Convenience sample of 620 undergrads completing entire online survey. Response rate 26.5%. Mostly female (68%) with 46% white.
Study Design	Cross sectional study of 620 male and female undergrads who completed an online questionnaire to examine relationships between social identify, injunctive norms, and alcohol use
Outcome Measure(s)	Self-report measure where number of drinks per occasion reported by students was the main dependent variable. Social identity measures and injunctive norm measures were adapted from standardized instruments
Limitations of the Studies	Low response rate. Results are tentative in that plausible alternative explanations for result exist.

Key Findings

Among students who identified strongly with a reference group, perceptions of heavy drinking acceptability were positively associated with greater alcohol consumption.

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Cross-sectional Study

Wechsler, H. & Nelson, T. (2008) What We Have Learned from the Harvard School of Public Health College Alcohol Study: Focusing Attention on College Student Alcohol consumption and the Environmental Conditions That Promote It. *Journal of Studies on Alcohol and Drugs*, *69*(4), 481-490*.*

Domain	School/Social	Community
Risk Factors	Alcohol use by peers; Participation in Greek life	High alcohol outlet density
Protective Factors	Prosocial activities including volunteering	N/A
Other Independent Variables	Examined how heavy college student use contributes to secondhand effects on those living in neighborhood.	
Sample Characteristics	50,000 students at 120 colleges	
Study Design	Nationally representative sample of 4-year colleges in the U.S. for times between 1993 and 2001.	
Outcome Measure(s)	Binge drinking in past two weeks, frequent binge drinking (three or more times in past two weeks), any alcohol use in past year, number of drinking occasions in past 30 days, number of drunken occasions in past 30 days, usual number of drinks on a drinking occasion	
Limitations of the Studies	Surveys are subject to self-report and nonresponse bias; response rates for schools and for students decreased over time with relatively small number of students sampled	
Related Strategy	College student drinking is related to state of residence, correlated with binge drinking rates of adults in the same state, and related to campus, local, and state alcohol control policies	

Key Findings

Article provides information on what has been learned about college drinking trends from data gathered 1993-2001. Some of these findings relate to harms produced for the drinkers, secondhand effects experienced by other students and neighborhood residents, and the role of college environment in promoting heavy drinking by students.

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Longitudinal Study

White, H., McMorris, B., Catalano, R., Fleming, C., Haggerty, I., & Abbott, R. (2006). Increases in alcohol and marijuana use during the transition out of high school into emerging adulthood: The effects of leaving home, going to college, and high school protective factors, *Journal of Studies on Alcohol*, *67*, 810-822.

Domain	Individual	Family	Peer
Risk Factors	Leaving home to transition from high school to college	N/A	Living in student housing
Protective Factors	Low sensation seeking; Higher levels of religiosity	Higher levels of parental monitoring	Fewer friends who use substances
Other Independent Variables	N/A		
Sample Characteristics	319 (53% male) students transitioning from high school to college were interviewed at end of 12th grade and then 6 months later		
Study Design	Longitudinal design overtime using the Computer-Assisted Personal Interview technique (CAPI) at end of 12th grade and six months later		
Outcome Measure(s)	30 day use of alcohol use, heavy episodic drinking, and marijuana use during both time periods (end of 12th grade and 6 months later) using a CAPI technique		
Limitations of the Studies	Not including students who had already transitioned to college or out of parent's home may have reduced chance to capture interactive effects; some kids who had high rates of substance abuse in 12th grade were not included; did not consider environmental conditions that may have played a role		

Key Findings

Being male and using alcohol frequently in the 12 grade predicted higher rates of alcohol use six months later. Having fewer friends who used the substances was a protective factor as well as parental monitoring and higher levels of religiosity.

GLOSSARY OF TERMS

Meta-analyses: Typically combine data from multiple quantitative studies that examine the same or similar outcomes and uses advanced statistical techniques to generate an overall effect size. An effect size is a measure of the strength or magnitude of a relationship between variables. Meta-analyses have specific search criteria to delineate the types of studies included (e.g., could include controlled trials only, selects a specific date range). The meta-analysis also has some important limitations. Most notably, a meta-analysis assumes well-collected, well-defined original data. Meta-analyses are also impacted by publication bias, which means that they often do not include work that remains unpublished. Finally, in some meta-analyses, the end result could be a final construct that is rendered meaningless because it combines measures that are simply too diverse. However, when properly performed, stronger conclusions may be drawn from meta-analyses compared to individual studies (longitudinal or cross-sectional) because these studies reflect consistency of study findings and also often consider the methodological quality of studies included.

Systematic reviews: These types of reviews seek to synthesize the research around a particular research question. Systematic reviews clearly articulate the methods used to identify the studies reviewed, including the search criteria (e.g., key word, databases, topic/content, years included, types of studies). Attention is paid to the methodological quality of the studies included, and a well-articulated approach is used to analyze or synthesize study findings. Sometimes a systematic review synthesizes study findings by using meta-analytic techniques; other times, the synthesis is more qualitative in nature. Systematic reviews can be impacted by publication bias, which means that they often do not include work that remains unpublished.

Non-systematic reviews: Summarize the findings of specific research but may not provide an explanation of the methods used to locate the studies (e.g., key word, databases, topic/content, years included, types of studies) or describe what criteria were used (e.g., methodological quality, consistency of findings) when describing the overall findings. Non-systematic reviews are also subject to publication bias, which means that they often do not include work that remains unpublished.

Longitudinal research studies: Longitudinal designs involve measuring individual responses on multiple occasions over time. For example, a longitudinal design can allow a researcher to assess whether a particular risk or protective factor preceded the binge drinking, giving the researcher some idea about the order in which the events occurred (temporal ordering).

Cross-sectional research studies: Cross-sectional designs often use survey methods. They offer observations at a single point in time with a sample of a population and they assess the concurrent relationship between two or more variables (e.g., current other illicit substance use and current binge drinking). They are not able to speak to temporal ordering or to cause-and-effect.

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Neal, D., & Carey, K. (2007). Association between alcohol intoxication and alcohol-related problems: An event-level analyses. *Psychology of Addictive Behaviors, 21*(2), *194-204.*

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Parra, g., Krull, J., Sher, K., & Jackson, K. (2007). Frequency and heavy drinking and perceived peer alcohol involvement: Comparison of influence and selection mechanisms from a developmental perspective. *Addictive Behavior*, *32*(10), 2211-2225.

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