RISK AND PROTECTIVE FACTORS INFLUENCING BINGE DRINKING AND HEALTH-RISK CONSEQUENCES IN A NATIONAL SAMPLE OF COLLEGE STUDENTS

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Introduction

- Binge drinking
  - Leading problem on college campuses
  - Definition
    - A pattern of drinking 5 or > drinks for males, 4 or > for females on one occasion bringing blood alcohol content (BAC) to 0.08 gram percent or above (NIAAA, 2004)
  - College Alcohol Study
    - 44% of college students engage in binge drinking
    - 23% frequent binge drinkers (Wechsler et al., 2002)
  - 15.5% nationwide binge drinking rate (CDC, 2008)
  - Major public health concern
### Background & Significance

- **Healthy People 2010**
  - Reduce binge drinking among college students
  - Baseline rate: 39%; 2008: 40%; Goal: 20% (USDHHS, 2010)

- **Healthy People 2020**
  - Goal: 36%

- **Prevalence of binge drinking**
  - Lack of progress
    - Evidence from national surveys
      - CAS, NSDUH, ACHA-NCHA
    - College vs non-college students
      - Higher rates for college students (MTF, NSDUH, NESARC)
        (ACHA, 2009; Dawson, Grant, Stinson, & Chou, 2004; Grucza, Norberg, & Bierut, 2009; O’Malley & Johnston, 2002; Wechsler et al., 2002)
Problem Statements

- Despite an extensive array of multidisciplinary research studies and the implementation of many well-intended programs by college administrators, the binge drinking rate among college students remains relatively unchanged since 1998.
- Binge drinking among college students results in numerous harmful consequences.
- There is a lack of theoretical-based research studies to explain this complex risky behavior.
Research Purpose

- To test the constructs of Problem Behavior Theory (PBT) as predictors of binge drinking and health-risk consequences in a national sample of college students
Research Objectives

- To test that risk and protective factors from PBT explain significant variance in college students’ binge drinking and health-risk consequences
- To examine specific risk and protective factors from the constructs of PBT as predictors of college students’ binge drinking and health-risk consequences
- To identify gender and racial differences related to the constructs of PBT in predicting binge drinking and health-risk consequences
Review of Literature

• Qualitative Studies
  ○ Focus on attitudes, beliefs, perceptions
  ○ Major themes: normative; socialization; disinhibiting

• Quantitative Studies
  ○ Predictors
    - Biologic: gender, race, family history, age of initiation, genetics
    - Social environment: living arrangements, relationship status, Greek membership, student athletes
    - Perceived environment: social norm perception
    - Individual differences: stress, depressive symptoms, intimate partner violence
    - Behavioral: smoking, marijuana, other drugs, community service, employment, GPA, PBS use
Review of Literature

○ Negative consequences
  - ~1,700 deaths (2001); 6% increase from 1998
  - > 500,000 unintentional injuries
  - > 600,000 second-hand injuries (Hingson, Heeren, Winter, & Wechsler, 2005)
  - Alcohol-impaired driving
  - Sexual assault and rape
  - Suicidal ideation
  - Risk for dependence & abuse

○ Interventions
  - Alcohol awareness & educational programs
  - Brief motivational interventions
  - Social norms marketing campaigns
  - Stricter alcohol policies on campuses
Theoretical Model

- Conceptual Framework for Adolescent Risk Behavior based on Problem Behavior Theory (PBT)
  
  - Complex explanatory model for adolescent risk behavior
  - Revised & extended by Jessor & colleagues over past 3 decades
    - Developed 1960’s
    - Why adolescents were engaging in certain problem behaviors
    - Uncertainty of problem behavior
      - Short or long-term behavior
      - Instigated by personality or social influences
      - Occurred among groups or general population

  (Jessor, 1991)

  (Jessor & Jessor, 1977)
Theoretical Model

- **Problem behavior**
  - A behavior that is “socially defined as a problem, as a source of concern, or as undesirable by the norms of conventional society and the institutions of adult authority” (Jessor & Jessor, 1977, p. 33)

- **Covariation between problem behaviors**
  - “socially organized opportunities to learn risk behaviors together & normative expectations that they be performed together” (Jessor, 1991, p. 600)

- **Outcomes**
  - **Positive**
    - Transition to adulthood, sign of maturity, acceptance by peers, autonomy from parents, cope with anxiety/frustration
  - **Negative**
    - Legal sanctions, academic problems, conflict with parents (Jessor, 1991)
Conceptual Framework for Health-Risk Consequences of Binge Drinking College Students

Interrelated Conceptual Domains of Risk Factors and Protective Factors

- **Biology/Genetics**
  - Age, Gender, Race
  - Risk Factors: Male, White
  - Protective Factors: African-American

- **Social Environment**
  - Residence, Greek Membership, Athletics, Relationship Status
  - Risk Factors: Lives in dorm, Greek Membership
  - Protective Factors: Lives with Parents, Committed relationship

- **Perceived Environment**
  - Social norm perception of alcohol use on campus
  - Risk Factors: High social norm perception of alcohol
  - Protective Factors: Low social norm perception of alcohol

- **Individual Differences**
  - Stress, abusive relationship, depression, academic impediments
  - Risk Factors: Depression, abusive relationship
  - Protective Factors: Few academic impediments, low stress

- **Behavior**
  - Marijuana, illicit drug use, smoking, use of PBS, GPA, Volunteer, Employment
  - Risk Factors: Marijuana use, illicit drug use, smoking
  - Protective Factors: Volunteer, high GPA, employment, use of PBS

**Adolescent Risk Behavior/Lifestyles**
Binge Drinking, Heavy Consumption of Alcohol

**Health-Risk Consequences**
- Unintentional injuries to self or others
- Unprotected sex
- Force or threat of sexual assault
- Alcohol-impaired driving
- Fighting
- Consideration of suicide

1. To what extent do the risk and protective factors from the constructs of PBT predict binge drinking?
   - H1: Constructs of PBT will account for significant variance in predicting binge drinking.

2. To what extent does alcohol use predict health-risk consequences?
   - H2: Alcohol use will account for significant variance in predicting health-risk consequences.

3. How do gender and race influence the constructs of PBT in predicting binge drinking?
   - H3: Constructs of PBT will vary by gender and race in predicting binge drinking among college students.
4. What are the environmental (social and perceived) risk and protective factors that influence binge drinking?

- H4: Greek membership or a high social norm perception of alcohol use on campus will be positively associated with binge drinking.
- H5: Residing in a parent’s home or being in a committed relationship will be negatively associated with binge drinking.
5. What are the individual differences risk and protective factors that influence binge drinking?

- H6: Reports of low numbers of impediments to academic performance or reports of low stress will be negatively associated with binge drinking.
- H7: Reports of being in an abusive relationship or reports of depression will be positively associated with binge drinking.
6. What are the behavioral risk and protective factors that influence binge drinking?

- H8: Reports of high grade point average (GPA), participation in volunteer activities, employment or the use of PBS will be negatively associated with binge drinking.
- H9: Reports of engagement in other problem behaviors of smoking, use of marijuana and use of other illicit drugs will be positively associated with binge drinking.
Methodology

- **Design**
  - Retrospective cross-sectional design
  - Secondary data
    - American College Health Association National College Health Assessment (ACHA-NCHA) survey
    - Spring 2008 reference group (ACHA, 2009)
      - >80,000 students from 106 institutions
    - Data use approval granted by the ACHA on 2/4/10
Inclusion/Exclusion Criteria

- **Inclusion**
  - Full-time, undergraduate students aged 18-25

- **Exclusion**
  - Students aged 26 and over
  - Non-undergraduate status
  - Part-time student
Sample

- **Size**
  - 62,249 randomly sampled college students
  - 106 institutions (range < 2,500 - > 20,000; 65 public; 41 private)

![Gender Pie Chart]

- Male: 35%
- Female: 65%

![Age Pie Chart]

- 18-19: 39%
- 20-21: 43%
- 22-23: 15%
- 24-25: 3%
Sample

### Class Level
- 5th Year: 4%
- 4th Year: 19%
- 3rd Year: 24%
- 2nd Year: 25%
- 1st Year: 28%

### Relationship Status
- Single: 60%
- Engage/CR: 38%
- Married/DP: 2%
- S/D/W: 0%
Instrument - ACHA-NCHA

- Developed in 1998 by a working group from the ACHA
  - Assist college health professionals in collecting data from their students
- Designed for use with college students
- Collects data on health behavior and health problems
  - 7 content areas & > 300 questions
- Institutions self-select to administer
  - Administered spring or fall semester
  - Available on-line or paper-scan versions
- Mean response rate (2008): 29% overall
- Psychometric testing
  - Acceptable reliability
  - Support for both construct & measurement validity

(ACHA, 2004)
Protection of Human Subjects

- IRB approval from the University of Massachusetts Lowell on 2/9/10
- Institutional IRB approval required to be included in national database
- Participation voluntary & completely anonymous
- Data confidential
  - no identifying information from any participating institutions released by the ACHA

(ACHA, 2004)
Data Analysis

- **Descriptive statistics**
  - Summarize student & institutional socio-demographic data; prevalence of problem behaviors

- **Full latent variable structural equation modeling (SEM)**
  - Test hypothesized relationships between & among latent variables from PBT predicting alcohol use & consequences

- **Binary logistic regression**
  - Estimate risk & protective factors as predictors of binge drinking & consequences
  - **DV**: binge=0 if BAC < .08, binge=1 if BAC ≥ .08
  - **IV**: indicator variables representing constructs of PBT
• **Alcohol Use**
  - 69.1% consumed alcohol in past 30 days
  - 37% consumed 1-4 drinks (last time partied/socialized)
  - Mean # of drinks = 4.27 (males: 5.4; females: 3.5)
  - Mean BAC = .07 (both males & females)

• **Binge drinking**
  - 39.8% consumed 5 or > drinks (last time partied/socialized)
  - 37.3% BAC ≥ .08 (males: 37%; females: 37.4%)
  - Whites: 40.5%; Blacks: 17.7%; Hispanics: 31.8%; Asians: 24.7%; AI/AN: 30.7%; Other: 29.9%
Reported Substance Use
(Past 30 Days)

![Bar chart showing the percentage of students using various substances over the past 30 days, differentiated by gender.](chart.png)
Reported Health-Risk Consequences (Last School Year)

- Driving after drinking any alcohol*
- Physically injured self
- Had unprotected sex
- Seriously considered suicide**
- Been involved in fight
- Driving after 5 drinks*
- Physically injured other
- Attempted suicide**
- Force or threat of force to have sex

Percent of Students

- Females
- Males
Descriptive Results

- Social norm perception
  - Perceived 34.8% used alcohol daily
    - Actual norm: 0.3%
- Academic impediments
  - Stress: 36%
  - Cold/flu/sore throat: 31.4%
  - Sleep difficulties: 27.7%
  - Alcohol use: 8.9%
- Individual differences
  - Emotionally abusive relationship: 13%
  - Felt overwhelmed by all had to do: 94.3%
  - Felt hopeless: 63.8%
  - Felt so depressed difficult to function: 43.4%
  - Diagnosis of depression: 13.2%
Reported Protective Behavioral Strategies

(Last school year)

- Eat before/during drinking
- Use a designated driver
- Keep track of drinks
- Determine in advance number of drinks
- Avoid drinking games
- Alternating alcoholic/non-alcoholic
- Have friend let you know when you had enough
- Choose not to drink alcohol
- Pace drinks to 1 or < per hour
- Drink alcohol look alike
SEM RESULTS

Alcohol Use

- **Behavior**
  - $\beta = 0.54$
  - $p < .001$
  - Direct positive effect
- **Individual differences**
  - $\beta = -0.07$
  - $p < .001$
  - Direct negative effect
- 29% of variance in alcohol use
SEM RESULTS

Binge Drinking

- **Behavior**
  - $\beta = 0.35$
  - $p < .001$
  - Direct positive effect

- **Individual differences**
  - $\beta = -0.03$
  - $p < .001$
  - Direct negative effect

- **Environment latent dropped**

- **12% of the variance in binge drinking**

Partial support for $H_1$
SEM RESULTS
Health-Risk Consequences

- Alcohol Use
  - 50% of variance in health-risk consequences
  - Direct positive effect on health-risk consequences
    - $\beta = 0.71$
    - $p < .001$
- Support for H2
Logistic Regression Results

- **Males**
  - 24% less likely to engage in binge drinking (compared to their counterparts & controlling for all other variables)
    - OR = 0.754, $p < .001$, 95% CI (.72, .79)

- **Racial groups**
  - **White students**
    - 35% more likely to engage in binge drinking (compared to their counterparts & controlling for all other variables)
      - OR = 1.346, $p < .001$, 95% CI (1.16, 1.57)
  - **Black students**
    - 35% less likely to engage in binge drinking (compared to their counterparts & controlling for all other variables)
      - OR = 0.654, $p < .001$, 95% CI (.54, .80)

- **Support for H₃**
Members of a Greek organization
- 63% more likely to engage in binge drinking (compared to their counterparts & controlling for all other variables)
  - OR = 1.63, $p < .001$, 95% CI (1.53, 1.74)

High social norm perception of alcohol use by the typical student at their school
- Increased the odds of binge drinking
  - OR = 1.4, $p < .001$, 95% CI (1.39, 1.41)

Support for H₄
Logistic Regression Results - Environmental

- **Reside in parent’s home**
  - 33% less likely to engage in binge drinking (compared to their counterparts & controlling for all other variables)
    - OR = 0.668, $p < .001$, 95% CI (0.62, 0.72)

- **In a committed relationship**
  - 12% less likely to engage in binge drinking (compared to their counterparts & controlling for all other variables)
    - OR = 0.88, $p < .001$, 95% CI (0.84, 0.92)

- **Support for H$_5$**
Logistic Regression Results – Individual Differences

- Higher number of academic impediments
  - Increased the odds of binge drinking
    - OR = 1.02, $p < .001$, 95% CI (1.01, 1.03)

- Stress
  - Non-significant predictor in model

- Partial support for H$_6$
Logistic Regression Results – Individual Differences

- Emotionally abusive relationship
  - 11% more likely to engage in binge drinking (compared to their counterparts & controlling for all other variables)
    - OR = 1.113, \( p < .002 \), 95% CI (1.04, 1.19)

- Physically or sexually abusive relationship
  - Non-significant

- Ever having been diagnosed with depression
  - 24% less likely to engage in binge drinking (compared to their counterparts & controlling for all other variables)
    - OR = 0.765, \( p < .001 \), 95% CI (0.72, 0.82)
    - Contrary to \( H_7 \)

- Partial support for \( H_7 \)
Logistic Regression Results - Behavior

- **Volunteer hours**
  - Less likely to engage in binge drinking (compared to their counterparts & controlling for all other variables)
    - 1-9 hrs/wk (OR = 0.845)
    - 10-19 hrs/wk (OR = 0.729)
    - 20-29 hrs/wk (OR = 0.501)

- **Employment hours**
  - Less likely to engage in binge drinking (compared to their counterparts & controlling for all other variables)
    - 30-39 hrs/wk (OR = 0.745)
    - 40 hrs/wk (OR = 0.689)

- **GPA**
  - Non-significant

- **Use of PBS**
  - Higher # of PBS slightly increased the odds of binge drinking (OR = 1.013)

- Partial support for H₈
Logistic Regression Results – Behavior
(past 30 days, compared to no use & controlling for all other variables)

- **Smoking**
  - 1-30 days – more likely to engage in binge drinking
    - 6-9 days - twice as likely (OR = 2.076)

- **Use of marijuana**
  - 1-30 days – more likely to engage in binge drinking
    - 6-9 days - 3.3 times more likely (OR = 3.306)

- **Use of cocaine**
  - 1-5 days – more likely to engage in binge drinking
    - 3-5 days - twice as likely (OR = 2.085)

- **Use of other drugs**
  - 6-9 days - almost twice as likely to engage in binge drinking
    (OR = 1.972)

- **Support for H₉**
Support for the constructs of PBT as predictors of binge drinking and health-risk consequences
  - Significant variance in alcohol use, binge drinking & consequences

Behavior construct
  - Strong positive association with alcohol use
  - Moderate positive association with binge drinking
  - Highest odds ratios in the prediction of binge drinking
  - Supports the premise of PBT
Discussion

- Individual Differences construct
  - Weak negative relationship to binge drinking and alcohol use
    - Contrary to the expected positive relationship
  - Lower odds of binge drinking with Dx of depression
    - Inconsistent results in the literature between stress & depressive symptoms and binge drinking
    - Self-medicate vs. contribute to depression
    - Social, celebratory nature of alcohol use vs coping mechanism
Risk Factors for Binge Drinking

- **Environmental**
  - Greek membership
  - High social norm perception of alcohol use on campus

- **Individual Differences**
  - Emotionally abusive relationship

- **Behavior**
  - Smoking
  - Use of marijuana, cocaine, other drugs
  - Use of PBS
Protective Factors for Binge Drinking

- Environment
  - Committed relationship
  - Residing in parent’s home

- Individual Differences
  - Low number of academic impediments
  - Previous diagnosis of depression

- Behavior
  - Participation in volunteer activities 1-29 hrs/wk
  - Employment of 30-40hrs/wk
Gender & Racial Differences

- **Gender differences**
  - Females more likely to engage in binge drinking
    - Contrary to previous findings
  - Differences
    - Frequency of binge drinking
    - Prevalence of consequences

- **Racial differences**
  - Whites: highest rates of binge drinking, frequent binge drinking & marijuana use
  - Blacks: lowest rates of binge drinking
  - AI/ANs: highest rates of smoking, unprotected sex, fights & injuries, driving after having 5 or > drinks, consideration of suicide, reports of depression, emotionally or physically abusive relationship
Implications for Nursing

- **Assessment & screening of adolescents**
  - Routine assessment & screening for alcohol & other problem behaviors
    - 32.5% of campus health centers (Foote, Wilkens, Vavagiakas, 2004)
      - 11.7% use standardized instruments
  - Recognize gender & racial differences
    - High risk groups
  - Holistic focus
    - Environmental, personality, behavioral influences
  - Appropriate screening methods
    - Standardized tools
    - Risk & protective factors
    - On-line screening
Implications for Nursing

- **Brief motivational interventions**
  - Incorporate into practice
    - Campus health centers, primary care, ER, schools

- **Referrals**
  - Counseling centers, community-based centers, 12-step programs

- **Promote prevention strategies**
  - Focus specifically on risk and protective factors
  - Health education in schools
  - Use of PBS
  - Parents
    - Parental monitoring, role modeling, proactive communication
      - Social host laws
Implications for Health Promotion

- Multi-factorial Focus
- Alcohol education programs
  - Ineffective alone
- Social norms marketing campaigns
  - Inconsistent results
- Health promotion courses in college curriculums
  - Offered to all undergraduates
  - Promote healthy behavior
Implications for Policy

- **Stricter campus alcohol policies**
  - Strict enforcement
  - Alcohol-free residences
  - Campus alcohol ban
    - “party school” vs “stone-cold sober” school
  - Greek houses alcohol policies

- **College Administrators/Advisors/Faculty**
  - Promote alcohol-free campus activities
  - Promote volunteerism, employment on campus/community
  - Recognize academic impediments

- **Community/State**
  - Stricter alcohol laws
    - Happy hours in 29 states
  - Alcohol tax
  - Alcohol advertising controls
Limitations

• **Threats to internal validity**
  - Non-response bias
  - Potential self-report bias
  - Potential social desirability bias

• **Cross-sectional designs**
  - Limits inference of causation
  - Inability to establish directionality

• **Secondary data**
  - Lack of control over data collection
  - Appropriateness of the data to address the research questions
Limitations

- **Measurement limitations**
  - Inability to measure all of risk and protective factors of binge drinking identified in the literature
    - Limitations in measurement of personality construct
  - Measurement of depression and stress
    - Lack the use of a standardized scale & no severity index
  - Measurement of binge drinking
    - Does not use the standard measure of binge drinking (4 or > drinks for females)
    - Inconsistent time frames to assess alcohol consumption, frequency of drinking & alcohol consequences
  - Measurement of other drugs

- **Threats to external validity**
  - Limitations of generalizability as institutions self-select to administer the survey
Conclusion

- Binge drinking
  - Leading problem on college campuses
  - Myriad of health-risk consequences
- PBT constructs
  - Accounted for significant variance in alcohol use, binge drinking & consequences
  - Varied by gender & race
- Identified risk & protective factors influencing binge drinking
- Complex & holistic approach to adolescent risk behavior
- Implications for nursing, health promotion, policy
  - Focus on specific risk/protective factors
Discussion and Questions