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Robert E. Braun MPH, CHES  
*Otterbein University*


Tavis Glassman Ph.D.,MPH  
*The University of Toledo*

Jiunn-Jye Sheu Ph.D.,MSPH  
*The University of Toledo*

Tim Jordan MEd  
*The University of Toledo*

Faith Yingling Ph.D.,MEd

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# Using the Integrated Behavioral Model to Predict High-Risk Drinking among College Students

**Robert E. Braun, Ph.D., MPH, CHES**  
*Otterbein University*

**Tavis Glassman, Ph.D., MPH, MCHES, Jiunn-Jye Sheu, Ph.D., MSPH, MCHES, Joseph Dake, Ph.D., MPH, & Tim Jordan, Ph.D., MEd**  
*The University of Toledo*

**Faith Yingling, Ph.D., MEd, CHES**  
*Bowling Green State University*

## ABSTRACT

*This study assessed the Integrated Behavioral Model's (IBM) utility in explaining high-risk drinking among college students. A total of 356 participants completed a four-page questionnaire based on the (IBM) theory and their drinking behavior. The results from a path analysis revealed three significant constructs ( $p < 0.05$ ) which predicted intentions to engage in high-risk drinking: experiential attitude (0.34), injunctive norms (0.23), and self-efficacy (-0.28). The IBM explained approximately 45% and 26% of variance in intentions and high-risk drinking, respectively. Although limited in its use thus far, the IBM shows promise in its application regarding high-risk drinking prevention among college students.*

**Keywords:** *High-risk drinking, college students, and behavioral science theory*

## BACKGROUND

The drinking behavior college students' exhibit remains an ongoing public health concern across the nation. High-risk drinking, defined by Johnston and colleagues (2001), as consuming five or more drinks in one occasion within the previous two weeks, is quite prevalent. With approximately 43% of the student population engaging in this behavior, for the better part of the last quarter century, the issue appears to be intractable (American College Health Association, 2010; Core Institute at Southern Illinois University, 2011; Substance Abuse and Mental Health Services Administration, 2011; Wechsler, Lee, Kuo, Seibring, Nelson, & Lee, 2002). College students who drink at these levels are at an increased risk for experiencing a variety of negative health outcomes. Results from the National College Health Assessment II (American College Health Association, 2010) reveal that college students experience the following when they over indulge: regret something they did (35% of males; 33% of females), forget where they were or what they did (32% of males; 28% of females) and physically injure themselves (18% of males; 15% of females). Other consequences suffered from consuming too much alcohol include death, injury, assault, sexual abuse, unsafe sex, and family problems (American College Health Association, 2010).

The National Institute on Alcohol Abuse and Alcoholism (NIAAA) provides a number of recommendations on how to remedy this issue including the use of evidence based and theory driven interventions (Presley, Meilman, & Leichliter, 2002). The Integrated Behavioral Model (IBM) represents an emerging theory to address health behavior. Much like the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB), the IBM's predecessors, the IBM posits the intention to perform a behavior as the strongest predictor of behavior; however, this model includes new concepts not utilized within the TPB. The IBM includes three global constructs — attitude, perceived norm, & personal agency — with two specific constructs per category. For example, the two constructs that compose attitude are experiential and instrumental attitude; within perceived norm includes injunctive and descriptive norms, and personal agency consists of perceived control and self-efficacy.

The first primary construct within the IBM, attitude, measures the respondent's feelings toward that behavior. It answers the question, "Does he or she have an unfavorable or favorable beliefs towards performing that behavior" (Montano & Kasprzyk, 2008, pg.78). In the IBM, attitudes are based on experiential and instrumental attitudes. Fishbein (2007) states the emotions associated with the behavior help to shape experiential attitude. For instance, if an individual had a favorable response in the past to performing a behavior, then he or she is more likely to perform it in the future. Past behavior is an important component of experiential attitude and influences future behavior. Instrumental attitude, a cognitively based construct, involves the evaluation of the behavior which subsequently influences intentions and future behavior.

The second primary construct, perceived norm, is based on social acceptance. This approval can come from a family member, significant other, or friend (referents). Injunctive norms, in this model, are similar to subjective norms in the TPB. While injunctive norms measure what the beliefs of your referents are, descriptive norms take into account the referent's behavior. This is important for two reasons. First, it answers the question, "do your referents participate in a particular behavior you are interested in," and second, "how often do they participate in a particular behavior?" This is critical because the higher the perceived prevalence of peers participating in the behavior, the more likely the individual will also engage in the behavior of interest (Montano & Kasprzyk, 2008).

The third primary construct, personal agency, consists of perceived control and self-efficacy. Perceived control is the perception a respondent has towards the environment around them, and the effect the environment has on their ability to perform a particular behavior; in general, their control of both internal as well as external factors around them. If an individual's perceived control is high, then he or she believes they can perform the behavior regardless of external influences. Self-efficacy, conversely, is an individual's belief in their ability or confidence in performing a particular behavior (Montano & Kasprzyk, 2008).

Although limited in its use thus far, research has been done with the IBM to assess college students' use of emergency contraception, with the model predicting 50% in the variance in inten-

tion (Wohlwend, Glassman, Dake, Jordan, Khuder & Kimmel, 2013). Turchik and Gidycz (2012) conducted a study assessing the sexual risk behaviors among college students and surmised that using additional constructs, accounted for more variance than the TPB alone. Another study was performed comparing the TPB to the IBM; the results indicated that the IBM elicited more variance than the TPB. The authors attribute the difference in the outcomes between the theories to the better fit the IBM constructs provided (Elliot & Ainsworth, 2012). Thus, a precedent has been set using the IBM to explain various health behaviors with different populations, yet research with this theory is sparse. The purpose of this research is to determine the IBM's utility in explaining high-risk drinking among college students and to assess which constructs are the most predicative of this behavior.

## METHODS

### *Participants*

The sample for this study consisted of college students from a large Midwestern public university. After approval from the University's Institutional Review Board, the university registrar randomly selected 40 classes to administer the survey with. Researchers also employed a shadow sample for this investigation in the event the originally selected course instructors were not able or willing to participate. Out of the 40 randomly selected classes; two classes had duplicate professors, two classes were offered online, three classes were cancelled, and one class was designated for graduate students only. Thus, of the 32 available classes, 16 professors agreed to allow the research team to administer the survey in their classroom. No pattern emerged among respondent versus non-respondent classes in this study. Of the 16 classes included in this study, 356 out of 402 students completed the survey generating a response rate of 89%. According to Hoyle (1995), in order to show statistical significance for path analyses, a minimal sample size of 250 was required (Hoyle, 1995). A power analysis for this research was conducted using the G\*Power 3 software and resulted with a similar minimum sample size projection (Faul, Erdfelder, Lang, & Buchner, 2007).

### *Procedure*

Researchers employed a cross-sectional research design for this inquiry. After curtailing the list of possible classes to 16, selected dates and times were agreed upon by the researchers and professors to administer the survey. Once in the classroom, the research staff member instructed participants about the informed consent process. Students were told that their voluntary participation in this study would not affect their grade or class standing. After completion of the survey, participants placed the completed form in a brown envelope, walked it to the front of the room, and place it in a locked box. The proctor stressed confidentiality throughout the data collection process.

### *Instrument*

The current study utilized a customized survey instrument to answer the research questions. Development of this questionnaire included a comprehensive literature review focusing on alcohol consumption among college students, and the Integrated Behavioral Model. Additionally, a total of six focus groups (two for abstainers, two for social drinkers, and two for high-risk drinkers) were used to elicit information to help design the survey and related items. The written questionnaire assessed the alcohol related behaviors among college students, comprised of 69 items on four pages. The questions included in this survey consisted of items related to the IBM, drinking habits, and demographics. Questions based on the IBM were developed using either a 7-point semantic differential or Likert-type scale. All of these scales were developed using the suggestions by Montano and Kasprzyk (2008).

Three types of validity were assessed in this study: face, content, and construct validity. Five experts reviewed the questionnaire for face validity (i.e., formatting, readability and general organization of the instrument) and content validity of items. The experts included two Alcohol, Tobacco, and Other Drugs (ATOD) practitioners, two ATOD researchers, and one psychometric expert. A Principle Components Analysis (PCA) was conducted using Varimax Rotation to assess construct validity. Consistent with the IBM, the results of the PCA yielded eight constructs or themes.

The results from the test/retest reliability were all significant at  $p < 0.01$  level with Pearson coefficient values listed as follows: instrumental attitude ( $r=0.87$ ), injunctive norms ( $r=0.79$ ), self-efficacy ( $r=0.78$ ), descriptive norms ( $r=0.76$ ), experiential attitude ( $r=0.73$ ), perceived control ( $r=0.62$ ), and behavioral intention ( $r=0.60$ ). The Cronbach's alpha coefficients for each of the sub-constructs also demonstrated the instrument's reliability: experiential attitude ( $\alpha=0.96$ ), behavioral intention ( $\alpha=0.92$ ), perceived control ( $\alpha=0.91$ ), instrumental attitude ( $\alpha=0.89$ ), self-efficacy ( $\alpha=0.86$ ), injunctive norms ( $\alpha=0.84$ ), and descriptive norms ( $\alpha=0.82$ ).

More than two-thirds of the survey was dedicated for the measurement of the IBM constructs. To assess the theory, the researchers measured each construct. The measurement of instrumental attitudes and experiential attitudes constructs included five items each. The response style for each item used a semantic differential style response with 7 potential responses anchored by two polar opposite anchor descriptors. For instrumental attitudes, descriptor examples include "bad-good" and "risky-not risky." Example anchors for experiential attitudes included "embarrassing-not embarrassing" and "not fun-fun." The measurement for injunctive norms, descriptive norms, and behavioral intention included four items each. The response style for each item used a Likert-type scale ranging from "strongly disagree" to "strongly agree." The perceived control construct included five items, coded on a scale, yielding potential scores ranging from one through seven. The response style for each item used a Likert-type scale ranging from "totally not under my control" to "totally under my control." Finally, the measurement of self-efficacy included five items with a response options scale ranging from "very difficult" to "very easy" on a seven-point scale.

### *Data Analysis*

Data analysis for this study utilized SPSS (Statistical Package for the Social Sciences) version 17. Statistical analyses for this investigation assumed a Type I error of 0.05. Descriptive statistics, including frequencies, means, proportions, percentages, and standard deviations, were calculated to describe the sample. Nonparametric tests such as the Chi-square was used for this study due to the non-normal distribution of the data obtained.

The path analysis was conducted using, EQS v6.1, a structural equation modeling software.

## RESULTS

As Table 1 illustrates, participants in this study included 171 males (48.2%) and 184 females (51.8%). Approximately 75% of the respondents identified themselves as Caucasian (74.7%;  $n=263$ ), followed by African-American (10.5%;  $n=37$ ), Asian or Pacific Islander (6.3%;  $n=22$ ), Hispanics (3.7%,  $n=13$ ), and others (4.8%;  $n=17$ ). The mean age of the participants was 23.4 years ( $SD=5.9$  years), with the minimum and maximum ages ranging from 19 and 60, respectively. Third-year undergraduate students made up the largest proportion of respondents (41.5%;  $n=146$ ) followed by 2<sup>nd</sup> year (21.9%;  $n=77$ ), 4<sup>th</sup> year (20.5%;  $n=72$ ), 5<sup>th</sup> year or greater (11.1%;  $n=39$ ), and first year (5.1%;  $n=18$ ). Finally, 37% of the respondents reported high-risk drinking the last time they partied/socialized.

**TABLE 1**

*Participant Demographics*

Characteristic	Frequency	Percent	SD
<b>Gender</b>			
Male	171	48.2	
Female	184	51.8	
<b>Age</b>			23±6
<b>Year in School</b>			
1 <sup>st</sup> Year	18	5.1	
2 <sup>nd</sup> Year	77	21.9	
3 <sup>rd</sup> Year	146	41.5	
4 <sup>th</sup> Year	72	20.5	
5 <sup>th</sup> Year or greater	39	11.1	
<b>Ethnicity</b>			
African American (Black)	37	10.5	
Asian or Pacific Islander	22	6.3	
Caucasian (White)	263	74.7	
Hispanic (Latino)	13	3.7	
Others	17	4.8	



<b>Greek Status</b>		
No	306	86.7
Yes	47	13.3
<b>Member of an NCAA Team</b>		
No	345	98.0
Yes	7	2.0
<b>Participation in Intramural/Club</b>		
No	272	77.3
Yes	80	22.7
<b>Hours spent drinking</b>		4±2.4
<b>Those who high-risk drank the last time they partied or socialized</b>		
No	224	63.3
Yes	130	36.7
<b># of alcoholic beverages consumed</b>		5±5.4
<b># of drinks consumed to become drunk</b>		5±6
<b>Enrollment Status</b>		
Part-time	39	11.1
Full-time	311	88.9

Means, Standard Deviations, and zero-ordered correlations were conducted to describe participants' perceptions and to determine the association among the IBM constructs (Table 2). The mean values for experiential attitude and instrumental attitude indicate that student perceptions were neutral concerning high-risk drinking affect and outcome beliefs. Conversely, a mean of 2.38 for injunctive norm demonstrated their referent's disapproval to perform this behavior while a mean of 4.43 among descriptive norm indicated uncertainty regarding their referents high-risk drinking behaviors. Perceived control and self-efficacy elicited high mean values which signify confidence and strong personal control concerning their intentions to engage in high-risk drinking. The results from Table 2 showed that with the exception of descriptive norms and perceived control, all constructs were correlated with one another. Conducting a correlation matrix is a prerequisite step (assess the data) to performing a path analysis. Overall, the correlation values indicate statistically significant relationships between the variables, but were not highly cor-

related. The IBM variables are independent from one another, thus limiting concerns of multicollinearity.

Figure 1 depicts the results from the path analysis illustrating the relationships among the IBM constructs. Using the maximum likelihood estimation, the model accounted for 45% of the vari-

**TABLE 2**  
*Descriptive Statistics and Correlations for the IBM associated with High-Risk Drinking*

	Mean	SD	EA	IA	IN	DN	PC	SE	BI
EA	3.82	1.75	-	.88***	.64***	.58***	-.15**	-.35***	.62***
IA	3.45	1.42		-	.57***	.48***	-.14*	-.28***	.58***
IN	2.38	1.39			-	.54***	-.16**	-.35***	.51***
DN	4.43	1.58				-	-.10	-.30***	.38***
PC	6.44	1.14					-	.52***	-.23***
SE	6.16	1.16						-	-.40***
BI	3.25	2.10							-

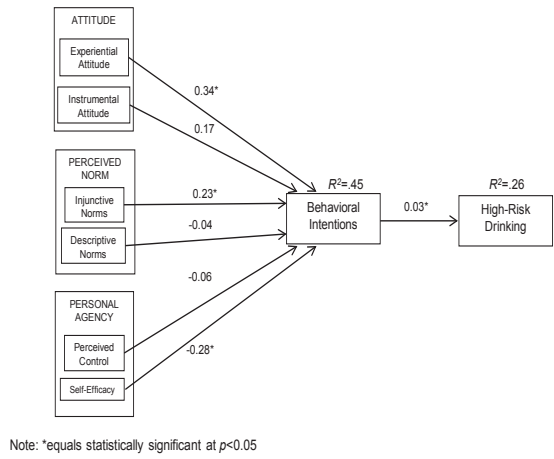
\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

Note: EA = experiential attitude, IA = instrumental attitude, IN = injunctive norms  
DN = descriptive norms, PC = perceived control, SE = self-efficacy, and  
BI = behavioral intentions

ance ( $R^2$ ) in the intention to high risk drinking. Three constructs, experiential attitude, injunctive norm, and self-efficacy were statistically significant ( $p < 0.05$ ) with path coefficients of 0.34, 0.23, and -0.28 respectively. Results also indicated the model predicted 26% of the variance in high-risk drinking. Overall, the model yielded acceptable model fit indices, as demonstrated by the Joreskog-Sorbom's Goodness of Fit (GFI) Index (.97), Comparative Fit (CFI) Index (.90), and Root Mean-Square Error of Approximation (RMSEA) of 0.15 and its 90% confidence interval of 0.11-0.19. Although model fit indices are descriptive in nature without a clear cut point for significance level, a CFI value greater than or equal to 0.95 and a RMSEA value less than or equal to 0.05 are suggested as adequate fit (Browne & Cudeck, 1992; Hu & Bentler, 1999). The model fit indices suggest the data fit at acceptable ranges.

Another path model was generated to assess the three primary constructs associated with the IBM, i.e. attitude (ATT), perceived norm (PN), and personal agency (PA), in predicting behavioral

Figure 1: Path Analysis of High-Risk Drinking using the IBM



intentions to engage in high-risk drinking. Each of the primary constructs was created by combining the respective sub-constructs. All three constructs, ATT, PN, and PA, exhibited statistical significance ( $p < 0.05$ ) with path coefficients of 0.27, 0.10, and -0.17, and accounted for 44% of the variance in behavioral intention. Overall, the model showed an acceptable model fit indices, as exhibited by the Joreskog-Sorbom's GFI Index (.95), Joreskog-Sorbom's AGFI Comparative Fit Index (.9175), and RMSEA of 0.19 with a 90% C.I. of 0.14-0.25 (see Table 3). Although the goodness of fit estimates were within acceptable range, the Chi-square values (statistically significant) associated with each path analysis did not fall within acceptable limits which is not uncommon with large sample sizes (Kline, 1998).

## DISCUSSION

Alcohol abuse continues to compromise academic performance and student health at colleges and universities across the country (Hingson, Zha, & Weitzman, 2009). Utilizing theory to design interventions to help address this issue represents a fundamental approach in attempting to change this entrenched behavior (NIAAA, 2010). This study used the IBM, the latest iteration of the Theory of Reasoned Action/Theory of Planned Behavior in an attempt to better understand the high-risk drinking patterns of college students. Each of the three primary constructs, i.e. attitude (ATT), perceived norm (PN), and personal agency (PA), and their sub-constructs were assessed to predict behavioral intention and high-risk drinking.

A path analysis was conducted to determine the direction and significance of the IBM constructs to predict behavioral intentions and high risk drinking. The results revealed the IBM explained approximately 44% and 26% of variance in intentions and high-risk drinking, respectively. These findings are consistent with the meta-analytic review published by Armitage and Conner (2001), which reported on average, for any behavior, the TPB explained 39% of the variance in behavioral intention and 27% in behavior.

Results from the path analysis also revealed that experiential attitude was the strongest positive predictor of intention to engage in high-risk drinking, which reflects trends in this area of research (Elliot & Ainsworth, 2012). Favorable attitudes towards alcohol consumption were indicative of high-risk drinking. Attitudes are

based in part, by the previous experiences people have. The more positive the experience, the more likely they are to perform the behavior again. Challenging alcohol expectancies and lessening student's beliefs about benefits of high-risk drinking remains an intervention focal point based on this and other studies (Ham, 2009).

Consistent with the literature, injunctive norms yielded a statistically significant, albeit, moderate path coefficient value of 0.23 (Ham, 2009; McMillan & Conner, 2003). Injunctive norms depict the referent's approval or disapproval in performing a particular behavior. Perhaps, the relatively low value was due to the fact that some respondents are more motivated by certain referents than others. For example, college students may seek approval from their peers but not their parents, thus diminishing the predictive value of this construct. These results corroborate similar outcomes in which the subjective norms construct is the weakest predictor within the TPB (Armitage & Conner, 2001). Nevertheless, in this study and others, injunctive norms, to some degree, influence the drinking patterns among college students (Park, Klein, Smith, & Martell, 2009).

In this study, self-efficacy yielded a statistically significant, moderate path coefficient of -0.28. Self-efficacy is an internal belief a person has to perform a particular behavior within a specific context. In this study, results yielded a negative path coefficient, which indicate an inverse relationship between self-efficacy and behavioral intention. Thus, as self-efficacy became stronger, intention to high-risk drink lessened, and vice versa. For example, if participants believed they had the confidence to refuse alcohol consumption then they tended not to engage in high-risk drinking. Collins and Carey (2007) also found a negative link between self-efficacy and intention. This finding indicates that prevention efforts should target college student's self-efficacy, perhaps focusing on peer refusal skills.

The behavioral intention construct predicted 26% of the variance in high-risk drinking, which is similar to the results by other researchers (Armitage & Conner, 2001). However, the complexities surrounding intentions and actual behavior merit further examination, as intentions are not always predictive of behavior. For example, unique circumstances may result in different intentions or the need for individuals to change their original

intention, some of which may not be captured with traditional survey data. How do intentions change when alcohol is free or when somebody is pursuing a “significant other” are just a couple of examples, which could influence the findings. In general, the more complicated the behavior or social dynamics the more challenging it is to assess intentions. The time between intentions and behavior is yet another variable to consider with this type of research. Nevertheless, behavioral intention within the TRA/TPB/IBM consistently predicts drinking behavior within the college population (Collins & Carey, 2007; O’Callaghan, Chant, Callan, & Baglioni, 1997).

Somewhat unexpectedly, neither instrumental attitude, descriptive norms nor perceived control predicted intentions to engage in high-risk drinking with statistical significance. Thus, to examine the efficacy of the IBM further a path analysis was performed using exclusively the three primary constructs within the IBM. The results showed that each of the primary constructs were statistically significant, with the model explaining approximately 44% of the intention to engage in high-risk drinking. Similar, to the first path analysis attitude was the strongest predictor followed by personal agency and then perceived norms.

The findings from this study indicate that the IBM provides utility in explaining high-risk drinking among college students. More specifically, researchers and practitioners should focus on experiential attitude, injunctive norms, and self-efficacy in designing interventions with this population and behavior. The precision the IBM provides in identifying which specific constructs to address when combating high-risk drinking demonstrates its usefulness beyond the theory’s predecessors, the Theory of Reasoned Action and Theory of Planned Behavior.

### *Limitations*

Several limitations exist within the current study. As with most surveys, the use of self-reported data merit concern, particularly recall bias (Portney & Watkins, 2000). Indeed, respondents may not remember the number of alcoholic beverages they consumed the last time they partied and/or socialized, or may not remember suffering a consequence due to their drinking behavior. The sample was obtained from 16 of the 32 randomly selected classes — represents another concern — response bias. However, the focus

of this study was on the student response rate, not the instructor. The participants in the sample closely matched the overall student population, with the exception of the small number of first year students. This may have been due to the time of the year when the study was conducted, students matriculating through their respective programs, and students entering the university with college credits obtained from high school. Regardless, the purpose of this study was not to generalize data, per se, but to assess a theory, which the sample provided an adequate means to accomplish this objective. In addition, a cross-sectional research design was employed for this study, thus causal inferences cannot be made. For example, attitudes, intentions, and behaviors do not always change concurrently, because these variables are constantly fluctuating, this may have possibly affected the results. Also, the items used to assess instrumental attitude, descriptive norm, and perceived control might not have accurately assessed these constructs, which may explain the insignificant values yielded from this study. Finally, a theory cannot be proven or disproven with one study, thus additional studies need to be conducted to further assess the efficacy of the IBM.

Indeed, a number of recommendations for future research using the IBM emerged from this investigation. First, to more accurately assess the utility of the IBM a time-series research design is suggested. The IBM posits that the intention to perform a behavior is the strongest predictor of behavioral performance. Assessing a respondent's intention to perform a behavior at time one and measuring how much they performed the behavior at time two warrants additional inquiry. Further, in order to assess construct validity more effectively, prospective research needs to be conducted with the IBM. Additional assessments should include other high-risk behaviors, such as marijuana use, cigarette smoking, or prescription drug abuse. There are many applications for this model; expanding it to other populations such as minorities, athletes, or Greek social fraternities or sororities represents additional possibilities.

Correspondence concerning this article should be addressed to: Robert E. Braun PhD, MPH, CHES, Assistant Professor, Otterbein University, Department of Health and Sport Sciences, 160 Center Street, Rike 226, Westerville, OH 43081; Phone: (614) 823-3535; Fax: (614) 823-1965; Email: [rbraun@otterbein.edu](mailto:rbraun@otterbein.edu).

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