How Jimmy Aced His Exam: Theoretical Explanations for Non-Medical Prescription Drug Use on College Campuses

Sarah Malone

Faculty Sponsor: Nicholas Bakken, Department of Sociology/Archaeology

ABSTRACT

The purpose of the current study is to find theoretical explanations for human substance misuse, specifically focusing on prescription drug misuse by college students. Little empirical research has considered how certain theories predict the likelihood of non-medical prescription drug use. Both Self-Control Theory and Social Control Theory can be applied to explain why college students choose to misuse prescription drugs. Univariate, bivariate, and multivariate (regression) models of the independent and dependent variables will be presented. Upon completion, the final results will contain theoretical explanations for prescription drug misuse on college campuses and will contribute to existing research by studying why college students begin misusing prescription drugs and why.

INTRODUCTION

Alarmingly, the use and misuse of prescription drugs is increasing in the U.S. and around the world (Arkes and Iguchi 2008). Indeed, in 2002, the National Survey on Drug Use and Health reported that nearly thirty million people, starting at the age of twelve, used prescription drugs for non-medical purposes (NSDUH 2004). To avoid any confusion, a few definitions will be clarified and held consistent throughout the present research. 'Prescription drugs' are "a drug requiring a prescription, as opposed to an over-the-counter drug, which can be purchased without one" (MedicineNet, Inc. 1998). 'Prescription drug misuse' is "the use of medications without a prescription or contrary to a doctor's direction" (Quintero, Peterson, and Young 2006:904). For the purpose of this research, the term 'non-medical prescription drug use' will have the same definition as 'prescription drug misuse.' Many types of prescription drugs will be analyzed, such as stimulants like Adderall and Ritalin, and painkillers like OxyContin and Percocet.

More specifically, a more recent fear is the increase of prescription drug misuse among college students. Not only are there a large number of people misusing prescription drugs, but the prevalence rates are currently at their highest levels and there does not appear to be hope for decline in the near future (Higgins, Mahoney, and Ricketts 2009). Research has illustrated that prescription drug misuse surpasses the use of heroin, crack cocaine, and inhalants, all combined (Substance Abuse and Mental Health Services Administration 1997). This increase in prescription drug misuse raises new concerns in the U.S. and typifies the need for new research that is necessary in identifying those risk factors that lead to this new type of substance use.

Population: College Students

Historically speaking, college students are the first age group to create change in substance use patterns that are eventually reflected in the rest of society (Johnston et al. 2006). This observation can be made by considering the experiences of a college student. A report by the National Survey on Drug Use and Health (2006) found that between 2002 and 2004, approximately 14.2% of 18 to 22 year old students attending college misused prescription drugs one time or more (Ford and Schroeder 2009). If such college campus trends are transferred to the general population, the individual and collective costs of prescription drug misuse could be devastating. These statistics reveal the importance of focusing research on college students, especially since there is only a limited amount of knowledge concerning explanations for prescription drug misuse among college students (Arria et al. 2008; Carrol, McLaughlin, and Blake 2006; Hall et al. 2005; Low and Gendaszek 2002; McCabe, Teter, and Boyd 2006).

The college career has been known as the student's opportunity to prepare for adult life and experiment with new experiences such as drug use before having to make any concrete decisions about the future (Quintero et al. 2006; Cote and Allahar 1996; Kett 1977; Ford and Schroeder 2009; Baer 2002; Horowitz 1987). Because the misuse of prescription drugs on college campuses is greater than the use of any other illegal drug by college

students, not including marijuana, there is a growing need to address this new trend and understand the attractiveness that prescription drugs hold, such as their accessibility, and how socially acceptable they are compared to other drugs (Arria et al. 2008; Ford and Schroeder 2009).

Drug of Choice: Prescriptions

Several studies have looked at the causes and risk factors of prescription drug misuse on college campuses. Quintero, Peterson, and Young (2006) analyzed the different reasons college students misused prescription drugs, such as for academic success or for socializing with friends. The research recognized that prescription drugs were substantially more attractive on college campuses compared to other drugs that carry heavier connotations, such as more commonly known street drugs like heroin (Quintero et al. 2006). Because prescription drugs are "easier to obtain, there is less likelihood of arrest, use is more socially accepted, and there is a perception that prescription drugs are safer", they become the ultimate drug of choice for college students to experiment with (Cicero et al. 2005; Ford and Schroeder 2009:30).

The selling and trading of prescription drugs among college students is becoming so common that campuses are now being referred to as "pharmers markets" (Quintero et al. 2005; Banta 2005; Whaley and Merritt 2005). The main non-medical uses for prescription drugs on college campuses are to assist with academics, socializing and/or experimentation, or medicinal purposes not recommended by a doctor (Quintero et al. 2006). Notwithstanding, prescription drugs are easily the new drug of choice partly due to Big Pharma (pharmaceutical corporations) and their advertising tactics that allow individuals of all ages to request prescription drugs without question (Quintero et al. 2005; Barsky 1988; Montagne 1988).

Basic Demographics

While many researchers have studied exactly why college students use prescription drugs non-medically, other studies have examined how an individual's gender and age affect prescription drug use (Arkes and Iguchi 2008; Simoni-Wastila 2000; Szwabo 1993). The study of how gender affects non-medical prescription drug use is lacking and as a result, is essential for researchers to consider (Simoni-Wastila, Ritter, and Strickler 2004). One specific study found that women are more likely to be prescribed drugs that have a tendency to be abused than men, but that further research was needed to determine whether this caused women to actually misuse prescription drugs more than men (Simoni-Wastila 2000). Four years later, the same researcher found that women are in fact more likely than men to use prescription drugs for non-medical purposes (Simoni-Wastila et al. 2004). Further researchers agreed that women used prescription drugs non-medically more than men (The National Center on Addiction and Substance Abuse 1998; Szwabo 1993). However, one study found the exact opposite and concluded that men misused prescription drugs more often than women (Substance Abuse and Mental Health Services Administration 1997b). Such discrepancies in existing research call for more empirical research to examine the gender differences in non-medical prescription drug use.

Besides gender differences, age plays a factor in prescription drug misuse (Wastila and Bishop 1996; Arkes and Iguchi 2008). A study by Arkes and Iguchi (2008) looked at five different age groups and predicted the causal factors leading to prescription drug misuse within each separate age group. By splitting up the population by age, this study was able to find different predictors of drug misuse according to the specific experiences within a person's age, thus being able to separate college-aged students from the rest of the population (Arkes and Iguchi 2008). Such predictors included gender, race/ethnicity, marital status, and other substance use. This research will similarly look at the effect between a student's gender and a student's age on his/her non-medical prescription drug use.

Theoretical Explanations

To explain such human differences in certain phenomena like prescription drug misuse, multiple theories have been explicated that can be used to explain this contemporary behavior. Two theories that could be applied to drug use were used in a study by Higgins and colleagues (2009) to better understand the non-medical use of prescription drugs. The research revealed how Social Learning Theory and Self-Control Theory help explain the prevalence of prescription drug misuse. Furthermore, there has been conflicting research on whether Hirschi's Social Control Theory or Sutherland's Theory of Differential Association is more applicable when predicting delinquency (Costello and Vowell 1999; Matsueda 1982).

In addition to the current research, this study will focus on the specific theories of Self Control Theory by Gottfredson and Hirschi (1990) and Social Control Theory by Hirschi (1969). Self Control Theory, also known as the "general theory of crime," holds that crime and other analogous behaviors can be predicted by the individual's level of self-control. The lower one's self-control, the more likely he or she is to commit crimes or similar deviant behavior. Accordingly, crime and drug use are similar in the sense that both allow the individual to receive easily

accomplished, immediate gratification (Gottfredson and Hirschi 1990). A lack of socialization by the individual's parents or guardians is the main explanation for low self-control. In other words, "individuals who have been subjected to poor or ineffective parenting practices" are more prone to low self-control (Gottfredson and Hirschi 1990; Higgins et al. 2009). This research will use Self Control Theory to examine if a relationship exists between prescription drug misuse and one's level of self-control. Many studies have employed Self-Control Theory when interpreting human drug abuse (Arneklev et al. 1993; Piquero, Gibson, and Tibbetts 2002; Winfree and Bernat 1998). However, none of those studies used Self-Control Theory to understand more specifically prescription drug misuse (Higgins et al. 2009).

Furthermore, Social Control Theory, also known as Bonding Theory, states that criminal or deviant acts are due to the lack of social bonds that cause compliance with the rest of society and its laws (Hirschi 1969). The theory claims that deviant behavior offers instant gratification with little work in comparison to normal behavior (Costello and Vowell 1999; Hirschi 1969).

The more an individual has "strong bonds with or ties to conventional, mainstream persons, beliefs, activities, and social institutions," the less likely that person will break from society's guidelines and engage in deviant behavior, such as misusing prescription drugs (Goode 2008:70). Therefore, having connections to society and its institutions decreases the likelihood of criminal behavior. This study will use Social Control Theory to find the relationship between prescription drug misuse and social bonds.

Both Self-Control theory and Social Control Theory have been used extensively to predict general drug use, such as alcohol, marijuana, and hard drugs like heroin and cocaine. Many studies agree that there is a significant positive relationship between low self-control and deviant behavior, such as illicit drug use (Gottfredson and Hirschi 1990; Grasmick et al. 1993; Higgins et al. 2009; Schreck, Stewart, and Fisher 2006). That is, the lower one identifies his or her level of self-control, the more likely he or she is to engage in deviant behavior. Likewise, research confirms that there is a significant inverse relationship between one's social bonds and deviant behavior, such as illicit drug use (Costello and Vowell 1999; Goode 2008; Hirschi 1969; Matsueda 1982). This inverse relationship indicates that the more one feels connected and bonded to society, the less likely he or she is to take part in deviant behavior. Because all of the previous studies involving Self-Control Theory and Social Control Theory predicted the likelihood of general drug use, there is a considerable gap in research on predicting non-medical prescription drug use. Thus, my research will ask whether these two well-known theories can similarly explain non-medical prescription drug use. Quite possibly, the specific elements of each theory may have more importance over one another in predicting prescription drug misuse.

Although both Self Control Theory and Social Control Theory share a common theme that deviant behavior is the natural human state, the two theories differ from one another much more than they are alike (Goode 2008). Thus, using both theories to explain prescription drug misuse by college students is crucial in order to understand the phenomenon from a wider perspective. Having more than one explanation is also beneficial in examining a more defined time frame of the college career when prescription drug misuse is more prevalent. It has been commonly cited that there is a lack of theoretical explanations of prescription drug use (Ford and Schroeder 2009; Higgins et al. 2009). Also, little empirical research has considered when most college students begin misusing prescription drugs. This research will observe whether underclassmen are more likely to use prescription drugs for non-medical purposes. Both Self Control Theory and Social Control Theory can be applied to explain prescription drug misuse and possibly why underclassmen may have a higher rate of non-medical prescription drug use than upperclassmen.

Using these theoretical perspectives, the following hypotheses will be tested:

H1: Underclassmen have a higher rate of non-medical prescription drug use than upperclassmen.

H2: College students with low self control are more likely to use prescription drugs for non-medical purposes than students with higher self control.

H3: College students with weaker bonds to family and friends are more likely to use prescription drugs for non-medical purposes than students with stronger bonds.

H4: Males have a higher rate of non-medical prescription drug use than females.

METHODS

Data Collection and Sample

This current research used a random sample of 706 University of Wisconsin-La Crosse undergraduate students. An online survey (Qualtrics) was sent to a random sample of 2000 undergraduate students attending the University of Wisconsin-La Crosse. The survey includes theory-based questions and questions concerning exposure to and frequency of different prescription drugs that were used for non-medical purposes. Subjects were informed that they may discontinue taking the survey at any time or skip any questions within the survey that they feel uncomfortable answering. Because this research involves human subjects, the Institutional Review Board (IRB) evaluated the

moral and ethical standards of the research tools and the overall study objectives. The demographics of the current sample are representative to that of the larger university population (see Table 1). The majority of the respondents were white females and most had a junior or senior standing.

Table 1. Sample Demographics (%)	
Gender	
Male	32.4
Female	67.6
Age	
18	10.9
19	20.5
20	22.6
21	23.6
22	12.1
23 and older	10.4
Race/Ethnicity	
White	92.9
Non-White	7.10
Class Standing	
Freshman	22.8
Sophomore	22.5
Junior	27.2
Senior	27.5

Variables

The primary dependent variable for this study examines the past year use of non-medical prescription drug use. Students responded to the question "During the past year, how many times have you taken a prescription drug(s) that were NOT prescribed for you?" The median value was used as a replacement for those who responded to 'past year drug use' in vague words, such as "a lot" or "numerous" times in the past year. For those who said "daily" or "all the time," the value was changed to "365."[1] The dependent variable was recoded into a dichotomous variable, where 0='no use' and 1='one or more uses'. Students who reported no use of any prescription drug were coded as 0, whereas students reporting using at least one of these drugs were coded as 1.

In order to measure the relationship between my dependent variable and the two theory-based independent variables, respondents were asked about factors in their life that are strong measures of level of self-control and social bonds (Watkins and Melde 2007; Costello and Vowell 1999; Grasmick et al. 1993; Schreck et al. 2006). To measure social bonds, questions were posed concerning the four elements within Hirschi's social control theory: emotional attachment to parents, peers, and conventional institutions, such as the school; commitment to long-term educational, occupational, or other conventional goals; involvement in conventional activities, such as work, homework, and hobbies; and belief in the moral validity of the law (Hirschi 1969). Together, these four elements compose social control, but they all have their separate effect over one's delinquent behavior individually (Hirschi 1969; Costello and Vowell 1999). As apparent in Table 2, several questions for each element of social control were used to analyze their effects on prescription drug misuse. A social control factor was created using Hirschi's measurements of social bonds (Costello and Vowell 1999; Schreck et al. 2006). Eight questions were asked pertaining to emotional attachment to parents, peers, and conventional institutions. The factor extracted from these variables retained 41% (3.30 Eigenvalues) of the variance (α=.787). The subsequent six questions were asked to measure commitment to long-term educational, occupational, or other conventional goals. The factor extracted from these variables retained 51% (3.06 Eigenvalues) of the variance (α=.791). Likewise, in order to measure involvement in conventional activities, such as work, homework, and hobbies, three questions were presented. The factor extracted from these variables retained 61% (1.82 Eigenvalues) of the variance (α=.604). Finally, six questions were asked pertaining to belief in the moral validity of the law. The factor extracted from these variables retained 59% (3.56 Eigenvalues) of the variance (α=.861).

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[1] In order to find an accurate median value, the middle two values in the upper range of past year drug use were used and divided by two, getting a value of 82. [(65+100)/2=82].

Table 2. Social Control Scale Items

Item	Mean	SD	Factor Loading
Attachment (α = .787)			
I want to be the kind of person my mother is.	3.73	1.08	.466
I want to be the kind of person my father is.	3.64	1.14	.337
My parents would stick by me if I got into trouble.	4.27	.790	.482
I want to be the kind of person most of my friends are.	3.55	.888	.297
I respect the opinions of most of my friends.	4.10	.603	.196
I feel like I can talk to my parents about anything.	3.55	1.17	.491
My parents always trust me.	4.01	.876	.538
My parents always praise me when I do well.	4.08	.879	.487
Commitment to long-term goals (α = .791)			
I dedicate a lot of my time to homework and studying.	3.70	.995	.611
I enjoy going to class.	3.49	.841	.342
I participate in class discussion.	3.59	.926	.260
I try hard in school.	4.04	.791	.710
Getting good grades is important to me.	4.33	.731	.586
Education is important to me.	4.51	.634	.554
Involvement: time spent doing each of the following (α = .604)			
Homework/class projects outside of class.	3.50	.862	.816
Studying for exams and quizzes.	3.41	.946	.813
Attending extracurricular activities.	2.87	1.15	.189
Belief in the moral validity of the law (α = .861)			
Laws are usually beneficial to society.	3.95	.648	.477
I try my hardest to always follow the law.	3.71	.852	.593
I know UW-L's rules and they are fair.	3.71	.714	.584
If I break UW-L's rules, I will be punished.	3.81	.721	.583
I know my home state's laws and they are fair.	3.63	.790	.670
If I break my home state's laws, I will be punished.	3.86	.697	.652

After measuring social control, I focused on self-control and its indicators. The full Grasmick scale was used to measure self-control, which includes 24 variables comprising six elements of self-control (Grasmick et al. 1993). As shown in Table 3, the six main elements are: impulsivity, simple tasks, risk seeking, physical activities, self-centered, and temper. The variables were coded so that a high self-control score indicates low self-control. Factor analysis was used in order to condense the 24 variables into one self-control variable. Four questions were asked pertaining to each of the six main elements. The factor extracted from these variables retained 21% (5.05 Eigenvalues) of the variance (α=.829).

Table 3. Low Self-Control Scale Items (α = .829)

Item	Mean	SD	Factor Loading
Impulsivity			
I often act on the spur of the moment without stopping to think.	2.49	.988	.426
I don't devote much thought and effort to preparing for the future.	1.90	.926	.610
I often do whatever brings me pleasure here and now, even at the cost of some distant goal.	2.39	.961	.614
I'm more concerned with what happens to me in the short run than in the long run.	2.15	.865	.615
Simple Tasks			
I frequently try to avoid projects that I know will be difficult.	2.50	.913	.589
When things get complicated, I tend to quit or withdraw.	2.10	.841	.574
The things in life that are easiest to do bring me the most pleasure.	2.40	.892	.574
I dislike really hard tasks that stretch my abilities to the limit.	2.24	.836	.595
Risk Seeking			
I like to test myself every now and then by doing something a little risky.	3.58	.885	.615
Sometimes I will take a risk just for the fun of it.	3.35	.990	.747
I sometimes find it exciting to do things for which I might get in trouble.	2.78	1.13	.641
Excitement and adventure are more important to me than security.	2.43	.930	.549
Physical Activities			
If I had a choice, I would almost always rather do something physical than something mental.	2.91	.971	.662
I almost always feel better when I am on the move than when I am sitting and thinking.	3.25	.944	.640
I like to get out and do things more than I like to read or contemplate ideas.	3.29	.992	.672
I seem to have more energy and a greater need for activity than most other people my age.	2.85	.988	.581
Self-Centered			
I try to look out for myself first, even if it means making things difficult for other people.	2.19	.849	.590
I'm not very sympathetic to other people when they are having problems.	1.82	.877	.485
If things I do upset people, it's their problem not mine.	1.84	.810	.633
I will try to get the things I want even when I know it's causing problems for other people.	1.83	.748	.689
Temper			
I lose my temper pretty easily.	2.08	.952	.587
Often, when I'm angry at people I feel more like hurting them than talking to them about why I am angry.	1.78	.884	.684
When I'm really angry, other people better stay away from me.	2.06	.975	.692
When I have a serious disagreement with someone, it's usually hard for me to talk calmly about it without getting upset.	2.41	1.10	.603

Basic demographics were also examined, such as the respondent's sex, age, level in school, race/ethnicity, and GPA. Several independent variables were also recoded in order to simplify the data. Gender was recoded to 0=Female and 1=Male. Race/Ethnicity was recoded to 0=Non-White to 1=White. Class standing was recoded to 1=Freshman, 2=Sophomore, 3=Junior and 4=Senior.

Analytic Strategy
In order to further explore explanations for non-medical prescription drug use, the relationship between the dependent variable 'past year drug use' and my various independent variables were analyzed. First, descriptive statistics of the independent variables, specifically the demographics, will be presented. Second, a cross-tabulation analysis between 'past year drug use' and gender will be explored to understand the relationship and direction

between these variables. Last, binary logistic regression models will demonstrate how each independent variable predicts the likelihood of non-medical prescription drug use. The logistic regression also offers insight into how much each independent variable accounts for the variance of the dependent variable.

RESULTS

The descriptive statistics of the demographic independent variables are displayed in Table 4. The majority of the sample of UW-L undergraduate students were white females, aged 20 to 21, of either junior or senior class standing. The average GPA was 3.32.

Table 4. Descriptive Statistics

	Mean	SD	Min	Max
Demographics				
Age	4.37	1.47	1.0	7.0
Gender	.324	.468	0.0	1.0
Race	.929	.257	0.0	1.0
Class Standing	2.59	1.12	1.0	4.0
GPA	3.32	.417	2.0	4.0

The first phase of analysis at the bivariate level explored the differences among students who either reported past year prescription drug misuse or no past year prescription drug misuse. Only 27.9% of white college students used prescription drugs non-medically in the past year, while 48.0% of non-white college students used prescription drugs for non-medical purposes in the past year. As for gender, only 24.5% of female college students used prescription drugs non-medically in the past year, while 39.7% of male college students used prescription drugs for non-medical purposes in the past year. Based on the aforementioned findings, there were significant differences between non-medical prescription drug use among males and females at the bivariate level. Prescription drug misuse among white students and non-white students was also found to be significant at the bivariate level.

It is noteworthy to mention the types of prescription drugs that had the highest reported frequencies of use. 10.5% of students reported using Ritalin/Adderall/Strattera, which were the highest reported drugs. Second to stimulants was OxyContin which was used by 3.1% of the sample. The third most frequently reported drug were Codeine or Tylenol with Codeine. All other drugs were reported being used by 1.6% of the sample or less. When students were asked how often they used prescription drugs for specific non-medical purposes, 'to increase concentration' was the highest response, followed by 'to relieve pain' and 'to have fun or get high.' It is not too surprising then that the reported reasons for misuse seem to correspond with the types of drugs that were most frequently used. For example the top reported prescription drug was stimulants, such as Ritalin, Adderall, and Strattera, whereas the top reported reason for using was for increased concentration.

The results from the multivariate logistic regression analysis are presented in Table 5. Three separate models were run in a stepwise fashion, each examining the independent and cumulative impact of the demographic, social control, and self-control indicators. Model 1 examines the effect of the respondent's demographics on past year non-medical prescription drug use. Students reported being male and white were significantly more likely to report past year prescription drug use compared to female and non-white students respectively. The odds of non-medical prescription drug use was 121.8% higher for male students than for female students Likewise, the odds of non-medical prescription drug use are 59.0% lower for white students than for non-white students. No significant relationship was found between prescription drug misuse and the independent variables age and class standing. Model 1 accounts for 7.4% of the variation in non-medical prescription drug use.

Table 5. Binary Logistic Regression Models for Nonmedical Prescription Drug Use

	Model 1			Model 2			Model 3		
	B	*SE*	Odds	*B*	*SE*	Odds	*B*	*SE*	Odds
Demographics									
Age	.036	.138	1.036	.031	.145	1.032	-.002	.148	.998
Male	.797**	.229	2.218	.759**	.243	2.136	.676**	.246	1.966
White	-.891*	.396	.410	-.771	.416	.463	-.712	.420	.491
Class	-.063	.182	.939	-.045	.190	.956	.034	.196	1.035
GPA	-.468	.263	.626	-.544	.285	.580	-.530	.288	.589
Social Control									
Attachment				-.162	.128	.851	-.148	.129	.863
Commitment				-.017	.166	.983	.099	.173	1.105
Involvement				.151	.150	1.163	.084	.153	1.087
Belief				-.514**	.127	.598	-.475**	.129	.622
Low Self-Control							.312*	.126	1.366
-2 log likelihood		527.485			502.099			495.874	
Nagelkerke R^2		.074			.143			.159	

* $p \le .05$, **$p \le .01$

Within Model 2, four social control indicators were added to the regression model – attachment, commitment to long-term goals, involvement, and belief in the legitimacy of the law. As was found prior, males were more likely to report past year use than females. When considering social control, the only significant factor is one's belief in the validity of the law. Every one point increase in belief reduces the odds of misusing prescription drugs by 40.2%, even after controlling for demographics and other social control factors. Age, race, class standing, GPA, attachment, commitment to long-term goals, and involvement all have no significant relationship with the dependent variable of past year prescription drug use. Race/ethnicity was no longer significant after the inclusion of the theoretical variables for social control. This could be due to the overwhelmingly predictable power of belief in the validity of the law. Adding the social control indicators (Model 2) resulted in a visible increase in the explained variance (7.4% to 14.3%).

Model 3 incorporates all independent variables, including demographics, social control variables, and the measure of self-control. As was found in the previous models, males were more likely to report past year use than females. Again, when considering social control, the only significant factor is one's belief in the validity of the law. Model 3 also includes the independent variable self-control. Every one point increase in low self-control increases the odds of non-medical prescription drug use by 36.6%. Age, race, class standing, GPA, attachment, commitment to long-term goals, and involvement all have no significant relationship with the dependent variable of past year prescription drug use. Model 3 now accounts for 15.9% of the variation in non-medical prescription drug use.

DISCUSSION

Non-medical prescription drug use, particularly among college students, is a growing social problem that is receiving much attention in the popular media, yet it still not fully understood. This exploratory study sought to add to the existing literature on non-medical prescription drug use by identifying those correlates that are predictive of past year use. More importantly, this study examines this behavior at a key point in life-course development, as college is such a key stage for the personal development of both prosocial and antisocial behaviors. Overall, 29.6% of students reported engaging in prescription drug use within the past year, representing an increase since 2004 (Ford and Schroeder 2009). Such statistics indicate that this is no longer a problem that can be overlooked or ignored in academic or policy-related circles.

Based on the stated findings, it can be concluded that there exists a significant relationship between gender and non-medical prescription drug use. It should also be noted that there is a significant relationship between social control and self-control and non-medical prescription drug use. Social bonds and self-control, for example, can be considered predictors in a person's likelihood of prescription drug misuse since the theory-based measurements are such prominent aspects of our culture. The desire to find the relationship between these independent variables and non-medical prescription drug use is, therefore, apparent.

Findings indicate that there is a significant relationship between non-medical prescription drug use and gender. Accordingly, male college students are much more likely to misuse prescription drugs that female college students. Although research results have varied (Simoni-Wastila et al. 2004; Szwabo 1993), these results parallel the findings

of previous research which supports the hypothesis that males are more likely to use prescription drugs for non-medical purposes than females (Substance Abuse and Mental Health Services Administration 1997b). Since males have often been found to abuse drugs in general more often, it is not surprising that the findings state that males are also more likely to misuse prescription drugs more than females.

According to the logistic regression analysis, gender, aspects of social control and self-control all help to predict the likelihood of non-medical prescription drug use, even after accounting for any effects from the other independent variables, such as race/ethnicity, age, class standing, and GPA. The regression analysis reveals that we can reject hypothesis 1 which states that underclassmen have a higher rate of non-medical prescription drug use than upperclassmen. Apparently, there is quite an even distribution among all ages and class standings of prescription drug misuse. A possible explanation for such results is the fact that underclassmen and upperclassmen share many of the same experiences, no matter what their year in college is. For example, college students of all ages have close bonds to society, while others do not. Likewise, low self-control can predict a student's behavior, whether that student is in his or her first year of college or last.

Additionally, underclassmen may be thought to misuse prescription drugs more often in order to fit in with their new acquaintances. In order to become socialized into their new group of friends, underclassmen tend to behave similarly to the group, such as engaging in the deviant act of non-medical prescription drug use. And since more underclassmen are living independently from their parents for the first time, experimentation and deviant behavior is more likely to occur. Thus, one would assume underclassmen would have a higher rate of misusing prescription drugs. However, upperclassmen tend to have heavier homework and studying loads than underclassmen. This may cause them to misuse prescription drugs, especially stimulants like Adderall, in order to stay caught up in their academics while simultaneously juggling work, relationships, and planning out their futures. Through this study, the results show that there is no significant difference in prescription drug misuse between underclassmen and upperclassmen.

Based on further results of the regression analysis, we can accept hypothesis 2 that college students with low self-control are more likely to use prescription drugs for non-medical purposes than students with higher self-control. These findings correspond with Gottfredson and Hirschi's (1990) theory of Self-Control. The lower one's self-control, the more likely he or she is to commit crimes or similar deviant behavior. The findings of this research are significant in that the results suggest that self-control theory can be applied to not only illicit drug use, but also prescription drug misuse. This addition to research is valuable in that future research can apply self-control theory when predicting non-medical prescription drug use.

Finally, the results do not show support for the hypothesis that college students with weaker bonds to family and friends are more likely to use prescription drugs for non-medical purposes than students with stronger bonds. The only social bond indicator that significantly predicts non-medical prescription drug use is belief in the moral validity in the law. Emotional attachment to parents, peers, and conventional institutions, such as the school, commitment to long-term educational, occupational, or other conventional goals, and involvement in conventional activities, such as work, homework, and hobbies were all insignificant in predicting prescription drug misuse (Hirschi 1969). Knowing that belief in the validity of the law is a significant indicator of possible prescription drug misuse is useful for future research. The fact that belief aids in predicting non-medical prescription drug use is essential to recognize when identifying explanations for such deviant behavior.

The findings on social control theory may be somewhat surprising in that the only significant element of the four elements of the theory is belief in the moral validity of the law. The three other elements - emotional attachment to parents, peers, and conventional institutions, such as the school; commitment to long-term educational, occupational, or other conventional goals; and involvement in conventional activities, such as work, homework, and hobbies – were found to be insignificant predictors of non-medical prescription drug use. Although these results may be somewhat unexpected, there may be noteworthy implications to social control theory and its relation to drug use, particularly non-medical prescription drug use on college campuses. A possible explanation for such findings can be found in the influence of each element of social control theory outlined by Hirschi (1969) on the population of college students.

To illustrate, consider the average lifestyle and goals of a typical college student. Because the student is away from most family and is living independently for the first time, the emotional connection to parents and life-long friends is usually no longer held as a central aspect of his/her life anymore. Thus, the social control element of emotional attachment does not have as much predictability over a college student's likelihood of deviant behavior like drug use as it would for children still living at home before attending a university. Likewise, most college students have a high commitment to long-term educational and/or occupational goals due to the fact that they are going through the instrumental action of obtaining a college degree. Such a life decision and commitment indicates that the individual is already committed to his or her long-term goals. Therefore, the social control element of

commitment to long-term goals may be ineffective in studying the likelihood of deviant behavior for college students since most college students already have a high probability of being extremely goal-orientated with a means-end viewpoint.

Similarly, the social control element of involvement in conventional activities, such as work, homework, and hobbies was found to be insignificant in predicting a college student's likelihood of non-medical prescription drug use. A possible explanation of this finding is that, like commitment to long-term goals, the average college student holds involvement in activities as a superior feature of the college experience. Not only are most college students invested in studying and homework, but many others spend a great deal of time working at a part-time job or getting involved with extracurricular activities and clubs on campus. Consequently, it is no real surprise that the social control element of involvement is not significant in predicting prescription drug misuse on college campuses.

It is interesting to note the theoretical importance in finding that the element of 'belief' within social control helps predict non-medical drug use. Gottfredson and Hirschi (1990) stated that self-control should be the only required predictor of deviant behavior and, thus, social bonds are not necessary to analyze the likelihood of deviant acts. However, this research found that self-control and social bonds (specifically, belief in the validity of the law) are both significant predictors of prescription drug misuse. These findings contradict Gottfredson and Hirschi's (1990) prevailing devotion to the predictable power of self-control. A possible explanation for such a contradiction between existing knowledge and the results found in this research is that the predictors of non-medical prescription drug use may be different from deviant behavior in general. Gottfredson and Hirschi (1990) did not consider prescription drug misuse as a deviant act at the time. Thus, there may be separate implications for the quickly increasing new trend of non-medical prescription drug use.

This new challenge to existing theoretical viewpoints has potential to benefit the disciplinary of social science. In order to make research as accurate as possible, it is imperative to calculate as much prediction as possible when analyzing a dependent variable, such as drug use. Knowing that social control theory still has possible significance, even when controlling for self-control variables, is a vital addition to current research. Although Gottfredson and Hirschi were able to theoretically support their confidence in self-control, this research put the theories into practice and found conflicting results. In fact, the social control element of belief in the moral validity of the law was found to be a stronger predictor of prescription drug misuse than self-control. Thus, using both theories to explain prescription drug misuse by college students is crucial in order to understand the phenomenon from a wider perspective. Such findings call for further research on the topic at hand.

LIMITATIONS AND FUTURE DIRECTIONS

Like in most social research, there are weaknesses within studies that make further research on prescription drug misuse indispensable. All social research has limitations involved. As for the present study, the sample size, consisting of 706 students, is relatively large considering the target population and data collection method; however, an even larger sample size would be valuable. I also am not able to easily generalize the results to the general population because the sample was of only undergraduate students attending the University of Wisconsin-La Crosse; thus, the generalizability to the whole population is questionable (Arria et al. 2008; Quintero et al. 2005). Another weakness is that there is a limit to the amount of independent variables I can put on the survey, so I may have omitted relevant variables in my analyses. Another limitation is the use of cross-sectional data sets where longitudinal data would be most beneficial in determining factors of non-medical prescription drug use (Ford and Schroeder 2009; Costello and Vowell 1999; Matsueda 1982). Self-reported data also causes concern about the validity of such an empirical study (Ford and Schroeder 2009; Arkes and Iguchi 2008). Finally, unequal spread of basic demographics, such as ethnicity, put limitations on the strength of the research (Quintero et al. 2005). However, the spread of demographics in the sample is proportionately similar to UW-L's overall population.

Existing research has analyzed various theories and their explanations and/or predictions of college students' drug misuse. However, this research looks at self-control, social control, and certain demographics and their relationship to non-medical prescription drug use. This new addition to previous research will offer policy makers and campus coordinators new outlooks on how to best target the influences during a student's college career. Through new applications and analyses, this research will open new doors to understanding the phenomenon of drug use and lead to further research on prescription drug misuse by college students.

Using these findings, campus administrators should create informative messages for college students to enlighten them about any negative consequences of non-medical prescription drug use. "One-on-one educational interventions may be particularly effective" in preventing the spread of this new trend on college campuses (Arria et al. 2008:1057). As for community prevention strategies, doctors who write prescriptions should regularly evaluate the students they treat to monitor their use of their medication (Quintero et al. 2005). In particular, "campus-based student health providers may wish to discuss issues related to the socio-recreational uses of prescription drugs,

alongside issues of self-medication and misuse for academic purposes" (Quintero et al. 2005:925). Overall, new programs should be created on campuses around the country to discourage prescription drug use. Such programs should be founded on education, management of academic strain, and should offer psychological help (Ford and Schroeder 2009). Assistance and guidance in dealing with academic strain is clearly needed since the top reported misused prescription drugs were stimulants and the top reported reason for misusing was to increase concentration. Also, since belief in the moral validity of the law was found to be the strongest predictor of prescription drug misuse, programs starting in grade school through college should emphasize the importance and benefits of school and state laws.

This addition to research is valuable in that future research can apply self-control theory when predicting non-medical prescription drug use. Likewise, knowing that belief in the validity of the law is a significant indicator of possible prescription drug misuse is useful for future research. The fact that belief aids in predicting non-medical prescription drug use is essential to recognize when identifying explanations for such deviant behavior. Leaving out an influential theoretical predictor of prescription drug misuse like the social control element of belief would put severe constraints on one's research.

Only after these characteristics are properly and empirically identified can effective intervention and policy-oriented outcomes be implemented in universities among educators, administrators, and practitioners. As such, researchers should continue to examine the causes and consequences of non-medical prescription drug use that will be conducive to the development of evidence-based prevention and education programs.

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