Recreational prescription opioid misuse among college students in the USA: An application of the theory of planned behavior

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Abstract

Introduction: Young adults aged 18-25 are at elevated risk for prescription drug misuse compared to other age groups. The purpose of the current study was to utilize the Theory of Planned Behavior (TPB) to predict the intention to engage in recreational prescription opioid misuse (RPOM) among college students while identifying specific salient beliefs that underlie this behavior.

Methods: A random sample of college students in the USA completed an electronic survey measuring TPB constructs, salient beliefs, RPOM, and demographic items. Salient beliefs regarding RPOM were identified through a qualitative elicitation process using a subsample (*n* = 17) of the target population. Content analysis identified specific beliefs that would form questionnaire items to be assessed among the larger sample.

Results: Among the entire sample (*n* = 776), 20.7% reported lifetime RPOM with 11.9% reporting past 6-month RPOM. Ten behavioral, two normative, and eight control beliefs identified in the subsample significantly and positively correlated with intention for RPOM when measured among the entire sample. A staged hierarchical logistic regression model examined the relationship between TPB constructs and intention. With the exception of perceived behavioral control, all constructs were significantly related to intention to engage in RPOM in the next six months. Descriptive norms had the strongest relationship to intention (OR = 1.37, 95% CI 1.23 to 1.54, *P* < .001), followed by subjective norms (OR = 1.33, 95% CI 1.20 to 1.48, *P* < .001), and finally attitude (OR = 1.13, 95% CI 1.09 to 1.17, *P* <.001). Further, attitude significantly moderated the descriptive norm-intention relationship.

Conclusion: The beliefs identified by this study may benefit interventions aimed at preventing prescription opioid misuse among this population. Further, targeting global perceptions of peer behavior, as well as, attitudes toward recreational use of prescription opioids may be particularly efficacious.

Riassunto

Introduzione: I giovani adulti di 18-25 anni hanno un rischio elevato rispetto ad altri gruppi d'età di fare un uso incongruo delle prescrizioni mediche. La finalità di questo studio è stata quella di utilizzare la Teoria del Comportamento Pianificato (TCP) per predire l'intenzione da parte di studenti universitari di fare uso di oppioidi a scopo ricreazionale (RPOM), attraverso l'identificazione delle specifiche convinzioni di particolare rilevanza che stanno alla base di tale comportamento.

Metodi: Un campione casuale di studenti ha completato un sondaggio elettronico che misurava i costrutti della TBC, le convinzioni di particolare rilievo, l'inappropriatezza delle prescrizioni di oppioidi a scopo ricreazionale ed i tratti demografici. Le credenze salienti riguardanti l'uso (RPOM) sono state identificate attraverso un processo di acquisizione di tipo qualitativo usando un sottocampione (n = 17) della popolazione target. L'analisi del contenuto ha identificato specifiche convinzioni che hanno formato gli item del questionario che è stato somministrato nel campione più ampio.

Risultati: All'interno dell'intero campione (n = 776), il 20.7% dei giovani ha riferito un tale uso nell'arco della propria vita, con un 11.9% che lo ha riferito nei 6 mesi trascorsi. Sono state identificate dieci convinzioni comportamentali, due normative ed otto relative al controllo, quando la misurazione è stata effettuata nell'intero campione. Un modello di regressione logistica gerarchica ha esaminato la relazione tra i costrutti della TCP e l'intenzione all'uso. Con l'eccezione del controllo comportamentale percepito, tutti i costrutti correlavano in modo significativo con l'intenzione all'uso (RPOM) nei successivi sei mesi. Le norme descrittive avevano la relazione più forte con l'intenzione (OR = 1.37, CI95% 1.23- 1.54, *P* < .001), seguite dalle norme soggettive (OR = 1.33, CI95% 1.20-1.48, *P* < .001), ed infine, dalla predisposizione all'uso (OR = 1.13, CI95% 1.09-1.17, *P* <.001). Inoltre, la predisposizione moderava in modo significativo la relazione descrittiva tra la norma e l'intenzione.

Conclusioni: Le credenze che il nostro studio ha identificato possono dare un vantaggio agli interventi mirati alla prevenzione di un uso inadeguato a scopo ricreazionale della prescrizione di oppioidi in questa popolazione. Inoltre, prendere di mira le percezioni globali del comportamento dei pari, così come le attitudini rispetto all'uso a scopo ricreazionale della prescrizione di oppioidi può essere particolarmente efficace.

TAKE-HOME MESSAGE

Intention to misuse prescription opioids for recreation among college students in the USA is associated with attitude toward the behavior along with perceived descriptive and injunctive social norms. In this study, we identified a system of beliefs associated with this behavior. Consideration of these beliefs is encouraged when developing interventions which attempt to reduce this behavior among students.

INTRODUCTION

In 2015, 12.5 million Americans were estimated to have misused opioid pain relievers [1]. The term 'misuse' accounts for any use without a prescription, inappropriate use by those with a prescription, and use in a way not medically directed [1]. Young adults aged 18-25 are at high-risk for prescription drug misuse compared to other age groups [1, 2]. This is the typical age of college students and factors specific to the college environment, such as, stress, peer approval, and diverse social networks may increase risk for misuse of these drugs [3–5]. In some studies, roughly 16% of American college students reported taking a prescription drug that was not theirs within the past 12 months [6, 7]. As many as 40% of American students have self-reported prescription drug misuse at least once during their lifetime, most commonly opioids [8]. Proximal recall periods (≤ 1 year) suggest misuse prevalence rates for opioid misuse near 10% [9, 10].

In the USA, demographic correlates of prescription opioid misuse among college students include being Caucasian, male, member of a Greek organization, and having a history of medical opioid use [11]. Cognitive and social variables have also been studied in relation to prescription drug misuse with limited work specifically focusing on opioids. Among college students, recreation is a primary reported motive for prescription opioid misuse [9, 12, 13]. This motivation would seem to imply a belief system where the behavior associates with pleasurable outcomes, however, these specific beliefs have yet to be thoroughly examined. Studies have shown college students believe prescription drugs to be safer options than non-prescription drugs due to Food and Drug Administration (FDA) approval [7]. Specifically, beliefs regarding low levels of harm have been associated with misuse [9, 14, 15]. Social factors such as friend misuse and beliefs about peer misuse also equate to prescription drug misuse at the individual level [10, 11, 16]. Personal approval of stimulant misuse associates with the belief that most peers approve of the behavior.

Further, perceiving that the majority of one's peers misuse prescription stimulants increases odds of personal misuse by nearly 5-fold [16]. Of interest, perceptions of peer drug use are often misguided, as these perceptions are commonly overestimated [5]. Importantly, these findings highlight the significance of the personal belief system and suggest that interventions intended to change the belief systems may be effective in deterring misuse. Further studies of psychosocial correlates of opioid misuse are necessary and may be fruitful for primary prevention efforts in order to reduce misuse of these drugs. Behavioral theory is a useful tool for conceptualizing perceptual and social factors that determine behavior [17–21]. Currently, there is a deficiency of existing research evaluating the effectiveness of theory-based investigations and interventions addressing opioid misuse among college students [8], even as literature suggests theory-driven interventions are more effective at facilitating behavior change [22].

The Theory of Planned Behavior (TPB) is a well-established behavioral framework [23] with evidence of predictability and explanatory power among a wide range of behavioral domains [24]. Briefly, intention is the central determinant of behavior according to the TPB. This intention is explained by 3 global constructs: attitude, subjective norms, and perceived behavioral control (PBC) [23]. These constructs are often referred to as direct measures of the cognitive structures upon which behavior is rooted. Further, underlying these constructs are salient belief structures, often referred to as the indirect measures, upon which each construct is based. Attitude is a general disposition towards a behavior determined by salient favorable or unfavorable perceived consequences of behavior, subjective norms are considerations of social norms determined by salient expectations of social referents, and PBC is a perceived degree of control over the behavior based on salient facilitating or hindering circumstances regarding the behavioral engagement [23]. Specific salient beliefs are only identifiable through

a qualitative elicitation process involving a subsample of the target population [25]. This fact, no doubt, relates to their scarcity in the literature [24]. Identification of these beliefs are seen as a necessary step in informing intervention efforts [20, 26].

To the best of our knowledge, there has been no application of behavioral theory to conceptualize the misuse of prescription opioids, specifically. The TPB has been previously applied to prescription of stimulants [27, 28], alcohol [29], tobacco [30], and marijuana [31]. Existing studies suggest that the TPB is well suited to explain substance use behaviors [32–34].

Utilization of prescription opioids for recreation is indeed a specific behavior driven by dissimilar psychosocial determinants than that of misusing other prescription drugs or even the same drugs for differing motives (e.g., self-medication). As such, this study focuses solely on 'recreational' prescription opioid misuse (RPOM), as literature suggests motivation for misuse among this population is predominantly recreational in nature [9, 12, 13]. The purpose of the current study was twofold: 1) To utilize the TPB framework to predict the intention to misuse prescription opioid drugs for recreational purposes; and 2) to identify specific salient behavioral, normative, and control beliefs that form a root structure for RPOM in order to inform future intervention efforts.

Within the study aims, several hypotheses were evaluated. First, we hypothesized that intention for RPOM might be significantly associated with the constructs of attitude, subjective norms, descriptive norms, and perceived behavioral control. Second, we hypothesized attitude toward RPOM might moderate the relationships between other theory constructs and intention. This logic is based on observations presented in previous literature related to substance use [31, 34, 35], whereby any association or strength of an association between other constructs and intention is dependent on individual attitude. Thirdly, we hypothesized that each set of salient beliefs might correlate with their respective direct measure. For example, based on theory principles a set of salient behavioral beliefs provide the basis of an attitude, thus, measured behavioral beliefs must correlate with measured attitude in order to be interpreted as meaningful.

METHODS

Study participants and data collection

Participants were students of a large university in the United States. The University's ethics committee approved all study procedures. Data was collected during the 2017-2018 academic year using an electronic survey design. The University's Office of Institutional Research provided 5,000 random student email addresses, which were used for recruitment. Email addresses equally represented freshman through graduate students. Emails containing informed consent and a survey link were sent directly to students. Students were instructed that by clicking the link, they were consenting to participate and, upon completion, they would be eligible for a gift card drawing. For contact purposes, students choosing to enter the gift card drawing clicked a link to an additional survey where they simply entered their email address. This process preserved the anonymity of participants.

Study instruments and measures

Prior to answering specific questions, participants were introduced to our operational definition of 'recreational use' (i.e., to get high, for euphoric effects, to have fun, relax, or experiment). The questionnaire contained items designed to evaluate TPB constructs, lifetime and past 6-month RPOM, and demographic factors. To avoid the possibility of confounding relationships between study variables, we excluded individuals screening positive for possible opioid use disorder (OUD). This screening tool was based on diagnostic criteria outlined by the Diagnostic and Statistics Manual for Mental Disorders, Fifth Edition (DSM-V) diagnostic criteria for OUD. Theory constructs were assessed using multiple items in a manner consistent with

recommendations of theory authors [25] and adapted from existing instruments pertaining to substance misuse [27, 34, 36, 37].

Recreational prescription opioid misuse

We assessed lifetime RPOM (i.e., 'yes' or 'no'), as well as, frequency of RPOM over the past six months. The frequency item was 'How frequently have you used prescription opioid medications (i.e., opioids like Vicodin, OxyContin, Tylenol 3, Percocet, Darvocet, buprenorphine, morphine, hydrocodone, oxycodone, methadone, fentanyl, or other such opioids) for recreational purposes in the past six months?'. Responses were recorded on a 7-point response format (never = 1, only once = 2, more than once = 3, every few months = 4, every month = 5, every week = 6, or most days = 7).

Theory of Planned Behavior

Intention

Intention to engage in RPOM in the next six months was measured with three items scored on a 7-point bi-polar (-3 to +3) semantic differential scale. These items were adapted from existing literature where they were applied to alcohol and marijuana use [37] and included; 'I intend to/plan to/want to use prescription opioid pain, relieving medications for recreational purposes in the next six months'. Cronbach's alpha for this subscale in the current study was .96.

Attitude

Attitude toward RPOM in the next six months was assessed by four items using a 7-point bipolar (-3 to +3) scale [37]. 'My using prescription opioid medications for recreation in the next six months would be…'. The following scale anchors were used: 'bad/good', 'unfavorable/favorable, negative/positive', and 'unsatisfactory/satisfactory'. Cronbach's alpha for the attitude subscale was .96.

Subjective norm

Three items measured on a 7-point response format were used to measure subjective norm. For example, 'People who are important to me

think I (should not/should) use prescription opioid medications for recreational purposes', 'People who are important to me would (disapprove/approve) of my using prescription opioid medications for recreational purposes, and 'People who are important to me want me to use prescription opioids for recreational purposes (unlikely/likely)'. Cronbach's alpha for the subjective norm subscale was .64.

Perceived Behavioral Control (PBC)

PBC was assessed by 3 items measured on a 7-point response format [37]. Items are noted as follows: 'Whether or not I use prescription opioid medication for recreational purposes is entirely up to me (strongly disagree/strongly agree)', 'How much personal control do you feel you have over using prescription opioid pain medication for recreational purposes? (very little/complete control)', and 'How much do you feel that recreationally using prescription opioid medication is beyond your control? (very much so/not at all)'. Cronbach's alpha for this subscale was .61.

Descriptive Norm

Given the recent literature suggesting that descriptive normative influences may be of importance in directing intentions and behaviors of college students [16] as well as behaviors that are less socially acceptable [34, 38], measures of descriptive norm were included. Differentiating from subjective norms, descriptive norms indicate the perceived behavior of important social referents. Three items measured descriptive norms for RPOM on a 6-point (1 - 6) response format ranging from none to all [34]. Items assessed RPOM among friends, other students at my university, and family members. Specifically, 'Please, indicate how many (if any) of your friends/students at your university/family members use prescription pain relieving medication for recreational purposes'. The Cronbach's alpha for this subscale was .55.

Elicitation of Salient Beliefs

A small pilot study was conducted among a subsample of the target population using a

free-response formatted instrument (i.e., participants provided written responses to items) to identify the salient beliefs of the target population [25]. Participants were students in a general education class. The particular class was chosen because of its representation of students of various racial groups, academic disciplines, and grade classifications. In all, 17 students from the course chose to participate by completing the instrument accessing salient behavioral outcomes, normative referents, and control factors. Content analysis of written responses revealed 10 behavioral, 6 normative, and 8 control beliefs specific to RPOM over the next six months. The identified beliefs were used to create items that were included in the TPB questionnaire delivered to the total sample.

Behavioral Beliefs

Two questionnaire items developed from the qualitative findings assessed each behavioral belief and the product of these items represents the particular belief. The first question assessed the likelihood of a specific outcome occurring (i.e., outcome expectation), the second question measured the evaluation of that outcome. Likelihood of outcome was scored on a 7-point 'Unlikely-Likely' unipolar scale and the evaluation of that outcome scored on a 7-point 'Bad-Good' bipolar scale ranging from -3 to +3. For example, 'Recreational use of prescription opioid pain medication in the next six months will help me relax' and 'For me, being able to relax would be…'.

Normative beliefs

These beliefs refer to the normative will of social referents associated with recreational prescription opioid misuse. Two items formed each normative belief, one assessed the perceived will of a specific referent and the other evaluated the participant's motivation to comply. A 7-point unipolar scale was used to score both the referents will (should not/should) and motivation to comply (disagree/agree) with that perception. One such normative belief was: 'My close friends think that I (should not/should) use prescription opioid pain relievers for recreational purposes', and 'I am motivated to do what my close friends think I should do (disagree/agree)'.

Control beliefs

These perceived factors or circumstances facilitate or hinder RPOM. Again, each control belief was the product of two items each assessed on a 7-point unipolar scale. One item evaluated the likelihood of the control factor occurring and the second item assessed the perceived power of the factor. For example, 'I will know where to find prescription opioids in the next six months' scored as (unlikely/likely) and 'Knowing where to find prescription opioid pain relievers will make me (less likely/more likely) to use them for recreational purposes'.

Data analysis

Descriptive statistics were calculated to reflect the characteristics of the sample. In order to test study hypotheses, the following analyses were conducted. Bivariate correlations evaluated inter-relationships among theory constructs. To predict intention to engage in RPOM, a three-step hierarchical logistic regression model was applied. Those who 'completely disagreed' with every intention item were coded as no intention and all others were coded as having intention. To establish theory logic, each set of salient beliefs were correlated with their respective direct measure (e.g., the direct measure attitude should hold a significant relationship with salient behavioral beliefs). For these correlations, summed product scores reflected each set of salient beliefs. Finally, to evaluate specific beliefs of greater interest for intervention targets, rank-order correlations are presented between individual salient beliefs and the intention variable. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) v. 23. Statistical significance was set at $P < 0.05$.

RESULTS

Socio-demographic characteristics

Approximately 20% of students accepted the

email invitation to participate in the study. After removal of participants with a large amount of incomplete data and those acknowledging indicators of OUD, 776 students were included in the analytic procedures. The mean age of participants was 21.9 years and the sample comprised predominately females (Table 1). The ethnic breakdown of participants was consistent with the demographics of the University's student population with 80% identifying as White/Caucasian. The majority of students (67.8%) were not affiliated with a Greek organization. Just 22.5% of participants self-reported a grade point average (GPA) less than 3.0. Over 20% of participants reported engaging in RPOM at least once in their lifetime and nearly 12% during the past six months.

Theory of Planned Behavior (TPB)

Means, standard deviations, and intercorrelations for TPB variables can be seen in Table 2. With the exception of PBC, intention for RPOM significantly, and positively, correlated with all measures. As expected [23], past behavior also correlated significantly with theory constructs. A hierarchical logistic regression model was used to identify factors influencing intention for RPOM (Table 3). Step 1 of this model included the constructs attitude, subjective norm, descriptive norm, and PBC.

Attitude, subjective and descriptive norms, were significantly related to intention for RPOM. With the exception of PBC, this confirmed our hypothesis that intention would be significantly associate with theory constructs. Descriptive norms were associate with the largest increase in odds (OR = 1.37, 95% CI 1.23 to 1.54, $P < .001$), followed by subjective norms, (OR = 1.33, 95% CI 1.20 to 1.48, $P < .001$), and finally, attitude (OR = 1.13, 95% CI 1.09 to 1.17, $P <.001$). This model produced no evidence of a significant relationship between PBC and intention for RPOM. As it was hypothesized that individual's attitude would moderate the influence of the additional constructs, step 2 of the model included product terms representing each construct's interaction with attitude. Variables were centered prior to constructing interaction terms [39]. Little evidence was produced in support of this hypothesis as the added variables equated to modest increase in explanatory power for our model ($\Delta R^2 = .026$, $P < .001$). Significance was observed only for the attitude by descriptive norm interaction. Directionally this interaction implied that perceptions of normative behavior exert stronger influence on intention among individuals with more positive attitudes toward the behavior.

In step 3, past 6-month RPOM was included as a predictor as a measure of theory principles (i.e., the effect of past behavior should be accounted for by theory constructs) [23, 40]. We observed a modest increase in the Nagelkerke R^2 of 4.2% ($\Delta R^2 = .042$, $P < .001$). This increase may indicate that past behavior has some effect on intention not accounted for by theory variables or may, in fact, be the product of systematic error variance. Regardless, the low magnitude of change in variance provides support for TPB principles. The model with the lower-order terms resulted in a Nagelkerke R^2 of .383, which improved to .409 with the inclusion of interaction terms in step 2 and 0.451 in step 3 with addition of past behavior. Initially, a multiple linear regression was used, treating intention as a continuous variable after summing the scores on the three intention items. This measure of intention was highly skewed, with much of the sample indicating no intention. Thus, the intention variable was dichotomized as described earlier and logistic regression was used. It should be noted that, regardless of a violation to normality, results were similar between the logistic and linear regression models.

Evaluation of Salient Beliefs

Though not presented in tabular format, summed product scores for each set of salient beliefs were correlated with their respective direct measure, an assumption of this framework [23]. Confirming our hypothesis, each relationship was significant and magnitude of these relationships ranged from small

Table 1. Descriptive statistics of the study participants (*n* = 776).

	Characteristics	*n* (%)
Age, mean± SD	21.9 (5.5)	
RPOM Lifetime* RPOM Past 6 months RPOM Gender		161 (20.7) 92 (11.9)
	Female	488 (62.9)
Race/ethnicity		
	White/Caucasian	621 (80.0)
	Black or African American	73 (9.4)
	Asian	42 (5.4)
	Hispanic	20 (2.6)
	Other	19 (2.4)
	Native American or Alaskan	1 (.10)
Greek Affiliation		
	Fraternity/Sorority	250 (32.2)
	Non-Greek	526 (67.8)
University Status		
	Freshman	176 (22.7)
	Sophomore	120 (15.5)
	Junior	190 (24.5)
	Senior	144 (18.6)
	Graduate Student	146 (18.8)
GPA**		
	< 2.0	9 (8.1)
	2.0 – 2.4	24 (3.1)
	2.5 – 2.9	88 (11.3)
	3.0 – 3.4	246 (31.7)
	3.5 – 4.0	409 (52.7)

*Lifetime indicates a yes response to the having engaged in RPOM at least once in their lifetime.
RPOM = recreational prescription opioid misuse ** GPA= Grande Point Average

Table 2. Correlation matrix with means and standard deviations.

Variable	Att	SN	DN	PBC	PB	*M*	*SD*
Attitude (Att)	1.00	.395*	.225*	-.009	.362*	-10.11	5.10
Subjective Norm (SN)	.395*	1.00	.295*	-.008	.304*	3.77	2.02
Descriptive Norm (DN)	.225*	.295*	1.00	.156*	.240*	5.30	2.11
Perceived Behavioral Control (PBC)	-.009	-.008	.156*	1.00	.044	17.4	4.59
Past Behavior (PB)	.362*	.304*	.240*	.044	1.00	1.22	.70
Intention†	.417*	.437*	.350*	-.002	.451*		

*Correlation is significant at the P <.001 level. Correlations presented are Spearman's rank-order correlations. †Indicates point biserial correlations.

Table 3. Hierarchical logistic regression of intention onto theory of planned behavior direct measures, interaction terms, and past behavior.

Variables	Nagelkerke R^2	Hosmer & Lemeshow	SE	Odds Ratio	95% CI	P
Step 1	.383†	.420				
Attitude			0.02	1.13	1.09 – 1.17	<0.001
Subjective Norm			0.05	1.33	1.20 – 1.48	<0.001
Descriptive Norm			0.06	1.37	1.23 – 1.54	<0.001
PBC			0.03	0.96	0.91 – 1.02	0.160
Step 2*	.409†	.266				
Attitude			0.02	1.11	1.06 – 1.17	<0.001
Subjective Norm			0.06	1.31	1.17 – 1.47	<0.001
Descriptive Norm			0.06	1.33	1.18 – 1.50	<0.001
PBC			0.03	0.96	0.91 – 1.01	0.135
Attitude X Subjective Norm			0.01	1.01	0.97 – 1.03	0.118
Attitude X Descriptive Norm			0.01	1.04	1.01 – 1.06	0.006
Attitude X PBC			0.01	1.01	0.99 – 1.02	0.417
Step 3*	.451†	.372				
Attitude			0.03	1.10	1.04 – 1.15	<0.001
Subjective Norm			0.06	1.30	1.16 – 1.46	<0.001
Descriptive Norm			0.06	1.30	1.15 – 1.47	<0.001
PBC			0.03	0.96	0.90 – 1.01	0.115
Attitude X Subjective Norm			0.01	1.01	0.99 – 1.03	0.218
Attitude X Descriptive Norm			0.01	1.03	1.01 – 1.05	0.040
Attitude X PBC			0.01	1.00	0.99 – 1.02	0.489
Past 6-month RPOM			0.16	2.21	1.60 – 3.04	<0.001

*The exponent of the coefficient of a product (interaction) term is a ratio of odds ratios.
†Nagelkerke R^2 significant at the $P < 0.001$ level for each stage of the model. Chi Square Tests for Hosmer & Lemeshow test of model fit for step one ($X^2 = 8.14_{(8)}$, $P = .420$), step two ($X^2 = 9.98_{(8)}$, $P = .266$), and step 3 ($X^2 = 8.66_{(8)}$, $P = .372$) of the logistic regression model.
PBC = Perceived behavioral control; RPOM = Recreational prescription opioid misuse; SE = Standard error.

to moderate [41]. The correlation between behavioral beliefs and the attitude variable was .28 ($P < .01$). Normative beliefs also correlated significantly with subjective norm at .24 ($P < .001$). Finally, the correlation between control beliefs and PBC was .11 ($P < .01$). Correlations displayed above are Spearman's rank-order correlations. *$P < .05$.
Each behavioral belief showed a significant relationship to student's intention for RPOM (Table 4). Though the pilot study identified many possible outcomes to RPOM, the study participants felt that positive outcomes would be quite unlikely. Specifically, having fun, relaxation occurring, and feeling good were generally scored unlikely. In contrast, students felt that RPOM would cause several unwanted outcomes such as making bad de-

cisions, causing physical harm, legal trouble, and disappointment or regret. The influence of close friends as well as partners were significantly related to intention. Largely, there was low agreement to statements regarding referent approval of RPOM with moderate to high motivation to comply with the perceived will of the referent (Table 4). This high level of motivation to comply with each referent provides assurance that the elicitation process indeed produced referent individuals of this population. Significant correlations were observed between all control beliefs and intention. Mean values for the perceived power items were all on the lower end of item scales indicating that in general participants felt that the presence of these factors would do little to increase the likelihood of RPOM.

Table 4. Correlation of salient beliefs with intention to misuse prescription opioid medication for recreational purposes.

Belief Measure	Outcome Expectation (b)		Outcome Evaluation (e)		Correlation with Intention
	M	*SD*	*M*	*SD*	$b_i e_i$
Behavioral Beliefs					
'Allow me to have more fun'	1.57	1.28	.78	2.45	.279*
'Help me relax'	2.17	1.87	1.10	2.33	.294*
'Make me feel good'	2.13	1.85	.93	2.40	.262*
'Allow me to get high'	3.21	2.48	-1.76	1.91	.205*
'Cause me to become addicted'	4.02	2.50	-2.86	.70	.081*
'Cause me to make bad decisions'	4.91	2.35	-2.85	.67	.217*
'Cause me mental illness'	3.85	2.33	-2.84	.62	.186*
'Cause me physical harm'	4.51	2.32	-2.88	.56	.214*
'Cause me legal trouble'	5.31	2.18	-2.91	.54	.253*
'Cause me disappointment or regret'	5.47	2.17	-2.83	.64	.301*
	Normative Beliefs		Motivation to Comply		
Normative Beliefs	(b)		(e)		$b_i e_i$
'My close friends think'	1.35	.95	3.93	2.16	.219*
'My parents think'	1.13	.66	5.10	2.07	-.005
'Other close relatives think'	1.14	.65	4.21	2.18	-.014
'My doctor think'	1.17	.77	5.39	1.90	-.024
'My professors think'	1.20	.77	4.20	2.08	.016
'My boyfriend/girlfriend or spouse'	1.25	.84	5.03	2.05	.193*
	Control Factor		Perceived Power		
Control Beliefs	(b)		(e)		$b_i e_i$
'I will have access to'	2.34	2.12	2.42	1.80	.359*
'I will have the opportunity to use'	2.38	2.14	2.29	1.73	.375*
'My friends will use'	2.10	1.75	1.93	1.44	.385*
'I will be stressed'	6.02	1.88	1.97	1.48	.343*
'I will have to interact with family'	6.41	1.59	1.56	1.27	.253*
'I will know where to find'	2.81	2.40	1.95	1.50	.398*
'I will attend parties'	4.98	2.40	1.92	1.43	.279*
'I will have school obligations'	6.66	1.29	1.63	1.31	.285*

Correlations displayed above are Spearman's rank-order correlations. *$P < .05$.

DISCUSSION

To our knowledge, this is the first study to examine prescription opioid misuse among college students while applying the TPB as framework. We specifically considered recreational drug use, herein finding high levels of RPOM (i.e., lifetime = 20.7%, past six months = 11.9%). Findings of the current study support the utility of the TPB within this behavioral domain. With the exception of the PBC-intention relationship, our findings are consistent with the TPB's propositions [23]. This is somewhat expected with negatively evaluated behaviors, as there is typically a negative or no significant relationship between PBC and intention when the behavior is evaluated negatively [42]. Though only slight, the descriptive norm construct increased the odds of intention to a greater degree than that of subjective norm. This is indicative that perceptions of peer behavior may carry more influence than perceptions of peer will. Additionally, support was presented for the moderating effect of attitude specific to descriptive norms. Because we found descriptive norm to exert the strongest influence on intention, this may be an important finding regarding

behavior change.

We found that the strongest predictors of intention among our sample were variables representing social influence, which is contrary to many empirical investigations [24]. Among our sample, descriptive norms had the strongest influence on intention for RPOM. This finding may not be surprising among a population of college students when the behavior in question is recreational drug use. Meta-analytic findings suggest a strong relationship between descriptive norms and intention among younger populations, especially when the behavior in question is a health-risk behavior [38]. Though not extensively applied, descriptive norms have been found to predict intention in TPB-based studies of alcohol and non-prescription drug use [31, 34, 43]. Because the subjective norm has historically shown a weak relationship with intention [24], descriptive norm may be a more relevant representation of normative influence and better predictor of intention under many behavioral considerations. Because of these findings and additional work suggesting significant overestimation of peer pharmaceutical misuse [5], we would recommend that future interventions focus on cultivating appropriate perceptions of normative behavior.

We observed a significant positive relationship between attitude and intention. This finding comes as no surprise; more positive attitude regularly relates to more intention to perform the behavior [23]. Based on previous work [31, 34, 35] we hypothesized attitudes' potential moderating effect upon other variables in the model. Among our data the only significant moderation occurred between attitude and descriptive norm, where we observed a protective effect of attitude. Descriptive norm had a reduced effect on intention for those with more negative attitudes toward RPOM. As we know peer influence may exert a powerful effect on young people's decision making, this information may highlight the utility of educational interventions aimed at changing attitudes toward this behavior. As we saw descriptive norm to have the greatest degree of influence on intention,

efforts to attenuate this factor are advised.

We hypothesized a significant relationship between theory constructs and intention, however, we observed no significant relationship between PBC and intention. Conner and McMillan (1999) found that, in relation to marijuana use intentions, when attitude was low PBC had a negative association with intention, however, when attitude was high PBC had no effect of intention. This finding supports the early perception of Eagly and Chaiken (1993) in that we should expect these findings when considering intention to perform negatively evaluated behavior. This concept has been upheld by previous study [34, 35, 44].

An important aim of the current study was to identify specific salient beliefs which serve as a foundation for RPOM among this population. These findings should be considered when planning future prevention efforts among college students. Illustrating the importance of the belief system; knowing that intention is reduced among individuals with negative attitudes is useful but quite logical. Of greater utility is understanding the basis of this negative attitude. This is the question answered through identification of these salient beliefs and these beliefs provide a target for intervention. In accordance with the TPB [23], salient beliefs were elicited from a subsample of the study population and intern evaluated among the total study sample.

Each behavioral belief item significantly correlated with intention for RPOM. Beliefs that RPOM would 'cause me legal trouble' and 'disappointment and regret' exhibited stronger correlations with intention. Participants perceived these particular negative outcomes to be likely and assigned extremely negative evaluations to these outcomes. Highlighting these unwanted consequences may prove fruitful for future educational intervention efforts, as perceptions of threat surrounding behavior are useful deterrents of action [45]. Further, beliefs regarding positive outcomes of 'allow me to have more fun', 'help me relax', and 'make me feel good' displayed stronger correlations with intention and should

be given attention. Through intervention, we must reduce an association between RPOM and positive outcomes, as this association serves as a predisposing factor for drug use. For example, it is important that educational interventions combat the media-based conditioning process which often exhibits a glorified portrayal of drug use. Close friends and partner relationships emerged significantly associated with intention. Participants perceived little approval for RPOM by these referents and were also generally motivated to comply with the perceived will of these referents. Per our findings, perceived opinions of those with whom the individual shares a close bond, emotionally or otherwise may be efficacious targets for social interventions.

In regression modeling we observed no significant relationship between PBC and intention. Conversely, we found each individual control belief to be significantly related to intention. Perhaps, the presentation of individual belief items provided more situational and contextual details and this may have elicited a more accurate estimation of personal control. It has been suggested that unlike behavioral and normative beliefs, control belief measures may be better predictors of intention than the direct measure of PBC [46]. Our findings support this conclusion. Control beliefs concerning access-related factors held strong relationships to intention. Of particular interest may be the relationship between the factor 'my friends will use' and intention. This finding, in conjunction with the significant normative belief regarding the perceived will of 'my close friends', highlights an emphasis for social intervention among this population. Efforts to establish social accountability and other forms of companionship social support among student groups may be particularly effective, as our findings indicate that students are motivated to comply with the perceived expectations of partners and friend networks. In our sample 20.7% of participants self-reported RPOM at least once in their lifetime. Though higher rates of lifetime misuse have been reported [8, 47], our findings exceed those presented by much of the literature

[9, 11, 12]. These studies serve as reference; however, for direct comparison purposes they are not ideal as they utilize terminology (i.e., nonmedical, or misuse) rendering identification of recreational behavior impossible.

The current study has several limitations worth presenting. The cross-sectional nature of this study does not allow for direct linkage of intentions for RPOM to future behavior. Scales used to assess TPB constructs in the current study were adopted from past studies where they were validated in association with the misuse of other substances. This may be one explanation for the low levels of internal consistency observed for some of the construct scales. Further, data was collected among a sample of college students from one southern university. Though we observed a hearty response rate of over 20% from randomly solicited students, the findings may not translate to students of other universities or non-college populations. The majority of participants had relatively high-grade point averages, it is unknown whether this fact may have impacted findings. Because data were collected by means of self-report, we cannot rule out the presence of certain biases consistent with survey methodology. Specifically, because this study focused on socially unacceptable behavior, social desirability and misinterpretation bias are possible. Our data, however, is equivocal and even exceeds existing prevalence rates for opioid misuse among this population. Therefore, we can infer that any existing underestimation is not unique to this study.

CONCLUSION

In conclusion, extensive literature exists linking college aged individuals to risky behavior, inclusive of substance misuse. Our study contributes to this broad body of literature by examining psychosocial factors and their association with an area of increasing concern, prescription opioid misuse. As national and international efforts to curb the current opioid crisis progress, this research stands to make a contribution in understanding RPOM among this particular population and our findings may be useful for future intervention

development. This study is the first to specifically examine 'recreational misuse' of prescription opioid medication and one of few to apply a behavioral theory to the understanding of prescription opioid misuse among any population. We found support for the application of the TPB regarding RPOM among this population. Amid our sample, perceptual elements concerning the social environment held the greatest influence on intentions for RPOM. As such, intervention efforts targeting this interpersonal level are advised. Given our findings, it would be prudent for future studies to examine this behavior among non-college populations to investigate whether these important constructs hold the same influence. Additionally, we recommend that future studies, whether theory-based or otherwise, move away from solely using terminology such as 'nonmedical use' or 'misuse' to describe this type of behavior. These definitions produce a degree of ambiguity when attempting to understand the psychosocial determinants of this behavior, determinants which are necessary for development of fruitful behavior change interventions. With escalating efforts to decrease misuse of prescription opioid medications, specificity will be necessary if we are to reach efficacious solutions.

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