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The Association Between Ethnic Identity and Non-Medical Prescription Drug Use Among A Sample of College Students: Does a Sense of Ethnic Belonging Matter?

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ABSTRACT

Background: National data demonstrate significant differences in non-medical prescription drug (NMPD) use, with Whites seeming to be more likely to use compared to non-Whites. College students also appear to be at an increased risk for NMPD use. *Objectives:* This study examines NMPD use using a component of social identity theory. We propose that a stronger sense of ethnic identity may reduce the likelihood of NMPD use among college students due to ethnic identity's ties to self-esteem and self-efficacy. We also propose that the protective power of ethnic identity may vary according to one's race. *Methods:* Data for this study were collected from a survey of undergraduate students at a Midwestern university ($N = 530$). Poisson regression analyses were used to test the relationship between ethnic identity and NMPD use. Of our sample, 135 participants (25.5%) indicated NMPD use over the past year. This percentage is high compared to findings from national college data. *Results:* Results indicate that a stronger sense of ethnic identity reduced the frequency of NMPD use among young adults. The findings also reveal that the relationship between ethnic identity and NMPD use is moderated by race. Ethnic identity was found to be a protective factor for non-White participants only. *Conclusions:* This study suggests that ethnic belonging may act as a protective factor against NMPD use among non-White young adults. These findings build upon our understanding of the relationship between ethnic identity and substance use. We conclude with a discussion of directions for future research and intervention programs

KEYWORDS

Non-medical prescription drug (NMPD) use; ethnic identity; social identity theory; substance use; college students

Introduction

The USA is currently undergoing a major drug use epidemic: a record 52,000 people were killed in 2015 due to overdoses (Rudd, Puja, David, & Scholl, 2016). The drug overdose death rate has increased significantly from 12.3 per 100,000 population in 2010 to 16.3 in 2015 (Rudd et al., 2016). Two-thirds of overdose deaths are due to opioids such as OxyContin. This is a major concern, especially for young adults. Pharmaceutical drugs are now the third most commonly used substance by juveniles, behind alcohol and marijuana (Stogner & Miller, 2015). Ethnic background characteristics appear to play an important role in the unfolding epidemic, as this crisis has disproportionately impacted White Americans (Johnston, O'Malley, Miech, Bachman & Schulenberg, 2015). The present paper is a "proof of concept" paper that attempts to examine the role of ethnicity in

non-medical prescription drug (NMPD) use. Specifically, we examine the relationship between NMPD use and ethnic identity attachment.

As NMPD use continues to rise and claim lives, it is important that researchers consider possible correlates, theories, and consequences of non-medical prescription drug use. Studies show that young adults who internalize a stronger sense of ethnic identity are more likely to display pro-social attitudes and behaviors (Brook & Pahl, 2005; Marsiglia, Kulis, & Hecht, 2001; Smith, Walker, Fields, Brookins, & Seay, 1999). Some studies have looked at how ethnic identity acts as a protective factor against drug and alcohol use (Marsiglia, Kulis, Hecht, & Sills, 2004; Sutherland & Ericson, 2010). Our goal is to examine the influence of ethnic identity on non-medical prescription drug use among college students.

Although the main purpose of this study is to examine the impact of ethnic identity on prescription drug use, our

analysis also accounts for several important covariates, including: gender, age, parental level of education, living situation (on or off campus), employment status, church attendance, and depression. Research shows that these variables may play an important role in the explanation of substance use, and their inclusion in this study provides a more complete understanding of the issue (Armstrong & Costello, 2002; Chu, 2007; DeSantis, Webb, & Noar, 2008; Osgood, Wilson, O'Malley, Bachman, & Johnston, 1996).

Trends and prevalence rates of prescription drug use

NMPD use is a serious public health concern (Calcaterra, Glanz, & Binswanger, 2013; Kolodny et al., 2015; McCabe, Cranford, & West, 2008; Young, Glover, & Havens, 2012). Over the past two decades, NMPD use has become an increasing problem among college students (e.g., Ford & Schroeder, 2009; McCabe, Boyd, & Young, 2007b; McCabe, Knight, Teter, & Wechsler, 2005; Teter, McCabe, LaGrange, Cranford, & Boyd, 2006). NMPD use is particularly high among those 18–25 years of age (McCabe, West & Wechsler, 2007a).

The types of NMPD use that are most frequently used by college students are stimulants; such as Ritalin, Adderall and Dexedrine; and opiates such as Percocet and Vicodin (DeSantis et al., 2008; McCabe et al., 2005). Students report that these drugs are often easy to acquire and are usually acquired from friends or “friends of friends” (DeSantis et al., 2008). The ease at which students can acquire these drugs is contributing to the growth of the trend. The wide availability of pharmaceuticals perhaps leads to reduced stigma of use among young adults who do use prescription drugs without a prescription (Schroeder & Ford, 2012; Sham, 2011). They may see prescription drugs as being less harmful than “hard drugs,” and believe that the overall consequences for using them will be less severe (Sham, 2011). Moreover, their actions may appear to be less deviant because they are acquiring the substances primarily from friends or family, rather than dealers. This perception is also enhanced by government approval and media advertising of prescription drugs (Schroeder & Ford, 2012). The perceived “safeness,” of these drugs, coupled with the wider availability and lower cost in comparison to hard drugs, has been suggested to be a major contributor to the growing trends of prescription drug use (Sham, 2011).

Ethnic differences in NMPD use

Studies that have examined the relationship between race, ethnicity, and substance use show that Whites are more likely to use drugs than Blacks, Hispanics, or Asian groups (Blum et al., 2000; Chen & Jacobson,

2012; Kirkpatrick Johnson, 2004; McCabe et al., 2007d; Wallace & Bachman, 1991). Johnston et al. (2015) compared substance use rates among Black, Hispanic, and White adolescents and found that Whites in the 12th grade reported the highest rates of use for most substances, including prescription drugs, in comparison to Blacks and Hispanics. Hispanic students reported the highest rates of marijuana use and other drugs including crack cocaine, crystal meth, and inhalants. However, overall rates of use for these “hard drugs” were very low for all three racial/ethnic categories. Whites and Hispanics were found to use almost all substances at higher rates than Blacks (Johnston et al., 2015). The literature shows consistent trends in terms of overall substance use among adolescents and young adults; Whites report the highest rates of use for most substances, Hispanics report rates that are similar to Whites, and Blacks and Asians report the lowest rates of use (Chen & Jacobson, 2012; Johnston et al., 2015; McCabe et al., 2007d).

A few researchers point to several explanations for why White adolescents and young adults use prescription drugs at higher rates than their ethnic minority peers. Data suggest that Whites are medically prescribed these drugs at higher rates than minority groups (Paulozzi, 2012). Outside of medical sources, adolescents and young adults are most likely to procure prescription drugs from peers or family members (DeSantis et al., 2008; Stogner & Miller, 2015).

Because Whites are legally prescribed drugs at higher rates than ethnic minorities, it may be easier for Whites to acquire prescription drugs from White social or familial circles. Whites are more likely to witness other White peers and family members who use pharmaceuticals without a prescription, which may lead them to believe that prescription drugs are less harmful or stigmatizing than harder drugs (Sham, 2011). Research also shows that Black young adults may be less likely to misuse alcohol and other substances due to the fear of adding to existing negative stereotypes about young Black adults (Peralta, 2005). White young adults may not have to fear the same types of drug-related stigma and stereotypes.

Ethnic identity as a protective factor against substance use

White and Burke (1987, p. 311) define ethnic identity as an “understanding shared by members of the ethnic groups, of what it means to be Black, White, Chicano...” This component of the self is developed through the exploration of and commitment to the

norms of one's ethnic group (Phinney & Ong, 2007). Commitment to this identity generates positive feelings about one's group membership which can then translate into more positive perceptions of oneself (Roberts et al., 1999). Phinney and Ong (2007) argue this perspective places ethnic identity within the realm of social identity theory. Social identity theory focuses on feelings of group belonging, and how individuals construct identity according to these feelings of group membership (Phinney & Ong, 2007; Roberts et al., 1999).

Research indicates that a stronger sense of ethnic identity relates to more interaction with prosocial groups and heightened positive self-esteem (Schwartz, Zamboanga, & Jarvis, 2007; Smith et al., 1999). Young people with a more positively defined ethnic identity are more likely to internalize positive goals, and prosocial means of attaining these goals. They are more likely to have positive outlooks on academic and career aspirations (Smith et al., 1999). They may also have stronger ties to parents and other prosocial networks, which eliminates the need to seek approval from more deviant peer groups (Brook, Balka, Brook, Win, & Gursen, 1998a). Multiple researchers have argued that the protective power of ethnic identity may be more salient for Blacks and other racial minority groups in comparison to Whites (James, Kim, & Armijo, 2000; Marsiglia et al., 2004; White & Burke, 1987). This may be because Whites are reminded of their ethnicity less frequently due to their dominant position within society. Whites tend to be less involved in overtly ethnic organizations, and experience far less racial/ethnic prejudice and discrimination in comparison to other racial groups (Jaret & Reitzes, 1999).

It is important to note that ethnic identity and racial identity share many similar components. Both identities are defined by a sense of belonging to a group which has a unique set of shared behaviors and values (Phinney & Ong, 2007). While these concepts are similar, research on racial identity has tended to focus on responses to racism and discrimination, and the internalization of racism. Research on ethnic identity, however, has tended to focus more on belonging and identity construction (Alvarez & Helms, 2001; Helms, 2007; Phinney & Ong, 2007). This study focuses more on the psychological and social benefits received from group membership, rather than the marginalization and oppression one faces from being a member of the group. Therefore, ethnic identity was deemed to be more appropriate for this study.

Multiple studies have examined the impact of ethnic identity development, and the influence that it has

on reducing deviance (Bettes, Dusenbury, Kerner, James-Ortiz, & Botvin, 1990; James et al., 2000; Wallace & Bachman, 1991). Research also shows that ethnic identity can serve as a protective factor against substance use specifically (Brook, Zhang, Finch, & Brook, 2010; Chae et al., 2008; Marsiglia et al. 2001, 2004; Pugh & Bry, 2007). Stevens-Watkins, Perry, Harp, and Oser (2012) found that for Blacks, ethnic community membership may act as a social "safety net" that protects against illicit drug use. In two separate studies, Brook and colleagues found that a higher sense of ethnic identity reduces drug use for both Black and Puerto Rican ethnic groups (Brook et al., 1998a; Brook, Whiteman, Balka, Win, & Gursen, 1998b). Kulis and colleagues (2001) found similar results for American Indian adolescents, and Marsiglia et al. (2004) found consistent results for Hispanic adolescents as well. Overall, these studies indicate a relationship between strength of ethnic identity and substance use behavior.

Past studies have found significant relationships between ethnic identity and other substances. Research indicates that a stronger sense of ethnic identity is linked to more positive self-esteem and self-efficacy (Smith et al., 1999). Individuals with a stronger sense of ethnic identity may be more likely to be associated with prosocial groups, which may reduce exposure to drugs and lead to the development of stronger anti-drug norms (Marsiglia et al., 2004). Through these mechanisms, ethnic identity has been shown to reduce the use of other substances. Therefore, we assume that these same mechanisms will help explain the relationship between ethnic identity and NMPD use.

Research question

Very little research has examined if a strong sense of ethnic belonging reduces the likelihood that a person will engage in NMPD use. Broman, Miller, and Jackson (2015) studied the relationship between self-esteem, ethnicity, and NMPD use: however, they used a measure of self-esteem rather than a direct measure of ethnic belonging. To our knowledge, this is the first study to examine this association using a measure of ethnic identity. We have two main research questions. (1) Does a strong sense of ethnic belonging reduce the likelihood that a person will use prescription drugs? (2) Does the protective power of ethnic identity differ by race? Based on the literature review and ethnic identity theory, our hypotheses are:

Hypothesis 1: Non-Whites will have a stronger sense of ethnic identity than Whites.

Hypothesis 2: Whites will be more likely to engage in NMPD compared to non-Whites.

Hypothesis 3: A stronger sense of ethnic identity will have a protective effect against prescription drug use.

Hypothesis 4: A stronger sense of ethnic identity will have a stronger negative relationship with prescription drug use for non-Whites in comparison to Whites.

Methods

Participants

Data for this study were collected through an online survey at a single Midwestern university. Participants were drawn from Introduction to Sociology courses during the Fall 2013 and Spring 2014 semesters and were offered extra credit for participation. Participants gave informed consent prior to participation. Ethical approval for this study was granted by the Institutional Review Board. Our final analytical sample size was $N = 530$.

Analysis of the sample show that the demographic composition, in terms of gender and race, is approximately equivalent to the composition of the overall university. Approximately 61% ($N = 322$) of the sample was female, and 39% ($N = 208$) male. We used a dummy variable to measure race due to a small number of minority groups in the sample other than Black. Approximately 77% ($N = 410$) of the respondents identified being non-Hispanic White, and the remaining 23% ($N = 120$) identified being in another racial category. This non-White category is composed of individuals who self-identified as Black ($N = 75$), Latino ($N = 17$), Asian ($N = 8$), and multiracial ($N = 20$). Students under the age of 18 and above the age of 25 were dropped from the sample to focus specifically on young adults. We focus on young adults because research shows prescription drug use to be more prevalent among this age group in comparison to other age groups (McCabe et al., 2005; McCabe, Cranford, Boyd, & Teter, 2007c; Teter et al., 2006).

Measures

The dependent variable (NMPD use) was measured utilizing six survey questions on a particular type of drug use over the last year: Ritalin, Vicodin, Adderall, OxyContin, Tramadol, and general narcotics. An example question on the survey was, "On how many

occasions (if any) have you taken Ritalin on your own, that is without a doctor telling you to take them during the last 12 months?" The possible choices were: zero times, 1–2 times, 3–5 times, 6–9 times, 10–19 times, 20–39 times, 40 or more times (coded 0–6). After combining the responses to these questions into one measure, scores ranged from 0 to 20, with higher scores indicating a greater frequency of drug use over a 1-year period.

Of note, our study finds a high rate of NMPD use in comparison to national rates of NMPD use. In our sample, 25.5% of participants indicated that they had used at least one prescription drug over the last 12 months, which is significantly higher than the national percentage of 12.5% (American College Health Association, 2017). Perhaps the rate is high in our sample because the state in which the study was conducted is at the epicenter of prescription drug use and overdose-related mortality (Seth, Scholl, Rudd, & Bacon, 2018). The extent to which our sample is representative of the alarmingly high rates of use and overdose-related mortality suggests college students comprise an important portion of the population of NMPD use in the state in which the data were collected.

The key independent variable utilizes a portion of the Multigroup Ethnic Identity Measure (MEIM) scale developed by Phinney (1992). This measure has been used in various studies on racial/ethnic groups and is widely used due to its ability to measure across ethnic groups (e.g., Abreu, Goodyear, Campos, & Newcomb, 2000; David, Okazaki, & Saw, 2009; Robitscheck, 2003; Roberts et al., 1999; Utsey, Chae, Brown, & Kelly, 2002). Many measures that were developed to study ethnic identity target a specific group, but the MEIM scale is versatile in that its questions can be applied to any group (Abreu et al., 2000). For this reason, the MEIM scale was selected as the ideal measure for this study. The MEIM scale measures three separate components of ethnic identity: ethnic identity achievement, ethnic belonging, and the practice of ethnic behaviors (Phinney, 1992). This study adopts questions from the ethnic belonging component of the scale.

The four questions adopted from the MEIM scale were: I feel a strong attachment towards my own ethnic group; I feel strongly about my culture or ethnic group; I feel a lot of pride in my ethnic group and its accomplishments; and I have a strong sense of belonging in my ethnic group. Each question was rated on a 5-point scale, with 1 indicating the respondent strongly disagrees and 5 indicating he/she strongly agrees. Scores were compiled into a single scale that provides the sum total of each response (on a range from 0 to 16). The Cronbach's

alpha was 0.898. Race was transformed into a dummy variable, with non-White coded as 0 and non-Hispanic White coded as 1.

Control variables included: sex, age, parent's education, religious attendance, number of hours worked per week, living situation (either on campus or off campus), and depressive symptoms. Sex was coded as female = 0; male = 1. There was no measure of income in this survey; parental education was used as a proxy for social class. Two separate questions asked respondents to identify the highest-level education achieved by both mother and father. Possible responses ranged on a scale (coded 0–5) from “grade school or less” to “graduate or professional school.” Responses for both questions were added and divided by two to create one variable measuring the education of both parents (on a scale of 0–8).

Religious attendance was controlled for in this study due to its potential influence as a protective factor against prescription drug use (Chu, 2007; Ford & Hill, 2012; Kendler & Myers, 2009). The survey question asked, “Do you attend religious services?” (no coded as 0, yes coded as 1). Another control was a measure of number of hours worked per week. Work may provide students with the funds to buy drugs, but research also shows that time spent on routine activities such as work limits opportunity to participate in deviant behavior such as NMPD use (Osgood et al., 1996). The survey question asked, “On the average over the school year, how many hours per week do you work in a part time or full-time job?” Possible responses were: none, up to 20 h, 21–39 h, 40+ (coded on a range of 0–3).

Living situation was controlled for because prior research shows that young adults are usually first exposed to prescription drugs by their peers, and residents who live on campus may have more exposure to peer groups (DeSantis et al., 2008). The survey question asked, “Do you live on campus?” (on campus coded as 0, off campus coded as 1). The final control was depression (Radloff, 1997). Research has shown that a positive correlation does exist between the existence of depressive symptoms and substance use (Armstrong & Costello, 2002; Khantzian, 1985). Eight questions were taken from the CES-D instrument and were implemented into this study (coded on a range of 0–3).

Analytic strategy

We used zero-inflated Poisson (ZIP) regression analysis to test the relationship between strength of ethnic identity and NMPD use. We selected this method because the prescription drug use measure follows a

Poisson distribution with an excess number of zeroes. Out of our 530 respondents, 395 (74.5%) recorded a score of zero on the prescription drug use measure. ZIP takes into consideration that certain members of the population have a zero probability of reporting the event being studied. Other members of the population do have a chance of experiencing the event, and report experiencing it at different rates from each other. By using a ZIP model, we can examine simultaneously whether ethnic identity is associated with being a non-user (the zero model), and whether it is associated with fewer instances of prescription drug use if a respondent is estimated as a user (the count model). In our first ZIP analysis, we tested the overall ethnic differences in the NMPD use, and the overall relationship between ethnic identity and the NMPD use. In the second ZIP analysis, we tested differential effects of ethnic identity on the NMPD use across ethnic groups by adding the interaction between the MEIM ethnicity scale and ethnic group membership.

Results

Descriptive statistics for the sample are provided in Table 1. We also compared the prevalence rates of substance use in our sample to national rates for college students in the year 2013. National data were acquired from the Monitoring the Future survey (Johnston et al., 2015). The comparisons are illustrated in Table 2.

The prevalence rates are higher in our analytical sample for all substances in comparison to national prevalence rates for 2013. Our NMPD use variable has a minimum score of 0, and a maximum of 20. However, the mean score is only 1.09. This is due to the high number of zeros present in the distribution. Table 2 shows that there is no statistical difference between NMPD use by race except for Tramadol whereby more non-Whites reported using this substance compared to their White counterparts. These findings did not render support for Hypothesis 2. The mean score on the ethnic identity scale for the overall sample is 9.59 with a standard deviation of 3.32. Because the literature shows that ethnic identity may be a more important component of identity formation for racial minorities (Gil, Wagner, & Tubman, 2004; Jaret & Reitzes, 1999; Marsiglia et al., 2001; White & Burke, 1987), we tested to see if there was a significant difference between ethnic identity scores for Whites and non-Whites. At test was run to see if there was a significant difference in the mean ethnic

Table 1. Descriptive statistics for the total sample ($N = 530$).

	Mean/proportion	SD	Minimum	Maximum
Control variables				
Age	19.3	1.54	18	25
Parents' education	4.28	1.83	0	8
CESD Scale	8.34	4.42	0	21
Gender				
Male	39.25%			
Female	60.75%			
Race				
Non-Hispanic White	77.36%			
Non-White	22.64%			
On/off campus living				
On campus	27.74%			
Off campus	72.26%			
Average work hours per week				
None	29.81%			
Up to 20 h	35.28%			
21–39 h	26.98%			
40+ h	7.92%			
Religious attendance				
No	50%			
Yes	50%			
NMPD use	1.09	2.74	0	20
NMPD use Whites only	1.06	2.57	0	20
NMPD use Non-Whites only	1.18	3.26	0	18
MEIM Ethnic Identity Scale	9.59	3.32	0	16
MEIM Scale Whites only	9.24	3.29	0	16
MEIM Scale Non-Whites only	10.8	3.12	3	16
<i>t</i> Test	4.63*			

Note: *t* Test indicates significant difference between MEIM scores for Whites and Non-Whites at $p < 0.05$.

Abbreviations: MEIM, Multigroup Ethnic Identity Measure; NMPD, non-medical prescription drug.

Table 2. Annual prevalence of college NMPD use between sample and 2015 national data.

	Total sample (%)	White sample	Non-White sample	National college
Narcotics (other than Heroin)	10.3	10.7	9.3	5.4
Adderall	14.8	15.6	12.8	10.7
OxyContin	5.6	4.6	8.8	2.3
Vicodin	14.7	15.1	13.7	4.4
Ritalin	4.9	4.8	5.4	3.6
Tramadol	3.6	2.5	6.7*	NA

Note: National data taken from Monitoring the Future (Johnston et al. 2015). National data does not include statistics on Tramadol use.

Abbreviation: NMPD, non-medical prescription drug.

*indicates that prevalence is significantly higher than other racial group ($p = 0.05$).

identity scores for these two racial groups. The results are presented at the bottom of Table 1.

For White respondents, the mean ethnic identity score was 9.24 ($SD = 3.29$). For non-White respondents, the mean score was 10.8 ($SD = 3.12$). The *t* value for our test of significance was 4.63 ($p < 0.001$) which indicates that non-Whites have a statistically significant higher mean score in comparison to Whites. These results are consistent with the expectations in our first hypothesis that racial minorities place greater importance on ethnic identity than Whites.

Table 3 provides a correlation matrix for all variables used in the study. The prescription drug use measure was found to have a significant negative correlation with the MEIM ethnicity scale, providing some support for our third hypothesis. The MEIM ethnicity scale was also found to have a significant negative correlation with race, indicating that racial minorities place greater importance on ethnic identity than Whites. This finding was consistent with the expectations in our first hypothesis.

Two ZIP analyses were run to test the relationship between ethnic identity and NMPD use; the first one without the interaction effect, and the second one containing it. For each analysis, a vuong non-nested test was run to compare the fit of a ZIP model versus a standard Poisson model for our analysis. The tests indicated that a ZIP model was superior to a standard Poisson model for both analyses. Additional likelihood ratio tests indicated that the ZIP models fitted the data better than negative binomial models. The results of both ZIP analyses are provided in Table 4.

In the first set of ZIP analyses, where the interaction effect is not included, we do not find support for the effect of ethnic identity upon NMPD use. These results fail to provide support for our third hypothesis. However, when the interaction effect is included in the next set of analyses, a different picture

Table 3. Bi-variate correlations for all variables.

	Prescript	Eth_Scale	Sex	Age	Race	Parent education	Church	Work	Living	CESD
Prescript		−0.10*	0.08	0.07	−0.01	−0.03	−0.16*	0.07	−0.01	0.11*
Eth_Scale			0.09*	−0.10*	−0.20	0.00*	0.20*	−0.03	−0.06	0.62
Male				0.1*	0.02	0.03	−0.05	−0.04	−0.04	−0.03
Age					0.05	−0.14*	−0.12*	0.37*	0.34*	−0.03
White (Non-Hispanic)						0.05	−0.09*	0.05	0.06	−0.13*
Parent education							0.15*	−0.15*	−0.14*	−0.02
Church (attends =1)								−0.06	−0.10*	−0.02
Work									0.34*	0.03
Living (off campus =1)										0.02
CESD										

Abbreviation: CESD, Center for Epidemiologic Studies Depression.

*indicates a coefficient is significant at the 0.05 level.

Table 4. Zero-inflated Poisson regression analysis of NMPD use on ethnic identity.

	Without interaction effect						With interaction effect					
	Zero model (non abuse)			Count model (abuse)			Zero model (non abuse)			Count model (abuse)		
	Coefficient	SE	Beta	Coefficient	SE	Beta	Coefficient	SE	Beta	Coefficient	SE	Beta
Intercept	1.90**	0.60		1.91**	0.24		1.28	0.89		2.41***	0.33	
Eth_Scale	0.02	0.03	1.06	-0.02	0.01	0.94	0.08	0.07	1.29	-0.07**	0.03	0.80
Age	-0.19*	0.07	0.75	-0.01	0.03	0.98	-0.19**	0.07	0.74	-0.01	0.03	0.98
Male	-0.57**	0.22	0.76	-0.13	0.09	0.94	-0.58**	0.22	0.75	-0.14	0.09	0.93
White (non-Hispanic)	-0.21	0.26	0.91	-0.26*	0.10	0.90	0.54	0.87	1.26	-0.89**	0.30	0.69
Parent's education	0.02	0.06	1.04	0.00	0.03	0.99	0.02	0.06	0.04	0.00	0.03	1.00
Attend Church (yes = 1)	0.49*	0.22	1.28	-0.27**	0.09	0.87	0.48*	0.22	1.27	-0.29**	0.10	0.86
Work	0.11	0.13	1.11	0.20***	0.06	1.20	0.11	0.13	1.11	0.18***	0.06	1.18
Living status (off campus = 1)	0.05	0.26	1.02	-0.37**	0.11	0.85	0.04	0.26	1.02	-0.37***	0.11	0.85
CESD Scale	-0.09***	0.02	0.66	0.01	0.01	1.06	-0.09***	0.02	0.66	0.01	0.01	1.06
Eth_scale x White							-0.07	0.08	0.70	0.07*	0.03	1.37
Prob > χ^2	0.000			0.000			0.000			0.000		

Note: Vuong test of zip versus standard Poisson: $z = 7.20$ $Pr > z = 0.0000$ (without interaction effect).
 $z = 7.23$ $Pr > z = 0.0000$ (with interaction effect).

Abbreviations: CESD, Center for Epidemiologic Studies Depression; NMPD, non-medical prescription drug; SE, standard error.

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

emerges. Although in the zero model the interaction effect is not significant, it is significant in the count model. For White respondents in the count model, the effect of MEIM ethnicity scale is almost zero ($-0.07 + 0.07 = 0$). For non-White respondents, a one unit increase on the MEIM ethnicity scale decreases the expected counts on the prescription drug use measure by 7% ($100 \times (\exp(-0.07) - 1) = 7\%$). This supports our fourth hypothesis. The difference between racial groups is depicted in Figure 1. Figure 1 demonstrates that ethnic identity reduces the frequency of prescription drug use for non-Whites but has a non-existent effect for Whites.

Lack of support for Hypothesis 3 may be explained by the fact that the sample used for this study was predominantly White (74.1%). If ethnic identity does not provide any protective power for Whites, then it makes sense why ethnic identity does not appear to reduce NMPD use when we do not differentiate its effects between Whites and non-Whites. The protective effect of ethnic identity for non-Whites was overshadowed by its lack of effect for Whites.

Among the control variables in our count model, with the interaction effect included, race, church attendance, hours worked per week, and living situation were found to be significant predictors of NMPD use. Analyses show race, church attendance, and living situation to be significant negative predictors in this model. The findings for race are not consistent with past literature, as Whites are usually found to use prescription drugs at higher rates than racial minorities (Ford, 2009; McCabe, Boyd, & Teter, 2009; McCabe et al., 2007d). This finding could be due to the fact that past studies compare rates of use between Whites and specific minority groups, while

our study compares Whites to a collapsed group of very different ethnic and racial minority groups. The mix of multiple minority groups could account for this unexpected result.

Discussion

This study builds upon the understanding of both NMPD use and ethnic identity theory by examining how ethnic identity may act as a protective factor against NMPD use. Our study is timely because it addresses race and ethnic disparities in NMPD use. The first key finding is that non-White respondents report greater ties to ethnic identity than White respondents. This shows consistency with previous research, which indicates that this is because race and ethnicity are far more salient to non-Whites in comparison to Whites (Jaret & Reitzes, 1999).

In testing our second hypothesis, we did not find a difference in the rate of prescription drug use between Whites and non-Whites. This finding is inconsistent with previous literature which shows that White adolescents and young adults tend to engage in NMPD use at higher rates than racial/ethnic minority peers (Ford, 2009; Johnston et al., 2015; McCabe et al., 2007b, 2009). This could be explained by the fact that the state in which this study was conducted has exceptionally high rates of NMPD use, opiate related overdoses and mortality. Increasing rates of overall NMPD use may also lead to a decrease in racial differences in rates of NMPD use, particularly on college campuses or in urban areas such as the one where this study was conducted. Also, our measurement of ethnic identity is not ideal in that we collapsed all

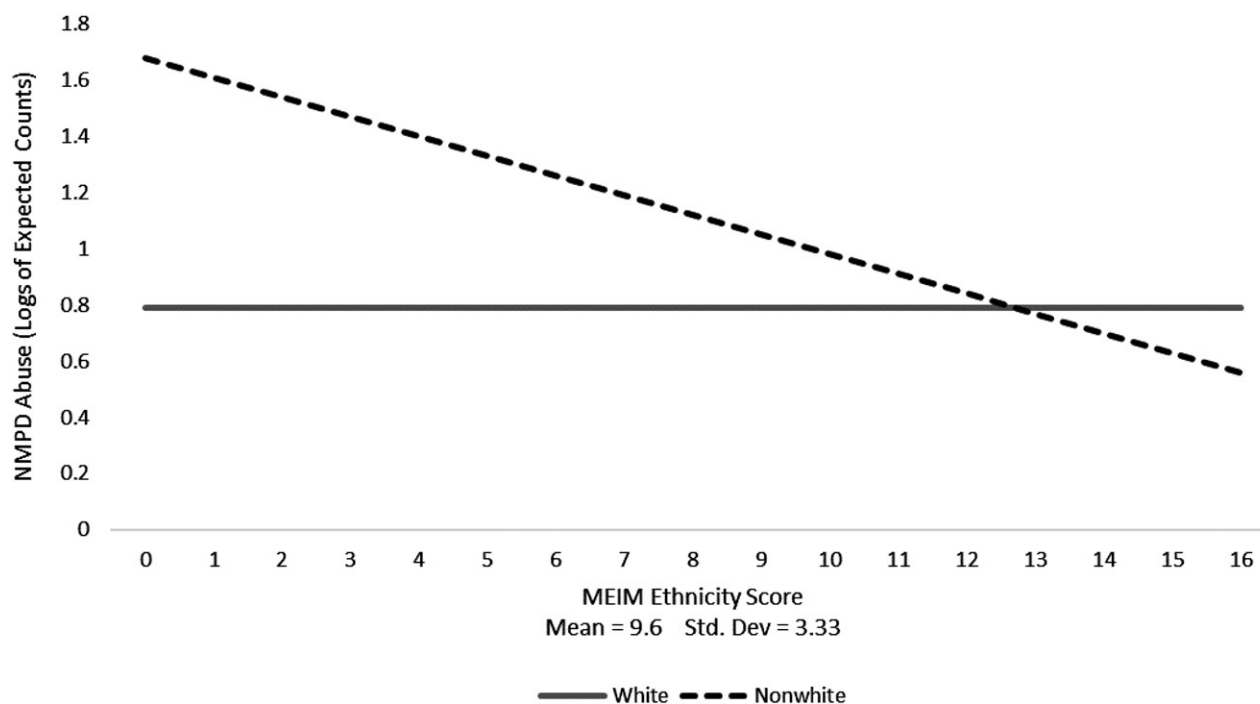


Figure 1. Interaction effect between race and strength of ethnic identity on non-medical prescription drug (NMPD) use.

nonwhite categories into a single dummy variable which obscures specific ethnic differences.

The final, and most significant finding is that the protective power of ethnic identity is moderated by race and appears to only apply to non-Whites. For Whites, ethnic identity has no effect on prescription drug use at all. As a result, ethnic identity may not appear to influence NMPD use in a predominantly White sample when the differential effects across ethnic groups are not accounted for. This relationship only becomes visible when the moderating effect of race is examined. The interaction effect indicates that respondents who are most at risk for prescription drug use are non-Whites with low levels of ethnic identity. This could be explained by past research which indicates that ethnic identity is far more important in identity formation among ethnic minority groups (Jaret & Reitzes, 1999).

There are weaknesses in this study that can be addressed by future research. First, we rely on a sample from a single university. While our sample may be representative of college populations in the Midwest, it may not be generalizable beyond this region. Future studies should be conducted with a representative and more racially diverse sample. Due to a small number of racial and ethnic minority groups in our sample, all respondents who did not identify as White were grouped together which prohibits our understanding of how ethnic identity attachment works for specific minority groups. However, we note that it is prudent to begin

this line of research with the basic distinction between White and non-White categories. Future research needs to examine individual ethnic and racial groups.

Although our findings for non-White participants were statistically significant, the effect size of ethnic identity on prescription drug use was small. A one unit increase on the MEIM ethnicity scale (range between 0 and 16) decreases the expected counts on the prescription drug use measure by about 7%. While the change in prescription drug use with each unit increase on the ethnic identity scale is not very large, it can be seen in Figure 1 that the difference is significant for non-White participants who are at opposite ends of the ethnic identity scale. Figure 1 also indicates that for non-White participants, the frequency of prescription drug use is lower than it is for whites only when their levels of ethnic identity are on the high end of the scale. In other words, non-White participants whose ethnic identity is measured toward the low end of the scale are predicted to have higher levels of misuse compared to Whites. These findings are theoretically important, despite their relatively small effect size.

This study also lacks certain important covariates that should be considered in future research. Given the prevalence of marijuana and alcohol use on college campuses, it would be beneficial to consider how these variables might influence NMPD use (Steele, Peralta, & Elman, 2011; Stogner & Miller, 2015). It might also be beneficial to consider the possible protective effects of racial identity. Racial identity, which focuses more on

how individuals deal with and internalize racism, has been shown to positively influence individuals' ability to deal with issues of racial adversity (Alvarez & Helms, 2001). The self-esteem benefits produced by racial identity may have a similar impact on substance use compared to ethnic identity. Future research should also incorporate qualitative methods, which could provide a clearer picture of the ways in which ethnic identity can strengthen self-esteem and reduce deviance in the form of NMPD use. Also, while some of our demographic variables mirror the national college population, our substance use estimates appear to be higher than the national average. Therefore, readers should use caution when extrapolating these results.

An important strength of our study is that we included a set of variables and measures that allow for the study of a previously untested relationship. This study takes a proof-of-concept approach whereby we focus on establishing the nature of the relationship between ethnic identity and NMPD use. Our results lend support for further research to be conducted on the association between ethnic identity and NMPD use. Thus, replication is necessary to establish the robustness of this relationship. Another strength of this study is that it builds on past literature by placing ethnic identity theory within the context of the prescription drug use epidemic. Much of the past research on NMPD use has been atheoretical. The contributions of this study provide a theoretical perspective that has not previously been used to frame this specific form of deviance.

These results imply that intervention strategies that target ethnic identity formation could be effective in reducing prescription drug use. These strategies may be more effective for non-Whites, who tend to place more importance on racial/ethnic belonging. For minorities who use NMPD, counselors or prevention specialists could assist in helping these individuals find social networks that could boost their ethnic attachment and identity. Colleges could help students link with ethnic based groups on campuses to help them develop self-esteem and self-efficacy. Intervention techniques that focus on developing ethnic identity still need to be paired with medical treatment and counseling for those who struggle with NMPD use. But introducing minorities to racial/ethnic networks and organizations could be an effective supplement to other forms of treatment or intervention. More research needs to be conducted to examine how interventions can be implemented. The prescription drug use problem has now reached epidemic proportions: further research in the area of ethnic identity attachment could provide new means for

supporting those who are at risk for NMPD use and for those already afflicted by it.

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