The Relationship between Perceived Discrimination and Psychotherapeutic and Illicit Drug Misuse in Chicago, IL, USA

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ABSTRACT *Based on several stress-coping frameworks, recent studies have suggested that perceived experiences of discrimination, a psychosocial stressor, may be associated with various risky health behaviors. The 2001 Chicago Community Adult Health Study (n=3,101), a face-to-face representative probability sample of adults in Chicago, IL, USA, was used to examine the relationship among lifetime everyday discrimination, major discrimination, and the use of illicit and psychotherapeutic drugs for nonmedical reasons. We used negative binomial logistic and multinomial regression analyses controlling for potential confounders. Approximately 17 % of the respondents reported using one or more illicit drugs and/or misusing one or more psychotherapeutic drug. Adjusting for socio-demographic characteristics, other stressors and various personality-related characteristics, results from negative binomial regression suggest that respondents who experienced moderate to high levels of everyday discrimination misused on average 1.5 different kinds of drugs more than respondents that experienced relatively low levels of everyday discrimination ($p<0.05$). Similarly, an increase in one lifetime major discrimination event was associated with an increase of misusing 1.3 different drugs on average regardless of experiences of everyday discrimination ($p<0.001$). When examining the types of drugs misused, results from multinomial logistic regression suggest that everyday discrimination was only associated with illicit drug use alone; however, lifetime major discrimination was associated with increased odds of using any illicit and both illicit/psychotherapeutic drugs. Mental health and substance use clinical providers should be aware of these potential relationships and consider addressing the harmful effects of perceived discrimination, in all patients not only among racial/ethnic minority patients.*

KEYWORDS *Social determinants of health, Stress, Coping behavior, Discrimination, Drug misuse*

INTRODUCTION

Using illicit drugs and psychotherapeutic drugs for nonmedical reasons are risky health behaviors not only for the individual users but also for society. For example, driving under the influence of a drug or substance, which 4.2% of the US population reported doing so in 2010, endangers the impaired driver and others sharing the road.¹ In terms of monetary cost to society, the estimated overall economic cost of

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substance abuse was 414 billion dollars in 2001.² Several stress-avoidant behavioral coping frameworks,³ including the tension reduction^{4,5} and self-medication hypothesis,⁶ posit that individuals may adopt behavioral and/or cognitive strategies such as misusing drugs or becoming angry or hostile against the perpetrator or others in response to life stressors, like perceived interpersonal discrimination. The inappropriate use of alcohol, prescription and nonprescription drugs is potentially an attempt by individuals to manage the emotional pain and anxiety associated with psychosocial stressors.⁶⁻⁹ Based on these stress-coping frameworks, recent studies have suggested that perceived experiences of interpersonal discrimination, a psychosocial stressor, may be associated with various risky health behaviors.^{10,11}

Previous studies have suggested that some individuals may use alcohol¹²⁻¹⁴ and tobacco use¹⁵⁻²⁰ to cope with perceived interpersonal discrimination. For example, two studies^{21,22} using probability-based nationally representative samples have shown that perceived interpersonal discrimination were adversely associated with cigarette use among Asian Americans in the USA and among Māori in New Zealand, respectively. Similarly, other published studies, using nonprobability-based samples of various subgroups of blacks in the USA, have shown the same relationship with cigarette use.^{16-18,23-26}

A limited number of studies have also suggested that perceived interpersonal discrimination may also be associated with prescription²⁷ and illicit drug misuse.^{14,27,28} For example, in a relatively young (<45 years old) adult sample, major lifetime interpersonal racial discrimination was associated with increased lifetime use of marijuana and cocaine among African Americans but not among whites.¹⁴ Similarly, Filipino Americans in San Francisco and Honolulu who experienced interpersonal everyday discrimination within the preceding 30 days and unfair treatment in the preceding 12 months due to various aspects of their race/ethnicity were more likely to report lifetime use and misuse of illicit and prescription drugs.²⁷ Although these studies are not directly comparable, together they are suggestive of a positive relationship between discrimination and substance use/misuse.

Of particular interest to some is the relationship between personality-related traits and reports of interpersonal discrimination and various health outcomes. In this study, we included several personality-related traits to control for potential confounding between experiences of interpersonal discrimination and drug use. As a confounder, the personality-related trait would, in theory, increase the exposure and/or perception to interpersonal discrimination.²⁹ If the trait of interest was indeed a confounder, the observed relationship between interpersonal discrimination and the outcome of interest may be biased or altogether spurious. Although very little research exists about these specific personality-related variables with respect to interpersonal discrimination and drug use, some insights can be gained when considering the larger body of work in this area. For example, previous research has found that perceived interpersonal discrimination is associated with externalizing reactions such as anger and hostility,³⁰⁻⁴⁰ suggesting a potential role as mediator. On the other hand, anger coping strategies, including confrontation, can serve to both influence the outcome of the race-related conflict (e.g., the expression of anger can serve to prompt the offender to alter his/her discriminatory behavior or to persuade others to take action) and manage the emotional burden generated by the anger.⁴¹

Similarly, cynical hostility, characterized by general cynicism and mistrust,⁴² has been shown to be associated with perceived interpersonal discrimination potentially as a coping mechanism.⁴³ On the contrary, some suggest that the relationship between hostility and interpersonal discrimination may work in the opposite direction, more suggestive of a confounding relationship.⁴³ Compared to individuals

with low hostility, those with high hostility tend to report fewer rational thoughts and more suspicious in reaction to some interpersonal events.⁴⁴

Very little research has examined the association between perceived interpersonal discrimination and hopelessness. Hopelessness is characterized as a belief among individuals that they will inevitably experience negative outcomes and that they will inevitably fail to experience positive future outcomes.⁴⁵ For example, perceived interpersonal discrimination was positively associated with hopelessness in a study of emerging adults (ages 18–25) and a study of adult patients in pain therapy for nonmalignant pain.^{46,47} Similarly, hopelessness has been linked to alcohol use and abuse in both adults and adolescents.^{48,49}

Anxiety, typically considered a normal reaction to stressful events, can also lead to more severe states of nervousness, fear, apprehension, and worrying that may interfere with normal functioning has also been associated with interpersonal discrimination.^{16,50–53} Although a relatively large number of studies have established the relationship between anxiety disorders and drug use/abuse, it is unclear whether drug use is a coping behavior or whether drug use is related to higher levels of anxiety.

Similar to the other personality-related traits, self-esteem, defined as a person's overall sense of self-worth or personal value, has been linked with both interpersonal discrimination and drug use in the literature. A growing body of research links interpersonal discrimination to self-esteem in multiple social contexts and across a variety of populations.^{39,54–57} For example, individuals that experience interpersonal discrimination might internalize some of the negative social devaluation of their group leading to lowered self-esteem.⁵⁸ On the other hand, other study findings suggest that self-esteem is associated with lower likelihoods of perceiving interpersonal discrimination⁵⁹ and others finding no association.^{60,61}

Although the personality-related traits that we examined may be considered as confounders, it is also entirely plausible that anger expression/repression and self-esteem, for example, may be mediators of the relationship between interpersonal discrimination and drug use. If indeed they are mediators, the individual's prior experience of interpersonal discrimination may potentially result in higher rates of drug use, by way of lower self-esteem and/or higher states of hostility. On the contrary, they may also be considered confounders. Williams,⁶² for example, suggested that relatively high levels of material deprivation found in segregated communities are often associated with factors (e.g., low socioeconomic status, poor quality medical care, etc.) that may promote high levels of certain personality-related traits (e.g., low self-esteem, high levels of anger, and higher levels of hostility), which subsequently may lead to more reports of perceived interpersonal discrimination. Additionally, some have suggested that internalized discrimination/stigma may lead to low-self esteem and potentially states of anger.^{60,61}

This study contributes to the existing literature by examining if, and to what extent, experiences of interpersonal discrimination are associated with illicit and psychotherapeutic drug misuse in a racial/ethnic heterogeneous probability-based sample of adults in a large urban city, controlling for several important personality-related traits that may confound the relationship. Additionally, we examined the co-occurrence of lifetime major and everyday interpersonal discrimination on illicit drug use and psychotherapeutic drug misuse. Because everyday and major interpersonal discrimination can co-occur in relatively short periods of time, they can generate new stressors or exacerbate existing, ongoing strains.^{63,64} Major events, such as being unfairly fired from a job, are generally rare for most individuals. However, the psychological impact on the individual is hypothesized to be immediate relative to the event's occurrence.^{63,64} In contrast,

everyday interpersonal discrimination experiences, like unfairly receiving poorer customer service, may be minimal in its immediate impact, but is hypothesized to gradually diminish the individual's functioning over time.^{63,64} Therefore, considering everyday and major interpersonal discrimination separately may bias our interpretation of the relationship between these types of interpersonal discrimination and drug use/misuse. As such, we explored the co-occurrence of everyday and major interpersonal discrimination and drug use in a large racial/ethnic heterogeneous sample of community-dwelling adults.

METHODS

Sample Description

The Chicago Community Adult Health Study (CCAHS) was a stratified, multistage probability sample of 3,105 adults aged 18 years and over, living in Chicago, IL, USA.⁶⁵ CCAHS, conducted between May 2001 and March 2003, was a face-to-face survey that obtained self-reported measures of individual and household psychosocial risk factors and resources, environments, and social contexts. The CCHAS sample included 802 Hispanics, 1,240 non-Hispanic blacks (blacks), 983 non-Hispanic whites (whites), and 80 individuals of other races/ethnicities. One adult was interviewed per household, with a response rate of 71.82 %. The weighted sample matched the age-race/ethnicity-sex distribution of Chicago based on the 2000 Census population estimates. Additional information about the CCAHS is available elsewhere.⁶⁵

Dependent Variables

Respondents were asked to indicate which, if any, of nine listed drugs they used in the past 12 months without a doctor's prescription, in larger amounts than prescribed, or for a longer period than prescribed: analgesics, sedatives, amphetamines, tranquilizers, cocaine, LSD, heroin, marijuana, or inhalants. A summary variable that counted all of the drugs that the respondents indicated they used was created. Based on a common drug classification scheme, a categorical variable with four mutually exclusive categories was also created: no drug misuse; psychotherapeutic drugs misuse (analgesics, sedatives, amphetamines, and tranquilizers); illicit drug use (cocaine, LSD, heroin, marijuana, and inhalants); and both (at least one drug from psychotherapeutic and illicit drug categories).¹

Independent Variables

We used a measure of everyday discrimination and a measure of lifetime major discrimination in this study. We used a modified five-item version of the everyday discrimination scale, a measure intended to capture the occurrence and frequency of routine and relatively minor experiences of unfair treatment.⁶⁶ Specifically, respondents reported their perception of how often (1) they were treated with less courtesy or respect than others, (2) they received poorer service than others, (3) they believed others acted as if they were not smart, (4) others acted as if they were afraid of them, or (5) they felt threatened or harassed. The item-response scale ranged from 1 to 5, with 1 indicating the highest frequency of at least once a week to 5 indicating never. To create the scale, the items were reverse coded (response option 5=0, 4=1, 3=2, 4=3, 5=4) and summed across the five items, which resulted in a range of 0–20, with higher scores reflecting greater frequency of interpersonal discrimination (Cronbach α =0.75).⁶⁶ The scale was then recoded to a categorical variable based on

quartile cut-points from the percentile distribution of the scale. We employed a binary variable (0–25th vs. 25–100th percentile) in the final analyses, based on results from preliminary analyses, which showed that the coefficients from the top three quartiles were not statistically ($p < 0.05$) different from each other.

The major lifetime interpersonal discrimination index, intended to capture relatively major lifetime interpersonal discrimination, was created by summing the “yes” responses to questions that asked the respondents if they were ever (1) unfairly fired from a job or unfairly denied a promotion; (2) unfairly not hired for a job; (3) unfairly stopped, searched, questioned, physically threatened, or abused by the police; and (4) unfairly prevented from moving into a neighborhood because the landlord or a realtor refused to sell or rent them a house or apartment (range, 0–4).

Covariates

To adjust for potential confounding, an a priori decision was made to include measures assessing stressful life events, 12-month major depression, chronic health conditions, and several widely used variables assessing personality-related characteristics in addition to the sociodemographic covariates. The stressful major life events index⁶⁷ is count of 24 potential major stressful life events, such as experiencing the death of a parent (range, 0–11). Since an individual with a major depression diagnosis may have access to or seek access to psychotherapeutic drug, we choose to include this variable in the analyses. The major depression variable was derived from the World Health Organization Composite International Diagnostic Interview short form, which used a specified algorithm to develop an indicator variable for having had a major depression episode over the past 12 months.⁶⁸ Chronic health conditions are a count variable of 13 chronic health conditions the respondent ever had (range, 0–9).

Personality-Related Variables. An abridged version of Spielberger’s⁶⁹ anger-out (Cronbach $\alpha = 0.76$) and anger-in (Cronbach $\alpha = 0.71$) expression scales, scales used to assess the mean of frequency ratings (1—almost never to 4—almost always) of how respondents typically react or behave when they are angry or mad (anger-in: keep things in; withdraw from people; gets irritated more than people are aware and gets angrier more than willing to admit; anger-out: argue with others; strike out at whatever infuriates me; say nasty things; and lose temper). The general hostility variable, based on a modified five-item version the Cook–Medley cynical hostility scale (Cronbach $\alpha = 0.74$),⁷⁰ used in this study is the mean of respondent’s agreement (1—disagree strongly to 4—agree strongly) with the following statements: (1) most people inwardly dislike putting themselves out to help other people, (2) most people will use somewhat unfair means to gain profit or an advantage rather than lose it, (3) no one cares much what happens to you, (4) I think most people would lie in order to get ahead, and (5) I commonly wonder what hidden reasons another person may have for doing something nice for me. The hopelessness scale (Cronbach $\alpha = 0.83$), consists of four questions: two from Everson’s⁷¹ hopelessness scale and two from Beck’s Hopelessness scale.⁷² Collectively, the scale assessed the respondents mean level of agreement (1—disagree strongly to 4—agree strongly) of negative expectancies about themselves and the future using the following statements: Everson—(1) impossible to reach goals strived for and (2) future seems hopeless with no change for the better; Beck—(3) no expectation of getting what they want; and (4) apprehension to try to achieve goals because of fear of failure. Anxiety was assessed with mean scores

of five questions taken from the Hopkins symptom checklist,⁷³ which assessed the respondent's mean frequency (1—never to 4—most of the time) of feeling anxious (nervous; hands trembling, fearful of dying; and faint) during the past week at the time of the interview (Cronbach $\alpha=0.79$). Self-esteem was assessed with an abridged four-item version of the Rosenberg Self-Esteem scale (Cronbach $\alpha=0.71$),⁷⁴ a scale of the mean of respondent's agreement (1—disagree strongly to 4—agree strongly) with statements about the respondent's positive attitude towards themselves, satisfaction with themselves, feelings of usefulness and overall goodness. It should be noted that the full versions of the scales noted above were used during the initial pretesting phase of the data collection process. However, in an effort to reduce overall response burden, the principal investigators of CCAHS developed an a priori criterion of keeping the minimal number of individual scale items that would result in a Cronbach $\alpha>0.70$ in the pretest sample ($n=200$).

Sociodemographic Covariates. The sociodemographic covariates included in the analyses were age, gender, nativity (US vs. foreign born), employment status (employed vs. not currently employed), education (years), marital status (married vs. not currently married), and income ($\leq \$10,000$, $\$10,000-\$19,999$, $\$20,000-\$34,999$, $\geq \$35,000$, and missing).

Analysis

All analyses were weighted to account for the different rates of selection in the CCAHS, as well as household size, differential coverage, and nonresponse across each of the neighborhood clusters. The complex survey feature of STATA (v12.1, Stata Corp., 2011) was used to ensure correct standard errors were calculated. The weighted distribution of all of the covariates used was first examined (Table 1). We then examined the first-order correlation between discrimination and the personality-related traits (Table 2). Bivariate analyses between psychotherapeutic drug misuse and illicit drug misuse and the two discrimination measures were also conducted (Table 3). Negative binomial regression analyses (NBREG) were conducted to examine the relationship between the two discrimination variables separately and together and the count variable of the psychotherapeutic and illicit drugs misused, net of the individual-level characteristics (Table 4). The 95 % confidence interval for the alpha value in the results from the NBREG suggested that overdispersion was present, meaning the mean and variance of the drug misuse count were not equal— a violation of key assumption necessary for using Poisson regression. In addition to the NBREG analyses, multivariable logistic regression predicting the probability of misusing any psychotherapeutic drugs and using any illicit drugs was conducted (Table 5). Informed by previous investigations, multiplicative interaction terms between the discrimination variables and race/ethnicity were explored in the multivariable analyses; however, because none were significant, the multivariable analyses included race/ethnicity as a covariate. A series of analyses were performed with the covariates added in an iterative manner; however, only the final models were presented.

We used the imputed dataset created by the CCAHS study investigators. The missing cases were imputed using an iterative imputation method that imputes multiple variables by using chained equations, a sequence of univariate imputation methods with fully conditional specification of prediction equations.⁷⁵ The final sample postimputation for this investigation consisted of 3,101 respondents.

TABLE 1 Selected characteristics of participants in the Chicago Community Adult Health Study, 2001 (N=3,101)

	Mean/% (SE)
Misused drugs (yes) ^a (%)	17.15
Mean drug use, overall ^b	0.25 (0.02)
Mean drug use, among users ^c	1.48 (0.06)
Everyday discrimination percentile (%)	
0–25th percentile	32.24
25–100th percentile	67.76
Mean lifetime major discrimination events (SE)	0.67 (0.02)
Mean stressful life events (SE)	2.36 (0.04)
Major depression (%)	10.56
Mean no. of chronic health conditions (SE)	1.13 (0.04)
Mean anger-in expression (SE)	2.11 (0.02)
Mean anger-out expression (SE)	1.62 (0.01)
Mean cynical hostility (SE)	2.52 (0.02)
Mean hopelessness (SE)	1.75 (0.02)
Mean anxiety (SE)	1.55 (0.01)
Mean self-esteem	3.40 (0.01)
Mean age [years (SE)]	42.48 (0.41)
Male (%)	47.25
Married (%)	41.85
Mean educational level [years (SE)]	12.97 (0.13)
Household income (%)	
<\$10,000	11.54
\$10,000–\$19,999	14.29
\$20,000–\$34,999	16.20
≥\$35,000	39.40
Missing	18.56
Employed (%)	64.29
Non-Hispanic white (%)	38.43
US born (%)	73.12

SE standard error, US United States

^aPercent report misusing any of the drugs

^bMean drugs misused among full analytic sample

^cMean drugs misused among users

RESULTS

Table 1 presents the distribution of the interpersonal discrimination variables and other individual-level covariates. Approximately 17 % of the respondents reported using at least one illicit drugs and/or misusing one or more psychotherapeutic drugs in the past 12 months. The mean number of drugs misused was 1.5, among drug users in the sample. Approximately one third (32 %) of the sample reported experiencing relatively low levels (0–25th percentile) of everyday interpersonal discrimination, while the overall mean of major interpersonal discrimination events was 0.7 events. The sample had slightly more (53 %) female than male respondents; respondents were on average 47 years old, had approximately 13 years of education, and relatively low income with approximately 25 % reported living in a household with less than \$20,000 annual income.

TABLE 2 Means, standard deviations (SD), and Pearson correlations of the personality-related measures

	1	2	3	4	5	6	7	8	9
1. Everyday discrimination	—								
2. Major discrimination	−0.418***	—							
3. Chronic stressor	−0.364***	−0.428***	—						
4. Major depression	−0.160***	−0.104***	−0.222***	—					
5. Anger repression	−0.170***	−0.119***	−0.157***	−0.190***	—				
6. Anger expression	−0.202***	−0.077***	−0.112***	−0.122***	−0.231***	—			
7. Hostility	−0.208***	−0.175***	−0.106***	−0.102***	−0.176***	−0.131***	—		
8. Hopelessness	−0.012	−0.004	−0.005	−0.125***	−0.099***	−0.119***	−0.379***	—	
9. Anxiety	−0.257***	−0.120***	−0.182***	−0.259***	−0.223***	−0.193***	−0.262***	−0.325***	—
10. Esteem	−0.143***	−0.046*	−0.106***	−0.240***	−0.222***	−0.216***	−0.211***	−0.491***	−0.369***

* $p<0.05$; ** $p<0.01$; *** $p<0.001$, two tailed

TABLE 3 Unadjusted bivariate analyses of measures of everyday and major discrimination by type of substance used: Chicago Community Adult Health Study, 2001

	Never used		Used in past 12 months		Odds ratio	<i>p</i> value ^a
	Number	Mean (SE)/%	Number	Mean (SE)/%		
Analgesics						
Everyday unfair treatment (%)						
0–25th percentile	947	97.12	32	2.88	2.53	<0.001
25–100th percentile	1,991	92.98	131	7.02		
Mean major unfair events	2,939	0.65 (0.02)	163	1.01 (0.11)		
Sedative						
Everyday unfair treatment (%)						
0–25th percentile	969	99.00	10	1.00	3.21	<0.05
25–100th percentile	2,054	96.86	68	3.14		
Mean major unfair events	3,024	0.66 (0.02)	78	1.17 (0.15)		
Tranquilizers						
Everyday unfair treatment (%)						
0–25th percentile	971	99.09	8	0.91	2.59	NS
25–100th percentile	2,076	97.68	46	2.32		
Mean major unfair events	3,048	0.66 (0.24)	54	1.16 (0.18)		
Amphetamines						
Everyday unfair treatment (%)						
0–25th percentile	976	99.46	3	0.54	2.25	NS
25–100th percentile	2,097	98.78	25	1.22		
Mean major unfair events	3,074	0.67 (0.02)	28	1.07 (0.17)		
Marijuana						
Everyday unfair treatment (%)						
0–25th percentile	940	96.45	39	3.55	4.39	< 0.001
25–100th percentile	1,855	86.09	267	13.91		
Mean major unfair events	2,796	0.641 (0.02)	306	1.18 (0.07)		
Cocaine						
Everyday unfair treatment (%)						
0–25th percentile	971	99.04	8	0.96	2.06	NS
25–100th percentile	2,078	98.04	44	1.96		
Mean major unfair events	3,050	0.66 (0.02)	52	1.37 (0.15)		
Heroin						
Everyday unfair treatment (%)						
0–25th percentile	978	99.92	1	0.08	8.23	<0.05
25–100th percentile	2,105	99.35	17	0.65		
Mean major unfair events	3,084	0.67 (0.02)	18	1.94 (0.36)		
Inhalants						
Everyday unfair treatment (%)						
0–25th percentile	976	99.85	3	0.15	1.66	<0.01
25–100th percentile	2,103	99.01	19	0.99		

TABLE 3 Continued

	Never used		Used in past 12 months		Odds ratio	<i>p</i> value ^a
	Number	Mean (SE)/%	Number	Mean (SE)/%		
Mean major unfair events	3,080	0.67 (0.02)	22	1.40 (0.39)		NS
LSD						
Everyday unfair treatment (%)						
0–25th percentile	977	99.59	2	0.41		
25–100th percentile	2,101	98.68	21	1.32	3.23	NS
Mean major unfair events	3,079	0.67 (0.02)	23	1.15 (0.19)		<0.01

SE standard error, NS not statistically significant (*p*>0.05)

^a*p* values derived from logistic regression (everyday discrimination binary variable) and the Mann–Whitney two-sample statistic (major discrimination) analyses comparing the usage categories (ever used vs. never used) by each drug variable of interest

Table 2 shows the correlation among the interpersonal discrimination, depressive symptoms and personality-related variables. Both interpersonal discrimination variables were positively correlated with the personality-related variables, with the exception self-esteem, which was negatively correlated with the interpersonal discrimination variables. Interestingly, hopelessness was not statistically correlated with either of the interpersonal discrimination variables or the chronic stressor variable.

Results from bivariate analyses between the interpersonal discrimination and the drug use/misuse variables are presented in Table 3. The three most common drugs misused in the past 12 months were marijuana (10.6 %), analgesics (5.7 %), and

TABLE 4 Results from negative binomial regression predicting the total number of illicit drugs used and psychotherapeutic drugs misused in the Chicago Community Adult Health Study, 2001

	Unstandardized coefficient <i>B</i> (95 % CI)	
Model 1		
Everyday discrimination	1.59*	(1.07–2.36)
Model 2		
Major discrimination	1.30***	(1.15–1.46)
Model 3		
Everyday discrimination	1.49*	(1.00–2.22)
Major discrimination	1.27***	(1.12–1.44)

Values were derived from multivariate tests of associations between measures of everyday and major discrimination and the number of the different illicit and psychotherapeutic drugs used via negative binomial regression. All analyses controlled for age, gender, racial/ethnic status, employment status, educational level, nativity, marital status, lifetime major depression, anger-in/out expression, cynical hostility, hopelessness, anxiety, self-esteem, and chronic health conditions. Everyday discrimination (model 1) and major discrimination (model 2) were modeled separately and together (model 3). Dependent variable was count of the number of illicit and psychotherapeutic drugs used ranging 0–7

p*≤0.05; *p*≤0.01; ****p*≤0.001

TABLE 5 Predicted probabilities from multinomial logistic regression predicting illicit use and psychotherapeutic drug misuse in the Chicago Community Adult Health Study, 2001: odds ratio (ORs) and 95 % confidence intervals (95 % CI)

	Psychotherapeutic drugs only ^a (n=167)		Illicit drugs only ^b (n=264)		Psychotherapeutic and illicit drugs (n=79)	
Model 1						
Everyday discrimination	1.63	(0.90–2.95)	2.75***	(1.56–4.85)	1.42	(0.63–3.20)
Model 2						
Major discrimination	1.24	(0.97–1.58)	1.57***	(1.32–1.87)	1.38	(0.99–1.92)
Model 3						
Everyday discrimination	1.54	(0.84–2.81)	2.43**	(1.36–4.36)	1.30	(0.56–3.03)
Major discrimination	1.20	(0.94–1.53)	1.50***	(1.26–1.78)	1.35	(0.95–1.91)

Values were derived from multivariate multinomial logistic regression between measures of everyday and major discrimination and the probability of using only prescription drugs, only illicit drugs only and both. All analyses controlled for age, gender, racial/ethnic status, employment status, educational level, nativity, marital status, lifetime major depression, anger-in/out expression, cynical hostility, hopelessness, anxiety, self-esteem, and chronic health conditions. Everyday discrimination (model 1) and major discrimination (model 2) were modeled separately and together (model 3)

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

^aReference group: nonusers

^bPrescription drugs include analgesics, sedatives, tranquilizers and amphetamines. Illicit drugs include marijuana, cocaine, LSD, heroin and inhalants

sedatives (2.5 %). Except for inhalants, respondents who reported misusing any of the eight other drugs on average experienced more major interpersonal discrimination than respondents who reported not misusing any drugs ($p < 0.05$). Respondents who experienced moderate to high levels of major interpersonal discrimination (>25th percentile) were more likely to report misusing analgesics, sedative, marijuana, heroin, and inhalants ($p < 0.05$).

Table 4 presents the unstandardized coefficients from the multivariable negative binomial regression analyses, with everyday (model 1) and major (model 2) interpersonal discrimination modeled separately and simultaneously (model 3), controlling for all of the covariates included in Table 1. Both everyday and major interpersonal discrimination were positively associated with drug misuse. Respondents who experienced moderate-to-high levels (>25th percentile) of everyday interpersonal discrimination misused on average 1.6 different types of drugs more than respondents that experienced relatively low levels of everyday interpersonal discrimination (0–25th percentile) ($p < 0.05$). Although slightly attenuated, this relationship remained significant after controlling for experiences of major interpersonal discrimination (1.49, $p < 0.05$). Similarly, experiencing one major interpersonal discrimination event was associated with respondents misusing 1.3 different types of drugs more regardless of experiences of everyday interpersonal discrimination ($p < 0.001$).

Table 5 depicts results from multinomial logistic regression analyses exploring the relationship between the misuse of only psychotherapeutic drugs, only illicit drugs, or both drug types with no drug misuse as the reference group. The coefficients were positive for all of the three drug-use patterns; however, only the illicit drug category was statistically significant. Interestingly, both interpersonal discrimination measures were predictive of the misuse of only illicit drugs when compared to no drug misuse.

The odds ratio of using only illicit drugs among respondents who experienced moderate-to-high levels of everyday interpersonal discrimination compared to those that experienced relatively low levels of everyday interpersonal discrimination was 2.4 ($p < 0.01$). Similarly, respondents who experienced major interpersonal discrimination were also more likely (OR, 1.5; $p < 0.001$) to report misusing only illicit drugs, controlling for everyday interpersonal discrimination. Experiences of major interpersonal discrimination were marginally significant ($p < 0.10$) with misusing both types of drugs when compared to no drug misuse (data not shown).

CONCLUSION

Lifetime major and everyday interpersonal discrimination were positively associated with different patterns of illicit and psychotherapeutic drug use and misuse. Although not the first to demonstrate that perceived interpersonal discrimination may be positively related to illicit drug use and psychotherapeutic drug misuse,^{14,27,28} the results from this study are noteworthy for several reasons. We examined lifetime experiences of major and everyday interpersonal discrimination and the misuse of drugs in the past 12 months, controlling for potential effects of anger expression/repression, hostility, hopelessness, self-esteem, and anxiety. This is of particular importance because as a confounder the personality-related trait would, in theory, increase the exposure and/or perception to interpersonal discrimination.²⁹ If the trait of interest was indeed a confounder, the observed relationship between interpersonal discrimination and the outcome of interest may be biased or altogether spurious.

Secondly, given that experiences of everyday and major interpersonal discrimination co-occur and can potentially exacerbate their effects, this study contributes to the literature by empirically examining everyday and major experiences of interpersonal discrimination simultaneously. In this study, both experiences of interpersonal discrimination positively predicted drug use in the co-occurrence models. Interestingly, the relationship between drug misuse and either interpersonal discrimination variables were modestly attenuated in the full model, but neither became statistically insignificant ($p > 0.05$), suggesting that both major and everyday interpersonal discrimination are each independently predictive of drug misuse, regardless of the experiences of the other. An additional strength, was the heterogeneity with respect to race/ethnicity and age of the sample. As noted, previous studies were mainly of blacks or relatively young adults. Combined with the existing studies, the results of this study suggest that lifetime interpersonal discrimination is a risk factor for illicit/psychotherapeutic drug misuse.

Interestingly, both interpersonal discrimination measures were only statistically significant for the illicit substances but not the psychotherapeutic drugs. Although the data would not allow us to directly assess the rationale into this particular finding, one potential explanation may be related to access. Although it is suggested in popular media that almost any prescribed drug is readily available on the informal market (can be obtained without a prescription from someone not legally allowed to sell the drug), drugs such as marijuana may be more accessible and less costly to more individuals. This particular rationale is somewhat supported given that the p value of the everyday interpersonal discrimination coefficients increased to 0.07 when marijuana was excluded from the analyses. The p value for the major interpersonal discrimination variables, however, remained virtually unchanged ($p < 0.01$) (data not shown). Although this particular observation is also supported by

Borrell et al.¹⁴ who suggest that (racial) interpersonal discrimination significantly predicted marijuana and cocaine use among African Americans, future studies should attempt to better address this particular question.

While extending our current understanding of the link between interpersonal discrimination and substance use, this study is not without limitations. Although one of the advantages of this study is the inclusion of lifetime experiences of interpersonal discrimination and past 12-month drug misuse, causality remains a concern. Even though the likelihood that drug use may lead to reports of interpersonal discrimination is very small, this remains a possibility. While a few studies of interpersonal discrimination and health related factors are beginning to address causality,^{76,77} this remains an issue in this study. The inability to discern the relationship between interpersonal discrimination and the adoption, relapse or continued use of drugs is a second limitation of this study. Due to the cross-sectional nature of the data, these types of relationships cannot be discerned. A third limitation is the use of self-report data, which may suffer from recall and social desirability bias. However, because individuals tend to under-report drug use, our estimates may actually be biased downwards. Although the number of longitudinal socio-epidemiological studies is increasing, causality will continue to be a concern.

Another limitation related to the issue of causality is the role of the personality-related traits we included in the study. Although we hypothesized that the personality-related traits (i.e., anger expression/repression, hostility, hopelessness, self-esteem, and anxiety) are confounders, it is recognized that they may be mediators (e.g., along the pathway between experiences of interpersonal discrimination and drug use) or potentially both in a very complex process. Given that mediation and confounding effects are estimated with the same statistical methods, the relationships of interest can only be distinguished on conceptual/theoretical grounds.²⁸ Despite the fact that some studies suggest that interpersonal discrimination is antecedent to various personality-related traits (implying mediation and not confounding), most of these studies use cross-sectional data, exposing them to the same limitation. Although future studies utilizing longitudinal data are warranted, the complex nature of the perceptions of psychosocial stress and the sequelae of health outcomes associated with stress will limit our understanding for some time to come. Because some personality traits, both positive and negative, may change over time, future research in this area must pay special attention to the methodological issues related to cycling or cross-lagged effects (e.g., perceived interpersonal discrimination influencing hostility, which in turn influences perceived interpersonal discrimination which furthers influences hostility, and so on).

Our inability to include measures that may serve as proxies to institutional discrimination is also another limitation. Although institutional discrimination is distinct from interpersonal discrimination, the measure of interest in this study, it is feasibly related to drug misuse. As previous studies have suggested, some groups of racial/ethnic minorities tend to live in communities with higher levels of outdoor advertising for alcoholic beverages^{78–80} and are less likely to access substance use treatment services,⁸¹ factors that are related to the initiation and/or the continued use of misuse of drugs and alcohol.

Another limitation of this study is the inability to examine additional coping styles beyond those addressed in this study (e.g., escapist behavior) that may further elucidate the relationship between interpersonal discrimination and behavioral coping responses, such as drug use. Although this study relied on the self-medication

hypothesis, which suggests that drug use may be a coping behavior among psychologically distressed individuals, no measures of coping styles were available in the dataset. Interestingly, our findings were robust given that we included a variety of personality related variables as covariates. Nonetheless, to advance this particular area of interest, future studies must include measures of coping styles.

Despite its limitations, the results of this study are noteworthy, in that it is the first known study to examine experiences of *lifetime* major and everyday discrimination and *past 12 month* illicit/psychotherapeutic drug misuse while controlling for a variety of potentially confounding personality-related characteristics in a probability-based, multiracial/ethnic sample of community dwelling adults.

These results have several implications for behavioral health clinicians, public health practitioners, and researchers. Similar to other studies, these results suggest experiences of discrimination may merit attention, like other traditional stressors, in the clinical substance use treatment settings. Clinical providers should be aware of and consider addressing the potential harmful effects of perceived interpersonal discrimination as a stressor and a risk factor for drug use, in all patients not only among racial/ethnic minority patients.

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