Peer Victimization and Unhealthy Weight Control Behaviors—the Role of Intersecting Identities among New York City Youth

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Abstract We investigated the intersection of sexual minority, gender, and Hispanic identities, and their interaction with peer victimization in predicting unhealthy weight control behaviors (UWCB) among New York City (NYC) youths. Using logistic regression with data from the 2011 NYC Youth Risk Behavior Survey, we examined the association of sexual identity, gender, ethnicity, and peer victimization (dating violence, bullying at school, electronic bullying) in predicting UWCB. Sexual minority youths, dating violence victims, and youths bullied at school had 1.97, 3.32, and

1.74 times higher odds of UWCB than their counterparts, respectively ($P < 0.001$). The three-way interaction terms between (i) dating violence, gender, and sexual identity and (ii) electronic bullying, gender, and sexual identity were statistically significant. The effect of dating violence on unhealthy weight control practices was strongest among sexual minority males (OR = 4.9), and the effect of electronic bullying on unhealthy weight control practices was strongest among non-sexual minority males (OR = 2.9). Sexual minority and gender identities interact with peer victimization in predicting unhealthy weight control practices among NYC youths. To limit the prevalence and effect of dating violence and electronic bullying among youths, interventions should consider that an individual's experiences are based on multiple identities that can be linked to more than one ground of discrimination.

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Introduction

Unhealthy weight control behaviors (UWCB), such as unhealthy dieting, laxative use, and self-induced vomiting, impact long-term morbidity and mortality risk [1–5]. Among adolescents in the USA, 57% of females and 33% of males engage in UWCB [6, 7], with 25 and 11%, respectively, report symptoms severe enough to warrant clinical evaluation [1].

Peer victimization not only disrupts self-control but also is a significant risk factor for weight dissatisfaction and UWCB [8–12]. The New York City Youth Risk Behavior Survey (NYC YRBS) 2009 revealed that 12% of high school adolescents reported being bullied [13] and 16% reported dating violence [14], the latter of which is higher than the national average (9.6%) [15].

Youth who have multiple minority identities (in terms of sexual orientation, gender, ethnicity) may be exposed to multiple stressors, including peer victimization, that create an additive health disadvantage compared to those with no or fewer minority identities [13, 16–18], thereby increasing their risk for UWCB. Studies investigating this hypothesis have demonstrated conflicting results [19]. While homosexual males are more likely to report engaging in UWCB compared to their heterosexual counterparts, homosexual females are almost equally likely to engage in UWCB as heterosexual females [20]. Furthermore, while studies show higher prevalence of UWCB among white females than their non-white counterparts [1], more African American, American Indian, and Asian/Pacific Islander males report UWCB than white males [1]. No significant interactions were found between sexual orientation and ethnicity in predicting UWCB [21].

Studies have also identified some differences in peer victimization by gender, ethnicity, and sexual orientation. Numerous studies suggest racial/ethnic minority and lesbian, gay, and bisexual (LGB) youth are at significantly greater risk for peer victimization than their respective counterparts [13, 22–26]. US trends indicate that females are more likely to report bullying than males; however, among NYC youth, no gender differences exist for bullying [22, 27]. Nationally, black males are more likely to be physical dating violence victims than white males and black, white, and Hispanic females [14].

Individuals with multiple minority identities may differentially experience psychosocial insults, such as peer victimization, and thereby have a higher risk of mental health-related outcomes [13, 17, 18, 21, 23, 28, 29]. One study found a complex four-way interaction between Hispanic ethnicity, gender, sexual identity, and bullying in the association between bullying and suicide [13]. However, there are no studies examining the interaction between minority identities and peer victimization in predicting UWCB. Consequently, this study aims to examine the role of intersecting identities—sexual orientation, gender, and Hispanic ethnicity—on the association between peer victimization and UWCB among NYC youth.

Methods

Data were taken from the 2011 NYC YRBS, a biennial cross-sectional survey conducted by the NYC Department of Health and Mental Hygiene in collaboration with the NYC Department of Education and Centers for Disease Control and Prevention to assess health risk behaviors among NYC youths [30].

A two-stage cluster sample design, as described elsewhere [30], was used to produce a representative sample of students in grades 9 through 12. Students in juvenile detention, absent on the day of survey administration, and in special education or English as a second language class were excluded. The 2011 survey includes data from 11,887 respondents. The school response rate was 93%, and the student response rate was 79%, yielding an overall response rate of 73% [30].

Measures

Unhealthy Weight Control Behavior Outcome

UWCB was based on a “yes” response to the following question: “During the past 30 days, did you vomit or take laxatives to lose weight or to keep from gaining weight?”

Peer Victimization Exposures

Exposures to dating violence, school bullying, and electronic bullying (e-bullying) “during the past 12 months” were based on a “yes” response to the following questions, respectively: “did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?”; “have you ever been bullied on school property?”; “have you ever been electronically bullied? (Include being bullied through e-mail, chat rooms, instant messaging, Web sites, or texting.)”.

Potential Effect Modifiers

Sexual orientation, Hispanic ethnicity, and gender were based on self-report [30]. Sexual orientation was based on participants’ response to: “Which of the following best describes you?” Response options were collapsed into an indicator for having a sexual minority identity (“gay or lesbian,” “bisexual,” or “not sure”) versus not (“heterosexual”) [13]. Hispanic ethnicity was based on a “yes” response to: “Are you Hispanic or Latino?” We considered Hispanic ethnicity rather than indicators for

combinations of ethnicity and race because (1) a complex relationship with gender, sexual identity, and bullying in predicting suicide attempt exists among Hispanics [13, 30], (2) NYC YRBS oversampled Hispanics giving larger numbers needed for assessing effect modification, and (3) Hispanics are the largest US minority group thus for whom further research is necessary to design targeted interventions [13].

Statistical Analysis

The population was described overall and by unhealthy weight control behaviors. The chi-square statistic was used to assess the statistical significance of differences in the distribution of each variable with UWCB. Logistic regression was used to determine the unadjusted association of each independent variable with UWCB. The first adjusted logistic regression model explored the odds of UWCB among those who experienced dating violence, adjusting for gender, sexuality, and ethnicity. This adjusted model was then run separately for the other two forms of peer victimization. We also ran a comprehensive logistic regression model that included all three forms of peer victimization and all three hypothesized effect modifiers in order to look at independent associations.

Effect Modification and Final Model Selection

We explored whether intersecting identities result in differential association between peer victimization and UWCB using a method similar to LeVasseur et al. [13]. In assessing interaction with peer victimization, we investigated each form (dating violence, bullying at school, and e-bullying) in separate regression models. We examined for interaction among dating violence, sexual minority status, Hispanic ethnicity, and gender in predicting UWCB in a model with possible two-, three-, and four-way product terms. This saturated model was then compared with the following models: (1) main effects model, (2) the model with all two-way interactions, (3) and the model with all two- and three-way interactions [13]. Models were compared using Akaike's information criterion (AIC), which is a measure of goodness of fit. The model with the lowest AIC value was chosen as the best model. These analyses were repeated replacing each form of peer victimization as the primary independent variable. When assessing interaction, the model was not adjusted for the other forms as little difference exists in the association of each form with UWCB in the models including

all three forms compared to individual models with only one form. Thus, the different forms of peer victimization did not confound each other.

In the presence of significant interaction, final results were stratified on the effect modifiers and stratified odds ratios were reported. Stratification was achieved using a domain statement as per guidelines set by the CDC for analysis of YRBS [31].

All significance tests, including those for interaction, were two-tailed and set at a two-sided value of $P < 0.05$ and adjusted for the complex sampling method and weighted to the population. Statistical analyses were conducted using SAS 9.3 (SAS Institute, Cary, NC).

Results

Description of the Population

Sexual minority youths represented 9.4% of the study population; 48.2% were female; and 34.4% were Hispanic. Nearly 10% of youth reported having experienced dating violence, 12.0% reported having been bullied at school, and over 10% reported being e-bullied in the past 12 months. Five percent reported taking laxatives or vomiting to lose weight or to keep from gaining weight in the past 30 days. Those who had experienced dating violence were more likely to report UWCB (15.2 versus 4.5%, $P < .001$). Additionally, those bullied at school and those e-bullied were more likely to report UWCB in the past 12 months (11.4 versus 4.6%, $P < .001$, and 2.4 versus 4.7%, $P < 0.001$, respectively). Sexual minority and Hispanic youths were more likely to report UWCB in the past month (11.0 versus 4.6% and 6.2 versus 5.0%, respectively, $P < .001$), but there was no significant difference in reported UWCB by gender (Table 1).

Logistic Regression Models for the Main Effects

In the unadjusted logistic regression models, NYC youths who experienced dating violence had 4.0 times higher odds of UWCB than those who did not experience dating violence ($P < .001$). Similarly, NYC youths who were bullied at school and those who were e-bullied had higher odds of UWCB (OR = 2.3 and 2.5, respectively, $P = 0.001$) than their respective counterparts. Sexual minority youths had 2.3 times higher odds of UWCB than non-sexual minority youths ($P < .001$). Hispanic youths had 1.4 times higher odds of UWCB

Table 1 Descriptive statistics of New York City Youth overall and separately by experiences of unhealthy weight control behaviors: 2011 New York City Youth risk behavior survey

Characteristic	Total sample, <i>N</i> (%)	UWCB, <i>N</i> (%)	No UWCB, <i>N</i> (%)	χ^2 <i>P</i> value
Total	10,185 (100.0%)	567 (5.0%)	9618 (95.0%)	<0.001
Dating violence in the past 12 months				
Yes	966 (9.7%)	147 (15.2%)	819 (84.8%)	<0.001
No	9087 (90.3%)	407 (4.5%)	8680 (95.5%)	
Bullied on school property in the past 12 months				
Yes	1137 (12.0%)	130 (11.4%)	1007 (88.6%)	<0.001
No	8893 (88.0%)	411 (4.6%)	8482 (95.4%)	
Bullied electronically in the past 12 months				
Yes	1082 (10.7%)	134 (12.4%)	948 (87.6%)	<0.001
No	9044 (89.3%)	421 (4.7%)	8623 (95.3%)	
Sexual minority				
Yes	1318 (13.0%)	145 (11.0%)	875 (89.0%)	<0.001
No	8712 (87.0%)	401 (4.6%)	8311 (95.4%)	
Gender				
Male	4535 (47.5%)	233 (5.1%)	4302 (94.9%)	0.216
Female	5622 (52.5%)	326 (5.8%)	5296 (94.2%)	
Ethnicity				
Hispanic	4487 (34.4%)	276 (6.1%)	4211 (93.9%)	0.015
Non-Hispanic	5518 (65.6%)	274 (5.0%)	5244 (95.0%)	

UWCB unhealthy weight control behavior

than non-Hispanic youths ($P = 0.021$). There was no significant difference in UWCB by gender (Table 2).

In the multivariate model including all three forms of bullying, those who experienced dating violence had 3.3 times higher odds of UWCB than those who did not experience dating violence ($P < 0.001$), and those who

were bullied at school had 1.6 times higher odds of UWCB than those who were not ($P < 0.001$) (Table 2). Those who were e-bullied also had higher odds of UWCB but the association varied depending on the adjustment for other forms of peer victimization: in the gender, sexual minority, ethnicity-adjusted model that

Table 2 Crude and adjusted logistic regression models looking at predictors of disordered eating: 2011 New York City Youth risk behavior survey

	Univariate (crude) models				Adjusted model 1 ^a ($n = 9715$)		
	Sample size for model	Odds ratio	95% CI	<i>P</i> value	Odds ratio	95% CI	<i>P</i> value
Dating violence in the past 12 months	10,053	4.1	(3.4, 5.0)	<0.001	3.3	(2.5, 4.2)	<0.001
Bullied on school property in the past 12 months	10,030	2.3	(1.8, 3.1)	<0.001	1.6	(1.1, 2.3)	0.006
Electronically bullied in the past 12 months	10,126	2.5	(1.9, 3.3)	<0.001	1.3	(0.9, 2.0)	0.235
Sexual minority	10,030	2.9	(2.1, 4.1)	<0.001	2.2	(1.5, 3.3)	<0.001
Female	10,157	1.2	(0.9, 1.5)	0.209	1.1	(0.1, 1.4)	0.669
Hispanic	10,005	1.4	(1.1, 1.8)	0.021	1.3	(1.0, 1.7)	0.046

^a Model 1: adjusted for sexual minority status, female, Hispanic, school bullying, dating violence and electronic bullying. (Results regarding the association of the three forms of peer victimization in the model with all three included were similar to the results when each form of peer victimization was examined in a separate model. Therefore, only the adjusted model with all forms is presented.)

excluded both the other forms of peer victimization, those who were e-bullied had 2.1 times the odds of UWCB than those who were not ($P < 0.001$) (data not shown). However, this association was no longer significant after adjusting for other forms of peer victimization (OR = 1.3, $P = 0.235$) (Table 2).

Sexual minority youths had 2.0 times higher odds of reported UWCB compared to non-sexual minority youths ($P < 0.001$); Hispanic youths had 1.3 times the odds of reporting UWCB than non-Hispanics, but the association was only of borderline significance ($P = 0.060$), and there was no significant gender difference in the odds for UWCB in the adjusted model (OR = 1.2, $P = 0.581$) (Table 2).

Effect Modification

The model with the lowest AIC was the model with the three-way interaction between dating violence, gender, and sexual minority identity, without Hispanic ethnicity ($P = 0.034$). After stratifying on gender and sexual minority identity, the association between dating violence and UWCB was lowest among female sexual minority youths (OR = 2.0, $P = 0.020$), and much stronger among male sexual minority youths (OR = 4.9, $P < 0.001$), male non-sexual minority youths (OR = 4.5, $P < 0.001$), and female non-sexual minority youths (OR = 4.1, $P < 0.001$) (Table 3).

The two-, three-, and four-way interaction terms with school bullying, gender, sexual, and Hispanic ethnicity were not significant. However, in the relationship between e-bullying and UWCB, the saturated model with the three-way interaction between e-bullying, gender, and sexual minority identity, and without Hispanic ethnicity was also found to be the model with the lowest AIC ($P = 0.037$). After stratifying on gender and sexual minority identity, the association between e-bullying and UWCB was lowest among female non-sexual minority youths (OR = 1.5, $P = 0.125$) and stronger among male sexual minority

youths (OR = 1.9, $P = 0.162$), female sexual minority youths (OR = 2.4, $P = 0.011$), and male non-sexual minority youths (OR = 2.9, $P < 0.001$) (Table 4).

Discussion

We believe this study to be one of the first to examine how gender, sexual minority, and ethnic identities may modify the relationship between peer victimization and unhealthy weight control behaviors. We found that (i) sexual minorities and Hispanics were more likely to report UWCB and that (ii) controlling for gender, ethnicity, and sexual identity, those who reported dating violence, school bullying, and/or e-bullying were more likely to report UWCB, although the association with e-bullying was no longer significant after adjusting for the two other forms of peer victimization. This suggests significant association between the stress associated with having experienced various forms of peer victimization and UWCB among youths.

We found no main effect association between gender and UWCB. This may be because males are less likely to report and seek help for dating violence due to stigma [32], but the self-administered, anonymous nature of this survey may have made reporting more comfortable thereby resulting in no difference.

We found a complex three-way interaction between gender, sexual identity, and peer victimization (dating violence and e-bullying). The form of peer victimization affects the direction of the effect modification by gender and sexual identity on the associations. The effect of dating violence on UWCB was much weaker among sexual minority females compared to all other groups (heterosexual males and females, and sexual minority males). In contrast, the effect of e-bullying on UWCB was weaker among heterosexual female and sexual minority male youths compared to sexual minority female and heterosexual male youths.

Table 3 Logistic regression models for the association between dating violence and unhealthy weight control behavior, stratified on sexual minority identity and gender: 2011 New York City Youth risk behavior survey

Variable	No.	Sexual minority youth			No.	Non-sexual minority youth		
		Odds ratio	95% CI	<i>P</i> value		Odds ratio	95% CI	<i>P</i> value
Female	789	2.0	(1.3, 3.1)	0.020	4925	4.1	(2.7, 6.3)	<0.001
Male	292	4.9	(2.4, 10.1)	<0.001	4422	4.5	(2.7, 7.4)	<0.001

Table 4 Logistic regression models for the association between electronic bullying and unhealthy weight control behavior, stratified on sexual minority identity and gender: 2011 New York City Youth risk behavior survey

Variable	No.	Sexual minority youth			No.	Non-sexual minority youth		
		Odds ratio	95% CI	P value		Odds ratio	95% CI	P value
Female	1044	2.4	(1.3, 4.8)	0.011	4670	1.5	(0.9, 2.5)	0.125
Male	408	1.9	(0.8, 4.8)	0.162	4306	2.9	(1.8, 4.6)	<0.001

When examining effect modification, however, heterosexual and homosexual males were found to have stronger associations between dating violence and UWCB regardless of sexual identity compared to their female counterparts. This may be a consequence of male externalization of abuse—re-enacting trauma through self-abuse rather than seeking help [33, 34]. Moreover, past literature has shown that homosexual females are more likely to seek help for abuse [35]. This may explain why the effect of dating violence on UWCB is weakest among homosexual females.

The difference in findings between dating violence and e-bullying may be related to the topics of bullying (e.g., sexual orientation, appearance, etc.), which may determine which groups are more emotionally impacted. Youths who experience sexuality-based victimization have worse mental health outcomes than youths who experience non-sexuality-based peer victimization or no peer victimization at all, with females at lower risk of internalizing this form of peer victimization [13, 20].

Interestingly, in contrast to LeVasseur et al., who found a four-way interaction among gender, sexual identity, Hispanic ethnicity, and bullying on school property in predicting suicide attempt [13], we found no evidence of such an effect modification of the association between bullying on school property and UWCB. The bully's reason for victimizing an individual may explain this difference in findings: with the increasing acceptance of sexual minorities in the USA, this was a less common reason for school bullying in 2011 compared to 2009, when the data for the LeVasseur paper was collected. Additionally, different forms of peer victimization may interact differently with various identities in predicting different mental health-related outcomes.

This study has a number of limitations. First, cross-sectional studies prevent the determination of causality due to their inability to establish temporality. Second, the self-reported measures may be subject to measurement error, such as social desirability bias. Third, as different

models were assessed with the interactions, we may have increased the likelihood of type I error. Thus, replication in different or larger samples is needed. Furthermore, some of our associations when stratifying on gender and ethnicity had wide confidence intervals due to low statistical power in the stratified models. Fourth, our study did not include youths who were high school dropouts, incarcerated, or runaways, who could be at a higher risk of peer victimization and UWCB, nor were youths enrolled in private schools included [36]. In assessing the impact of peer victimization, other stressors such as experiences of family abuse, homophobia, sexism, and racism could not be examined because they were not captured in the NYC YRBS. We hope that these topics will be included in future surveys.

Unhealthy weight control behavior poses significant short- and long-term health implications. In the present study, the effect of dating violence was strongest among sexual minority males and the effect of electronic bullying was strongest among non-sexual minority males. To reduce peer victimization, the CDC recommends that schools develop integrated school, family, and community psychological, social, and health services [37]. As a component of this, coordinating interventions that address differences in how people with intersecting minority identities react to peer victimization and that incorporate a multilevel socio-ecological perspective are needed to reduce UWCB among at-risk youths.

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