**Introduction**

Student substance misuse is an ongoing problem in schools across the United States, and it is outside the training and expertise of most educators. Nonetheless, school staff are presented with situations in which students bring substances to campus or arrive under the influence of them. Despite the evidence that zero-tolerance policies do not improve school safety nor student behavior (American Psychological Association, 2008), the likely default response in contemporary schools to substance-related behavior occurs through their discipline systems. Although the national mindset is moving toward a more inclusive approach to behavioral health, this study seeks to determine to what extent school practices have shifted with it. Specifically, this study seeks to examine how use of out-of-school suspension (OSS) differs by substance possessed and student race/ethnicity.

**Research Questions**

1. To what extent does the substance a student possessed for their referral (Alcohol, Tobacco, or Drugs) predict whether or not they receive an out of school suspension for substance possession?

2. To what extent does student race predict whether or not a student receives an out of school suspension for substance possession?

3. To what extent is there an interaction between student race and substance in predicting out of school suspension for substance possession?

**Method**

**Sample**

The data sample for the project comes from the web-based School-Wide Information System (SWIS) for collecting and analyzing school discipline data in the form of office discipline referrals (ODRs; May et al., 2013) following a formal, written data request submitted by the first author. The sample of 2018-19 referrals included 30,773 students in grades 6-12 across 45 states. Schools in the 2018-19 dataset numbered 1,903 within 1,008 districts. The majority of students in the dataset were coded as White (52%). The next largest group was Latinx students (23%), followed by Black/African American (10%), students of more than one race (2%), Indigenous (2%), Pacific Islander (1%), and Asian (1%).

**Procedure**

Analysis was done using only the first referrals for substance possession for each student in the dataset to eliminate concerns about possible confounding of analyses related to decision-making with subsequent referrals. Prior to beginning this course, the following steps were taken to prepare the data set for analysis: (a) the dataset was restricted to contain only the 2018-19 school year, (b) variables were created including a dummy coded variable for use of suspension and expulsion for each referral and a dummy coded variable for type of substance possessed for each referral, (c) the dataset was pivoted the dataset wider by student so that referrals, in order of date of receipt, were nested with students, (e) the sample was further restricted to grades 6-12 and (f) the dataset was restricted only variables of interest. For analysis in R, the variables needed to be properly formatted as factors to use multilevel modeling. Missing data was handled by listwise deletion for instances where an individual student's race or ethnicity was not available (i.e., listed as Not Applicable, NA). The race or ethnicity identifier was drawn from the National Center on Educational Statistics approach for collecting and disseminating extant data. In this case, 7.7% (2360 of 30773 observations) of the data was removed from analyses because there was insufficient demographic information.

**Measures**

***Dependent Variable***

The receipt (or not) of OSS as a consequence of a behavior referral is the primary dependent variable. Per the SWIS training materials, OSS is defined as a period when a student is not allowed on campus. Substance type was one dependent variable with three categories: Alcohol Possession, Drug Possession, or Tobacco Possession. For analysis, these codes were turned into dummy-coded variables. Race/Ethnicity was modeled as a categorical variable and included codes for Asian, Black/African American, Latinx, Indigenous, Multiracial (more than one race), Pacific Islander, and White.

**Analytic Plan**

***Research Question 3***

Table 1 shows that mean rates of OSS appear different by substance type and student race/ethnicity; however, Table 2 illustrates that the substance type in a student’s first referral might vary by our two key fixed effects: race/ethnicity and substance type (i.e., drugs, tobacco, and alcohol). To analyze differences in exclusionary discipline by the interaction between student race/ethnicity and substance type, multi-level modeling was used with student Race/Ethnicity as fixed effects and school varying as a random effect. Nesting at the district level was considered as well, but over 64% of districts had only one school in the dataset and 85% of districts had two or fewer. A Bayesian approach was selected in order to allow for more flexible analysis of differences by race/ethnicity based on the posterior distribution. Flat, preset priors from the brms package were used as baseline estimates before introducing model iterations.

**Results**

In the current interaction model, all values were equal to 1.00, and estimated errors were examined for exceptionally large values. The student group coded Pacific Islander had one potentially over-sized estimated error (i.e., log-odds estimate for alcohol OSS of -0.61 with credible interval ranging [-2.99 - 1.59], which was compared with the student group coded Native American as our intercept mapping on to alcohol OSS). This is likely a sample size issue, and the Pacific Islander group was retained for analysis because other estimates were not paired with the same degree of estimated error.

For the interaction estimates, we will examine one example case: receiving an OSS for drugs as a student coded as black. The log-odds of this occurrence was 2.09 (95% credible interval range [1.22 - 3.01]) with an associated probability of 89%. As a basis of comparison example, let's also examine OSS for drugs as a white student: log-odds are 1.57 (95% credible interval range [0.77 - 2.42]) with an associated probability of 82%. For a more direct comparison of these two cases, the difference between groups was computed based on positive estimates from the posterior distribution. All of the following comparisons use indigenous students receiving an OSS for alcohol as the comparison group. Black students were approximately three times more likely than white students to receive a first-time OSS for drugs (20.8% likelihood for white students versus a 63.0% likelihood for black students). Specific to drugs as the substance instigating a first time OSS, the racial/ethnic group most likely to receive this form of discipline was Pacific Islanders (84.6%), which was approximately 4 times higher than the lowest likelihood group of receiving a first-time OSS for drugs, White students (20.8%). On examining probabilities of tobacco being the substance type associated by race/ethnicity, the results were much more wide ranging than drugs. Students coded multiple races or white had 5.1% and 6.1% likelihoods of receiving an OSS for tobacco respective, as compared with Latinx (25.9%), Black (46.2%), Asian (48.1%), and Pacific Islander (77.1%), which were up to a 15-fold increase from the lowest probability group to the highest. There was an opposite trend for alcohol possession as the substance leading to an OSS infraction, where Pacific Islanders were the lowest likelihood group at 30.0% and multiracial/multiethnicity students were the highest likelihood group at 97%.

Notably, all interaction terms’ credible interval range crossed zero and the ranges overlapped across interaction terms. As many of the posterior densities had significantly high percentages above zero (e.g., multiracial/multiethnicity students’ alcohol OSS, in the most recent example), there is a greater confidence that these specific subgroups with substances will have an increased likelihood of receiving and OSS. However, given the inclusion of zero in the credible interval range, those posterior densities which were closer to 50% positive indicate no increased likelihood when compared with the reference group (i.e., indigenous students x alcohol).

**Discussion**

The current results extend previous literature (e.g., Skiba et al., 2014) on the impact of race as a predictor of exclusionary discipline practices in school. Specifically, the results to a research question on the interaction between race or ethnicity and substance type leading to an OSS pointed to some subgroups (e.g., Pacific Islanders) having probabilities in the extremes (e.g., highest for drugs, lowest for alcohol). Other subgroups seemed inflated in comparison to indigenous students (e.g., black students consistently seemed more likely than indigenous students to receive OSS for all substances). See figures 1-3 for a whole picture of the log-odds per substance type and each race/ethnicity.

**Limitations**

An important limitation that was not previously addressed was the small samples sizes for some race/ethnicity groups (e.g., Pacific Islander, used for several examples), which may stir reaching inferences with Bayesian analysis.

References

American Psychological Association. (2008). Are zero tolerance policies effective in the schools? An evidentiary review and recommendations. *American Psychologist, 63*, 852-862.

Skiba, R. J., Chung, C., Trachok, M., Baker, T. L., Sheya, A., & Hughes, R. L. (2014, August 1, 2014). Parsing disciplinary disproportionality: Contributions of infraction, student, and school characteristics to out-of-school suspension and expulsion. *American Educational Research Journal, 51*, 640-670. <https://doi.org/10.3102/0002831214541670>

Table 1

*Out-of-School Suspension Rate by Student Race/Ethnicity*

|  |  |  |
| --- | --- | --- |
| Race/Ethnicity | *M* | *SD* |
| Native | .6150 | .48701 |
| Asian | .6194 | .48614 |
| Latino | .6339 | .48176 |
| Black | .6436 | .47902 |
| White | .5074 | .49996 |
| Pacific Islander | .5397 | .50041 |
| More than One Race | .5797 | .49385 |
| Total | .5614 | .49622 |

Table 2

*Crosstabulation of First-Referral Count for Each Race/Ethnicity Category by Substance Type*

|  |  |  |  |
| --- | --- | --- | --- |
| Race/Ethnicity | Alcohol | Drugs | Tobacco |
| Native | 65 | 268 | 254 |
| Asian | 32 | 156 | 214 |
| Latino | 888 | 4004 | 2421 |
| Black | 224 | 1506 | 1390 |
| White | 950 | 3564 | 11354 |
| Pacific Islander | 6 | 56 | 64 |
| More than One Race | 68 | 338 | 591 |
| NA | 167 | 569 | 1624 |
|  |  |  |  |

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*Figure 1.* Fixed Effects of drugs as the substance type per Race/Ethnicity on Log-Odds of Receiving Out of School Suspension.

Note: Category labels are as follows: 1 = Native, 2 = Asian, 3 = Latinx, 4 = Black, 5 = White, 8 = Pacific Islander, 44 = More than one race.

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*Figure 2.* Fixed Effects of tobacco as the substance type per Race/Ethnicity on Log-Odds of Receiving Out of School Suspension.

Note: Category labels are as follows: 1 = Native, 2 = Asian, 3 = Latinx, 4 = Black, 5 = White, 8 = Pacific Islander, 44 = More than one race.

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*Figure 3.* Fixed Effects of alcohol as the substance type per Race/Ethnicity on Log-Odds of Receiving Out of School Suspension.

Note: Category labels are as follows: 1 = Native, 2 = Asian, 3 = Latinx, 4 = Black, 5 = White, 8 = Pacific Islander, 44 = More than one race.