



School racial composition and lifetime non-medical use of prescription painkillers: Evidence from the national longitudinal study of adolescent to adult health



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ABSTRACT

Objective: To investigate the possible effects of middle and high school racial composition on later reporting of lifetime non-medical use of prescription painkillers (NMUPP) in young adulthood, and to explore whether there is evidence of variability by individual race/ethnicity in such effects.

Methods: Using data from Wave 1 (1994/5) of the National Longitudinal Study of Adolescent to Adult Health (Add Health), we categorized the sample's 52 middle schools and 80 high schools as majority (> 50%) non-Hispanic white, majority non-Hispanic black, or neither. We used two-level hierarchical modeling to explore associations between individual- and school-level race at Wave 1 and lifetime prescription painkiller misuse reported at Wave 4. We included a cross-level interaction between individual race and school racial composition to assess variability in school-level associations by race.

Results: Overall crude prevalence of lifetime NMUPP in majority white schools (17.9%) was over three times that of prevalence in majority black schools (4.8%), and also higher than prevalence in schools neither predominantly black nor predominantly white (12.4%). Lifetime misuse among blacks in majority white schools was more prevalent (5.2%) than among blacks in black schools (2.8%), as was misuse among whites in white schools (19.3%) compared to their white peers in black schools (15.7%). Two-level random intercept Poisson regression results suggest that attendance in a majority black secondary school lowered a participant's risk of lifetime NMUPP (compared to attending a majority white school: RR=0.66, $p = 0.03$). Compared to blacks in black schools, blacks in white schools had twice the risk of prescription painkiller misuse ($p = 0.004$) over a decade later, and whites in white schools had 5.5 times the risk ($p = 0.01$). The risk ratio comparing whites in black schools to whites in white schools was not significant (RR: 1.30; $p = 0.37$).

Conclusions: We found evidence of an effect of school racial composition on the risk of misusing prescription painkillers over a decade later, over and above individual race, with higher risk of misuse reported among participants who had attended white schools. Black participants who had attended predominantly white schools were, on average, twice as likely to report lifetime misuse of prescription painkillers compared to blacks who had attended black schools.

1. Introduction

Remarkably consistent variability by race and ethnicity in substance use has been observed in the U.S., with highest rates reported among non-Hispanic whites across substances such as cigarettes, alcohol, marijuana, and other illicit drugs (Johnston et al., 2013a). Similar disparities have emerged in the rise of the misuse of prescription medications, including the nonmedical use of prescription painkillers

(NMUPP). In one large, nationally representative cross-sectional study, non-Hispanic white participants aged 12–17 were more likely to report non-medical use of opioids (10.5%) than were Hispanics (9.4%) or non-Hispanic blacks (8.9%) (Wu et al., 2008). Studies involving college students also show higher prevalence of misuse of prescription drugs among whites than among racial and ethnic minority groups (McCabe et al., 2005a). Similar patterns—with an often more pronounced relative protection for blacks—have continued to surface for adolescents

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and young adults in recent years (Johnston et al., 2013; Sung et al., 2005).

The mechanisms underlying this consistent patterning by race are not fully known, but a protective effect for blacks and Hispanics—for prescription drug misuse in particular—might arise from the well-documented disparities in prescribing by doctors, who in multiple studies have been shown to treat pain differentially based on the race of their patients, with far higher prescribing rates for non-Hispanic whites compared to minorities (Singhal et al., 2016; Pletcher et al., 2008; Heins et al., 2006). Compounding this disparity is the striking difference in the stocking of opioids in pharmacies, with facilities in minority neighborhoods often understocked, while pharmacies in white neighborhoods carry more adequate quantities of the demanded painkillers (Green et al., 2005; Morrison et al., 2000). There is also some evidence that religiosity might have a protective influence against substance use (Rew and Wong, 2006; Wallace et al., 2003) by acting as a buffer against stress (Resnick et al., 1997). Such protection could be more prevalent among blacks and Hispanics, who are more likely to report being religious (Donahue and Benson, 1995; Smith et al., 2002). A so-called “immigrant effect” might be an alternative explanation for lower rates of drug use among Hispanics, who are more likely to be immigrants, a status that has repeatedly been linked to lower rates of cigarette, alcohol, and other illicit substance use (Blake et al., 2001; Cavanagh, 2007; Gfroerer and Tan, 2011; Katz et al., 2010; Peña et al., 2008; Vega et al., 1998).

While the literature on the topic has grown along with the opioid epidemic, researchers have noted the dearth of longitudinal studies examining factors tied to the non-medical use of prescription drugs, due to a heavy reliance on cross-sectional data (Nargiso et al., 2015; Young et al., 2012). As the lifecourse perspective emphasizes, exposures at formative times (e.g., adolescence) can exert significant and enduring influence on health outcomes throughout the lifespan (Avison, 2010; George, 2007; Elder et al., 2003), making longitudinal studies crucial to our understanding of disease patterns. Explorations of the roots of prescription drug misuse would also benefit from the inclusion of school-level characteristics, as previous work has revealed the critical role the school environment can have in shaping the risk-taking behaviors of adolescents and young adults (Durlak, 1997; Baum, 1998; Hawkins et al., 1997; Hallfors and Dorn, 2002; Alexander et al., 2001; Dunn et al., 2015; Aveyard et al., 2004; Rehm et al., 2005; Ennett et al., 1997; Robins and Przybeck, 1985). Given the differences reported by individual race in prescription drug misuse, a worthy focal point for investigation of higher-level measures would be racial composition at the school level, and its potential influence on prevalence of prescription painkiller misuse, above and beyond the role of individual race and ethnicity. Research has shown the powerful influence of the school environment in introducing adolescents to behavioral modeling, social norms of peers, and increased access to substances (Durlak, 1997; Baum, 1998; Hawkins et al., 1997; Hallfors and Dorn, 2002). Evidence suggests substance use varies significantly across schools for smoking (Alexander et al., 2001; Dunn et al., 2015; Aveyard et al., 2004), drinking (Rehm et al., 2005), and marijuana use (Ennett et al., 1997). Because early initiation of substance use in adolescence predicts misuse later in life (Hawkins et al., 1997; Robins and Przybeck, 1985), it is particularly important to explore any lasting associations between school environment and prescription misuse evident in adulthood.

The aim of this study is to determine whether an association exists between non-medical use of prescription painkillers and school-level racial composition, over and above any relationship between NMUPP and individuals' race, and whether such a relationship varies by individual race. This preliminary exploration is motivated by at least four hypothesized mechanisms explaining possible disparities by race at the school level. First, it is known that schools affect behavior of adolescent students by establishing and reinforcing social and behavioral norms (Hawkins et al., 1997; Anderson, 2016). Social influence theory highlights teens' desire to conform to group norms in behavior and attitude

(Lewin, 1947). A majority-white school setting where prevalence of substance use is likely to already be elevated might therefore lead to further reinforcement and perpetuation.

Alternatively, health disparities by school racial composition might be explained by the effects that segregated settings could have on psychosocial pathways. Minority students in majority white schools experience more racial discrimination and harassment (Allen, 1992); such experiences can lead to social disengagement (Felice, 1981). Higher rates of substance use have been seen among teens reporting feelings of disconnection from their schools (Tani et al., 2001). Substance use has also been seen to be a coping mechanism for the stress that discrimination causes (Gerrard et al., 2012; McLaughlin et al., 2010; Brody et al., 2012). Minority students in high-percentage white schools, therefore, might be more at risk for substance use, including NMUPP.

Third, school-level variation in substance use could stem from differences in school regulations. Schools with tighter regulations and policies regarding punitive repercussions of illicit substance use, it might be argued, could see lower rates of drug use; the same might be true in schools with programs promoting social norms discouraging such behavior. However, evidence suggests that such policies have more of an impact on overt behavior as opposed to covert behavior (Evans-Whipp et al., 2004); their effectiveness, therefore, might be far greater for an activity like smoking than for a behavior like swallowing a pill, which is easier to conceal.

A fourth possible mechanism involves the practical matter of access. As noted above, non-Hispanic whites are most likely to be prescribed painkillers (Singhal et al., 2016). Pharmacies serving minority populations have been seen to be severely understocked with opioid analgesics compared to pharmacies in white neighborhoods (Green et al., 2005; Morrison et al., 2000). The most common source of diverted prescription medications for misuse among teens and young adults is friends and family (McCabe and Teter, 2007; Manchikanti, 2007). These facets of access could work in concert to ensure that NMUPP would be most prevalent in schools with high percentages of white students, where prescriptions would be more abundant.

To our knowledge, there has yet to be a study assessing the influence that school-level racial composition in adolescence might have on misuse of prescription painkillers reported in early adulthood. This gap is unsurprising, as most work on health effects of segregated settings has focused on segregation at the neighborhood level (Osypuk and Acevedo-Garcia, 2010). Recent exceptions include work by Bifulco et al. (2011), who found evidence of increased marijuana use among students in high-percentage-black school cohorts but no significant effects for post-secondary outcomes. Walsemann and colleagues (Walsemann et al., 2011) reported that depressive symptoms among blacks increased as the percentage of white students in schools they had attended rose. Results of work by Goosby and Walsemann (Goosby and Walsemann, 2012) exposed a harmful association for blacks between previous attendance in a predominantly white school and self-rated health in young adulthood.

Exploiting the rich longitudinal data from Add Health, we follow students who attended middle and high schools of different racial compositions to see whether there is evidence of an enduring association between school-level racial composition in adolescence and lifetime non-medical use of prescription painkillers reported in young adulthood. Using hierarchical regressions that include cross-level interactions, we run the rough equivalent of a fictitious experiment to see if any variability in effect estimates for school context vary by race/ethnicity among our sample population. We hypothesize that higher prevalence of lifetime NMUPP in young adulthood will be seen among study participants who attended majority white schools compared to those who went to majority black or neither majority schools in adolescence, and that this association will be significant, even after adjustment for individual-level race. We also predict that blacks who attended white schools will be at increased risk of NMUPP compared to

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