

Taste clusters of music and drugs: evidence from three analytic levels¹

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Abstract

This article examines taste clusters of musical preferences and substance use among adolescents and young adults. Three analytic levels are considered: fixed effects analyses of aggregate listening patterns and substance use in US radio markets, logistic regressions of individual genre preferences and drug use from a nationally representative survey of US youth, and arrest and seizure data from a large American concert venue. A consistent picture emerges from all three levels: rock music is positively associated with substance use, with some substance-specific variability across rock sub-genres. Hip hop music is also associated with higher use, while pop and religious music are associated with lower use. These results are robust to fixed effects models that account for changes over time in radio markets, a comprehensive battery of controls in the individual-level survey, and concert data establishing the co-occurrence of substance use and music listening in the same place and time. The results affirm a rich tradition of qualitative and experimental studies, demonstrating how symbolic boundaries are simultaneously drawn around music and drugs.

Keywords: Substance use; music; cultural capital; taste clusters; consumption

Introduction

People develop tastes for particular drugs in much the same way they develop preferences for art or music. As Becker noted, 'Taste for such experience is a socially acquired one, not different in kind from acquired tastes for oysters or dry martinis' (1963: 53). Qualitative and experimental research show that tastes for drugs and music frequently coincide, in keeping with Bourdieu's insight that 'taste classifies, and it classifies the classifier' (1984: 6). This paper brings statistical evidence to bear on these ideas, examining three analytic

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levels using three distinct data sets: aggregate trends among youth and young adults in US radio markets (Level A), individual preferences in a nationally representative survey of US youth (Level B), and subcultural participation in a large American concert venue (Level C).²

We will argue that those favouring particular musical genres begin to identify with the scene that surrounds them, with shared values and social activities delineating social boundaries. These values and activities often include specific positive and negative evaluations of substance use, which can crystallize into distinctive taste clusters of music and drugs. We will not make strong causal claims for this process, nor will we suggest that deliberate efforts to manipulate the airwaves would curb drug use. On the contrary, genre-specific scenes represent a reaction against such universal approaches. Rather, our goal is to employ new methods and data to probe and elucidate the connections between musical genres and substances.

Music, drugs, and culture

The concept of taste is central in sociological studies of art and music. For Bourdieu, taste is the propensity and capacity to appropriate (materially or symbolically) a given class of particular objects or practices (1984: 173). Through the classification of tastes, distinctions between cultural forms shape behaviour and legitimate social differences, such that knowledge of cultural objects represents a form of capital (Bourdieu 1984; DiMaggio and Useem 1978). Yet, cultural capital is often fungible and variable across social space, such that certain knowledge, practices, and objects are more highly valued by some groups than others. For example, knowledge of hip hop music may be valuable for teens seeking approval from their peers, whereas knowledge of opera may be less valued and useful in this context. Taste thus helps create symbolic boundaries, as groups use cultural expertise to define themselves and to recognize members and outsiders (Lamont 1992; DiMaggio 1987). As people assemble to share tastes for, say, hip hop, they may also share a common affinity for marijuana use. This view of tastes and boundaries allows for overlapping and mutually reinforcing identifications, which unfold dynamically over time and deepen feelings of in-group solidarity.

These concepts have proven useful in explaining consumption of music and the arts. At the upper end of the stratification hierarchy, cultural socialization shapes taste for the high arts, reinforcing elite cohesion through favoured (DiMaggio and Useem 1978; Schuessler 1948) and disfavoured aesthetic tastes (Bryson 1996; Mark 1998). Music consumption similarly defines boundaries at the base of the social ladder. For example, punk and reggae music emerged from resistance by the white working class and black lower class, respectively (Hebdige 1979), a theme also reflected in recent studies of hip hop music

(Tanner, Asbridge, and Wortley 2009; Kubrin 2005, 2006). Boundary formation based on cultural consumption, of course, is not limited to a single domain such as music. To the extent that parallel consumption-based boundaries develop around substance use, a clustering of tastes is likely to emerge.

In a critique of research on tastes, Holt calls on researchers to consider bundles of preferences or 'taste clusters' across disparate consumption fields (1997: 118). Based on these clusters, researchers can construct cultural profiles that combine other activities with musical tastes (Katz-Gerro 1999). By this logic, musical genres and substances should be related to the degree that they occupy similar consumption spaces (Bourdieu 1984). Although illicit consumption has not been considered in this line of research, criminological work clearly supports such arguments. As Sutherland, Cressey, and Luckenbill (1992) and Becker (1963) describe, both delinquent and non-delinquent attitudes and behaviours are learned in similar ways. This learning includes norms, techniques, and motives for behaviours, which likely encompass both musical preferences and substance use preferences. Enjoyment is thus learned and cultivated by others' favourable definitions of the experience (Sutherland, et al. 1992; Becker 1963: 56), and continued use is a product of this differential reinforcement (Akers 1992).

Many qualitative studies have drawn precisely these connections, portraying music and drugs as mutually reinforcing forms of cultural consumption. For example, Andrew Wilson (2007: 9) describes an 'amphetamine ethos' within the British northern soul scene of the 1970s; for those initially drawn to the music and dancing, amphetamine use was both a rite of passage and a symbol of commitment. The contemporary rave scene similarly combines ecstasy use with house, electronic, and techno music (Maxwell 2005). As Pedersen and Skrondal (1999) report, preferences for techno music among Oslo youth predict preferences for ecstasy over other drugs, even as the genre grew increasingly popular (Hammersley, Khan, and Ditton 2002).

Research in the USA finds similar evidence tying music scenes to particular drugs. As Kubrin demonstrates via content analysis (2005: 375–7; 2006), some hip hop music provides an 'interpretive resource' for feelings of injustice (Tanner, Asbridge, and Wortley 2009), extending the purview of a street code of violence and respect. Johnson et al. (2006) describe a distinctive argot among marijuana smokers that is so often paired with hip hop music that such activities are expected to occur together (Dunlap et al. 2005; Kelly 2005). This research leads us to expect a clustering of hip hop and other forms of urban music (e.g., rhythm and blues) with marijuana use and substance use more generally (Chen et al. 2006).

Rock music is perhaps the most-studied genre in relation to substance use. There are myriad rock sub-genres, several of which have been paired with particular substances. While rock music is broadly associated with substance use, the sub-genre most often singled out for analysis is heavy metal or hard

rock. Arnett (1991a) reports that heavy metal is more than a musical preference to young boys, shaping their worldview, habits, and values. Boys and girls with strong preferences for this genre appear to have especially high levels of sensation seeking and delinquency (Arnett 1991b, 1996; McNamara and Ballard 1999; Selfhout et al. 2008; Singer, Levine, and Jou 1993). Given this line of research, we expect heavy metal and hard rock preferences to be associated with greater substance use, both legal and illegal.

Studies of the Grateful Dead and psychedelic rock similarly link a rock sub-genre to drug use. The 'Dead' gave rise to a subculture of startling commitment (Pearson 1987: 427), which remains distinct from broader shifts in youth culture (unlike, say, European rave culture (Hammersley, Khan and Ditton 2002)). Drug markets make up a significant part of this group's economy, supported by a value system promoting the recreational and spiritual use of hallucinogens (Epstein and Sardiello 1990). Although most research has focused specifically on the Grateful Dead, we expect that psychedelic rock – and recent incarnations, such as jam bands – will be more generally associated with substance use, particularly hallucinogens.

Research on other sub-genres within the broader rock music category has hinted at similar connections. For example, Hebdige (1979) describes substances as playing a part in the cultural emergence of punk rock, such that we might expect more alcohol and drug use among those who prefer this sub-genre. Also, so-called 'alternative' music is a heterogeneous strain of rock music derived from Seattle grunge bands and, to some extent, punk rock bands. Little extant literature expressly addresses this form of rock music, but it represents a more popularized or mainstream rock sub-genre than heavy metal or punk rock.³ Devotees of so-called alternative music may thus show more varied or muted tastes for substance use, relative to those who prefer the better-defined rock sub-genres described above.

Outside of hip hop and rock music, studies of musical preferences and substance use have been rare or inconclusive, though some patterns have emerged. Because religiosity is linked to lower substance use among teens and young adults (Bachman et al. 2002), we expect religious musical preferences to be associated with lower use across all substances. As for country music, the research does not paint a clear picture. Chalfant and Beckley (1977) show how ambivalence toward drinking is woven into country music – alcohol is portrayed as a necessary activity for coping with life, albeit one that usually produces negative results (Connors and Alpher 1989). Because alcohol consumption is so prominent in the genre, we expect a positive association between drinking and country music preferences.

Finally, some musical tastes are closely associated with particular stages of the life course. One of the better-known findings of life course research is that adolescents who work intensively or adopt other adult roles exhibit greater delinquency, including substance use (see, e.g., Agnew 1986; McMorris and

Uggen 2000). Yet Mulder et al. (2010) find that adult-oriented *music*, including jazz and classical genres, is negatively related to substance use. So too is pop music, a mainstream taste that stresses age-appropriate teen behaviour. Such work points to both the potential and the complications of life course approaches to cultural consumption and drug use; age-appropriate musical consumption might either encourage or buffer against the precocious development of adult substance use patterns.

Based on this literature, several expectations emerge regarding the clustering of musical preferences and substance use. We expect a positive association between most rock sub-genres and substance use. Alternative rock is the exception, where the relationship has yet to be explored. We also expect positive effects for 'urban' sub-genres, including hip hop and rhythm and blues. From the existing research, we would also expect negative associations between drug use and religious, pop, classical, opera, and jazz music. Finally, the expectations for country music are unclear. Most research has focused on alcohol consumption, where an ambivalent relationship exists, but with a pronounced thematic emphasis on consumption.

Strategy, data, and methods

Analytic strategy

While the preceding research links musical preferences and substance use, we lack the sort of quantitative studies that would generalize to broader populations of interest. Recognizing the strengths and weaknesses of various analytic approaches, we consider evidence from three different levels, summarized in Table I. Level A is an analysis of US states and large Metropolitan Statistical Areas (MSAs), based on aggregated FBI Uniform Crime Report arrest data, National Household Survey on Drug Abuse self-reported substance use, and Arbitron Radio Reports listenership data from 1998 to 2002. Level B is an individual-level cross-sectional survey of US teenagers conducted by the *New York Times* and CBS News in 1998. Level C is a complete record of drug arrests and seizures for 40 concerts at a large music venue in Wisconsin, USA from 2002 to 2006.

We first examine aggregate substance use rates (Level A), based on drug arrests in the 100 largest US MSAs and self-reported drug use across the 50 states and District of Columbia. The potential pitfalls of aggregate data in this context have been fully explicated (see, e.g., the comments and replies based on Stack and Gundlach's 1992 article on suicide rates and country music). With proper model specification, however, the risk of falsely interpreting aggregate data is greatly reduced (Gove and Hughes 1980). Following the causal path described in qualitative studies, we estimate the effect of music listenership on

Table I: Analytic level descriptions

	Level A	Level B	Level C
Level	Aggregate rates	Individual-level survey data	Concert/Event data
Population of interest	US states and Metropolitan Statistical Areas (teenagers and young adults)	US teenagers aged 13–17	Concert venues
Years covered	States: 1999–2001; MSAs: 1998–2002	1998	2002–2006
Drug measures	Self-reported marijuana, other drug, and cigarette use among states; total juvenile drug arrest and total DUI arrest rates among MSAs	Self-reported marijuana, cigarette, and alcohol use	Police reports for marijuana, LSD, and cocaine arrests; and marijuana, cocaine, ecstasy, hashish, heroin, LSD, and psilocybin seizures
Music measures	Percentage listening to radio stations of specific musical genres	Self-reported musical genre preference	Musical sub-genre of performing band(s), as defined by Amazon.com and allmusic.com
Data sources	<i>Drugs:</i> National Household Survey on Drug Abuse, FBI Uniform Crime Reports; <i>Music:</i> Arbitron Radio Reports; <i>Controls:</i> US Census Bureau	<i>New York Times</i> /CBS News individual-level cross-sectional survey (1998)	Walworth County, Wisconsin Sherriff's Department complete arrest and seizure data for each event at Alpine Valley Music Theatre (East Troy, Wisconsin, USA)
Sample size	50 states and D.C. over 3 years (153); and 100 MSAs over 5 years (500)	1048 teenagers	All 40 musical events occurring over 5 years
Statistical controls	Per cent black, per cent Hispanic, per cent males ages 15 to 24, population, unemployment rate, per cent with high school education, income	Age, sex, race, parent's education, work, household and marital status, parental marijuana use, city type, US region, work hours, volunteering, school type, car ownership, church attendance	N/A
Method	Fixed effects time series models	Logistic regression models	Descriptive statistics

drug use using fixed-effects models (Allison 2009). These models statistically control for the stable characteristics of each state or metropolitan area, so that estimates cannot be biased by factors that do not change over time. To adjust for time-varying traits, our models also include a set of demographic control variables.

Of course, one potential threat that cannot be completely overcome in aggregate-level analysis is the ecological fallacy – drawing inferences about individual behaviour from data that characterize a larger group. To address this risk, we draw on a CBS News/*New York Times* survey of 13 to 17 year olds in the USA that asks individuals about both their musical preferences and their

substance use (Level B). With this survey, we can be certain that the individuals reporting particular musical preferences are the same individuals using particular substances. The survey includes a robust battery of questions concerning other determinants of substance use, providing important controls in our models (see Bachman et al. 2002).

Even with robust controls and statistical evidence of a relationship, however, we still cannot be certain that music listening and drug use are co-occurring activities or part of the same cultural phenomena. We therefore compiled a third dataset with a complete record of drug arrests and seizures at a popular American concert venue for all events from 2002 to 2006 (Level C). These data will clearly reveal whether particular types of drugs co-occur with particular types of music, though we caution that some concerts (and venues) are more heavily policed than others. The three analytic levels are thus complementary and mutually reinforcing, such that a consistent pattern of results would paint a convincing picture of the specific taste clusters linking drugs and music, bolstering conclusions from qualitative and ethnographic studies.

Level A: Aggregate music listenership and drug use

FBI Uniform Crime Reports (UCR)

We used county-level UCR data⁴ to construct arrest rates for the 100 most populated US MSAs from 1998 to 2002 (US Department of Justice, various years). We follow US Census Bureau definitions (2003a, 2003b) to identify the 100 MSAs and to aggregate county-level arrest data to the appropriate MSA.⁵ The dependent variables include the rate per 100,000 for total juvenile drug arrests (of all drug types) and the total driving under the influence (DUI) arrest rate (which includes alcohol and other drugs).

National Household Survey on Drug Abuse (NHSDA)

The NHSDA is the primary source of statistical information on the drug use of Americans ages 12 and older (Wright 2003a).⁶ The data are collected through in-person interviews with a representative sample of the noninstitutional population at their place of residence (see Wright 2003a for sampling and estimation procedures). The 1999 to 2001 state estimates report the percentage using cigarettes, marijuana, and any drug other than marijuana in the past month (Wright 2003b, 2002; Wright and Davis 2001). These are used as dependent variables in models predicting change in self-reported substance use for teenagers (12–17) and young adults (18–25).

Arbitron Radio Reports

Our first measure of music consumption comes from Arbitron, a leading international media and marketing research firm. Although internet and

satellite radio have expanded dramatically in recent years, broadcast radio was dominant during our 1998 to 2002 observation period.⁷ Arbitron's 'Format Trends' capture the percentage of radio listeners during an average quarter hour tuned to a station of a given genre (or 'format'), with radio stations self-identifying their genre (Arbitron 2004). Arbitron randomly selected over 5 million potential 'diarykeepers' in the 94 largest US Arbitron Radio Metros each year, with an average response rate of 75 per cent. Upon consent, participants were mailed a 7-day radio listening diary for each household member over the age of 12, instructions, and a cash premium. From a given Thursday to Wednesday, participants recorded the stations they listened to, start and stop times, listening locations, and demographic information. Each week, 230,000 diarykeepers recorded their listening habits on an average of 2,500 radio stations. These trends are periodically reported on Arbitron's website and can be viewed by demographic characteristics and eight geographic regions. For each region, we selected the listening trends for those ages 12 to 17 and those ages 18 to 24, averaging the four quarterly rates. For each state and MSA, we recorded the percentage listening in the region in which the state or MSA is located. Because regional values are used for lower levels of aggregation, the standard errors are adjusted for regional clustering using the cluster option in Stata. This measure taps the broader cultural identification of individuals in a particular area, assuming that their time investment in a musical genre represents commitment to the scene associated with that music (Mark 1998; Bourdieu 1984: 281).

Demographic controls

We incorporate demographic variables in our analyses to adjust for other changing factors that may affect drug use and arrests. For MSAs, data were aggregated in the same manner as the UCR. Measures of the percentage black, Hispanic, males aged 15 to 24, and total population are taken from US Census Bureau (2003a, 2003b) population estimates. The unemployment rate, the percentage aged 25 and older with a high school education, and income are derived from the Current Population Survey and reported by the US Bureau of Labor Statistics (US Census Bureau 2003c). Income and education are unavailable for MSAs, but are included in state models.

Level B: CBS News/New York Times individual-level survey

Our second analytic level is a cross-sectional survey from a monthly poll of 13 to 17 year olds conducted by CBS News and the *New York Times* (1998). This survey of social and political issues remains, surprisingly, the only large-scale ($N = 1,048$) nationally representative US survey to address both musical preferences and substance use.⁸ The survey inquires into several categories of

musical preference and use of marijuana, alcohol, and cigarettes. Given the age range and thus lower usage patterns, we analyse lifetime use, though this specification is less suited for establishing temporal order than the fixed-effects models discussed above.⁹ In addition to musical preferences and substance use, the survey collected an impressive breadth of information regarding the key predictors of substance use. The control variables cut across all the primary predictors in the substance use literature (see, e.g., Bachman et al. 2002), including work patterns (hours worked, volunteer participation), school involvement (extra-curricular participation), religiosity (church attendance), family substance use (parental marijuana use), immediate surroundings (city size, type of school attended), home life (parental employment, family structure), ability to spend recreational time outside the home (owning one's own car), socioeconomic background (parents' education), and demographic characteristics (age, gender, race). By adjusting for these covariates, we reduce the risk of drawing spurious individual-level inferences about music and drugs.

Level C: Alpine Valley Music Theatre arrest and seizure data

To situate substance use and music listenership in the same time and place, we compiled a complete record of drug arrests and seizures from Alpine Valley Music Theatre from 2002 to 2006. Alpine Valley is a large outdoor amphitheater in East Troy, Wisconsin, USA, 51 km (32 miles) south-west of Milwaukee and 128 km (80 miles) north-west of Chicago. With a capacity of 37,000, the venue attracts well-known recording artists, with regular musical offerings in four rock music sub-genres: alternative rock, classic rock, jam bands, and heavy metal.¹⁰ Events at the venue are policed by the Walworth County Sheriff's Department, which provided complete arrest and seizure information for every Alpine Valley event.

Estimation

For the Level A analysis of USA states and MSAs, we use fixed effects pooled time-series models to predict changes in arrests and self-reported substance use. These models are preferable when researchers cannot ensure that confounding variables are adequately controlled, because the fixed effects reduce the risk of bias from specification errors due to stable, uncontrolled differences, thereby removing all between-area differences (Allison 2009). Across multiple waves, a pooled fixed effects data structure results in

$$Y_{it} = (\alpha + \mu_i) + \beta_1 X_{it1} + \dots + \beta_p X_{itp} + e_{it}$$

where, for region i in wave t with p predictor variables, μ_i represents the fixed effect for the region-specific adjustment of the intercept. Fixed effects models

are estimated in Stata. For our cross-sectional survey (Level B), we use standard logistic regression techniques with covariate adjustment. For the concert venue data (Level C), simple descriptive statistics are used.

Results

Level A: Trends over time and place using aggregated data

Our drug measures for the analysis of USA states include last month marijuana use among teens 12 to 17, any other illicit drug use among young adults 18 to 25, and cigarette use among teens. Our official drug measures include the rate (per 100,000 population) of juvenile total drug arrests and total DUI arrests. With regard to music, Arbitron reports distinct differences in listenership between teenagers and young adults. On average across the years, 8 per cent of teens listened to classic or hard rock¹¹, compared to 14 per cent of young adults. Also, 14 per cent of teens listened to urban, compared to 12 per cent of young adults. On average, more young adults (8 per cent) than teens (5 per cent) listened to country, and more young adults (11 per cent) than teens (10 per cent) listened to alternative. Religious music accounts for a small share of the total listenership, about 1 per cent in both age groups.¹²

Since musical affiliations are closely correlated, we estimate separate models for the effects of each musical genre on each drug measure and age group, though all control variables are included in all models. Given the large number of models, we condensed the results into a single table, which does not display covariates used strictly as statistical controls. Further, we only display models for dependent variables in which the musical affiliation variables exhibit significant effects. Full models are available upon request.

Column 1 in Table II considers the effects of musical identification on total juvenile drug arrests (juvenile drug arrests are predicted using teen music listening). We find statistically significant effects for religious ($p < 0.05$) and classic/hard rock ($p < 0.01$) music, net of demographic controls. The models show that for a one percentage point increase in religious music, there is a predicted decrease of about 3.9 in the juvenile drug arrest rate per 100,000 (which averaged 72 across all years). For a similar one per cent increase in classic/hard rock listening, there is a 1.2 unit increase in the juvenile drug arrest rate per 100,000. The total DUI arrest rate model is shown in column 2 of Table II. Country music ($p < 0.001$) and classic/hard rock listenership ($p < 0.001$) among young adults have significant positive effects on the DUI arrest rate. A one percentage point increase in country listenership corresponds to a 25.2 increase in DUI arrests per 100,000 (which averaged 468 across all years), and a one per cent increase in classic/hard rock corresponds to an increase of 8.0 in DUI arrests per 100,000.

Table II: Level A estimates from separate fixed effects models for the effect of musical affiliation on drug-related outcomes

	Column 1 Total juvenile drug arrest rate; music ages 12–17 (93 MSAs)	Column 2 Total DUI arrest rate; music ages 18–24 (93 MSAs)	Column 3 Self-reported last month marijuana use ages 12–17; music ages 12–17 (50 states & DC)	Column 4 Self-reported last month other drug use, ages 18–25; music ages 18–24 (50 states & DC)	Column 5 Self-reported last month cigarette use, ages 12–17; music ages 12–17 (50 states & DC)
<i>Musical Affiliation</i>					
Alternative rock	0.038 (0.323)	-2.765 (2.622)	-0.285** (0.061)	-0.126** (0.034)	-0.233*** (0.032)
Country	0.229 (0.905)	25.172** (6.919)	-0.198 (0.198)	0.053 (0.123)	-0.037 (0.239)
Religious	-3.944* (1.535)	-16.853 (12.088)	0.039 (0.416)	-0.041 (0.669)	-1.060# (0.520)
Classic/Hard rock	1.190*** (0.208)	8.011** (2.048)	0.216* (0.071)	0.112* (0.038)	0.168# (0.087)
Urban	-0.245 (0.527)	-2.223 (4.664)	0.181*** (0.034)	0.115 (0.164)	0.149* (0.059)

Sources: FBI Uniform Crime Reports (MSAs; US Department of Justice, various years), National Household Survey on Drug Abuse (states; Wright 2003b, 2002, Wright and Davis 2001), US Census Bureau (MSAs and states; US Census Bureau 2003a, 2003b), US Bureau of Labor Statistics (MSAs and states; US Census Bureau 2003c), Arbitron (MSAs and states; Arbitron Radio Ratings and Media Research 2004).

Notes: (a) Numbers in parentheses are standard errors. (b) For analyses of MSAs, there are 93 groups and 459 observations, spanning 1998 to 2002. For analyses of states, there are 51 groups and 153 observations, spanning 1999 to 2001. (c) Each coefficient represents a different model. Each model controls for per cent black, per cent Hispanic, per cent males ages 15 to 24, population, and unemployment rate. The models for states additionally control for per cent with a high school education and income. Full models with controls are available upon request. (d) # $p < 0.10$ * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$ (two-tailed test)

Gusfield (1981) warns of the dangers of basing inferences on DUI arrest data, as enforcement rates vary greatly – a warning that extends to all arrest data. Although our fixed effects models effectively control for stable policy differences across jurisdictions, we are mindful of these cautions and thus consider self-reported drug use in Columns 3–5. Column 3 shows results from models of USA states predicting self-reported marijuana use for teens (which averaged 7.9 per cent). We find a significant positive effect of both classic/hard rock ($p < 0.05$) and urban ($p < 0.001$) music. A one per cent increase in classic/hard rock listenership predicts a 0.22 per cent increase in self-reported marijuana use, while a one per cent increase in urban listenership corresponds to a 0.18 per cent increase. These results support our expectations for both genres. Perhaps surprisingly, alternative music ($p < 0.001$) has a significant negative coefficient, with a one per cent increase in listenership corresponding to a 0.29 per cent decrease in marijuana use.

The effects of classic/hard rock and alternative music are replicated in models predicting use of illicit drugs other than marijuana among young adults

(which averaged 6.4 per cent), as shown in column 4. A one per cent increase in classic/hard rock music corresponds to a 0.11 per cent increase in use of such drugs. A similar increase in alternative rock listenership predicts a 0.13 per cent decrease. As for drugs that are legal for adults but illegal for juveniles, Column 5 of Table II reports models predicting teen cigarette use (which averaged 15.3 per cent). Here, increases in both alternative ($p < 0.001$) and religious music (marginally significant, $p < 0.10$) have negative effects. Urban music has a statistically significant ($p < 0.05$) positive effect, while classic/hard rock is marginally significant and positive in direction, providing some support for our genre-specific expectations.

Level B: Addressing the ecological fallacy with individual-level survey data

To learn whether those reporting certain musical preferences are the same individuals reporting particular substance use, we examine data from the only nationally representative US survey with information on both behaviours (Level B). Table III shows descriptive statistics for CBS News/*New York Times* data. At the time of the 1998 survey, alternative (23 per cent) and hip hop (20 per cent) were the most popular musical preferences, with rhythm and blues next at 13 per cent. Rock sub-genres, including classic rock, punk rock, and heavy metal and hard rock, together account for about 12 per cent of the sample. The remaining categories include country, religious music, opera, classical, jazz, pop, and a small but diverse ‘other’ category.¹³ Lifetime use of marijuana, alcohol, and cigarettes was 15 per cent, 43 per cent, and 36 per cent, respectively. Table III also shows descriptive statistics for the wide breadth of control variables used to address potential spuriousness in the association between musical preferences and substance use.

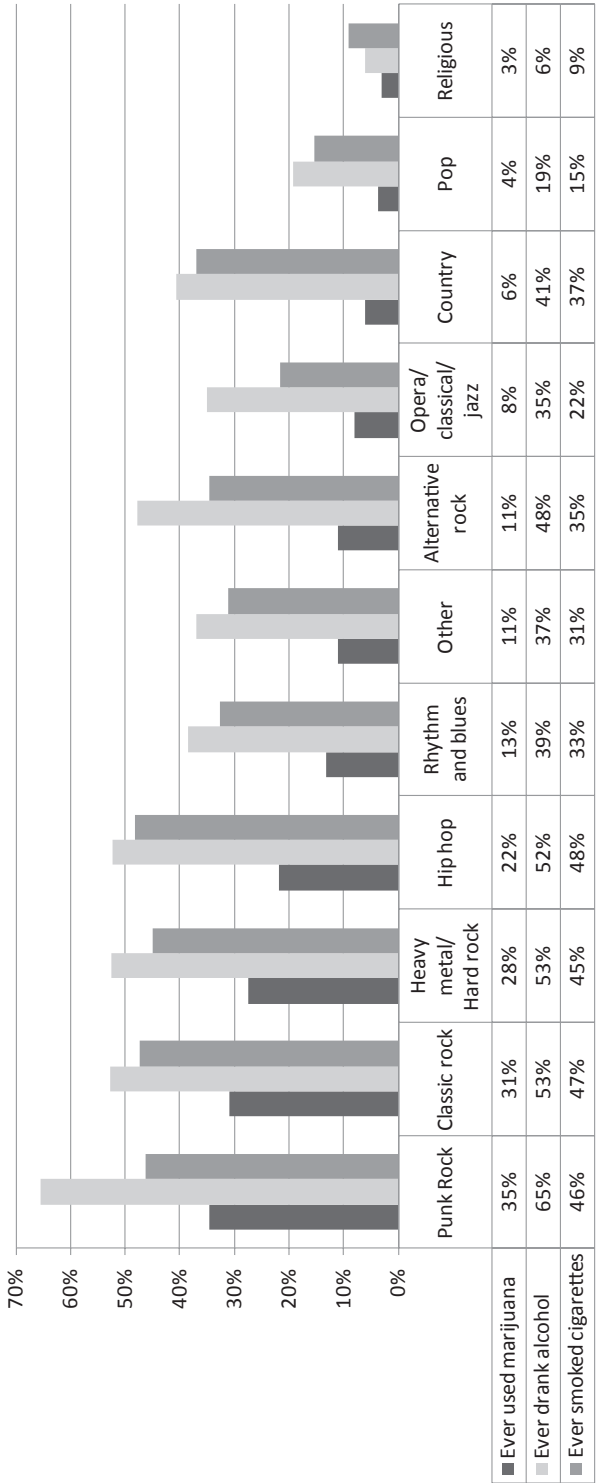
The bivariate relationships between musical preferences and substance use are shown in Figure I, sorted by marijuana prevalence rates. The figure clearly shows high use among the rock sub-genres, particularly for punk rock, classic rock, and heavy metal and hard rock. For example, those identifying a punk rock preference report lifetime use rates of 35 per cent for marijuana, 65 per cent for alcohol, and 46 per cent for cigarettes. Among non-rock genres, hip hop listeners report the highest use rates: 28 per cent for marijuana, 53 per cent for alcohol, and 45 per cent for cigarettes. The figure also shows very low rates of use among those favouring religious, pop, and country music, though the latter genre was associated with relatively high rates of alcohol (41 per cent) and cigarette (37 per cent) use.

Of course, these bivariate relationships may be spurious due to common or correlated causes. We therefore turn to logistic regression models that introduce a large battery of control variables. For each outcome in Table IV, we present a nested model that includes only musical preferences, followed by a

Table III: Level B survey descriptive statistics, CBS News/New York Times data 1998 (reported as percentages, except where noted)

Variable	Categories	Percentage/Average
Substance use	Ever used marijuana	14.7%
	Ever drank alcohol	43.2
	Ever smoked cigarettes	35.9
Musical preference	Alternative rock	23.4
	Classic rock	5.3
	Pop	5.0
	Punk rock	2.5
	Heavy metal/Hard rock	3.8
	Religious	3.2
	Country	7.8
	Rhythm and blues	12.9
	Hip hop	19.7
	Opera/classical/jazz	3.5
Age	Other	12.9
	Mean years (s.d.)	15.0 (1.4)
Sex (female)	Female = 1; male = 0	50.8
Race	White	74.9
	Black	12.2
	Asian	2.1
	Hispanic	7.4
	Other	3.3
Parent's highest education	High school or less	35.1
	Some college or trade school	15.9
	College graduate	32.6
	Post-graduate	9.7
	Don't know	6.6
Household parental structure	Both parents	63.3
	Only one parent	19.7
	Parent and step-parent	15.0
	Someone else	2.0
Parents married	Yes	67.6
Father works	Yes	90.0
Mother works	Yes	83.2
Know parents smoke marijuana	Yes	19.8
City type	Large city	30.2
	Suburbs	41.7
	Rural	28.1
Region	East	17.7
	Midwest	26.9
	South	34.6
	West	20.7
Work hours	Not working	51.0
	0-5	16.6
	6-10	11.4
	11-20	7.6
	More than 20	13.5
Volunteer activities	Yes	59.0
Extra-curricular activities	Yes	73.6
School type	Public = 1; Private/Parochial = 0	88.2
Have own car	Yes	15.4
Church attendance	Every week	33.7
	Almost every week	16.5
	Once or twice a month	16.7
	Few times a year	22.2
	Never	10.9

Figure 1: Level B substance use by musical preference (sorted by marijuana use)



Source: CBS News/New York Times Survey 1998

Table IV: Level B logistic regression predicting ever used a given substance (1998)

	Marijuana		Alcohol		Cigarettes	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-2.242*** (0.224)	-8.118*** (1.802)	-0.131 (0.132)	-8.368*** (1.267)	-0.661*** (0.139)	-5.554*** (1.292)
Music: Classic rock vs. Alternative	1.403*** (0.374)	0.968* (0.427)	0.245 (0.305)	-0.391 (0.353)	0.623* (0.308)	0.143 (0.356)
Music: Pop vs. Alternative	-0.957 (0.755)	-0.567 (0.786)	-1.280*** (0.377)	-1.454*** (0.425)	-1.021* (0.410)	-0.990* (0.442)
Music: Punk rock vs. Alternative	1.354** (0.502)	1.370* (0.566)	0.642 (0.442)	0.981* (0.496)	0.324 (0.437)	0.395 (0.499)
Music: Heavy metal/Hard rock vs. Alternative	1.325** (0.436)	1.224* (0.499)	0.303 (0.364)	0.202 (0.417)	0.255 (0.372)	0.140 (0.423)
Music: Religious vs. Alternative	-1.160 (1.041)	-0.838 (1.084)	-2.543*** (0.743)	-2.598*** (0.772)	-1.573* (0.623)	-1.746** (0.678)
Music: Country vs. Alternative	-0.649 (0.561)	-0.764 (0.589)	-0.241 (0.268)	-0.716* (0.313)	0.122 (0.276)	-0.215 (0.311)
Music: Rhythm and blues vs. Alternative	0.296 (0.356)	0.115 (0.409)	-0.240 (0.228)	-0.299 (0.280)	-0.109 (0.241)	-0.212 (0.290)
Music: Hip hop vs. Alternative	0.834** (0.293)	0.559 [#] (0.336)	0.289 [#] (0.200)	0.433 [#] (0.243)	0.593** (0.205)	0.625* (0.246)
Music: Opera/classical/jazz vs. Alternative	-0.499 (0.763)	-0.745 (0.797)	-0.428 (0.385)	-0.822 [#] (0.447)	-1.062* (0.505)	-1.496** (0.577)
Music: Other vs. Alternative	0.199 (0.362)	0.307 (0.397)	-0.371 (0.229)	-0.476 [#] (0.260)	-0.171 (0.241)	-0.229 (0.270)
Age		0.430*** (0.101)		0.525*** (0.070)		0.374*** (0.071)
Sex: Female vs. Male		-0.497* (0.225)		-0.046 (0.156)		0.108 (0.160)
Race: Black vs. White		0.031 (0.397)		-0.480 (0.300)		-0.820** (0.319)
Race: Asian vs. White		-0.230 (0.749)		-0.296 (0.532)		-0.083 (0.573)
Race: Other vs. White		0.061 (0.633)		0.088 (0.426)		-0.440 (0.463)
Race: Hispanic vs. White		0.156 (0.405)		0.387 (0.301)		0.211 (0.309)
Parent education: Some college vs. H.S.		-0.216 (0.330)		-0.110 (0.236)		0.160 (0.237)
Parent education: College grad vs. H.S.		0.106 (0.268)		-0.043 (0.190)		-0.185 (0.196)
Parent education: Post-graduate vs. H.S.		0.157 (0.418)		-0.096 (0.287)		0.028 (0.299)
Parent education: Don't know vs. H.S.		-1.399 (1.050)		-0.153 (0.397)		-0.591 (0.445)
Home structure: 1 Parent vs. Both		0.494 (0.492)		-0.307 (0.375)		0.306 (0.367)
Home structure: Parent & Step vs. Both		0.445 (0.457)		-0.329 (0.338)		0.634* (0.324)
Home structure: Someone else vs. Both		0.613 (0.818)		1.402 [#] (0.767)		0.106 (0.664)
Parents married		-0.074 (0.446)		-0.408 (0.331)		0.089 (0.323)
Father works		0.062 (0.420)		0.499 (0.335)		-0.518 (0.327)
Mother works		-0.389 (0.281)		0.684** (0.218)		-0.060 (0.216)

Table IV: *Continued*

	Marijuana		Alcohol		Cigarettes	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Parents smoke marijuana		0.977*** (0.245)		0.533** (0.202)		0.990*** (0.200)
City type: Suburbs vs. City		-0.133 (0.263)		-0.183 (0.188)		-0.215 (0.194)
City type: Rural vs. City		-0.124 (0.298)		0.109 (0.210)		-0.007 (0.214)
Region: Midwest vs. East		-0.753* (0.331)		-0.573* (0.233)		-0.223 (0.237)
Region: South vs. East		-0.384 (0.314)		-0.305 (0.232)		-0.211 (0.236)
Region: West vs. East		-0.223 (0.329)		-0.328 (0.249)		-0.596* (0.261)
Work hours: 0-5 vs. Not working		0.657* (0.317)		0.021 (0.221)		0.063 (0.231)
Work hours: 5-10 vs. Not working		0.482 (0.370)		0.570* (0.247)		0.408 (0.254)
Work hours: 11-20 vs. Not working		0.285 (0.394)		0.285 (0.296)		0.589* (0.293)
Work hours: >20 vs. Not working		0.664* (0.312)		0.302 (0.246)		0.896*** (0.243)
Volunteer activities		-0.023 (0.231)		0.331* (0.166)		-0.018 (0.170)
Extracurricular activities		-0.298 (0.244)		0.194 (0.184)		-0.230 (0.185)
School type: Public vs. other		0.557 (0.402)		-0.281 (0.248)		-0.246 (0.251)
Have own car		-0.121 (0.310)		0.296 (0.246)		0.157 (0.242)
Church: Every week vs. Never		-0.930* (0.370)		-0.391 (0.281)		-0.160 (0.290)
Church: Almost every week vs. Never		-0.631 (0.412)		-0.392 (0.310)		0.005 (0.321)
Church: Once/twice a month vs. Never		-0.335 (0.358)		0.033 (0.298)		0.225 (0.305)
Church: Few times a year vs. Never		-0.711* (0.350)		0.121 (0.283)		0.136 (0.290)
-2 Log-likelihood	706.65	605.80	1250.77	1056.46	1185.20	1013.40
Chi-squared, df	45***, 10	145***, 44	53***, 10	247***, 44	47***, 10	219***, 44

Source: CBS News/*New York Times* Survey, 1998.

Note: Standard errors are in parentheses.

$p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

model with the full set of control variables. As the modal category, alternative rock represents the baseline category for comparison. Beginning with marijuana in Model 1, we find significantly higher use among those identifying classic rock, punk rock, heavy metal and hard rock, and hip hop as their musical preferences. The three rock sub-genres remain predictive in Model 2, though hip hop is reduced to marginal significance. The magnitude of most significant coefficients is reduced in Model 2, due to their correlation with

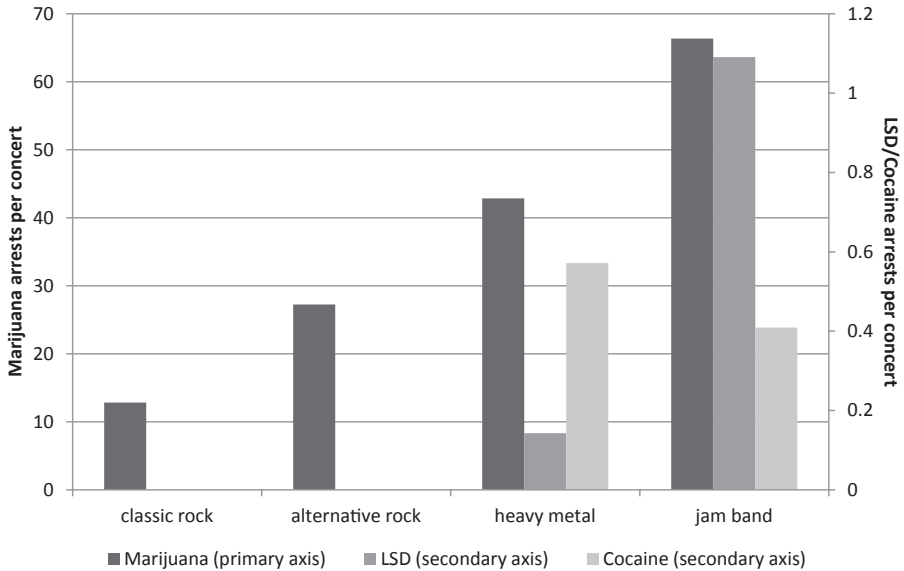
control variables such as age. Nevertheless, the estimated coefficients remain strong and statistically significant predictors. Compared to alternative rock, those who identified punk rock as their musical preference were 3.9 times ($e^{1.379} = 3.935$) more likely to have smoked marijuana in their lifetime ($p < 0.05$), net of the control variables. Similarly, those identifying heavy metal/hard rock and classic rock were 3.4 and 2.6 times more likely to have used marijuana, respectively ($p < 0.05$).

Musical preferences thus remain robust predictors in models with strong controls. Consistent with the substance use literature, females are 39 per cent less likely than males to have smoked marijuana ($p < 0.05$) and use increases with age ($p < 0.001$). Further, teens who work either a few hours per week (0 to 5) or many hours (more than 20) are more likely to use marijuana than those who do not work. Church attendance also has a statistically significant effect, with weekly attenders about 61 per cent less likely to have used marijuana than non-attenders. The musical preference effects hold even after inclusion of powerful predictors such as parental marijuana use, which raises the odds of respondents' marijuana use by about 2.7 times.

Turning to the results for alcohol use in Model 4, musical preferences again remain statistically significant in the face of strong control variables. Relative to those who favour alternative rock, punk rock devotees are about 2.7 times more likely to use alcohol ($p < 0.05$) and religious music listeners are 93 per cent less likely to drink ($p < 0.001$). Preferences for pop, a taste linked to childhood and early-adolescent age norms, are associated with a 77 per cent reduction in alcohol use ($p < 0.001$). We also find a negative effect of country music relative to alternative rock, with the former about 51 per cent less likely to imbibe. While this finding may be surprising, it is not inconsistent with our aggregate-level results, where the only significant country music finding was for those 18–25 years old. Similar to the marijuana model, a preference for hip hop is positive but only marginally significant. Again among the control variables, age, hours worked, and parental marijuana use are significant predictors of alcohol use. In addition, those who report that their mother is employed are about twice as likely to use alcohol ($p < 0.001$).

There is little to differentiate the rock sub-genres with respect to cigarette use, as shown in Model 6. As with alcohol, we again find statistically significant negative effects for religious and pop music, with odds of use about 83 per cent and 63 per cent lower than alternative rock, respectively. In addition, opera, classical, and jazz preferences are associated with lower odds of cigarette use ($p < 0.10$). Finally, supporting our aggregate-level results, those identifying a hip hop preference are about 87 per cent more likely to have smoked cigarettes than those preferring alternative rock ($p < 0.05$). We again find significant effects for age, hours worked, and parental marijuana use. In addition, there is a significant race effect, with blacks about 56 per cent less likely to have smoked cigarettes than whites ($p < 0.01$).

Figure II: Level C marijuana, LSD, and cocaine arrests by musical sub-genre at all concerts at Alpine Valley Music Theater, 2002–2006



Source: Walworth County, Wisconsin, USA Sherriff’s Department

Even after adjusting for the robust set of controls suggested by the substance use literature, our cross-sectional models (Level B) reveal significant differences in substance use by musical preference. Consistent with the aggregate level results (Level A), we again find a positive association between rock music and substance use. The more refined individual-level data, however, show important differentiation among the rock sub-genres. We also find consistent evidence tying hip hop to marijuana and cigarette use and, again, observe a negative association between religious music and substance use. We next explore the rock sub-genres in greater detail, using data situating drugs and music in the same time and place.

Level C: Concert data situating drug types and musical sub-genres in time and place

Examining substance use at concerts (Level C) helps to address an unknown from the analytic levels A and B: the *simultaneity* of music listening and drug use. Given our theoretical framework, it is critical to establish the two phenomena as co-occurring and to deepen our analysis of sub-genres. Our focus here is rock music, given its widespread association with substance use across the Level A and Level B results and the qualitative literature tying drug use to rock sub-genres.¹⁴ Figure II shows marijuana, LSD, and cocaine arrests per

concert across four rock sub-genres, based on analysis of 40 Alpine Valley concerts from 2002 to 2006. While marijuana is ubiquitous across all four, only the heavy metal and jam band sub-genres elicit arrests for cocaine and LSD, as expressed on the secondary axis. Two sub-genres involved *only* marijuana arrests, with an average of about 13 per classic rock concert and 28 per alternative rock concert. Jam band and heavy metal concerts provoke arrests for all three types of drugs, and their rate of marijuana arrests – 43 per heavy metal concert and 66 per jam band concert – far exceeds that of other concerts. Consistent with qualitative research associating hallucinogens with ‘Dead-heads’ (Epstein and Sardiello 1990), jam band concerts also elicit more LSD arrests (1.1 per concert) than heavy metal shows (0.14 per concert), although LSD and cocaine base rates are very low for all sub-genres. Heavy metal concerts average 0.6 arrests per concert for cocaine, relative to 0.4 arrests for jam band concerts.

Table V shows the distribution of drug *seizures* at these concerts. Similar patterns emerge: the concerts with only marijuana seizures featured alternative rock and classic rock sub-genres, with the exception of a single heavy metal band in 2006. Cocaine, ecstasy, hashish, heroin, and LSD seizures occurred exclusively at jam band concerts, again with a heavy metal exception for Ozzfest (a multi-band, multi-genre festival). Psilocybin is widespread across genres, occurring in all but classic rock concerts.

Though our data cannot speak to the demographic characteristics of audiences, the low level and limited variety of drug arrests at classic rock concerts is consistent with life-course theories of drug use. Classic rock bands are labeled as such because of their enduring popularity – many concert-goers are older and prefer only marijuana, and at a lesser rate than attendees in other sub-genres. Jam band attendees experience the full spectrum of drugs at high levels, while heavy metal and alternative rock concert attendees are more specific in their use, mostly at lower levels. Overall, these data support expectations about substance use differences at the sub-genre level: tastes in drugs, as well as music, help constitute these sub-genres as distinctive scenes.

Discussion

Sociological research findings are greatly strengthened when affirmed by diverse methods. While interviews, observations, content analyses, and small-scale psychological studies have greatly contributed to understanding the covariation between tastes for music and substance use, such understanding is complemented and bolstered by a generalizable quantitative assessment. Recognizing that any quantitative approach has its own disadvantages, we examined taste clusters of drugs and music using US data from three analytic levels. We first used Arbitron Format Trends to estimate fixed effects models of music

Table V: Level C drug seizures by concert at Alpine Valley Music Theater (2002–2006)

Drug seized	Musical artist	Musical style (Amazon.com)
Marijuana <i>only</i> *	Creed (2002)	Alternative rock
	Pearl Jam (2003)	Alternative rock
	David Lee Roth (2002)	Classic rock
	Aerosmith (2002, 2003, 2006)	Classic rock
	ZZ Top & Ted Nugent (2003)	Classic rock
	Bon Jovi (2003)	Classic rock
	Kiss (2003)	Classic rock
	Motley Crue (2006)	Classic rock
	Korn (2006)	Heavy metal**
	Ozzfest (2002, 2003, 2005, 2006)	Heavy metal**
Cocaine	Jimmy Buffett (2003)	Jam bands
	Grateful Dead (2002)	Jam bands
	Phish (2003, 2004)	Jam bands
	Deadheads (2004)	Jam bands
	Dave Matthews Band (2006)	Jam bands
	String Cheese Incident (2002)	Jam bands
Ecstasy	Grateful Dead (2002)	Jam bands
	Dave Matthews Band (2002, 2003, 2004)	Jam bands
	Phish (2003)	Jam bands
	Deadheads (2004)	Jam bands
	Grateful Dead (2002)	Jam bands
Hashish	Grateful Dead (2002)	Jam bands
	Phish (2004)	Jam bands
	Deadheads (2004)	Jam bands
Heroin	Grateful Dead (2002)	Jam bands
	Phish (2004)	Jam bands
	Dave Matthews Band (2006)	Jam bands
LSD	String Cheese Incident (2002)	Jam bands
	Grateful Dead (2002)	Jam bands
	Ozzfest (2002)	Heavy metal
	Phish (2003, 2004)	Jam bands
	Deadheads (2004)	Jam bands
Psilocybin	Radiohead (2003)	Alternative rock
	Coldplay (2005)	Alternative rock
	Ozzfest (2005, 2006)	Heavy metal**
	Dave Matthews Band (2003, 2005, 2006)	Jam bands
	Phish (2003, 2004)	Jam bands
	Deadheads (2004)	Jam bands

Source: Walworth County, Wisconsin, USA Sheriff's Department.

Notes: * Where the band is not otherwise listed in the table for a concert during a different year.

** Based on headlining acts, defined as those playing the main stage.

and drug consumption that statistically adjust for stable differences across states and metropolitan areas (Level A). We then addressed potential ecological problems in this approach by analyzing a nationally representative survey of individual US teenagers (Level B). To further strengthen our inferences, we drew on drug arrest and seizure data from a major US concert venue to place the two activities in the same location and time (Level C). Taken together, results from the three levels paint a consistent picture, supporting a conceptual model drawn from broader theories of taste and more localized empirical studies.

For Bourdieu (1984), individuals are predisposed to favour groups of embodied tastes, which Holt (1997) calls taste clusters. While much past work addresses high art consumption, we extend these theories to consumption of popular music and drugs. People are predisposed to enjoy and identify with particular genres through consumption of those genres. In identifying with the scene surrounding this music – the fellow enthusiasts they meet at concerts, for example – they begin to draw boundaries based on the values and activities of the group (Lamont 1992). These may include positive or negative definitions of drug use, which increase or decrease the chances of initiating and continuing use (Becker 1963; Akers 1992). Because certain music scenes value general and particular drug use, we hypothesized taste clusters linking drugs and music.

The expected link between urban music and substance use was supported in models predicting marijuana use and cigarette use at Levels A and B. We also found support for our expectations about the suppressive effects of religious music at Levels A and B, affirming the negative effects of religious cultural identification on substance use (Bachman et al. 2002). Our expectations for country music were substance-specific and focused on alcohol, though past research had been unclear as to the direction of such effects. In the model for total DUI arrests, country music showed a large positive effect for young adults, but there was no such effect among teenagers at Levels A or B.

Most generally, tastes for rock music consistently predict self-reported substance use and drug arrests in both age groups. These effects are present in both aggregate and individual-level models (Levels A and B), consistent with small-scale studies showing high substance use among rock listeners (Arnett 1991a, 1991b, 1996). Where it was possible to disaggregate the various rock sub-genres, we found further support for our expectations that certain marginalized listening habits would elicit higher rates of use, as seen with heavy metal and punk rock, relative to more mainstream tastes such as alternative rock. We further investigated rock sub-genres in our Level C concert data. Consistent with expectations, each sub-genre showed a distinctive pattern of drug use – in terms of both taste and levels of consumption – with few arrests and seizures at classic rock shows, low levels at alternative shows, cocaine and marijuana use at heavy metal concerts, and ubiquitous drug use for jam bands.

None of this is to suggest that the substance and form of specific musical genres causes drug use. Rather, we argue that many teens and young adults form identities within and around music-listening scenes. Based on this identification, they come to define the accepted practices of the group as normal and enjoyable, and other practices as deviant and unpleasant. Definitions and practices around substance use are thus defined with reference to the scene. While we remain agnostic as to the causal role of musical tastes, we have established that the two phenomena – drugs and music – move in tandem in predictable patterns. Nevertheless, we would not suggest that deliberate efforts

to manipulate the airwaves would somehow curb drug use. In fact, such campaigns could draw sharper boundaries around genre- and substance-specific scenes (Hebdige 1979), likely mobilizing resistance to anti-drug messages.

Even with validation across three levels, several questions remain unanswered. First, the association of hip hop and marijuana use is partly explained by race and class differences in musical taste, which should encourage further exploration of class, race, and boundary formation. Second, our study categorizes individuals into distinct groupings based on musical affiliation. In reality, youth and young adults may identify with multiple scenes, which could affect the formation of taste clusters. Third, even with survey and concert data on sub-genres, our measures still represent rather mainstream categorizations. For example, intensive participation in a local 'heavy metal scene' implies more than simply identifying heavy metal as one's favourite music. If boundary formation is stronger on the periphery than the mainstream, we would expect even greater clustering of drugs and musical tastes among the 'hardcore' scene members identified in qualitative studies. While our analysis cannot explicate the intensive process of subcultural identification, the studies outlined in our literature review do examine this process, and our quantitative study can affirm their findings. Finally, technological changes in the consumption of both music and drugs, particularly regarding the digital distribution of music, should spur new research to refine these relationships.

In sum, the links between drugs and music observed in past qualitative and experimental studies are also manifest at higher levels of aggregation. We find taste clusters of music and drugs among youth and young adults, with symbolic boundaries simultaneously drawn around both activities. Such boundaries dictate feelings of group solidarity and guide the interactions of members (Lamont 1992). Here, groups listening to particular musical genres come to define reality by classifying practices, including drug use. Such mutually reinforcing processes comport well with the learning models of substance use advanced by Akers (1992), Becker (1963), and Sutherland, et al. (1992). Identification with a genre or scene that values drug use thus engenders greater drug use among its members – whether identification is measured at the aggregate level by radio ratings, at the individual level by expressed personal preferences, or at the event level by artists embodying distinct sub-genres.

(Date accepted: June 2013)

Notes

1. The authors thank Doug Hartmann, Kathy Hull, Angie Behrens, Sarah Shannon, Suzy McElrath and Rochelle Schmidt for helpful comments on earlier drafts, and the

Walworth County, WI Sherriff's Department for sharing their data.

2. We use the term 'subculture' advisedly here, preferring the terms 'scene' or 'genre'

to indicate participation in and identification with particular musical forms (see Hesmondhalgh 2005).

3. Alternative music is the only rock sub-genre tracked in the Arbitron Radio Ratings genre categories (Level A), attesting to its mainstream acceptance. Alternative rock was also the most commonly preferred sub-genre in our individual-level survey (Level B).

4. FBI UCR data were obtained from the Inter-University Consortium for Political and Social Research (ICPSR). The study numbers are: 2910 (1998); 3167 (1999); 3451 (2000); 3721 (2001); and, 4009 (2002).

5. Because county-level arrest data are not available for the seven Florida MSAs, the number of MSAs in the models is 93.

6. The NHSDA changed substantially in 1999 and 2002, including a name change in 2002 to the National Survey on Drug Use and Health (NSDUH). Because changes in the structure of the survey and incentives have affected prevalence estimates, we limit our analysis to 1999–2001 when the data are considered comparable (Wright 2004).

7. Arbitron has since changed their methodology to better incorporate digital music (see, www.arbitron.com). Given the growth in digital music, radio listenership was likely a more salient measure of musical affiliation in the late-1990s than it is today. A full discussion of these changes is beyond the scope of the current study, though the changing technology of music consumption is clearly relevant for future work on taste clusters. This is especially the case for subsequent replications of our Level A models over a longer historical period or with a contemporary sample. These shifts should have little effect on our other analytic levels (B and C), however, as they do not draw on broadcast radio sources.

8. The logistic regression models below have an N of 952, or 91 per cent of the total

respondents, when missing responses are excluded.

9. We also examined use in the previous month, although the rates are too low to provide stable estimates for less popular genres such as religious music. Among other genres, however, results for past-month use parallel those for lifetime use (not shown, available by request).

10. Unfortunately, no hip hop or country concerts took place during our observation period. Given the specificity of our hypotheses for rock sub-genres, however, analysis of the venue's rock concerts still proves informative.

11. While Arbitron disaggregates rock sub-genres such as alternative, the data do not distinguish between stations that identify as classic rock versus hard rock/heavy metal. Thus, for the Level A analysis, these categories are combined. Similarly, the Arbitron data do not distinguish between the urban music sub-genres of hip hop and rhythm and blues, so these are combined as well. Distinctions within these sub-genres are explored in more detail in the individual-level survey (Level B) analysis.

12. Models with 'pop' as a category are not discussed due to a lack of significant results. The lone significant finding was in the total DUI arrest model ($b = -10.50$, $p < 0.01$).

13. The choices in the 'other' category had very few respondents each and include oldies, reggae, techno rave, folk, disco, Latin/salsa, unspecified rock, everything, other, and don't know.

14. Sub-genres were classified based on a search by band name on Amazon.com and allmusic.com. While we considered using Billboard.com to classify performers into genres, each group or performer may appear on multiple Billboard charts, but Allmusic and Amazon provide global classifications.

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