Published in final edited form as:

Subst Use Misuse. 2012 January ; 47(2): 130–142. doi:10.3109/10826084.2012.637438.

Dance Is the New Metal: Adolescent Music Preferences and Substance Use Across Europe

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Abstract

This study examined relationships between music preferences and substance use (tobacco, alcohol, cannabis) among 18,103 fifteen-year-olds from 10 European countries. In 2005–2006, across Europe, preferences for mainstream Pop (pop chart music) and High-brow (classical music and jazz) were negatively associated with substance use, while preferences for Dance (house/trance and techno/hardhouse) were associated positively with substance use. In three countries, links were identified between liking Rock (rock, heavy metal punk/hardcore, and gothic) and substance use; associations between Urban (hip-hop and R&B) and substance use were mixed. No substantial gender differences emerged in these patterns, and controlling for relevant covariates did not attenuate the predictive value of substance use. The findings are consistent with the conclusion that music is a robust marker of adolescent substance use.

Keywords

pop; rock; urban; dance; highbrow; heavy metal; hip-hop; techno; adolescent; substance use

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

INTRODUCTION

Most adolescents love music. It provides the soundtrack for a developmental phase characterized by rapid and profound physical, emotional, and intellectual changes. Music addresses themes, mainly romance and sex, that appear to many adolescents to be fresh, exciting, confusing, and personally relevant. Much of pop music taps the emotional turmoil attached to feeling attracted to someone, falling in love, maintaining, and breaking-up a romantic relationship (Cooper, 1991). Music also has strong mood-enhancing qualities that can energize, uplift, and comfort listeners of any age (Juslin & Laukka, 2004). Music is an indispensable aspect of adolescent social gatherings, and pop music particularly often addresses partying and having a good time. Four decades of content analysis of lyrics from popular songs in the US have documented convincingly that cigarettes, alcohol, and drugs are prominent topics in popular music, and that some genres are rife with references to licit and illicit substances (see review by Christenson, Roberts, & Bjork, 2011). Not surprisingly, research has also uncovered links between adolescents' preferences for certain music genres and substance use.

Previous studies have reported that adolescents who listen to loud, energetic, and rebellious music show a propensity for risk behaviors, including substance use (Roe, 1995). Fans of particular music genres tend to seek each others' company and build "scenes" (Selfhout, Branje, ter Bogt, & Meeus, 2009). Some adolescent crowds have a reputation for elevated use of licit and illicit drugs that is mirrored in the lyrics of the music they adore, and vice versa. Crowd members may be affected by either substance use messages in songs or substance use behaviors of peers, or both, and hence crowd or "scene" membership may translate into higher substance use (Mulder, ter Bogt, Raaijmakers, Nic Gabhainn et al., 2010).

US studies from the eighties and nineties indicated that adolescent heavy metal fans were more likely to be substance users (Arnett, 1991; Took & Weiss, 1994). More recent US studies indicated that preferences for rap, techno, and reggae were positively associated with smoking and drinking alcohol among adolescents (Chen, Miller, Grube, & Waiters, 2006). In Canada, Miranda and Claes (2004) reported higher cannabis and alcohol use among youth liking rap music. In another Canadian study, Tanner, As-bridge, and Forsyth (2008) found higher levels of drug use among adolescent hip-hop and heavy rock fans. Forsyth, Barnard, and McKeganey (1997) linked British adolescents' and young adults' liking of electronic dance music to the use of alcohol and other substances, while ter Bogt and Engels (2005) found that young Dutch dance fans, mean age 22.3 years, who favored the hardest and loudest form of dance music (hardcore, hardhouse, and techno) consumed more alcohol and drugs than other dance fans. Mulder and colleagues (2009) reported that adolescents with preferences for any type of non-mainstream music, that is, music generally not found in the pop charts, may be more prone to substance use. Hence, there is a relatively substantial literature linking adolescent preference for heavy metal, hip-hop, dance music, and non-mainstream variations of these types of music to substance use behaviors.

Recent research with a large representative sample of Dutch adolescents (Mulder, ter Bogt, Raaijmakers, Nic Gabhainn et al., 2010) provides results with some nuances. While in the

English-speaking countries, a positive link between liking loud rock music and substance use has been widely reported, only weak connections were found for Dutch boys, and no association for girls. The same held for the link between hip-hop and substance use: among Dutch adolescents (particularly among boys), no relation was found between liking hip-hop and substance use. Cross-cultural differences and historical shifts in youth cultural styles may account for the variable associations between music preferences and substance use. The majority of the studies in this field have relied on small samples, and many of them have only investigated specific musical genres in relation to substance use. Pop music is a virtually global medium that is of high importance for its young consumers. It is therefore timely to study potential links between music and substance use in a cross-national context using large representative samples. Thus, the aim of this study is to examine connections between music preferences and substance use among adolescents in 10 different European countries.

Accounting for the Music–Substance Use Link

Twentieth-century popular music has always been associated with substance abuse and casual sex. From the Charleston flappers in the twenties with their short hair, short dresses, and craving for drinks and cigarettes to the fifties' rock 'n' rollers high on booze and loud music to stoned-out sixties' hippies and nineties' pill-popping dance fans, popular stereotypes have always connected music with excess, loss of control, and moral looseness (ter Bogt, 2000). Popular opinion still favors the notion that pop music lyrics and music videos corrupt young people (Nuzum, 2001). Social research has demonstrated that the overwhelming majority of even hardcore fans of "deviant" music develop into decent, law-abiding citizens (Weinstein, 1991), and that much problem behavior, including substance abuse, is limited to adolescents (Moffitt, 1993). However, there may be a grain of truth in the stereotypical portrayal of the links between liking certain types of music and substance use and abuse (ter Bogt, 2000). Several theoretical perspectives shed light on the potential links between music, artist behavior, and music videos on the one hand and adolescent substance use on the other, and empirical research has provided some evidence for these associations.

From the perspective of schema theory (Bem, 1981), exposure to media messages can strengthen adolescent endorsement of tobacco, alcohol, and other drug use. Favorable media portrayals of smoking, drinking, drug use, and more recently energy drinks can reinforce the viewers' general understanding that substance use is cool, socially acceptable, pleasurable, and not particularly harmful (see review from Spijkerman, 2005). No single media portrayal is likely to be persuasive, but the preponderance of favorable images may be, and it has been observed that popular music lyrics and videos contain an overwhelming number of positive references to substance use (Christenson et al., 2011).

From the perspective of social cognitive theory (Bandura, 1986), people learn through the observation of others, through which they obtain vicarious reinforcement. When relevant behaviors are modeled by high-status others such as rock stars, adolescents may develop favorable expectancies about the behavior and seek to imitate it. Pop music artists may be particularly potent role models because they are famous and adored by their fans.

Musicians' actual or perceived substance use behaviors may be highly relevant to adolescents just when they are beginning to explore the use of tobacco and psychoactive substances (Christenson et al., 2011).

In addition, music preference may be associated with substance use through selection processes. Arnett (1991) and Roe (1995) argued that adolescents who are alienated from important social institutions such as family, school, and society at large may choose music that reflects their social position. Both authors have made this case by discussing the example of heavy metal, viewed as loud, unruly, and rebellious music. They found that a choice for heavy metal implied associating with other fans in a social environment where smoking, drinking, and drug use were more common than in other adolescent environments or subgroups. Within certain youth subcultures, both music and substance use may be lifestyle characteristics that are so central that they in fact define these subcultures. Examples can be found in the heavy metal scene, as well as in hippie, punk, and rave (i.e., house) subcultures. Recent research has found that preferences for energetic, non-mainstream music may increase selection into adolescent peer groups in which consumption of licit and illicit drugs is normative, and that, conversely, liking more mainstream types of music is associated with a choice of friends characterized by less substance use (Mulder, ter Bogt, Raaij-makers, Nic Gabhainn et al., 2010), suggesting that music, peer crowd orientation, and substance use or non-use are indeed interrelated.

The Structure of Music Preferences

While there are many types of music, research about the structure of adolescent music taste generally shows that preferences for a multitude of different music genres can be subsumed under four or five different broad styles of music. By means of factor analysis, US researchers Rent-frow and Gosling (2003) distinguished between (1) an "upbeat and conventional" style, including chart pop music, country, sound track, and the range of religious music; (2) an "intense and rebellious" style, defined by rock, alternative, and heavy metal music; (3) an "energetic and rhythmic" style, encompassing rap/hip-hop, soul/funk, and electronic dance music; and (4) a "reflective and complex" style, including classic music, jazz, blues, and folk music. Similar analyses of the structure of musical preferences have been conducted in Belgium (Stevens & Elchardus, 2001), the Netherlands (Tillekens, 1993) and Sweden (Roe, 1992) with relatively comparable results. More recently, ter Bogt et al. (ter Bogt, Delsing, Self-hout, Christenson, & Meeus, 2011; ter Bogt, Raaijmakers, Vollebergh, Van Wel, & Sikkema, 2003) analyzed a large representative sample of Dutch youth and discerned the following five overall music styles on the basis of preferences for 16 different genres: (1) *Pop* (chart pop music, Dutch pop music); (2) *Rock* (rock, heavy metal, punk, gothic); (3) *Urban* (hip-hop, R&B, reggae); (4) *Dance* (house, trance, techno); and (5) *Highbrow* (classic, jazz, blues, soul). As Urban and Dance types of music have become very popular during the nineties and the early years of the new century, it may not come as a surprise that Urban and Dance genres sometimes merge with the Pop factor, or that they cluster together as highly danceable, rhythmic music (ter Bogt, 2011). Findings from a variety of countries thus indicate that broad music styles exist and that they are valid cross-culturally. Fans in different countries may be affected similarly by their favorite

artists' behaviors, lyrics, and videos, and affiliate with friends who are also fans and hold certain attitudes about substance use.

Also noteworthy is that music preferences are highly stable across adolescence. Adolescence can be seen as a period in which cultural preferences are tested, further developed, and refined; however, even at age 12 or 13, most young people already have intricate knowledge of different types of music. Though there is some change in preferences in early and mid-adolescence, by late adolescence, music taste is firmly in place. Research has established that the music people prefer in late adolescence and early adulthood is best remembered in later life (Janssen, Chessa, & Murre, 2007) and remains better liked than music originally listened to at an earlier or later age (Holbrook & Schindler, 1989; Smith, 1994). During adolescence and young adulthood, preferences for individual artists or bands may vary, but preferences for broad styles of music, that is, Pop, Rock, Urban, Dance, or Highbrow, show a stability that resembles or even surpasses the stability of fundamental "Big Five" person characteristics, that is, extraversion, emotional stability, agreeableness, conscientiousness, and openness to experience (Delsing, ter Bogt, Engels, & Meeus, 2008; Mulder, ter Bogt, Raaijmakers, & Sikkema, 2010). Music preference stability implies that across adolescence, young people seek to listen to the same type of music over and over again, and depending on the content of the music, are either more or less exposed to substance use messages.

The Present Study

Music is an important medium for adolescents and music preferences are a remarkably stable feature of adolescent lifestyle. Popular music in general and some styles specifically contain a high number of mostly positive references to substance use. Through their music choice, adolescents may associate with peers with certain substance use dispositions and behavior. Therefore, it is of interest to examine the relationships between music preferences and adolescent substance use as well as non-use. Most research on the connection between music taste and substance use originates in the US, Canada, the Netherlands, and the UK, and these links have not been examined extensively across Europe. The current study sought to extend the literature by exploring the link between music preference and substance use among 15-year-olds in 10 countries that participated in the Health Behaviour in School-aged Children (HBSC) study. This research focuses on the relationships between music preferences for music (including mainstream pop, jazz, classical music, and non-mainstream music such as heavy metal, punk, gothic, and the hardest types of dance music) and a composite measure of three of the most important types of adolescent substance use: tobacco, alcohol, and cannabis use.

Because both music preferences and substance use have been shown to vary by gender, we investigated gender differences within each country. Finally, prior research has brought to light important indicators of adolescent substance use besides music preferences or crowd orientation. To test the uniqueness of the associations between music and substance use, we examined whether introducing a set of relevant covariates that have been shown to relate to both music preferences and substance use – family affluence, household composition, support from parents, and evenings out with friends (Arnett, 1992; Kuntsche, Simons-Morton, Fotiou, ter Bogt, & Kokkevi, 2009; Monshouwer, Van Dorsselaer, Verdurmen, ter

Bogt, & Vollebergh, 2006; Mulder, ter Bogt, Raaijmakers, & Vollebergh 2007; Verdurmen, Van Dorsselaer, Monshouwer, ter Bogt, & Vollebergh, 2005) – attenuated the links between music preferences and substance use. This study aims to answer three research questions:

RQ 1: Are adolescent music preferences associated with substance use, and are these links similar across 10 European countries?

RQ 2: Are associations between music preferences and substance use similar for female and male adolescents?

RQ3: Are connections between music preferences and substance use attenuated when controlled for a set of relevant confounders?

METHOD

Sample

The data were drawn from the 2005–2006 World Health Organization collaborative HBSC study. HBSC is an international collaboration between research teams in 41 countries (2005–2006) across Europe and North America that aims to monitor and further understanding adolescent physical health and psychosocial well-being and its antecedents. Data were collected through a school-based survey using classroom-administered self-completion questionnaires in each participating country and region, with standardized requirements for sampling, questionnaire items, and survey administration established by an internationally agreed research protocol. Participation in the survey was voluntary, with assurances provided in relation to confidentiality and anonymity. Each country respected ethical and legal requirements in their countries for this type of survey. Ethical approval for each national survey was obtained according to the national guidance and regulation in place at the time of data collection. Participating countries were required to include a minimum of 95% of the eligible target population within their sample frame. In the majority of countries, national representative samples were drawn and samples were stratified to ensure representation by, for example, geography, ethnic group, and school type. Further details about study development and the methods employed can be found in Currie et al. (Currie, Nic Gabhainn, & Godeau, 2009; Currie et al., 2008).

In 10 countries, the 2005–2006 survey contained questions about music preferences: Belgium (Flanders), Estonia, Greece, Ireland, Macedonia, the Netherlands, Portugal, Spain, Switzerland, and the UK (England and Scotland). Our analysis was limited to 15-year-olds, who also answered questions about tobacco, alcohol, and cannabis use. Following central data cleaning by the HBSC data bank, the original 10 country files contained 19,124 cases; 5.3% of the students did not respond to the music preferences questions and were therefore removed, resulting in a data file with 18,103 cases (51.0% girls). Remaining missing values on music preferences, including values indicating that respondents did not know that particular genre (ranging from 4.4% of the scores for a highly popular genre such as hip-hop to 23.8% for an unpopular and unknown genre such as gothic rock), or any of the other variables in the analysis were imputed with the help of the Relative Mean Substitution procedure developed by Raaijmakers (1999), a reliable and valid method for estimating missing values of (composite) Likert-type scale scores (Bernaards & Sijtsma, 2000).

Measures

Music preference—Music preference was assessed using 11 questionnaire items about music genres that students could each rate on a five-point Likert scale with answering categories 1 = “strongly dislike,” 2 = “dislike,” 3 = “do not dislike or like,” 4 = “like,” and 5 = “strongly like.” These 11 music genre-items were designed to represent music that is well known and popular among adolescents and documented to have a broad cross-national appeal (Rentfrow & Gosling, 2003; ter Bogt et al., 2003). The items included popular mainstream pop music: chart pop; different types of popular and underground rock music: rock, heavy metal, punk/hardcore, and gothic; two types of mostly Black American, urban music: hip-hop and R&B; one type of popular and one type of less mainstream dance music: house/trance and techno/hardhouse; and highbrow music: jazz and classical music. As has been noted before, a multitude of genres may be subsumed under a smaller number of more general styles of music. In the present study, four latent music style factors were discerned: Rock (indicated by rock, heavy metal, punk/hardcore, gothic), Urban (hip-hop and R&B), Dance (house/trance and techno/hardhouse) and Highbrow (classic music and jazz), in addition to mainstream Pop (manifest variable) (see left part of Figure 1).

A confirmatory factor analysis (CFA) (AMOS 16.0) of this structuring of genres among all respondents showed a satisfying fit with all factor loadings $> .57$ (CFA: $\chi^2(36) = 2409.5$, $p < 0.05$, CFI [comparative fit index] = .96, RMSEA [root mean square error of approximation] = .06). In a multigroup analysis, we further tested whether this structure differed between countries. First, the music indicators of the different latent constructs were constrained, and subsequently estimated freely. The freely estimated model showed a significant decrease in the χ^2 value ($-\chi^2 = 559.7$, $df = 54$, $p < .05$), but neither the CFI nor the RMSEA indices were affected positively by freely estimating. Freely estimating does not result in a superior model; hence, we conclude that the patterning of music taste as proposed in our constrained model is valid cross-nationally.

Substance use—Three types of substance use were included: tobacco, alcohol, and cannabis. Tobacco use was assessed by asking students “How often do you smoke tobacco at present?”, with response options 1 = “never,” 2 = “less than once a week,” 3 = “at least once a week, but not every day,” and 4 = “every day.” Alcohol use was measured with the item “At present, how often do you drink anything alcoholic such as beer, wine or spirits? Try to include even those times when you only drink a small amount.” The response options were: 1 = “never,” 2 = “rarely,” 3 = “every month,” 4 = “every week,” and 5 = “every day.” Cannabis use: “Have you ever taken cannabis in your life”, with the response options 1 = “never,” 2 = “once or twice,” 3 = “3–5 times,” 4 = “6–9 times,” 5 = “10–19 times,” 6 = “20–39 times,” and 7 = “40 times or more.” Smoking, drinking, and using cannabis are distinct substance use behaviors, but they do cluster together and have been documented to indicate a single underlying construct of substance use (e.g., Johnston, O’Malley, & Bachman, 2002; Kendler, Schmitt, Aggen, & Prescott, 2008; Kuntsche, 2004). Hence, the tobacco, alcohol, and cannabis values were transformed into Z-scores, and in our model of music and substance use behaviors, these Z-scores were used to indicate a latent construct of *substance use*, following a procedure reported by Mulder et al. (2009) (see Figure 1). The CFA showed

an excellent fit with factor loading of .79, .50, and .83 for tobacco, alcohol, and cannabis use, respectively (CFA: χ^2 (10) = 85.91, $p < .05$, CFI = .99, RMSEA = .02).

Control Variables

The following covariates were included: *Gender* (0 = “male,” 1 = “female”) is an important factor for both music preferences and substance use, and therefore included in all our analyses. *Family Structure* was dichotomized into 0 = “living with both biological parents” and 1 = “other family structure.” *Family Affluence* was computed by summarizing adolescents’ indications of having a family car and one or more computers, traveling away on holidays, and having their own bedroom. Perceived *Support from Parents* was assessed by the question “How easy is it for you to talk to the following persons about things that really bother you?” with response options 1 = “very difficult,” 2 = “difficult,” 3 = “easy,” and 4 = “very easy.” A sum score of support from mother and/or father was computed; responses indicated by 5 = “don’t have or see this person” were treated as a missing= value and imputed with the relative mean substitution procedure (Raaijmakers, 1999). *Evenings Out with Friends* was assessed with the question “How many evenings per week do you usually spend out with your friends?”, with the response options ranging from 0 = “never” to 7 = “seven nights a week.”

Analysis Strategy

Music preferences were modeled as predictors of substance use, controlling for gender (see Figure 1). To test cross-national differences in these connections (RQ 1), in a multigroup analysis (AMOS 16.0), all indicators of latent constructs and paths between the music constructs and substance use were set to be equal across the 10 country groups. Subsequently, the paths between music and substance use were released. A significant increase in model fit was used as a criterion for distinguishing country or gender differences in the links between music preferences or gender and substance use. Second, within all 10 countries, potential gender differences in the associations between music and substance use were tested in a multigroup analysis (RQ 2). Paths indicating latent constructs and paths between the music predictors and the outcome were constrained across the two groups and then released. A significant increase in model fit was used as a criterion for distinguishing separate girls’ and boys’ paths in these models. Third, to investigate the potential attenuating effect of relevant covariates (RQ 3) of *Family Affluence*, *Family Structure*, *Parental Support*, *Evenings Out with Friends*, and connections between these predictors were added to the model depicted in Figure 1. As will be clear from our results next, the pattern of paths between music and substance use was highly similar across countries, and therefore this test of the unique contribution of music in predicting substance use was executed with the total sample of all 18,103 respondents. It should further be noted that paths between error components were not allowed in our models, except for the connection between smoking and cannabis use. As this research is based on a large database, an alpha level of 0.001 was used in all statistical tests.

RESULTS

The popularity of different kinds of music varied cross-nationally. The most popular types of music among 15-year-olds in Europe were Pop and Urban (Table 1). Rock and Dance were considerably less popular, and Highbrow music was least popular. While the overall patterning of popularity of different styles was highly similar across the 10 countries, some cross-national and gender differences were observed (MANCOVA [multivariate analysis of variance] with gender as covariate, Pillai's $F(45, 90415) = 62.99, p < .001, \eta^2 = .03$). Mainstream Pop was relatively popular in Ireland and less well liked in Estonia and Switzerland (all mean values significantly deviated ± 0.3 from grand mean, $p < .001$). Dutch youth were not particularly fond of Rock music; Irish and Portuguese youth were into Pop and Urban music, while young people in Greece and Spain mainly favored Pop; Dance was liked most in Belgium, and less so in Greece, Switzerland, and the UK (all differences ± 0.03 , p values $< .001$). No substantial cross-national differences were observed in (dis)liking Highbrow music. Pop and Urban were significantly more popular among girls. Substance use also differed cross-nationally (ANCOVA with gender as covariate, $F(9, 18083) = 63.26, p < .001$, see Figure 2). Substance use was particularly high in the Netherlands and the UK, and low in Portugal and Macedonia.

The first research question pertained to cross-national similarities or differences in the relationships between music preferences and substance use, when controlling for gender. Table 2 represents the most important paths between music and the substance use outcome. Paths can range from -1 to 0 , as an indication of a negative association between music preferences and substance use, and between 0 and $+1$, as an indication of a positive relationship. In all paths between music and substance use, some cross-national differences were found, and the model in which these paths were estimated freely showed a better fit than the constrained model (constrained multigroup model $\chi^2(817) = 8257.4, p < .05, CFI = .91, RMSEA = .02$; freely estimated multigroup model $\chi^2(772) = 7889.6, p < .05, CFI = .91, RMSEA = .02, \chi^2 = 367.8, -df = 45, p < .001$). But even though significant cross-national differences were found in the associations between music and substance use, overall, the patterning of connections between, on the one hand, Pop, Rock, Dance and High-brow and, on the other hand, substance use was highly similar, and only for the link between Urban and substance use did values diverge substantially. Although a significant increase in the χ^2 value was observed when releasing constraints, other measures of fit did not improve by discerning cross-national differences in the paths from music preferences to substance use. Thus, our results indicate both communality and (small) differences among the connections in our model.

Specifically, liking Pop was associated with less substance use in all countries, and in nine out of the 10 countries, path coefficients were significantly negative, ranging from $-.14$ in Spain to $-.37$ in Switzerland. Liking High-brow music was also associated with lower levels of substance use in all countries, and path coefficients reached significance in seven, ranging from $-.16$ in Ireland to $-.24$ in the UK. Relatively strong associations were found between liking Dance music and substance use. In all countries, this connection was positive, and in nine countries significantly so, ranging from $.15$ in Greece, to $.48$ in the UK. Mixed results were obtained pertaining to preferences for Urban music. Liking Urban music was

significantly related to lower substance use in two countries (Macedonia and Spain) and higher substance use in three (Greece, Ireland, and Switzerland), and no connection was found in the remaining five.

The second research question concerned potential gender differences in the music–substance use link. Multi-group analyses for all 10 countries, with gender as a criterion, indicated that in none of the countries, paths between girls' and boys' preferences and substance use differed so much that releasing them resulted in a significantly better fit (at $p < .001$). This implies that the associations between music and substance use are similar for both genders.

Third, in analyses across all 18,103 respondents, we tested whether in addition to gender, other covariates such as *Family Affluence*, *Family Structure*, *Parental Support*, and *Evenings Out with Friends* attenuated the links between music and substance. In the second column of Table 3, it can be seen that though all covariates were significantly linked to substance use, music preferences remained robustly associated with substance use: liking Pop or Highbrow indicated less substance use, and preferring Rock, and even more so, preferring Dance music were associated with more substance use, while liking Urban held no systematic relation to substance use. The first model with music and gender accounted for 14% of the variance in substance use and adding the covariates to this model increased this percentage to 35%. The second model shows that *Affluence*, *Family Structure*, *Parental Support* and most notably *Evenings Out with Friends* are indeed significantly and independently associated with substance use, and also that music preference is a significant and substantial marker of substance use, even after having controlled for these factors.

DISCUSSION

This study set out to investigate the associations between music preferences and substance use among adolescents in 10 European countries. It further sought to document potential gender differences in these connections, and test whether associations between liking certain music genres and substance use were attenuated by the inclusion of other factors in our models. Across Europe, a highly similar structure in adolescents' structuring of music genres was identified. Factor analysis revealed that in addition to the most popular, chart type of music, Pop, four styles of music emerged: Rock, which included rock, heavy metal, punk/hardcore, and gothic; Urban, including hip-hop and R&B; Dance, which comprised house/trance and techno/hardhouse; and Highbrow, including classical music and jazz. More importantly, strong evidence was found for associations between adolescent music preferences and substance use across Europe. Preferences for Pop and Highbrow music were related to lower substance use, while liking Dance music indicated more substance use. No or weak links were found between liking Rock music and substance use, and the pattern of relationships was mixed for preferring Urban music. Although there were gender differences in music preferences and reported substance use, within countries, the relationships between the two were very similar for girls and boys. Results also revealed that the associations between music and substance use remained significant after including covariates in our models, and that differences in music preferences accounted for a substantial part of the variation in adolescent substance use. In sum, music preferences were a significant, robust, and unique marker of adolescent substance use for both genders across Europe.

Lyrics and Artists as Role Models

Questions remain as to why or how music preferences would be linked to substance use. Schema and social learning theories introduced earlier in this paper point to the potential role of lyrics and artists themselves as carriers or conduits of pro- or anti-substance use messages, strengthening substance use-related cognitive schema and behaviors. Content analyses show that mainstream Pop, Rock, and particularly Urban music contain many references to alcohol and drug use, mostly in a favorable way (Christenson et al., 2011). However, our results demonstrate that liking these genres of music with these messages does not necessarily translate into higher substance use, and thus there is a lack of specificity in this potential explanation. It could be argued that Rock lyrics have the potential to lead to some substance use among its fans, but in the case of Pop and Urban, this argument is far more tenuous, if not impossible. Urban music contains the frequent references to licit and illicit substances (Christenson et al., 2011), and some Urban music fans may indeed respond to this positive characterization of substance use, but not consistently so, as indicated by the fact that in some countries, the association between liking Urban and substance use is positive (Greece, Ireland, and Switzerland), but in others, negative (Macedonia and Spain). Furthermore, though exposed to many positive substance use messages via song lyrics, those who prefer Pop reported lower levels of substance use.

Preferring music genres that rely far less on lyrics, such as Highbrow and Dance, is associated with less and more substance use, respectively. Much Highbrow music is instrumental in character, and if voices are included, for example in cantatas or opera, they function often as an additional instrument; hence, lyrics, if at all present and intelligible, are relatively unimportant in this music style. To our knowledge, it has never been systematically examined, but it is hard to imagine that vocal classical music contains many (anti-)substance use messages that result in lower substance use among its audience. The reverse holds for Dance music. Known for its intense rhythmic quality and its sparse lyrics, dance does not contain many (pro-)substance use that may incite adolescent substance use. In sum, the absence of lyrics can hint at more or less substance use, and preferences for music types that do contain (strong) positive substance use messages, most notably Urban music, are not unequivocally associated with more substance use. If at all effective, lyrics only seem to appeal to and affect a part of the music audience, and further investigations are required to determine under which conditions and for whom and why this may apply.

If lyrics do not help explain these findings, perhaps the key is related to attributes of the performers. Marc Bellis and his colleagues (2007) have found that successful, professional pop musicians not only have relatively shorter life expectancies, but also that these shorter life expectancies result from high levels of substance use and misuse that are relatively common in their professional field. Some mainstream pop stars promote a healthy way of living, but many others are renowned for alcohol and drug use excesses that are broadly exposed in the press and are noted and discussed in fanzines (Bandelow, 2007). Thus, the fact that adolescents who like Pop report less substance use is not very likely linked to the protective modeling role of Pop artists, as many of them exhibit risky behaviors. There is also no easy interpretation for the patterns of association between Rock and Urban music preferences and substance use. Many Rock and Urban performers are notorious for their

pro-alcohol and drug stance, and a lifestyle that is infused with drug and alcohol misuse (Oksanen, 2011; Shapiro, 2003). However, a (weak) connection between liking Rock and substance use was found in only a few countries, and results for Urban music preferences were varied. Thus, the well-known, use-infused lifestyles of Rock and Urban artists do not translate unambiguously into more substance use among their fans, implying that, if at all relevant, artists' effects as role models are moderated by as yet unknown and to-be-researched factors.

Selection Effects

Selection may be a more plausible explanation for the link between music and substance use. Some authors have suggested that personal characteristics such as sensation-seeking and rebelliousness or lack of social inclusion, such as alienation from family, school, or society at large, may trigger adolescent interest in energetic and noisy music, such as heavy metal and punk rock, the rougher types of hip-hop, and the loudest and speediest forms of dance music (Arnett, 1991; Carpentier, Knobloch, & Zillman, 2003; ter Bogt & Engels, 2005). Our findings suggest that some Urban and Rock fans and most Dance fans report higher levels of substance use; this may at least partly be traced back to their personality and social context. Conversely, the brashness, rough edges, and often ear-splitting character of much non-mainstream Rock, Urban, and Dance music may simply be uncomfortable or unattractive for those who prefer Pop or Highbrow music. Pleasant-sounding Pop and reflexive Highbrow music may be attractive to young people who are lower in their sensation-seeking and rebelliousness, and those with a greater orientation to the adult world and positive relationships to parents, again suggesting that it is not so much their music choices but their personality, warm relationships with parents, and their social inclusion that lead to avoiding early and elevated substance use. Selection on the basis of personality or social characteristics may be an important mechanism for at least partially explaining the link between music preferences and substance use. It must be noted though that in studies of the links between substance use and music which have been controlled for sensation-seeking and rebelliousness, a unique effect of music was identified, indicating that not all of the connection between music and substance use can be explained by the specific personality characteristics of listeners (Arnett, 1991).

These findings may imply that the selection of "deviant" music (Roe, 1995) by substance-using youth is a process that seems to differ cross-nationally. While young people with higher levels of substance use prefer Dance music, and to a lesser extent, Rock in most participating European countries, Urban music is liked by adolescents higher or lower in substance use than their peers, depending on their country of residence. It may be that the presentation and perceptions of Urban music varies cross-nationally; in some countries, it may have a mainstream pop feel; in others, it may be perceived as non-mainstream music, attracting a more deviant adolescent subgroup. Further research on cross-national differences in the framing and context of this type of music is warranted.

During the eighties and nineties, Arnett (1991, 1992) and Roe (1995) found that loud, non-mainstream Rock music was particularly attractive to alienated, heavy substance-using youth. Today, this type of Rock music appears to have a wider appeal. This music, with its

sometimes outrageous lyrics, videos, and artist behavior, may be used by adolescents on more normative developmental trajectories as a vehicle to open up and maintain a personal sphere outside the reach of their parents. Experimenting with and testing personal identity and social rules may be enhanced by associating with a musical subculture that sometimes contradicts the attitudes, norms, and values of conventional adult life. For many fans, identification with Rock can be conceived as a temporary, functional period with a focus on gaining autonomy from parents, but as it now appears, without the associations with high-risk behavior and substance use (Mulder et al., 2009). Although prior research suggested strong links between liking Rock and substance use, these patterns were not replicated here. We argue that this is most likely explained by shifting patterns in the role of music genres cross-nationally. Rock may now have a less deviant, more mainstream audience and that may be why we have found unanticipated weak links between liking Rock and substance use.

Study's Limitations and Strengths

The abovementioned last observations illustrate some limitations of this research. First, although personality may lie at the root of both music choice and substance use, we did not include measures of personality or control for personality factors in our analyses; therefore, our comments on their relevance must remain speculative. However, we did control for relationship quality and other covariates and still found a significant independent association between music and substance use. Second, previous research suggested that music choice may be important for the choice of friendship and affiliation with adolescent peer groups, which in turn relates to substance use behaviors (Mulder, ter Bogt, Raaijmakers, Nic Gabhainn et al., 2010). Our data set did not allow us to test this potentially important mechanism through which music preferences are associated with substance use. Our results, however, cast doubt on the relevance of other proposed mechanisms: the possible modeling effect of lyrics and the behavior of artists. Our findings do not provide support for the relationships between preferences for music with many pro-substance use messages, made by artists notorious for their alcohol and drug use, and adolescent substance use. A third related limitation is that our data are cross-sectional, and thus, we are unable to identify causal links. Our study's strength lies in robustness and the comparability of the cross-national data set, and our ability to examine patterns across nations. We have demonstrated connections between music preferences and substance use on the basis of an unprecedented large cross-national study, using the same appropriate measures of adolescent music preferences and substance use behaviors in 10 European countries.

CONCLUSION

With Rock apparently tamed and mixed findings for Urban music, electronic Dance music has emerged as the new “risky” music across Europe, in the sense that preferences for this musical genre are substantially, cross-nationally linked to higher substance use among adolescents. Dance has a history of being linked to drug use; in the late eighties and nineties, the emergence of new electronic dance music was fueled by the popularity of MDMA (“XTC”) and vice versa (ter Bogt & Engels, 2005). Our data suggest that this association remains valid even today. Our results indicate that among European 15-year-olds, this type

of music is attractive to the young people who report relatively heavier use of tobacco, alcohol, and cannabis. Once they are allowed to attend dance parties, they may become members of adolescent and young adult subgroups known for their elevated substance use, and becoming a part of that party scene, no matter how much fun, holds the risk of more substance use.

In sum, Rock music, which was characterized as being “deviant” during the eighties and nineties has probably gained mainstream appeal and is no longer reliably connected to high, risky substance use. Adolescent preferences for the newer music styles such as trance, house, hardhouse, and techno, collectively labeled as Dance, now significantly and substantially indicate higher substance use among adolescents. Though cultural meanings seem to have shifted in the sense that Rock and in some countries, Urban, have lost their non-mainstream edge, in another way, the story remains the same; it is still preferences for loud, non-mainstream music that are associated with “heavier” substance use. Now that it is clear that significant links between music and substance use exist cross-nationally, the mechanisms through which music preferences translate into lower or higher substance use have to be studied in more detail.

Biography

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GLOSSARY

Dance	Electronic dance music played at large dance parties; the late eighties successor of Disco, also referred to as House, or Rave music. Around the turn of the century, Trance became the most popular dance music.
Heavy Metal	The loudest form of Rock music with, in the seventies and eighties, a disproportionally male, working class following, but now popular among a broader range of audiences.
Highbrow	Complex music from the classical music tradition. Since the fifties, Jazz is increasingly referred to as highbrow music as well. Generally, the mostly highly educated audiences that like Classical music also prefer Jazz.
Hip-hop or Rap	Originally, Black American music where singing is replaced with rapping, (i.e., rhythmically and poetically talking to the music, often using local slang). Hip-hop became the most important pop music of the nineties, and American examples were followed worldwide. Hip-hop thereby crossed national, ethnic, and racial barriers.
Marker	a factor that indicates particular traits or (future) behaviors.
Pop	Literally “popular” music; mainstream music that can be found in the hit parades, or that at least aims at a position in the charts. From the sixties onwards, easy listening, catchy songs from various origins are referred to as Pop.
R&B	The term “Rhythm and Blues” originally referred to rhythmic, danceable Black American music of the forties and fifties, a predecessor of Rock ‘n’ Roll. The term re-emerged as an indicator of melodic, soulful Black American music in the nineties.
Rock	Music that emerged in the late sixties and early seventies as a loud, guitar-, drum-, and bass-driven type of popular music.
Schema theory	Psychological theory, popularized by Ulric Neisser in his book <i>Cognitive Psychology</i> (1967). Schemas refer to mental structures organizing perception, interpretation, and behaviors.
Social cognitive theory	Psychological theory, popularized by Albert Bandura, proposing that much human behavior is learned through observing, interpreting, and imitating others who show behaviors that are deemed relevant and desirable for the observer.
Techno	Minimal, often instrumental type of Dance music.
Urban	From the eighties onwards, a general indication of Black American music, mostly referring to Rap or Hip-hop, or R&B music.

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FIGURE 1.
A structural model of music preferences and substance use.

FIGURE 2.
Substance use in 10 countries (Z-scores).

TABLE 1

Music preferences by country and gender (means)

	Pop	Rock	Urban	Dance	Highbrow
Belgium	3.4	2.7	3.5	3.2	2.1
Estonia	3.2	2.8	3.3	3.0	2.4
Greece	3.4	2.7	3.1	2.5	2.2
Ireland	3.8	2.6	3.7	2.8	2.3
Macedonia	3.5	2.6	3.3	3.1	2.4
The Netherlands	3.7	2.3	3.6	2.8	2.2
Portugal	3.4	2.9	3.8	3.1	2.1
Spain	3.6	2.7	3.0	2.9	2.2
Switzerland	3.1	2.7	3.3	2.5	2.1
UK	3.5	2.7	3.4	2.6	2.1
Girls	3.7	2.6	3.6	2.8	2.2
Boys	3.2	2.8	3.3	2.9	2.2
Total	3.5	2.7	3.4	2.9	2.2

Note: Estimated marginal means. Music preference scale 1 = “do not like at all” to 5 = “do like very much”; all differences .30 between countries, and between boys and girls are significant at $p < .001$.

TABLE 2
Music preferences and substance use in 10 European countries (standardized path coefficients)

	Belgium	Estonia	Greece	Ireland	Macedonia	The Netherlands	Portugal	Spain	Switzerland	UK
Pop	-.26 [*]	-.22 [*]	-.28 [*]	-.23 [*]	-.06	-.17 [*]	-.23 [*]	-.14 [*]	-.37 [*]	-.16 [*]
Rock	.04	.03	.12 [*]	.03	.06	.07	.02	.14 [*]	.35 [*]	.10
Urban	.01	-.02	.22 [*]	.14 [*]	-.15 [*]	-.01	.08	-.14 [*]	.33 [*]	.02
Dance	.35 [*]	.30 [*]	.15 [*]	.37 [*]	.32 [*]	.40 [*]	.30 [*]	.30 [*]	.04 [*]	.48 [*]
Highbrow	-.20 [*]	-.05	-.27 [*]	-.16 [*]	-.07	-.23 [*]	-.06	-.21 [*]	-.24 [*]	-.23 [*]
Gender (female)	-.03	-.12 [*]	-.12 [*]	.03	-.03	.08 [*]	-.05	.10 [*]	-.07	.09 [*]

Note:

^{*} indicates significant path at $p < .001$.

TABLE 3

Music preferences and substance use in 10 European countries (standardized path coefficients)

	Model 1	Model 2
Pop	-.08 *	-.16 *
Rock	.10 *	.07 *
Urban	-.03	.02
Dance	.30 *	.24 *
Highbrow	-.24 *	-.16 *
Gender (girls)	.08 *	.03
Family affluence scale	—	.09 *
Single-parent family	—	.11 *
Monitoring parents	—	-.16 *
Evenings out with friends	—	.45
Multiple R^2	14	35

Note:

Countries: Belgium, Estonia, Greece, Ireland, Macedonia, the Netherlands, Portugal, Spain, Switzerland, and the UK.

* indicates significant path at $p < .001$.