

Arts Education and Positive Youth Development:  
Cognitive, Behavioral, and Social Outcomes of Adolescents who Study the Arts

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## **EXECUTIVE SUMMARY**

The value and positive impact of arts study on children and adolescents is often self-evident to artists, musicians, and arts educators. Yet, the arts community is frequently called upon to justify the expenses of arts education by providing evidence that engaging in arts education and arts experiences make a meaningful, positive difference in the lives of students. The purpose of the present study was to examine the value and positive impact of the arts by analyzing the cognitive, behavioral, and social outcomes of adolescents who study the arts in comparison with their non-arts peers using data from the National Longitudinal Study of Adolescent Health (“Add Health”). Importantly, this study was constructed recognizing that there are certain, measurable pre-existing differences between those adolescents who do and do not choose to study the arts in schools, and these differences were statistically controlled in the analyses.

### **Study Methodology**

This study was designed to quasi-experimentally compare a nationally representative sample of adolescents who did and did not study the arts on a variety of measures that are indicative of positive youth development. To track a nationally representative sample of arts and non-arts adolescents longitudinally through and beyond adolescence, I identified sample members from the National Longitudinal Study of Adolescent Health (Harris & Udry, 2013), or “Add Health,” who had and had not earned high school credit for formal coursework in the arts (visual art, music, dance, drama, and film/media arts). Because prior research suggests substantial population differences exist between those students who do and do not elect arts study, a series of observable covariates was statistically controlled in the analyses using a propensity score approach.

### Key Findings

#### During Adolescence

- ◆ Each additional year of arts study was significantly associated with a **20% reduction** in the likelihood that an adolescent would ever be suspended out-of-school.
- ◆ As adolescents, students of the arts are **significantly more optimistic** about their chances to attend college than non-arts students.
- ◆ Adolescents enrolled in music were **26% less likely** than non-music students to consume alcohol “more than two or three times” during adolescence. Each additional year of music study was significantly associated with an **11% reduction** in the likelihood that an adolescent would ever consume alcohol. No other area of arts study was significantly associated with alcohol use during adolescence.
- ◆ As adolescents, Music students were **24% less likely** than non-music students to use marijuana. Dance students were **47% less likely** than non-dance students to have used marijuana during adolescence. Conversely, visual arts students were **29% more likely** than non-visual arts students to have used marijuana as adolescents. Theater study was not significantly associated with either increased or decreased marijuana usage.
- ◆ Students of music and dance were significantly less likely than non-arts students to be engaged in fewer delinquent behaviors during adolescence, while visual arts students are significantly more likely to be engaged in delinquent behaviors. In each case, though statistically significant, the effect sizes are very small.
- ◆ Visual arts students reported significantly higher levels of school attachment than did non-visual arts students. No other form of arts study was significantly related to increased or decreased levels of school attachment.
- ◆ Music students were significantly less likely to be motivated to be sexually active as adolescents than were non-music students. No other form of arts study was significantly associated with motivation for sexual activity.

### **During Emerging Adulthood**

- ◆ Emerging adults who had studied music, theater, or the visual arts scored slightly, but statistically significantly, higher on a standardized test of vocabulary as emerging adults than did their non-arts peers. Emerging adults who had studied dance scored slightly lower on the same test than had their peers with no high school arts coursework.

### **As Adults**

- ◆ Echoing their higher levels of postsecondary education optimism reported as adolescents, former arts students were **55.38% more likely** to have attended any postsecondary school by adulthood than were former non-arts students. Each additional year of arts study was associated with an **18% increase** in the likelihood of having attended any postsecondary schooling.
- ◆ Former students of the arts were **29% more likely** than former non-arts students to have earned a four-year college degree by age 24-32. Each additional year of arts coursework was associated with a **12% increase** in the likelihood that adolescents would eventually earn a four-year college degree.
- ◆ Former students of music and theater were significantly more optimistic as adults than were former non-arts students. Other forms of arts study were not significantly associated with general optimism.
- ◆ Former arts students were significantly less likely to be involved with the criminal justice system than were former non-arts students: Adults who had taken arts coursework were **26% less likely** than those without high school arts coursework to have ever been arrested. Each additional year of arts coursework was associated with a **9% reduction** in the risk of being arrested.
- ◆ Former music students reported significantly less illicit substance use as adults than did former non-music students. Compared to adults with no high school music courses, adults who had studied music in high school were **20.25% less likely** to have ever tried marijuana, **26.55% less**

**likely** to have ever tried cocaine, **41.18% less likely** to have ever tried crystal meth, and **25.12% less likely** to have ever tried other illicit substances.

- ◆ Former dance students were significantly less likely than non-dance students to have ever tried cocaine—**62.13% less likely** than non-dance students.
- ◆ As adults, former theater students were **38.48% more likely** than adults with no high school theater courses to have ever tried cocaine and **39.55% more likely** than adults who had not taken high school theater courses to have ever tried crystal meth. Compared to adults with no high school theater courses, former theater students were **38.76% more likely** to have tried other illicit substances.
- ◆ Compared to adults with no visual arts coursework, students of the visual arts were significantly more likely to have used illicit substances, and, on average, former visual arts students reported having tried a slightly, but statistically significantly, higher number of drugs. Former visual arts students were **26.14% more likely** to have ever used marijuana, **31.48% more likely** to have ever used cocaine, **42.29% more likely** to have ever used crystal meth, and **49.98% more likely** to have ever used other illicit substances than were adults with no visual arts coursework.

### Conclusions and Next Steps

Results from this study suggest that, in many respects, adolescent arts students achieve significantly more positive developmental outcomes than their peers who do not pursue arts coursework in schools. However, the results suggest a nuanced picture with certain outcomes varying based on the arts discipline studied. By and large, arts students do appear to experience positive developmental benefits from their arts study that extend beyond adolescence into adulthood.

That arts students, when compared to their non-arts peers, were so much more optimistic about attending college as adolescents, and that this optimism led to significantly increased likelihood to attend postsecondary school and earn a four-year is a particularly interesting result of the present study. This result is compatible with the existing research and theoretical literature on the benefits of arts study;

however, further research is needed to examine the potential causal pathways for the association between arts study and positive postsecondary outcomes. One strong possibility is that the causal pathway runs through the college admissions process, with arts students either more likely to enter the college admissions process and/or more likely to succeed in the college admissions process when compared with their non-arts peers. Future research should examine the effect of arts study, net of grades, socioeconomic status, and college entrance exams, on the success rate of students applying to colleges and the selectivity of colleges.

In the present study, adolescent arts students were less likely than non-arts to be suspended out-of-school. It is possible that arts students are more engaged in school (as visual arts students reported more school *attachment* than non-arts students), and therefore arts students may avoid behaviors that could lead to a suspension. There are, however, myriad other possibilities for this finding that need future research to be understood.

Substance use among arts students in the Add Health sample was neither universally more nor universally less positive than substance use among non-arts students. A varied and nuanced picture emerged suggesting that music students were less likely to use illicit substances both as adolescents and into adulthood, and that visual arts students were more likely to be substance users both in adolescence (marijuana, specifically) and as adults (when former visual arts students were more likely to report having used nearly all of the substances analyzed: marijuana, cocaine, crystal meth, and other illicit substances). Further research is clearly needed in this area, as there is no existing theory in the scholarly literature to suggest why the pattern of substance use might be different among the different arts. Since differential selection into the various arts disciplines may create preexisting population differences between visual arts students and students of the other arts that were not accounted for in the propensity score model employed in the present study, this result should be interpreted with caution as future research replicating and extending this result is needed.

Taken altogether, the results of this study suggest that arts students do appear to experience positive developmental benefits from their arts study through adolescence and into adulthood. Further

research examining the outcomes analyzed in this study and other developmental outcomes of arts and non-arts students is needed to extend and solidify the research base on arts education as a context for positive youth development and to determine potential causal pathways.

### CASTING ARTS EDUCATION AS A CONTEXT FOR ADOLESCENT DEVELOPMENT

The value and positive impact of arts study on children and adolescents is often self-evident to artists, musicians, and arts educators. Yet, the arts community is frequently called upon to justify the expenses of arts education by providing evidence that engaging in arts education and arts experiences make a meaningful, positive difference in the lives of students. Often, this research has focused on the associations between arts study and traditional measures of academic achievement (Catterall, 1997; Deasy, 2002; Gouzouasis, Guhn, & Kishor, 2007; Helmrich, 2010; Miksza, 2007; 2010; Morrison, 1994; Schellenberg, 2005; Southgate & Roscigno, 2009). Research of this type has not yet been able to establish a causal link between arts study and increased academic performance. In fact, the observed association between arts study and academic performance has recently been called into question by research suggesting that the types of students who elect arts study are *initially* more likely to have higher academic achievement than their peers who do not elect the arts (Elpus & Abril, 2011; Fitzpatrick, 2006; D. W. Kinney, 2008; Winner & Cooper, 2000).

Even though research on the academic benefits of arts study has yet to be fully settled, adolescent arts students frequently report to researchers that they highly value their artistic pursuits and that their arts study becomes an important *context* to help them navigate the challenges of adolescence (Adderley, Kennedy, & Berz, 2003; Barber, Stone, & Eccles, 2005a; Fredricks et al., 2002; Graham, 2003). Contexts are an important consideration in research on adolescent development, which is not solely focused on the isolated, individualistic experiences of adolescents. Rather, since at least the 1960s—the beginning of what Lerner and Sternberg (2009) term the “second phase” in the history of adolescent development research—developmental psychologists have taken a broader view that considers the influences of parents, peers, and non-parental adults (among others) on the developmental trajectories of adolescents. The situations created by these social connections—these “developmental contexts” (Eccles, 2005)—are now seen as vitally important to understanding the Western experience (Larson, Wilson, & Rickman, 2009) of adolescence. Examining these contexts, and their influences on the developmental outcomes of

adolescents, is consistent with a model of positive youth development that focuses on adolescents' building blocks toward positive developmental outcomes, rather than on deficits that lead to negative outcomes. By framing adolescence as an opportunity for positive development, rather than as a series of developmental deficits in need of intervention and remedy, we "shift the focus from the study of problems and failures to the study of trajectories that promote positive outcomes for adolescents" (Halverson, 2010, p. 3).

Adolescent developmental psychologists confirm that involvement in organized activities—broadly defined, and nearly always including arts education activities among those studied—is a generally positive context for youth development that promotes prosocial behaviors and successful developmental outcomes for all students, including those considered at-risk (Barber et al., 2005a; Barber, Stone, Hunt, & Eccles, 2005b; Bartko & Eccles, 2003; Mahoney, Larson, Eccles, & Lord, 2005b; Nurmi, 2004). The adolescent experience of art—both as consumer and in many cases as creator—can therefore be construed as an important developmental context, with the potential to influence developmental trajectories through organized activities (such as participating in school-based musical ensembles) or through individual experience (such as in the creation of solo works of visual art).

Adolescence, as broadly defined in the Western world, is the transition period in between childhood and adulthood. During this transition, developmental psychologists often point to several typical "developmental tasks" that must be achieved for successful entry into early adulthood. These developmental tasks include forming more mature peer relationships, breaking childhood emotional dependence upon parents, exploring and achieving sex-role identity, preparing for long-term romantic partnership and family life, and preparing for entry into the workforce and the economic world through choices about education and a career (Nurmi, 1993). Key to all developmental tasks—in fact, subsuming most of them—is the emergence of a stable identity (Marcia, 1980). Markus and Nurius (1986), in a widely cited and highly regarded paper, have theorized that exploration of individual preferences, skill acquisition in areas of innate ability, and the formation of strong peer connections allows adolescents to experiment with several different variations of their eventual adult identities. That is, during their

transition from childhood to adulthood, adolescents are trying out many “possible selves.” The majority of possible selves exploration occurs when adolescents are alone and beginning to understand their “private selves” (Roberts, Henriksen, & Foehr, 2004, p. 494), and during adolescence—even as peer relationships become of utmost importance (Brown & Larson, 2009)—the amount of time spent alone is drastically more than in childhood (Csikszentmihalyi & Larson, 1984; Rideout, Foehr, & Roberts, 2010; Roberts et al., 2004).

There is some fuzziness in the research literature about the precise length and duration of adolescence, with some studies of “early adolescence” extending to participants as young as ten or eleven years old (coinciding with the youngest sixth graders in American middle schools) and some studies of “late adolescence” extending to participants as old as 26, the end of Arnett’s (2000) theorized “emerging adulthood” developmental stage. For the purposes of this study, and the review of literature supporting it, I considered adolescence to be the stage of life between the ages of 12 and 19 years of age, when teens are enrolled in the seventh- through twelfth- grades. Developmental psychologists have investigated this period in the human lifespan since at least the publication of G. Stanley Hall’s *Adolescence* in 1904 (Lerner & Steinberg, 2009). In the intervening century, various theoretical approaches and conceptual orientations have emerged and declined in the research literature, but this phase of rapid biological, social, and psychological transition has remained a great area of interest for scientific inquiry.

### **Arts Education as Developmental Context: Similar to a “Crowd”**

High schools are complex social environments in which adolescents are consistently shaping and re-shaping subcultures that stratify the peer groups within the schools (Brown, Eicher, & Petrie, 1986). Descriptive research explaining these subcultures has been carried out “for more than four decades” (D. A. Kinney, 1999, p. 21), and typically delineates the archetypical crowds of adolescents that seem immediately familiar to those who have experienced high school in America: the “popular” kids, the “jocks,” the “preppies,” the “burnouts,” the “stoners,” and the “geeks” (Barber, Eccles, & Stone, 2001). Importantly, adolescent crowds as they are defined in the research literature are reputation-based and not

necessarily interaction-based (Brown, Mory, & Kinney, 1994)—they are socially constructed identity “options” from which possible selves can be chosen and tend to have permeable boundaries. Because of this, close friendships may not exist between all the members of a certain crowd, and yet each crowd develops a culture with its own value system: Kinney (1999), for example, found that desire to succeed academically was a treasured value of some groups (e.g., the popular crowd in his study—the “trendies”—as well as the “hippie” crowd) but not in others (e.g., the “headbangers” and “druggies”).

One of the ways in which adolescents navigate the identity exploration choices that crowds make available to them is through school-based elective activity participation. Nurmi (2004) refers to the adoption of contexts from a range of choices that influence the adolescent developmental trajectory as “selection.” Selecting specific elective activities in which to participate alters the developmental trajectory by exposing adolescents to peers with similar interests and abilities. Feldman and Matjasko (2005) contend that “the adolescent years represent a critical period in human development during which young people work toward establishing independence and during which contexts outside of the family become more important” (p. 191). Thus, just as the peer context is gaining more importance in adolescent life, the peers around whom an adolescent’s social network revolves are more likely to share the same interests and pursuits as the adolescent since their common interest and selection of the same elective activities is likely to have first brought them together. School-based activities, then, not only help define an adolescent’s own proclaimed identity, they also serve to bring together groups of adolescents who share the same interests and pursuits, thus reinforcing the shared sense of identity common among high school crowds. The organized activity itself is therefore an important context of adolescent development (Mahoney, Larson, & Eccles, 2005a).

Elective school activity participation, such as the curricular or extra-curricular study of music, dance, drama, or visual art in the schools, has therefore been considered a key component of adolescent development. Feldman and Matjasko (2005) assert that elective, structured activities are “central developmental settings for adolescents” (p. 161). In their analysis of the National Longitudinal Study of Adolescent Health (Feldman & Matjasko, 2007), they found that 76.2% of adolescents in the Add Health

sample participated in at least one of 33 possible school-based sports, academic clubs, performing arts opportunities, or in any combination of these types of activities. Elective music study in schools is one of the more popular choices. Elpus and Abril (2010), using national data from the Education Longitudinal Study of 2002, found that fully 21% of enrolled high school seniors in 2004 had participated as a member of their school's band, choir, or orchestra.

Prior research has linked activity participation to positive developmental outcomes for adolescents. Eccles and Barber (1999) found that activity involvement predicted greater school attachment, higher GPA, and future college attendance, even when academic and social success were controlled. Barber, Eccles, and Stone (2005a) found that participation in performing arts activities was associated with greater liking of school in the 10th and 12th grades as well as to higher 12th grade final GPA. Using data from the National Education Longitudinal Study of 1988, Gardner, Roth, and Brooks-Gunn (2008) found that activity participation in school was associated with higher rates of attendance at postsecondary institutions, higher postsecondary degree completion, and volunteering eight years after high school. Consistent with these findings, Darling (2005) found in both cross-sectional and longitudinal analyses that activity participation was linked with positive academic outcomes and decreased usage of illicit substances, with the notable exception of alcohol.

Fredricks and colleagues (2002) provide evidence that positive outcomes for arts students and athletes may come from the developmental assets provided by their involvement. They confirm that involvement in the highest levels of arts study or athletic competition by adolescents becomes an important part of "their developing notion of who they [are] and what they [value]" and link this aspect of their talent pursuit as an important motivator for continued study (p. 87). Eccles (2005) reports that

participating in specific activities helps one explore related identities. . . . If one discovers a good fit of a specific identity with one's experiences of the demands and opportunities associated with the related activity domain, then one is likely to continue both participating in the activity and consolidating the parts of one's identities associated with that activity. (p. 354)

In proposing that school-based arts education serves as a context of development for those adolescents who choose to engage in arts study, I theorize that this occurs through three mechanisms: (1)

involvement in arts education channels peer selection, much in the same way that adolescent crowds have been shown to function (Brown, et al., 1994); (2) this channeling of peer selection reinforces identity choices; and (3) the connection between arts teacher and arts student provides many, but not all, arts education students with an influential non-parental adult relationship (Darling, Hamilton, & Niego, 1994). “Channeling,” as Brown, Mory, and Kinney (1994) define it is the social process encouraging adolescents to form “relationships with certain peers and away from interactions with [certain] others” (p. 133).

**ARTS EDUCATION AND  
THE NATIONAL LONGITUDINAL STUDY OF ADOLESCENT HEALTH**

The National Longitudinal Study of Adolescent Health (“Add Health”) is a major longitudinal study of a nationally representative sample of adolescents who were enrolled in grades 7 through 12 during the 1994-1995 academic year. Some 90,000 adolescents responded to a survey given that year in their schools; a subset of nearly 21,000 of these also participated in a detailed in-home interview. Add Health participants ( $N = 14,738$ ) were re-surveyed in 1996 at Wave II, as young adults in 2001-02 at Wave III ( $N = 15,197$ ), and as adults in 2007-08 ( $N = 15,701$ ).

At the time of Wave III data collection, when all Add Health participants had graduated from high school, 91% of respondents allowed their complete high school transcripts to be released to the Population Research Center at the University of Texas, Austin. These transcripts ( $N = 12,250$ ) became the basis for the ancillary Academic Achievement and Adolescent Health (AHAA) study. They were coded using the same procedures followed by the U.S. Department of Education’s National Center for Education Statistics when that agency collects transcripts for the National Assessment of Educational Progress (NAEP) High School Transcript Studies. Sample members were classified as “Arts students” or “Non-arts students” in this study using their high school transcripts. Those students who had formally enrolled credit-bearing coursework in music, theater, visual arts, dance, or film/media arts are considered arts students in this study. Specific procedures for the identification of arts and non-arts students are detailed in the appendix.

**Research Questions Guiding the Study**

The purpose of this study was to examine the value and positive impact of the arts by analyzing the cognitive, behavioral, and social outcomes of adolescents who study the arts in comparison with their non-arts peers using data from the National Longitudinal Study of Adolescent Health (“Add Health”). Importantly, this study was constructed recognizing that there are certain, measurable pre-existing differences between those adolescents who do and do not choose to study the arts in schools. Observable

pre-existing differences between arts and non-arts students were statistically controlled using a method known as propensity scores. Details regarding the estimation and application of propensity scores in this study are available in the Research Methodology appendix.

The following research questions guided the inquiry:

1. How do adolescents who formally study the arts in schools differ from their non-arts peers on key indicators of positive youth development during adolescence?

- a. School attachment
- b. Psychological adjustment (Depression and Protective Factors)
- c. Delinquency
- d. Time Use (Involvement in risky behaviors, Hours per week engaged with media)
- e. Substance Use (drugs/tobacco/alcohol)
- f. Relative riskiness of closest peers
- g. Optimism about postsecondary school

2. How do adolescents who formally study the arts in schools differ from their non-arts peers on developmental outcomes in young adulthood and beyond?

- a. College attendance
- b. Four-year college degree attainment
- c. Psychological adjustment (Depression and General Optimism)
- d. Involvement with the criminal justice system
- e. Standardized test scores
- g. Substance use

Additionally, demographic data regarding the racial/ethnic makeup of the arts students, and indicators of their prior academic achievement were analyzed. These demographic data are presented in the next section.

### Characteristics of Arts Courses and Arts Students in the Add Health Sample

A majority of students in the Add Health study graduated high school having earned at least one full year's worth of academic credit in an arts course. In the entire Add Health study, there were 12,232 students for whom complete high school transcript data were available. Of these, 9,520 sample members, or 77.83%, graduated high school with at least one arts course appearing on their transcript. Table 1 shows the proportions of arts students enrolled in each of the main arts disciplines.

[Insert Table 1 about here]

The arts students in the Add Health sample pursued a total of **35,526** arts courses over their four years in high school. Among the Add Health sample, Music students pursued 16,494 courses, visual arts students pursued 14,580 courses, theater students enrolled in 3,052 courses, dance students enrolled in 981 courses, film students pursued 205 courses, and students pursued 214 arts survey courses. The total arts courses divided somewhat evenly among the four years of high school, with 9,521 courses taken in 9<sup>th</sup> grade, 8,325 taken in 10<sup>th</sup> grade, 8,514 taken in 11<sup>th</sup> grade, and 9,166 taken in 12<sup>th</sup> grade. Arts students earned an average of **2.13** Carnegie units<sup>1</sup> of coursework in the arts ( $SD = 1.72$ ) across their four years of high school.

Arts students identified their race or ethnicity as: 67% White, 14% Black or African American, 11% Hispanic, 5% Asian, 2% Native American, and 1% other. Rao-Scott adjusted chi-square analysis indicated that the racial makeup of arts students was not significantly different from the racial makeup of the total Add Health sample,  $F(3, 434) = 1.03, p = .38$ .

Prior academic achievement of arts and non-arts students was evaluated using two variables available in Add Health, (1) the ninth-grade academic GPA, and (2) the base-year scores on the Add Health Picture Vocabulary Test (AHPVT), a shortened version of the standard Peabody Picture Vocabulary Test that was administered to all Add Health in-home interview participants. The average ninth-grade GPA across the entire Add Health sample was 2.56 ( $SE = 0.04$ ). The mean ninth-grade GPA for arts students was 2.82 ( $SE = 0.03$ ), while the mean ninth-grade GPA for non-arts students was 2.66

( $SE = 0.05$ ). The distribution of 9<sup>th</sup> grade GPAs is displayed in Figure 1. For the entire sample, the average base-year AHPVT score was 101.20 ( $SE = 0.83$ ); for arts students, the average base-year AHPVT score 102.20 ( $SE = 0.92$ ) while the average base-year AHPVT for non-arts students was 98.00 ( $SE = 1.09$ ). The distribution of base-year AHPVT scores is displayed in Figure 2. This suggests, as has been evident in prior research, that arts students had higher academic achievement than non-arts students even prior to high school arts study.

[Insert Figures 1 and 2 about here]

### INDICATORS OF POSITIVE YOUTH DEVELOPMENT AMONG ADOLESCENT ARTS STUDENTS

Two years following their initial interview for Add Health, most in-home interviewees were re-interviewed for Add Health's Wave II. At Wave II, the majority of adolescents interviewed were still enrolled in secondary school. The Wave II interview collected interview information concerning students physical, emotional, and psychological well-being, as well as indicators of positive (and negative) adolescent development.

**Analytic sample.** The design of Add Health required a restricted analytic sample for these analyses, because at Wave II, some Add Health sample members had not yet completed high school (because at the time of the first survey and interview, Add Health sample members ranged from 12 to 18 years of age). In order to ensure that this analysis compared adolescents who had completed the arts coursework reflected on their high school transcripts, the analytic sample for Wave II outcomes was restricted to those Add Health participants who were at least 17 years of age at the time of Wave II data collection. The analytic sample for Wave II outcomes analyzed here included 3,690 Add Health sample members who were at least 17 years old at Wave II and for whom propensity scores and complete transcript data were available.

Among the participants in the analytic sample for this wave, a large majority (76.34%) had taken at least one arts class while in high school. This included 2,000 who had taken a visual arts class, 1,337 who had taken a music class, 351 who had taken a theater class, 109 who had taken a dance class, and 90 who had taken a film class. Among the analytic sample members, studio art classes were the most popular, with 1,511 having taken at least one studio art class. The second most popular class was choral music—556 of the analytic sample members had taken a choral class.

The present analysis compared arts and non-arts student on a series of behavioral, cognitive, and social indicators of positive youth development. The remainder of this chapter presents the results of the analyses.

### Behavioral Indicators

**Delinquency.** Participants in Add Health's Wave 2 were asked a series of 14 questions asking about the frequency, over the twelve months prior to the interview, that respondents engaged in a series of behaviors that could be considered "delinquent." These ranged from being loud or rowdy in a public place through various levels of theft or burglary and up to being initiated into a named gang. Responses ranged from 0 (never) to 3 (five or more times). I created a **delinquency scale** based on the unstandardized mean of participants' answers to these fourteen items. Delinquency scale scores ranged from 0 to 2.86, with a grand mean of 0.21 ( $SD = 0.30$ ). The scale had a high estimated reliability (Cronbach's  $\alpha = .81$ ). Overall, arts students scored slightly lower than non-arts students on the delinquency scale (0.186 for arts students and 0.192 for non-arts students), but the difference was not statistically significant ( $b = .002$ ,  $SE = 0.02$ ,  $t[128] = 0.14$ ,  $p = .888$ ).

An analysis disaggregating type of arts studied suggests practically small yet statistically significant differences in delinquency between certain kinds of arts students and non-arts students. Table 2 shows the results of this regression. Controlling for the preexisting differences between arts and non-arts students and holding other types of arts participation constant, students of music and dance had lower delinquency scores than non-arts students, and these differences were small but statistically significant. Conversely, visual art students' delinquency scores were slightly, but statistically significantly, higher than those of non-arts students.

**Out-of-school suspensions.** Across the entire analytic sample, 8% of participating adolescents reported that they had ever been disciplined with an out-of-school suspension. Among arts students, only 7.5% had received an out-of-school suspension; among non-arts students, 10% had been disciplined with an out-of-school suspension. With the exception of visual arts students, this pattern holds consistent across the various art types studied by Add Health participants. Comparisons by type of arts studied are as follows: Music students 5.5% ever suspended, non-music 9.5%. Dance students 6.8% ever suspended, non-dance 8.0%. Theater students 4.6% ever suspended, non-theater 8.4%. Visual art students 8.5% ever suspended, non-visual art 7.4%.

Logistic regression comparisons between arts and non-arts students, controlling for preexisting differences between arts and non-arts students *and* for school urbanicity, suggest that the difference in suspension rates between arts and non-arts student are not statistically significant ( $OR = 1.09$ ,  $SE = .20$ ,  $p = .622$ ). School urbanicity is included in the regression since exploratory data analyses suggested it was significantly associated with the likelihood of an adolescent receiving an in-school suspension.

Although the binary difference between arts and non-arts students was not statistically significant, regressing the likelihood of out-of-school suspension on the number of arts credits studied suggest that each additional year of arts study is significantly associated with a **20% reduction** in the likelihood that a student would receive and out-of-school suspension ( $OR = .80$ ,  $SE = .05$ ,  $p = .001$ ).

**School expulsions.** Across the entire analytic sample, just 0.92% of adolescents had ever been sanctioned with expulsion from school. Among arts students, the number was slightly higher (0.97%), but the difference was not statistically significant. Logistic regression controlling for preexisting differences and urbanicity of school showed that the difference in likelihood of expulsion was not significantly different for arts and non-arts students ( $OR = 1.40$ ,  $SE = 0.86$ ,  $p = .584$ ). Analysis for the effect of arts credits on expulsion suggests that each additional year of arts coursework is associated with 24% reduction in the likelihood that a student would be expelled, but the result was not significant ( $OR = 0.76$ ,  $SE = 0.10$ ,  $p = .050$ ). The lack of statistical significance for this analysis is perhaps unsurprising—given the rarity of reported expulsions in the analytic sample, the statistical power to detect effects for this outcome is quite low.

**Hours per week engaged with media.** Adolescents in the analytic sample reported a mean of 37.23 hours per week of engagement with television, music, video games, and computers for entertainment purposes<sup>2</sup>. Overall, arts students reported a mean of 36.48 hours per week of media engagement while non-arts students reported a mean of 39.63 hours per week so engaged.

### Substance Use During Adolescence

**Tobacco use.** Across the entire analytic sample, 49.35% of participating adolescents reported that they had ever smoked cigarettes. Among all arts students, 49.34% report having ever smoked, a statistically non-significant difference from the 49.38% of non-arts students who reported having ever smoked ( $OR = 0.97$ ,  $SE = 0.03$ ,  $t[128] = -1.12$ ,  $p = .263$ ).

**Alcohol use.** Across the entire analytic sample, 57.75% of adolescents reported that they had had a drink of beer, wine, or liquor—not just a sip or taste of someone else’s—more than two or three times. For those students who had enrolled in at least one arts course, 57.61% reported having used alcohol, compared to 58.19% of non-arts students. The difference is not statistically significant ( $OR = 1.00$ ,  $SE = 0.13$ ,  $t[128] = 0.02$ ,  $p = .982$ ). Each additional year of arts coursework, however, was associated with a statistically significant **10% reduction** in the likelihood that a student would use alcohol ( $OR = 0.90$ ,  $SE = 0.28$ ,  $t[128] = -3.30$ ,  $p = .001$ ). Disaggregating arts by area suggests that this reduction is primarily driven by enrollment in music courses. Holding other types of enrollment constant, music students were **26% less likely** to report having consumed alcohol more than two or three times ( $OR = 0.74$ ,  $SE = 0.07$ ,  $t[128] = -3.05$ ,  $p = .003$ ). Each additional year of music coursework was significantly associated with an **11% reduction** in the likelihood that a student would use alcohol ( $OR = 0.89$ ,  $SE = 0.03$ ,  $t[128] = -3.37$ ,  $p = .001$ ). No other area of arts coursework was significantly associated with either a reduction or increase in the likelihood that adolescents would report drinking alcohol more than two or three times.

**Marijuana use.** In the entire analytic sample, 30.73% of Add Health participants reported having tried or used marijuana in the two year timeframe between the first and second waves of the study. Among arts students, 30.62% reported having used marijuana while 31.08% of non-arts students reported having used marijuana. The overall difference between arts and non-arts students is statistically non-significant ( $OR = 1.05$ ,  $SE = 0.15$ ,  $t[128] = 0.40$ ,  $p = .689$ ). However, disaggregated analyses suggest differential relationships between marijuana use and type of arts studied.

Table 3 shows the results of a logistic regression for marijuana use by arts area studied. As seen in the table, holding other arts study constant, music students were **24% less likely** to have used

marijuana than were non-music students. Dance students were **47% less likely** than students who had not taken dance to use marijuana. Conversely, visual arts students were **29% more likely** than non-visual arts students to have reported using marijuana.

### **Cognitive Indicators**

**Postsecondary education optimism.** Add Health participants were asked a series of three questions related to their optimism for attending and completing a college degree. The questions were (1) “On a scale of 1 to 5, where 1 is low and 5 is high, how much do you want to go to college?” (2) “On a scale of 1 to 5, where 1 is low and 5 is high, how likely is it that you will go to college?” and (3) “What do you think are the chances that you will graduate from college?”. I created a **college optimism** scale based on the unstandardized mean of participants’ answers to these three items. The college optimism scaled scores ranged from 1 to 5, with higher scores indicating more optimism toward attending and graduating from college. The grand mean across the entire analytic sample was 4.06 ( $SD = 1.05$ ). The college optimism scale had a high estimated reliability (Cronbach’s  $\alpha = 0.88$ ). Overall, arts students had a significantly higher level of college optimism ( $M = 4.16$ ) than did non-arts students ( $M = 3.75$ ). Ordinary least squares (OLS) regression estimates controlling for preexisting differences between arts and non-arts students suggested this difference was statistically significant ( $b = 0.15$ ,  $SE = 0.07$ ,  $t[128] = 2.25$ ,  $p = .026$ ). For each additional year of arts credit earned, college optimism scores increased by 0.05 point, a small but statistically significant increase ( $SE = 0.01$ ,  $t[128] = 3.51$ ,  $p = .001$ ).

Further analyses examining disaggregated types of arts education suggest that the music students drive the overall significant difference between arts and non-arts students. Holding other types of arts enrollment constant and accounting for preexisting differences between arts and non-arts students, music students outscored on the non-music students on the college optimism scale by 0.15 ( $SE = 0.06$ ,  $t[128] = 2.54$ ,  $p = .012$ ). In the disaggregated analysis, there was no significant effect found for other types of arts enrollment.

**Depression.** At Waves 1 and 2, Add Health participants responded to all 20 items of the Center for Epidemiological Studies Depression scale (CES-D), a standardized self-report measure of depression specifically designed for research on the general population, as opposed to clinical diagnosis (Radloff, 1977). Each item of the CES-D is scored by respondents on a 0 to 3 scale indicating the respondent's frequency of the event in question within the past week. I computed a depression scale score for each analytic sample member by taking the mean of all items comprising the scale (after reversing the signs of the four items in the CES-D that are worded in a positive direction), yielding a composite score ranging from  $-1$  to  $2.32$ , with higher scores indicating a higher level of depression. Reliability for the CES-D scale among the analytic sample for Wave 2 outcomes was high (Cronbach's  $\alpha = .87$ ). Across the entire analytic sample, the average mean score was  $-0.04$  ( $SD = 0.40$ ). CES-D scores at Wave 1 were predictive of CES-D scores two years later at Wave 2 ( $b = 0.61$ ,  $SE = 0.02$ ,  $t[128] = 30.25$ ,  $p < .001$ ), however the difference between arts and non-arts students was not statistically or practically significant ( $b = 0.01$ ,  $SE = 0.02$ ,  $t[128] = 0.69$ ,  $p = .494$ ).

### Social Indicators

**School attachment.** Participants in Add Health were asked to rate their agreement with the following six statements: (1) You feel close to people at your school, (2) You feel like you are a part of my school, (3) Students at your school are prejudiced, (4) You are happy to be at your school, (5) The teachers at your school treat students fairly, and (6) You feel safe in your school. I created a **school attachment** scale based on the unstandardized mean of these items (reversing the signs of the scores on the third item). The school attachment scaled scores ranged from 0 to 4, with higher scores indicating more attachment to school. The scaled scores had a grand mean across the entire sample of  $1.49$  ( $SD = 0.69$ ). The school attachment scale had a high estimated reliability (Cronbach's  $\alpha = 0.74$ ). Overall, arts students showed slightly higher levels of school attachment ( $M = 1.50$ ) compared to non-arts students ( $M = 1.45$ ). Ordinary least squares (OLS) regression estimates controlling for preexisting differences between

arts and non arts students suggested this difference was statistically significant ( $b = 0.09$ ,  $SE = 0.04$ ,  $t[128] = 2.27$ ,  $p = .025$ ).

Further analyses examining disaggregated types of arts education suggest that the visual art students drive the overall significant difference between arts and non-arts students. Compared to students who had never enrolled in a visual arts course, visual arts students outscored on the school attachment scale by 0.14 ( $SE = 0.04$ ,  $t[128] = 3.55$ ,  $p = .001$ ). The positive effect for visual arts students remained robust when holding other arts enrollment constant ( $b = 0.14$ ,  $SE = 0.04$ ,  $t[128] = 3.38$ ,  $p = .001$ ); no significant difference was found among the other types of arts enrollment.

**Support from Family, Friends, and Nonparental adults (Protective Factors).** Add Health participants were asked a series of eight questions about the support they felt they received from the people in their lives. Specifically, participants were asked: (1) how much they feel adults care about them, (2) how much they feel teachers care about them, (3) how much they feel their parents care about them, (4) how much they feel their friends care about them, (5) how much they feel the people in their family care about them, (6) how much they feel they want to leave home, (7) how much they feel that they have fun with their families, and (8) how much they feel their family pays attention to them. Responses ranged from 1 (“not at all”) to 5 (“very much”). I created a protective factors scale based on the unstandardized means of the responses to these items, reversing the sign on item six. The scaled scores ranged from 0.375 to 5, with higher scores indicating a greater level of perceived support. The estimated reliability of the scale was modest (Cronbach’s  $\alpha = .75$ ). Across the entire analytic sample, the grand mean was 3.19 ( $SD = 0.61$ ). Arts students’ mean (3.19) was slightly higher than the mean for non-arts students (3.18), but this difference was not statistically significant. An analysis disaggregating arts by discipline also revealed no significant difference on this measure between students of the the individual arts disciplines and non-arts students.

### Arts Students' Peer Context

**Friends' substance use.** Three questions in the Add Health Wave 2 Home Interview asked participants to report how many of their three closest friends smoked cigarettes, drank alcohol more than once per month, or used marijuana more than once per month. I created a **peer substance use** scale based on the unstandardized mean of these three items. Scores on the peer substance use scale ranged from 0 (indicating that none of the respondent's three closest friends drank, smoked cigarettes, or used marijuana) to 3 (indicating that all three of the respondent's three closest friends drank, smoked cigarettes, and used marijuana). The estimated reliability for the scaled score was moderate (Cronbach's  $\alpha = .62$ ). Across the entire analytic sample, the grand mean was 1.12 ( $SD = 0.91$ ). Arts students' peer substance use ( $M = 1.10$ ) was less than that of non-arts students ( $M = 1.20$ ). Ordinary least squares (OLS) regression estimates controlling for preexisting differences between arts and non-arts students suggested that this difference was not statistically significant ( $b = -0.01$ ,  $SE = 0.07$ ,  $t[128] = -0.15$ ,  $p = .884$ ).

**Motivation to be sexually active.** At Wave 2, Participants in Add Health were asked to rate their agreement with a series of seventeen questions relating to reasons they might or might not participate in risky behaviors. For example, one such statement was "If you had sexual intercourse, you would feel less lonely." Participants indicated their level of agreement on a scale of 1 to 5, with higher numbers representing a greater sense of agreement. I created a **motivation for sexual activity** scale based on the unstandardized mean of these items (reversing the signs of the scores on those items where agreement would indicate *less* risk to be sexually active). The motivation for sexual activity scaled scores ranged from 0 to 3.5, and had a high estimated reliability (Cronbach's  $\alpha = .71$ ). The grand mean across the entire analytic sample was 1.11. Overall, arts students had lower scores ( $M = 1.08$ ) than did non-arts students ( $M = 1.22$ ). OLS regression analysis accounting for preexisting differences between arts and non-arts students showed that this difference was statistically significant ( $b = -.05$ ,  $SE = 0.02$ ,  $t[128] = -2.37$ ,  $p = .019$ ). Each additional year of arts coursework was associated with a statistically significant decline in the motivation for sexual activity scaled score ( $b = -.02$ ,  $SE = 0.01$ ,  $t[128] = -4.06$ ,  $p < .001$ ).

Further analyses examining disaggregated types of arts education suggest that the music students drive the overall difference between arts and non-arts students. Holding other types of arts enrollment constant and controlling for preexisting differences between arts and non-arts students, music students reported significantly lower motivation to engage in sexual activity than did non-music students ( $b = -0.06$ ,  $SE = 0.02$ ,  $t[128] = -2.69$ ,  $p = .008$ ). In the disaggregated analysis, no art form other than music was significantly associated with motivation to engage in sexual activity.

### **ARTS STUDENTS' DEVELOPMENTAL OUTCOMES IN EMERGING ADULTHOOD**

In 2001-2002, six years after the initial wave of Add Health data collection, Add Health investigators located as many of the original Add Health participants as possible ( $N = 15,197$ ), now aged 18-26, and re-interviewed them in their homes about their relationships, marital history, childbearing history, and educational history. Many of the original questions were asked again verbatim while new segments of the interview were created to gather data on issues pertinent to young adults.

**Analytic sample.** Although the earlier in-adolescence analyses for this study required the restriction of the analytic sample by age to ensure that all arts students had already taken their transcript-indicated arts coursework, at Wave III, no such restriction is necessary (as all participants were at least age 18 at the time of Wave III data collection). Consequently, for the analyses in young adulthood, the analytic sample is increased to 10,606 Add Health participants for whom transcript data were available and propensity scores had been calculated.

Among the participants in the analytic sample for this wave, a large majority (77.27%) had taken at least one arts class while in high school. This included 4,373 who had taken a visual arts class, 3,012 who had taken a music class, 1,007 who had taken a theater class, 309 who had taken a dance class, and 132 who had taken a film class. Among the sample members, studio art classes were the most popular, with 3,420 having taken a studio art class. The second most popular class was choral music—1,321 sample members had taken a choral music class.

The remainder of this chapter presents the results of an analysis of three behavioral and cognitive developmental outcomes of former arts and non-arts in emerging adulthood. Specifically, at this wave, I analyzed outcomes for engagement in violence and/or delinquency, the Add Health Picture Vocabulary Test given at Wave III, and levels of depression.

#### **Behavioral Outcome**

**Violence and delinquency.** At Wave III, Add Health participants were asked a series of 26 questions related to their exposure to, and committing of, acts of delinquency and violence. I created a

**violence and delinquency scale** based on the unstandardized mean of participants' answers to these 26 items. There was no statistically significant difference between the scores of young adults who had taken arts courses in high school and those who had not.

### **Cognitive Outcomes**

**Add Health Picture Vocabulary Test.** Participants in Add Health were administered an abridged version of the Peabody Picture Vocabulary Test (Revised). For the 87 items on the test, the interviewer reads a word aloud and the participant is asked to choose the single picture, from a choice of four, that best describes the meaning of the word. For this analysis, arts and non-arts students were compared on their third Wave scores on the Add Health Picture Vocabulary Test (AHPVT)<sup>3</sup>.

For the entire analytic sample, the mean standardized AHPVT score at Wave III was 102.79 ( $SD = 16.75$ ). The mean for arts students was 103.71 while the mean for non-arts students was 99.64. Ordinary least squares (OLS) regression analysis controlling for preexisting differences between arts and non-arts students suggest the advantage for arts students is small (about one-tenth of a standard deviation), but statistically significant ( $b = 1.78$ ,  $SE = 0.50$ ,  $t[128] = 3.59$ ,  $p < .001$ ). Each additional year of arts coursework in adolescence was associated with a very small 0.82 point gain in young adult AHPVT scores ( $SE = 0.11$ ,  $t[128] = 7.26$ ,  $p < .001$ ). Disaggregated analyses suggest the score advantage was highest for former drama students, who outscored young adults with no high school arts coursework by 2.72 points ( $SE = 0.68$ ,  $t[128] = 3.99$ ,  $p < .001$ ), about 0.16 of a standard deviation. The positive effect was smaller, but still statistically significant, for former visual art students ( $b = 1.22$ ,  $SE = 0.56$ ,  $t[128] = 2.18$ ,  $p = .031$ ) and music students ( $b = 0.92$ ,  $SE = 0.42$ ,  $t[128] = 2.20$ ,  $p = .030$ ). Conversely, young adults who had studied dance during high school significantly *underperformed* those without any arts coursework by -2.42 points ( $SE = 1.17$ ,  $t = -2.07$ ,  $p = .041$ ), which is about 0.14 of a standard deviation.

**Depression.** At Waves I and II, Add Health participants responded to all 20 items of the Center for Epidemiological Studies Depression scale (CES-D), a standardized self-report measure of depression specifically designed for research on the general population, as opposed to clinical diagnosis (Radloff,

1977). At Wave III, a shortened version of the CES-D questionnaire was administered as part of the interview. Each of the nine items of the shortened CES-D was scored by respondents on a 0 to 3 scale indicating the respondent's frequency of the event in question within the past week. I computed a Wave III depression scale score for each analytic sample member by taking the mean of all items comprising the scale (after reversing the signs of the two items in the shortened CES-D that were worded in a positive direction), yielding a composite score ranging from -1 to 2.22. Reliability for the shortened CES-D scale among the analytic sample for Wave III outcomes was high (Cronbach's  $\alpha = .80$ ). There was no significant difference between arts and non-arts students in Wave III shorted CES-D scores ( $b = 0.01$ ,  $SE = 0.02$ ,  $t[128] = 0.69$ ,  $p = .489$ ).

### ARTS STUDENTS' DEVELOPMENTAL OUTCOMES IN ADULTHOOD

In 2007-2008, fourteen years after the initial wave of Add Health data collection, Add Health investigators again located as many of the original participants as possible ( $N = 15,701$ ) and conducted an additional in-home interview. Now aged between 24 and 32, the original adolescents were now engaged in their adult responsibilities. As had been the case in earlier follow-up waves, the questions administered to participants in Wave IV were a mix of duplicates from the earlier interviews (to collect longitudinal data) and new questions more suited to the young adult phase of life.

**Analytic Sample.** No age restrictions were necessary for the analyses of outcomes in young adulthood. For these analyses, the analytic sample used in this study includes 11,039 Add Health participants for whom transcript data were available and propensity scores had been calculated.

Among the participants in the analytic sample, the vast majority (77.8%) had taken at least one arts class while in high school. This included 3,824 students who had taken a visual arts course, 2,689 who had taken a music course, 916 who had taken a drama course, 276 who had taken a dance course, and 111 who had taken a film class.

The remainder of this chapter presents the results of an analysis of a series of behavioral and cognitive developmental outcomes of former arts and non-arts in adulthood. Specifically, at this wave, I analyzed outcomes for engagement in violence and/or delinquency, the Add Health Picture Vocabulary Test given at Wave III, and levels of depression.

#### Cognitive Outcomes

**Postsecondary attendance.** Add Health participants reported at the Wave IV interview (when they were aged between 24 and 32) whether they had ever enrolled in any degree-granting postsecondary institution for any length of time. Among the members in the entire analytic sample, 69.19% reported having attended at least some postsecondary education. Among adults who had studied the arts formally in high school, **73.41%** reported having attended a postsecondary school. Among those with no arts coursework in high school, only **54.39%** reported having attended any college. Logistic regression

analysis controlling for preexisting differences between arts and non-arts students suggest this difference is statistically, and practically, significant, with former arts students **55.38% more likely to attend any postsecondary school by age 24-32** than were former non-arts students ( $OR = 1.55, SE = 0.16, t[128] = 4.2, p < .001$ ). Each additional year of arts study was associated with **18% increase in the likelihood** of having attended any postsecondary schooling ( $OR = 1.18, SE = 0.04, t[128] = 5.47, p < .001$ ).

**Earning a four-year college degree.** At Wave IV, when Add Health participants were aged 24-32, they were asked whether they had earned a four-year college degree. Among the entire analytic sample, 34.62% had earned at least a four-year degree by this age. Among former high school arts students, **37.89%** had earned their four-year college degree by Wave IV, whereas only **23.19%** of adults who had no high school arts coursework. Logistic regression controlling for preexisting differences between arts and non-arts students suggest the difference is statistically significant,  $OR = 1.29, SE = 0.15, t[128] = 2.23, p = .028$ . **Arts students were 29% more likely to have earned a college degree by young adulthood than were non-arts students.** Each additional year of arts coursework was associated with a **12% increase in the likelihood** that adolescents would go on to earn a college degree by young adulthood ( $OR = 1.12, SE = 0.03, t[128] = 4.48, p < .001$ ).

**Depression.** At Wave IV, Add Health participants responded to a shortened version of the Center for Epidemiological Studies Depression scale (CES-D), a standardized self-report measure of depression specifically designed for research on the general population, as opposed to clinical diagnosis (Radloff, 1977). Each item of the CES-D is scored by the respondents on a 0 to 3 scale indicating the respondent's frequency of the event in question within the past week. Add Health's Wave IV data already include a CES-D constructed scale that summed scores from all included CES-D items, which was used in these analyses<sup>4</sup>. Across the entire analytic sample, the mean score for the CES-D scale was 2.62 ( $SD = 2.56$ ), with a minimum of 0 and a maximum of 15 and where higher scores are more indicative of depression than lower scores. Participants who had taken no arts courses in high school had average CES-D scores of 2.42. Regression model including controls for preexisting differences between the arts and non-arts

students surveyed in Add Health suggest this difference was not statistically significant ( $b = -0.02$ ,  $SE = 0.02$ ,  $t[128] = -0.92$ ,  $p = .361$ ).

### Behavioral Outcomes

**General optimism.** At Wave IV, young adults were asked a series of questions relating to the relative optimistic or pessimistic nature of their personality. A constructed variable summing the responses to these questions is available in the Add Health dataset and was used as the outcome for this analysis. Values in the optimism scale ranged from 4 to 20, with a grand mean of 14.89 ( $SD = 2.45$ ) across the entire analytic sample. Adults who had taken arts courses in high school were significantly more optimistic than were adults who had no arts coursework,  $b = 0.26$ ,  $SE = 0.10$ ,  $t[128] = 2.64$ ,  $p = .009$ . The effect size for any arts coursework, roughly one-tenth of a standard deviation, was moderate. Each additional credit of arts coursework had a significant additive effect,  $b = 0.07$ ,  $SE = 0.02$ ,  $t[128] = 3.67$ ,  $p < .001$  per year of arts coursework, suggesting that a four-year former arts student scored 0.28 higher than a former non-arts student, roughly one-ninth of a standard deviation. Disaggregated analyses holding other types of arts coursework constant suggest that adolescents who were enrolled in theater ( $b = 0.31$ ,  $SE = 0.13$ ,  $t[128] = 2.47$ ,  $p = .015$ ) and music ( $b = 0.17$ ,  $SE = 0.08$ ,  $t[128] = 2.21$ ,  $p = .029$ ) demonstrated the strongest effect.

**Involvement with the Criminal Justice System.** At Wave IV, Add Health participants were asked in the self-administered computer assisted portion of the interview whether they had ever been arrested. Responses were recorded as a simple “yes” or “no.” Across the entire analytic sample, 26.85% of respondents indicated that they had ever been arrested. Among former arts students, 24.63% reported having ever been arrested, while 34.64% of students who had taken no arts coursework in high school reported having been arrested at least once. A logistic regression analysis controlling for preexisting differences between adolescents who did and did not take the arts suggest this difference is statistically significant. Adults who had taken any arts coursework in high school were **26% less likely** than those without high school arts coursework to have been arrested ( $OR = 0.84$ ,  $SE = 0.07$ ,  $t[128] = -2.06$ ,  $p = .041$ ).

Each additional credit of arts coursework was associated with a **9%** reduction in the risk of having been arrested ( $OR = 0.91$ ,  $SE = .02$ ,  $t[128] = -4.23$ ,  $p < .001$ ).

### **Lifetime Substance Use as Reported in Adulthood**

**Daily tobacco use.** At Wave IV, 22.95% of the analytic sample reported that they smoked or otherwise used tobacco products daily. Among former students of the arts, only 21.32% reported being daily tobacco users, while 28.70% of former non-arts students reported using tobacco every day. Logistic regression controlling for preexisting differences suggests this difference was not statistically significant,  $OR = 0.84$ ,  $SE = 0.08$ ,  $t[128] = -1.83$ ,  $p = .070$ .

**Number of illicit drugs tried.** Add Health Wave IV respondents were asked a series of questions about whether they had tried certain illegal substances (anabolic steroids, marijuana, cocaine, crystal meth, or “other”). I created a simple count of the number of drugs respondents had tried by summing the answers to this series of questions. Across the entire analytic sample, the mean number of drugs participants had tried by early adulthood was 1.15 ( $SE = 0.03$ ). Among former arts students, the average number of drugs tried was slightly below the grand mean (Arts  $M = 1.147$ ), while respondents who had not taken an arts class in high school reported an average slightly above (Non-arts  $M = 1.153$ ). This difference was not statistically significant ( $b = 0.05$ ,  $SE = 0.06$ ,  $t[128] = 0.84$ ,  $p = .400$ ). However, when disaggregating the arts study by discipline, a more varied pattern emerges. As seen in Table 4, compared to adults with no high school arts enrollment, and holding other types of arts enrollment constant, former music students average number of drugs tried by adulthood was slightly lower, while former visual arts students’ average number of drugs tried was slightly higher.

**Ever tried marijuana.** Across the entire analytic sample, 57.22% of young adults reported that they had ever tried marijuana. Among former arts students, the proportion was slightly smaller (56.95%) and among young adults who had not taken a high school arts course, the proportion was slightly higher (57.30%). The difference was not statistically significant ( $OR = 1.04$ ,  $SE = 0.10$ ,  $t[128] = 0.45$ ,  $p = .656$ ). A similar pattern to the results for number of illegal drugs tried emerges for marijuana use when

disaggregating arts study, as seen in Table 5. Former music students were **20.25% less likely** than former non-arts students to have ever tried marijuana ( $OR = 0.798, SE = 0.06, t[128] = -3.16, p = .002$ ) while former visual arts students were **26.14% more likely** than former non-visual arts students to have ever tried marijuana ( $OR = 1.261, SE = 0.11, t[128] = 2.61, p = .010$ ). Seemingly strikingly, former film students were **2.12 times (212%) more likely** than former non-film students to have ever tried marijuana. However, caution should be exercised in interpreting the results for film students since the analytic sample for this Wave includes only 111 former film students, a very small percentage of the overall 11,037 respondents in the analytic sample.

**Steroids and “body building” drugs.** Only 2.38% of the entire analytic sample at Wave IV reported that had ever tried steroids or other “body building” drugs. Given such a small number of respondents who had used steroids, statistical power was not sufficient to compare arts and non-arts students on this outcome.

**Cocaine.** Among the entire analytic sample for Wave IV, 21.45% of respondents reported that they had ever tried cocaine by early adulthood. Among former arts students, the proportion was slightly lower (21.18%), while among adults with no high school arts coursework the proportion was slightly higher (22.39%). The overall difference is not statistically significant. Similar to the earlier analyses, differences emerge based on the type of arts coursework that adults had pursued. As presented in Table 6, former music and dance students were significantly less likely to have tried cocaine (**26.55% and 62.13% less likely, respectively**) than were adults who had not pursued high school arts classes, while former theatre and visual arts students were significantly more likely to have tried cocaine (**38.48% and 31.48% more likely, respectively**).

**Crystal meth.** Among respondents in the Wave IV analytic sample, 9.97% reported that they had ever tried crystal meth. The proportion of former arts students who had tried crystal meth was lower than the general proportion—9.43%—while the proportion of adults who had not pursued arts coursework in high school that had tried crystal meth was higher—11.89%. This difference was not statistically significant. However, as with the other individual illicit substances, results differ when the arts disciplines

are disaggregated. As presented in Table 7, former students of music were significantly less likely to report ever having tried crystal meth (**41.18% less likely** than adults who had no high school music courses), while former students of theater and visual art were significantly more likely to report having done so than adults with no high school arts classes (**39.55%** and **42.29% more likely**, respectively).

**Other drugs.** Nearly one quarter of Wave IV analytic sample members reported having tried any other illegal drug (24.45%). Among former arts students, the proportion was slightly higher than the grand mean (24.91%) and among former non-arts students, the proportion was slightly lower than the grand mean (22.83%). As with the other individual substances, the overall difference was not statistically significant, but disaggregated analyses suggest that reported drug use varied by arts discipline studied in high school. As seen in Table 8, adults who had studied music in high school were **25.12% less likely** than adults who had not studied the arts in high school to report having ever tried other illegal drugs and the difference was statistically significant. However, former students of theater and visual art were significantly more likely to report having tried other illegal drugs than were former non-arts students (**38.76%** and **49.98% more likely**, respectively).

### CONCLUSIONS AND NEXT STEPS

This study presents a varied and nuanced picture of some developmental outcomes for arts and non-arts students. Arts study was associated with significantly more positive postsecondary schooling outcomes—particularly those related to postsecondary attendance and four-year degree completion, as Shuler (1996) has theorized. This empirical result is compatible with existing theory (Eisner, 2002; Hetland, Winner, Veenema, & Sheridan, 2007) on the intrinsic skills that are learned through arts education. These theories suggest that arts education engenders “habits of mind” that promote critical thinking and the ability to perceive subtle differences in qualitative relationships, skills which are prized in higher education settings (Pascarella & Terenzini, 2005). Further research is needed to more precisely understand the nature of the linkage between arts study and postsecondary outcomes. The most likely causal path must travel through the college admissions process, but this raises myriad new questions suitable for future research. For example, are arts students simply more likely to apply to colleges, thus leading to better postsecondary outcomes? Or are they no more likely than non-arts students to apply to college but then become more successful once they enter the college admissions process? How does arts study function as a unique factor in evaluating students for college admission—is there an “effect” of intense arts study on college admissions outcomes if grades, college entrance exam scores, and socioeconomic status are held constant? Each of these is an intriguing question worthy of serious future research. It is also possible that entry to and outcomes from the college admissions process do not differ for arts and non-arts students; if this is the case, further investigation of the “why” for the positive postsecondary outcomes for arts students demonstrated in the present study is needed.

As adolescents, the results of this study may suggest that arts students find their schools more engaging places to be (Noblit, Corbett, Wilson, & McKinney, 2008; Thomas & Arnold, 2011). This was evident in the results for the school attachment scale, which suggested that arts students felt more attachment to their schools than non-arts students. The overall relationship between arts and school attachment was driven mostly by students of the visual arts, who reported significantly higher levels of attachment to their schools than did non-arts students. It is quite possible that the higher level of school

attachment reported by visual arts students is a result of the positive mentoring relationships (Rhodes & Lowe, 2009) that often develop between visual arts teachers and their students. Given the individual nature of visual art production and skill development, visual arts classrooms in high school often feature highly individualized one-on-one cycles of artistic instruction by the teacher, artistic creation by the student, and a continuing dialogue of feedback and constructive critique. This cycle may foster a unique teacher-student relationship where the guidance of the visual art teacher, and the investment of the teacher in the individual art student, which may result in the student viewing the art teacher as an influential nonparental adult. Research has shown that teacher-student relationships that take on this mentoring characteristic are positively associated with levels of school engagement and achievement (Roorda, Koomen, Spilt, & Oort, 2011). However, the mentoring aspect of visual arts classrooms is only one of many possible theories that could explain the association between visual arts coursetaking and increased school attachment. Further research is needed to examine and explain the relationship demonstrated in this study.

Another piece of evidence from the present study suggesting that arts students may be more engaged in school than non-arts students was the association between arts study and a reduced risk of out-of-school suspension. One plausible hypothesis that needs further inquiry is the idea that arts students may commit fewer school rule infractions that are subject to suspension as a punishment, with the theory behind that hypothesis being that greater engagement in school reduces the likelihood that students would risk being suspended. Prior research has suggested that schools with thriving arts programs have greater daily attendance percentages than do schools without thriving arts programs (Harris Interactive, 2006), and other research has suggested that thriving arts programs make schools more engaging places to be (Noblit et al., 2008). The lack of committing suspendable offenses may be one way that higher levels of school engagement result in positive developmental outcomes, but further research is needed to determine the precise reasons for the relationship demonstrated here.

While there were several areas related to positive youth development that were seemingly unrelated to arts study, such as levels of depression and engaging in violent or delinquent behavior, the

analyses for illicit substance use among arts and non-arts students present an interesting and nuanced picture that merits further research. Substance use among arts students in the Add Health sample was neither universally more or universally less positive than substance use among non-arts students. Results of this study suggest that music students were less likely than non-music students to use illicit substances both as adolescents and into adulthood, consistent with the prior research literature on school-based, prosocial organized activities (Barber et al., 2001). However, visual arts students were more likely to be substance users both in adolescence (marijuana, specifically) and as adults (when former visual arts students were more likely to report having used nearly all of the substances analyzed: marijuana, cocaine, crystal meth, and other illicit substances). Further research is clearly needed in this area, as there is no existing theory in the scholarly literature to suggest why the pattern of substance use might be different among the different arts. Barber and colleagues (2001) suggest that it is the prosocial nature of organized activities that might lead students away from substance use; perhaps it is the individualistic nature of visual arts study, versus the group or ensemble based nature of most music study, that accounts for the disparity between these types of arts engagement. However, most theater study is also group or ensemble focused, so this theory does not adequately explain the results suggesting that theater students were more likely to have used cocaine and crystal meth as adults. It is important to remember that the results obtained for this analysis, as with all of the analyses reported in the present study, are contingent on the propensity score model having captured as many observable preexisting differences between the students of the various arts disciplines as possible. It is possible that unobservable population differences exist that drive the differing substance use findings or that the propensity score model was not adequate to yield an unbiased estimate for all arts types. Clearly, the question of whether visual arts students, and, for some drugs, theater students, are truly more likely to engage in illicit substance use begs further research inquiry.

The curious substance use results aside, by and large, arts students do appear to experience positive developmental benefits from their arts study that extend beyond adolescence into adulthood. Further research examining these and other developmental outcomes of arts and non-arts students is

needed to extend and solidify the research base on arts education as a context for positive youth development.

**APPENDIX: DETAILED RESEARCH METHODOLOGY**

This appendix provides detailed information on the research methods used to carry out the present study. All data analyzed here were collected as part of the National Longitudinal Study of Adolescent Health (Add Health) and the separate, yet associated, collection of high school transcript information from Add Health participants known as the Adolescent Health and Academic Achievement (AHAA) study.

**Add Health**<sup>5</sup>. Add Health was a major longitudinal study of a nationally representative sample ( $N = 20,745$ ) of adolescents enrolled in grades 7 through 12 during the 1994-1995 academic year who were surveyed in their schools and also interviewed in their homes during that year; approximately 70,000 additional adolescents completed only the in-school survey. Home interview participants were re-interviewed in 1996 ( $N = 14,738$ ) at Wave II, as young adults in 2001-02 ( $N = 15,197$ ) at Wave III, and as adults in 2007-08 ( $N = 15,701$ ) at Wave IV. Ancillary data were collected from parents of sample members ( $N = 17,670$ ) at Wave I and from romantic partners of sample members ( $N = 1,507$ ) at Wave III.

The initial nationally representative sample of students was drawn using multistage survey sampling techniques. The first stage drew a sample of 80 high schools with unequal probability of selection; 52 “feeder” middle schools of the 80 selected high schools were also selected. Prior to the selection of the sample of schools, the sampling frame was stratified by region of the country, urbanicity, school size, school type, and ethnic makeup. The stratification, when properly accounted for in the analyses, ensures that the sample is representative of schools in the United States with respect to those characteristics.

**AHAA**<sup>6</sup>. At the time of Add Health Wave III data collection, when all Add Health sample members had graduated from high school, Add Health sample members were provided with a release form allowing the Population Research Center at the University of Texas, Austin to receive a copy of their complete high school transcript for coding and inclusion in a supplementary Add Health dataset called the Adolescent Health and Academic Achievement Study (AHAA). Roughly 91% of Wave III respondents signed the release form ( $N = 14,070$ ), and complete high school transcripts were obtained for

most respondents ( $N =$  approximately 12,250). Ancillary data regarding school policies, grading practices, and special programs offered were collected from the schools providing the transcript.

Transcripts were coded using the same procedures followed by the U.S. Department of Education National Center for Education Statistics (NCES) for the National Education Longitudinal Study of 1988 (NELS) and the National Assessment of Educational Progress (NAEP) High School Transcript Studies.

**Data access.** Add Health (Harris & Udry, 2013) and AHAA data (Harris, Udry, & Muller, 2012) are archived and distributed by the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan in Ann Arbor. Because of the sensitive and private nature of much of the data about participants included in the Add Health study, the principal investigators as well as ICPSR require analysts to maintain strict confidentiality and data security procedures including the execution of a non-disclosure agreement. Although the Add Health data include no specific identifying information about the participants, because of the detail available on the participants, the potential for deductive disclosure of the identity of Add Health participants is a pressing concern for the principal investigators. As such, the detailed AHAA data, which include complete high school transcripts for many Add Health participants and thus present a high risk for deductive disclosure, are some of the most highly secured data in the project. Analyses using AHAA transcript data are currently restricted to a secure data enclave physically located at the ICPSR building in Ann Arbor and statistical output is subject to a data disclosure risk analysis by ICPSR and Add Health staff. As required, analyses for the present study were conducted on-site in Ann Arbor and results were scrutinized for disclosure risk prior to being released for dissemination.

**Research design for this analysis.** This study was designed as a quasi-experimental study comparing arts and non-arts students on a variety of measures related to positive youth development. Because prior research has indicated that there are significant, preexisting population differences between those students who do and do not elect to pursue the arts in schools (e.g., Elpus & Abril, 2011; Feldman & Matjasko, 2007; Fitzpatrick, 2006; D. W. Kinney, 2010), some form of statistical control is required to

account for these differences. The present study used propensity scores, detailed later, to adjust for a series of observable covariates that are theoretically linked to selection into arts classes.

There were three phases of data analyses, which are detailed below: (1) the identification of arts students in the Add Health sample through the use of AHAA transcript data, (2) the estimation of propensity scores from observable covariates, and (3) the estimation of the effects of arts study on the outcomes using methods appropriate for the complex sampling employed by Add Health.

**Identification of arts students.** The first phase of data analysis for the present study was the identification of those Add Health sample members who had earned credit for formal arts coursework in their high schools. These students were identified using the high school transcript data collected as a part of AHAA, the ancillary education data complement to Add Health. The procedure essentially follows the same one used by Elpus (2011), though some modifications (described below) were necessary due to the heightened level of data security applied to the AHAA transcript data.

Transcripts in the AHAA data are coded using the U.S. Department of Education's "Classification for Secondary School Courses" (CSSC) system<sup>7</sup>, the same coding system applied to transcripts in the National Center for Education Statistics National Assessment of Educational Progress (NAEP) High School Transcript Studies as well as the Longitudinal Education Studies (High School & Beyond, the National Education Longitudinal Study of 1988, the Education Longitudinal Study of 2002, and the High School Longitudinal Study of 2009). Since NCES coders were not experts in arts education or music education, Elpus (2011) used CSSC codes to identify students who had pursued music courses in high school only after first manually verifying that the CSSC coding that NCES had applied matched the specific subarea of music indicated by the verbatim course title recorded in the dataset. Though unexpected prior to beginning the analyses, I discovered that manual verification of CSSC coding with course titles was not possible with AHAA data because of security restrictions applied to the data to reduce deductive disclosure risk. As mentioned above, AHAA transcript data are only made available to analysts at a secure data enclave physically located with the ICPSR building in Ann Arbor, MI and must be analyzed on ICPSR-provided computers. After arriving in Ann Arbor to conduct the analyses, I

discovered that verbatim course titles were redacted from the dataset made available to outside analysts for use in the secure data enclave. Given this redaction, I was unable to manually verify that arts courses were correctly coded and instead rely on the accuracy of the CSSC coding as available in the dataset.

Students for whom high school transcripts indicated the earning of credit in a course coded between 500000 and 509901, inclusive, were considered arts students for the present study ( $n = 9,520$ ). Those students who had not earned credit in a course coded in that range were considered non-arts students ( $n = 2,712$ ). CSSC codes available in the dataset allowed students to be further divided into several arts subareas: visual arts students ( $n = 6,331$ ), music students ( $n = 4,484$ ), drama students ( $n = 1,465$ ), dance students ( $n = 439$ ), and film/media arts students ( $n = 187$ ).

Importantly, this study considered formal high school coursework in the arts only. As such, it is possible that some students classified as “non-arts” students in the present study participated in some extracurricular or outside of school arts experiences. *Due to the emphasis of this study on formal arts coursework, these extracurricular or out-of-school “only” arts participants were excluded from the arts group by definition.*

**Use of propensity scores.** Since there are significant, preexisting differences between the populations of students who do and do not elect arts study in U.S. high schools, studies such as this one that seek to compare arts and non-arts students must use some method to equate the groups. Selection into arts study is a complex phenomenon that has not yet been fully explicated in the research literature (Elpus, in press), so the choice of covariates to use for statistical control purposes is limited both by the available data and by current theory regarding selection into the arts. At a minimum, careful covariate choice guided by theory should include all observable covariates which are known or hypothesized to be correlated both with selection into arts study and the outcomes of interest (Steiner, Cook, Shadish, & Clark, 2010).

The present study uses a propensity score procedure (Rosenbaum & Rubin, 1983) to equate the groups. For each Add Health sample member, a propensity score was estimated using logistic regression (logit model) accounting for the following covariates which are observable in the Add Health dataset: sex,

race, native English speaker status, base year Add Health Picture Vocabulary Test score, a log transformation of the ninth grade GPA, highest achieving parent's level of education (a stand-in for socioeconomic status), and the participant's base year score on the CES-D. Propensity scores, if estimated well, are considered to "provide an index—or scalar, in Rubin's terms—that optimally summarizes the information the covariates contain" (Murnane & Willett, 2011, p. 314). The PSCORE procedure, available as an add-on to the statistics package Stata, was used to estimate propensity scores and to verify that the balancing property of the propensity scores between the arts and non-arts groups was met. There was sufficient overlap of propensity scores between arts and non-arts students, as shown in Figure 3.

Propensity scores were utilized in analyses through the PS-ANCOVA approach (Steiner et al., 2010), which is the simplest of the propensity score analytic approaches, but assumes that the functional form of the relationship between the propensity scores has been adequately modeled. Analyses here assume a linear relationship between the propensity score and the outcome; further research using other methods of covariate control is needed to confirm whether this assumption holds.

**Estimation of the effects of arts study on the outcomes.** Outcomes that are measured on continuous scales were estimated through the use of ordinary least squares regression. Outcomes that are categorical were estimated through the use of logistic (logit model) regression.

**Complex sampling adjustments.** Add Health data are the result of a multistage complex stratified cluster sampling strategy, wherein schools were sampled first from four regions of the U.S. and then students within the sampled schools were recruited for the study. To ensure that estimates from these analyses were nationally representative of the cohorts studied, probability weights, available in the dataset, were applied to all analyses. Standard errors for the analyses reported here were estimated using Taylor series linearization, and are robust to both the stratification and the clustering of the sample.

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Table 1

*Add Health Arts Students by Arts Discipline*

Arts discipline	<i>N</i>	% of total sample
All Arts	9,520	77.83
Visual Art	6,331	51.76
Studio Art	4,968	40.61
Crafts	572	4.68
Ceramics	987	8.07
Graphic Design	530	4.33
Photography	977	7.99
Art History	385	3.15
Music	4,484	36.66
Band	1,751	14.31
Choir	1,931	15.79
Orchestra	288	2.35
Secondary General	919	7.51
World Music	18	0.15
Music Technology	17	0.14
Guitar	88	0.72
Music Theory	172	1.41
Piano	186	1.52
Instrument Lessons	43	0.35
Independent Study	41	0.34
Drama/Theater	1,465	11.98
Dance	439	3.59
Film	187	1.53
Arts Survey Course	172	1.41

*Note.* Frequency counts reported in this table are unweighted and represent the raw counts and percentages of sample members and are not nationally representative estimates.

Table 2

*Linear Regression of Adolescent Delinquency Scale Scores by Arts Discipline*

Arts discipline studied	<i>B</i>	<i>SE B</i>	<i>t</i>	<i>p</i>
Music	-0.03*	0.01	-2.04	.044
Dance	-0.06*	0.02	-3.35	.001
Theater	0.43	0.02	1.79	.075
Visual art	0.27*	0.01	2.04	.043
Film	0.004	0.07	0.06	.950
Arts survey course	0.02	0.04	0.56	.576

*Note.* Standard errors are robust to the complex sampling design of Add Health. Unweighted  $n = 13,563$ . \*  $p < .05$

Table 3

*Logistic Regression for Likelihood of Marijuana Use during Adolescence by Arts Discipline*

Arts discipline studied	<i>OR</i>	<i>SE OR</i>	<i>t</i>	<i>p</i>
Music	0.758*	0.954	-2.20	.030
Dance	0.525*	0.123	-2.74	.007
Theater	1.337	0.237	1.64	.104
Visual art	1.293*	0.141	2.36	.020
Film	0.566	0.572	-0.56	.575
Arts survey course	0.501	0.227	-1.52	.130

*Note.* Standard errors are robust to the complex sampling design of Add Health. OR = "Odds Ratio". Unweighted  $n = 13,555$ . \*  $p < .05$

Table 4

*Linear Regression of Number of Drugs Tried through Adulthood by Arts Discipline*

Arts discipline studied	<i>B</i>	<i>SE B</i>	<i>t</i>	<i>p</i>
Music	-0.212*	0.047	-4.45	.000
Dance	-0.201	0.116	-1.73	.086
Theater	0.197*	0.061	3.22	.002
Visual art	0.216*	0.050	4.31	.000
Film	0.294	0.238	1.23	.220
Arts survey course	-0.142	0.160	-0.89	.377

*Note.* Standard errors are robust to the complex sampling design of Add Health. Unweighted  $n = 11,039$ . \*  $p < .05$

Table 5

*Logistic Regression for Likelihood of Marijuana Use through Adulthood by Arts Discipline*

Arts discipline studied in high school	OR	SE OR	t	p
Music	0.798*	0.057	-3.16	.002
Dance	0.798	0.160	-1.13	.262
Theater	1.237	0.141	1.861	.065
Visual art	1.261*	0.112	2.61	.010
Film	2.121*	0.797	2.00	.047
Arts survey course	0.972	0.320	-0.09	.932

Note. Standard errors are robust to the complex sampling design of Add Health. OR = "Odds Ratio". Unweighted  $n = 11,001$ . \*  $p < .05$

Table 6

*Logistic Regression for Likelihood of Cocaine Use through Adulthood by Arts Discipline*

Arts discipline studied in high school	OR	SE OR	t	p
Music	0.745*	0.072	-3.06	.003
Dance	0.580*	0.145	-2.17	.032
Theater	1.384*	0.167	2.70	.008
Visual art	1.314*	0.125	2.88	.005
Film	1.266	0.408	0.73	.466
Arts survey course	0.706	0.276	-0.89	.375

Note. Standard errors are robust to the complex sampling design of Add Health. OR = "Odds Ratio". Unweighted  $n = 11,011$ . \*  $p < .05$

Table 7

*Logistic Regression for Likelihood of Crystal Meth Use through Adulthood by Arts Discipline*

Arts discipline studied in high school	OR	SE OR	t	p
Music	0.588*	0.078	-4.00	.000
Dance	0.781	0.315	-0.61	.542
Theater	1.395*	0.209	2.23	.028
Visual art	1.423*	0.148	3.38	.001
Film	1.883	1.393	0.85	.394
Arts survey course	0.486	0.348	-1.01	.316

Note. Standard errors are robust to the complex sampling design of Add Health. OR = "Odds Ratio". Unweighted  $n = 11,014$ . \*  $p < .05$

Table 7

*Logistic Regression for Likelihood of Other Illegal Drug Use through Adulthood by Arts Discipline*

Arts discipline studied in high school	<i>OR</i>	<i>SE OR</i>	<i>t</i>	<i>p</i>
Music	0.749*	0.070	-3.11	.002
Dance	0.829	0.193	-0.80	.423
Theater	1.388*	0.152	2.98	.003
Visual art	1.499*	0.132	4.60	.000
Film	0.928	0.412	-0.17	.867
Arts survey course	0.809	0.296	-0.58	.563

*Note.* Standard errors are robust to the complex sampling design of Add Health. OR = “Odds Ratio”. Unweighted  $n = 11,008$ . \*  $p < .05$

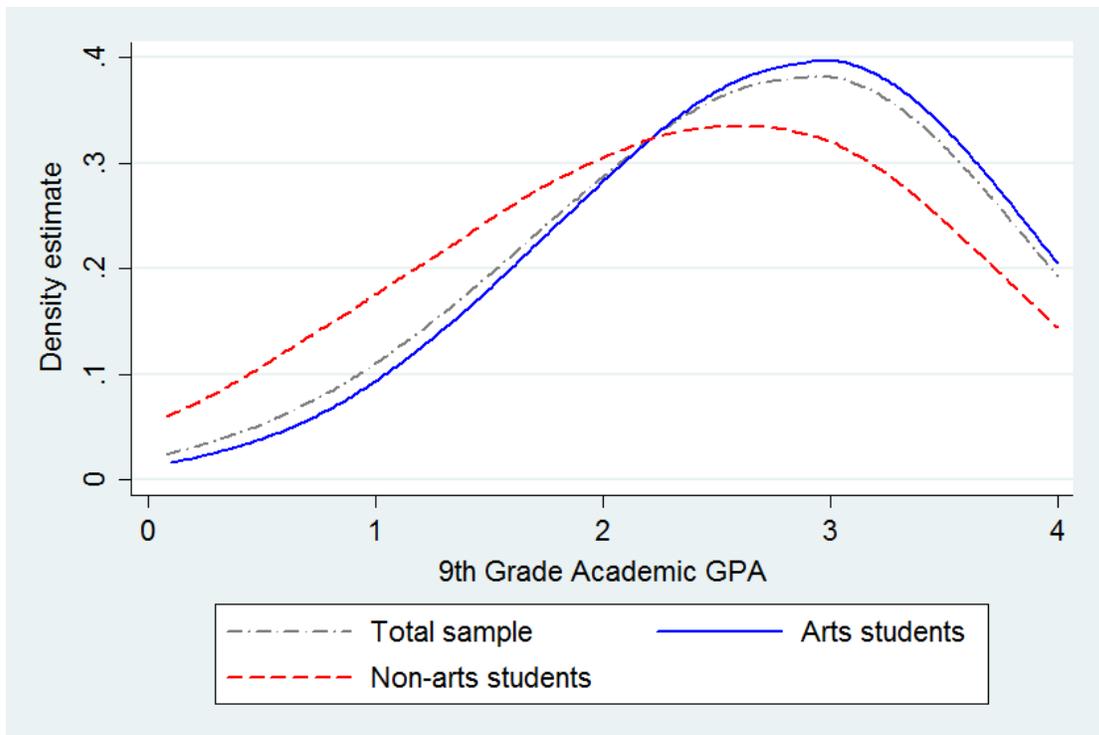


Figure 1. Distribution of 9<sup>th</sup> Grade GPAs by Arts Status

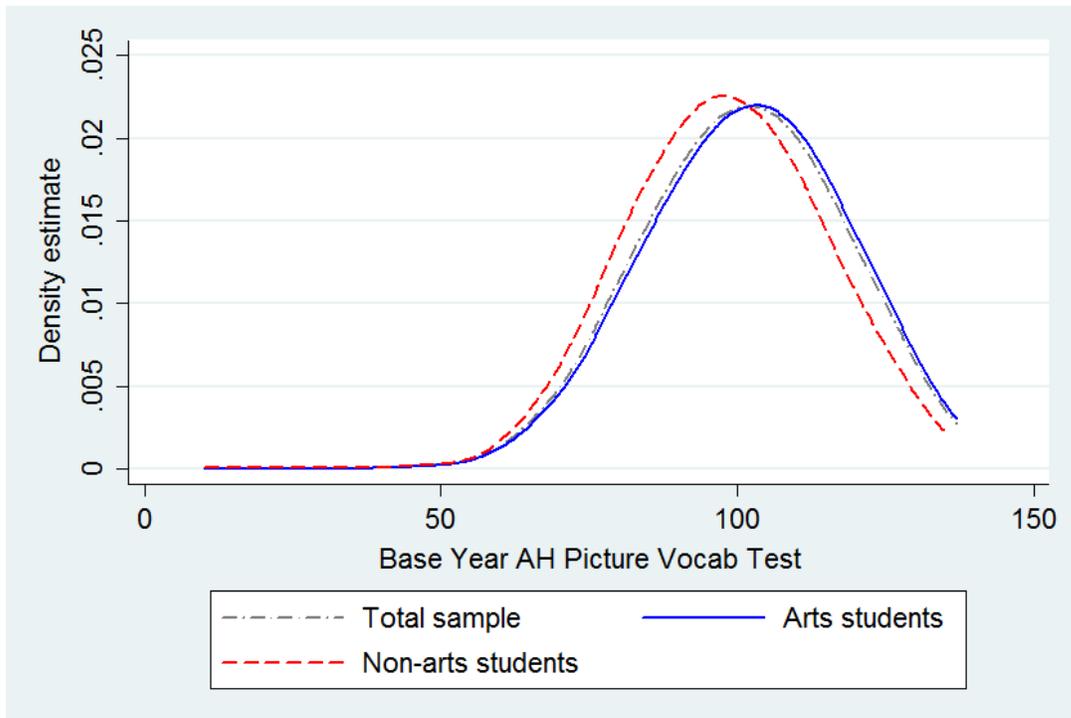


Figure 2. Distribution of base-year AHPVT scores

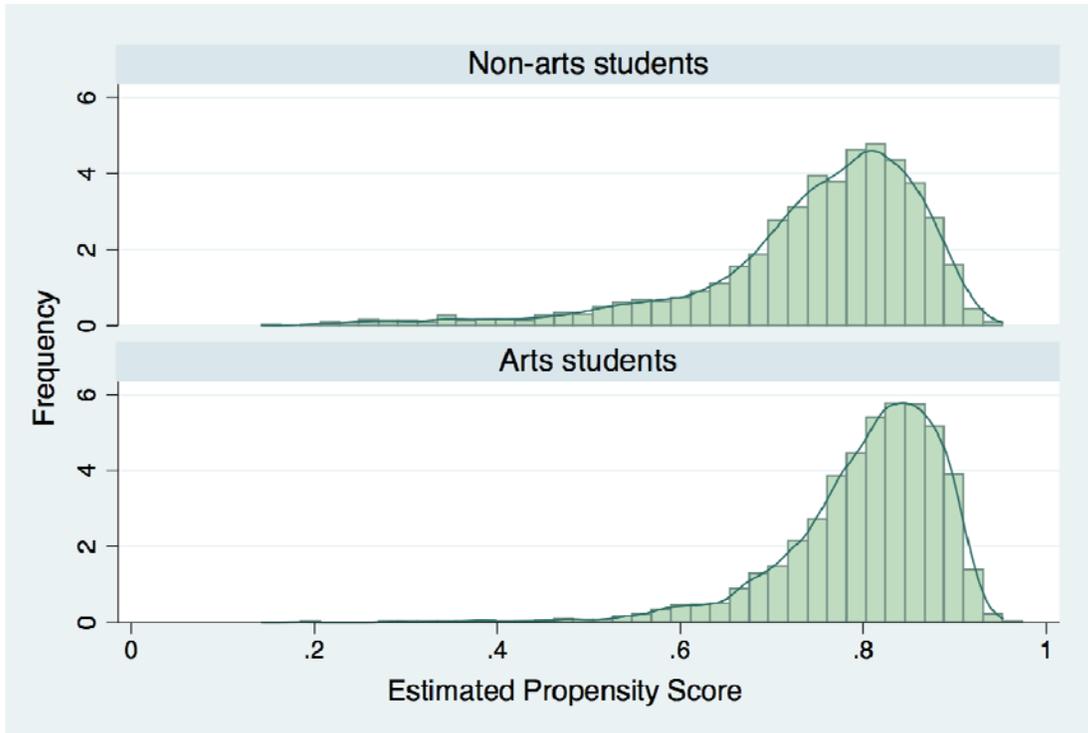


Figure 3. Propensity score distribution by arts status.

## Endnotes

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<sup>1</sup> A Carnegie unit is a standard measure of high school credit; one Carnegie unit is equivalent to one course taken in one traditional-length class period per day, five days per week, for an entire school year.

<sup>2</sup> For this analysis particularly, it is important to remember that participants in Add Health were adolescents in the early- to mid-1990s, before the rapid expansion of home Internet access and well before the advent of social media.

<sup>3</sup> Since the propensity score model for arts participation, which helps control for preexisting differences between arts and non-arts students, included the Wave I AHPVT score, this analysis examines the Wave III Add Health variable PVTSTD3L. This variable is the Wave III AHPVT score for a longitudinal analysis.

<sup>4</sup> The constructed variable for CES-D scores at Wave IV available in Add Health data was created by summing each participant's responses across all included CES-D items. The Wave II and III analyses of CES-D scores, conversely, used a CES-D scale that was created by averaging the items. Readers should not compare the magnitude of scores from this wave to analyses of earlier waves.

<sup>5</sup> Information on the design of Add Health drawn from (Harris et al., 2009).

<sup>6</sup> Information on the design of AHAA drawn from <http://www.laits.utexas.edu/ahaa/>

<sup>7</sup> For information on the CSSC coding system for secondary courses, see <http://nces.ed.gov/surveys/hst/courses.asp>.