

**This research was supported by the GE Fund. It is contained in
Champions of Change.**

**Involvement in the Arts and Human Development:
General Involvement and Intensive Involvement
In Music and Theatre Arts**

**James S. Catterall¹
Richard Chapleau
John Iwanaga**

**The Imagination Project at UCLA
Graduate School of Education & Information Studies
University of California at Los Angeles
July 1999**

Introduction

This briefing presents results from our work during the past 2 years exploring interactions between the arts and human development and achievement. This research enlists the National Educational Longitudinal Survey (NELS:88), a panel study which has followed more than 25,000 students in American secondary schools for 10 years. The work addresses developments for children and adolescents over the period spent between the 8th and 12th grades, i.e. late middle school through high school. The first phase of the work examines involvement in the arts generally -- across all disciplines. The second phase examines the potential importance of sustained involvement in a single discipline, here using instrumental music and the theatre arts as case examples. We focus on these two arts disciplines in the one case because of related research suggesting links between music and cognitive development at younger age levels, and in the other because of related research on drama and theatre in education.

Our findings presented in more detail below can be summarized in three main sets of observations:

¹ James S. Catterall is Professor and Co-Director of the UCLA Imagination Project, Graduate School of Education & Information Studies, Los Angeles, CA 90095-1521. *jamesc@gseis.ucla.edu*. Assisting in this research are Mr. Richard Chapleau, UCLA doctoral student in educational leadership, and Mr. John Iwanaga, UCLA doctoral student in Educational Psychology.

- (1) **Involvement in the Arts and Academic Success.** Positive developments for children engaged in the arts are seen at each step in the research -- between 8th and 10th grade as well as between 10th and 12th grade. The comparative gains for arts-involved youngsters generally become more pronounced over time. And more important, this pattern also holds for children from low-income and low parent-education level homes.
- (2) **Music and mathematics achievement.** Students who report consistent high levels of involvement in instrumental music over the middle and high school years show significantly higher levels of mathematics proficiency by grade 12. This observation holds both generally and also for low SES students as a subgroup. (SES refers to socioeconomic status -- a measure of family education level, income, and type of job(s) held by parents).

Moreover, differences in measured mathematics proficiency between students consistently involved versus not involved in instrumental music, grow significantly over time.

- (3) **Theatre arts and human development.** Sustained student involvement in theatre arts (acting in plays and musicals, participating in drama clubs, and taking acting lessons) associates with a variety of developments for youth: gains in reading proficiency, gains in self concept and motivation, and higher levels of empathy and tolerance for others. Our analyses of theatre arts were undertaken for low SES youth only. Our presumption would be that more advantaged youngsters would be more likely to be involved in theatre and drama because of attendance at more endowed schools and because of parent ability to afford theatre opportunities in the private or community sectors.

Furthermore, we take into account SES in all of our analyses for the same reason.

We turn now to a brief summary of our first release of data from this project and then to presentations of some of the important observations from the later research.

I. Synopsis of First Findings -- Involvement in the Arts Generally and Student Outcomes

In mid 1997 we released a draft study of the effects of involvement in the visual and performing arts on student achievement in middle and high school. Published in the *Americans for the Arts* monograph series as "Involvement in the Arts and Success in Secondary School," this analysis was based on a multi-year survey of more than 25,000 students sponsored by the United States Department of Education. This study offered the first reported analysis of information in the NELS:88 survey about student participation in the arts. This research used a definition of "involvement in the arts" which gave students credit for taking arts-related classes in or out of school as well as involvement and leadership in school activities such as theatre, band, orchestra, chorus, dance, and the visual arts.

Our analyses found substantial and significant differences in achievement and in important attitudes and behaviors between youth highly involved in the arts on the one hand, and those with little or no arts engagement on the other hand. In addition -- and

more significant from a policy standpoint -- the achievement differences between high- and low-arts youth were also significant for economically disadvantaged students. Twenty of the differences favoring arts involved students are significant at the $p < .001$ level (meaning that the odds of the differences being caused by pure chance are smaller than one in one-thousand).. Four are significant at the $p < .01$ level. The only difference not significant was performance on the history geography tests for low SES children.

This observation provides some evidence that achievement differences favoring youngsters involved in the arts occasionally reported are not simply a matter of parent income and education levels, which do tend to favor children with more visual and performing arts in their lives. Another result was that consistent involvement in the arts showed up in increased advantages for arts-rich youngsters over time, albeit over the relatively short time between the 8th and 10th grades.

A case for the importance of the arts in the academic lives of middle and early high schoolers was the primary suggestion of this earlier research. The research did not definitively explain the differences shown, nor was it able to attribute student successes unequivocally to the arts. This caution rises in large part because panel studies are not well suited to unambiguous causal modeling. Nonetheless, the differences were striking, and the chief confounding variable, student family background, was reasonably accounted-for in the work. The discussion in the published report offers a set of plausible explanations consistent with the evidence, several having to do with why the arts might contribute to achievement.

More Recent Findings

Grants to the Imagination Project at UCLA from the GE Fund in September of 1997 and December of 1998 supported extensions of this research. There were three general priorities for the newly-funded work. One was to extend the analyses describing developments up to grade 10 through the balance of high school and beyond. We are now able to report results through grade 12. A second priority was to begin to conceptualize involvement in the arts in ways that could capture the potential value of “depth” of involvement. Our earlier work relied on measures of involvement that tended to reward widespread involvement over many artistic pursuits; the most “involved” students in our first study were largely those who attached themselves to several disciplines. There are good reasons, however, to believe that intensive involvement in a single discipline would act differently than scattered attention to diverse artistic endeavors. This is because different effects are touted for different arts disciplines, and depth of involvement in one might be expected to intensify particular effects.

Our first effort in satisfying our curiosity about depth of experience in the arts was to examine students who reported sustained involvement in instrumental music. This course of inquiry also contributed to progress on a third priority for the research, which was to explore possible connections between involvement in music and cognitive development. Much interest has been generated by recent studies in neuroscience linking certain types of music training with positive developments in cognitive functioning. (We refer here especially to various studies of Gordon Shaw, Frances Rauscher, and others over the past 6 years described below.)

Our second effort in satisfying our curiosity about depth of experience in the arts was to examine students who reported sustained involvement in the theatre arts. The

theoretical rationales for this inquiry derive largely from a literature focused on theatre in education and drama in the classroom produced mainly over several decades of research and scholarly writing in Great Britain.

Findings of 1998-99 Research

There are generally three areas of research we report here. One is the extension of our earlier analyses to the 12th grade. A second is a preliminary analysis of instrumental music and mathematics achievement. And a third is a preliminary analysis of the impacts of intensive involvement in theatre over grades 8 through 12.

I. Extending Analyses of Effects of Involvement in the Arts through Grade 12

Involvement in the Arts as of Grade 12. Before examining outcomes, we first found that levels of student involvement in the arts tended to decline between grades 10 and 12. As of the spring of the senior year, twelfth graders appear to fall off in reported involvement in the arts when compared to grade 10. For example, where as 22.7 percent of 10th graders report involvement in band or orchestra and 23.3 percent show involvement in chorus or choir, fewer than 20 percent show involvement in any school musical group by grade 12. The NELS:88 data base also provides many fewer indicators of arts involvement for 12th graders, namely those shown in Figure 1c:

Figure 1c. Percentages of 12th Graders Involved in Arts Related Activities Reported in the NELS:88 Data Base.²

Participates in:	
School Music Group	19.5%
School Play/Musical	15.0%
Takes out-of-school classes in	
Music, Art, or Dance:	
rarely or never	85.9%%
less than 1/week	4.2%
1-2 per week	7.4%
every day or almost	2.5%

² NELS:88 is managed by the National Center for Education Statistics at the Office for Educational Research and Improvement, United States Department of Education. The data and code books are available in various forms on CD Rom media for public use.

High- Versus Low-Arts Involvement and General Student Performance.

Here we recount observed differences between high_ and low-arts involved students as of grades 8 and 10, and then show differences accruing through grade 12.

Previously reported Achievement Differences for Grades 8 and 10:

Figure 2a. Involvement in the Arts and 8th Grade Academic Performance

% in each group	<u>High Involvement</u>	<u>Low Involvement</u>
Earning mostly As and Bs in English	82.6%	67.2%
Top 2 quartiles on std. tests	67.3%	49.6%
Dropping out by grade 10	1.4%	3.7%
Bored in school half or most of time	37.9%	45.9%

Figure 2b. Involvement in the Arts and 10th Grade Academic Performance

% in each group	<u>High Involvement</u>	<u>Low Involvement</u>
Top 2 quartiles std. tests	65.7%	47.5%
Top 2 quartiles Reading	64.7%	45.4%
Level 2 (high) Reading Proficiency	61.0%	43.5%
Top 2 quartiles Hist./Geog./Cit.	62.9%	47.4%

Achievement Differences for Grade 12:

Figure 2c. Involvement in the Arts and 12th Grade Academic Performance

% in each group	<u>High Involvement</u>	<u>Low Involvement</u>
Top 2 quartiles std tests	57.4%	39.3%
Top 2 quartiles Reading	56.5%	37.7%
Level 2 or 3 (high) Reading Proficiency	58.8%	42.9%
Top 2 quartiles Hist./Geog./Cit.	54.6%	39.7%

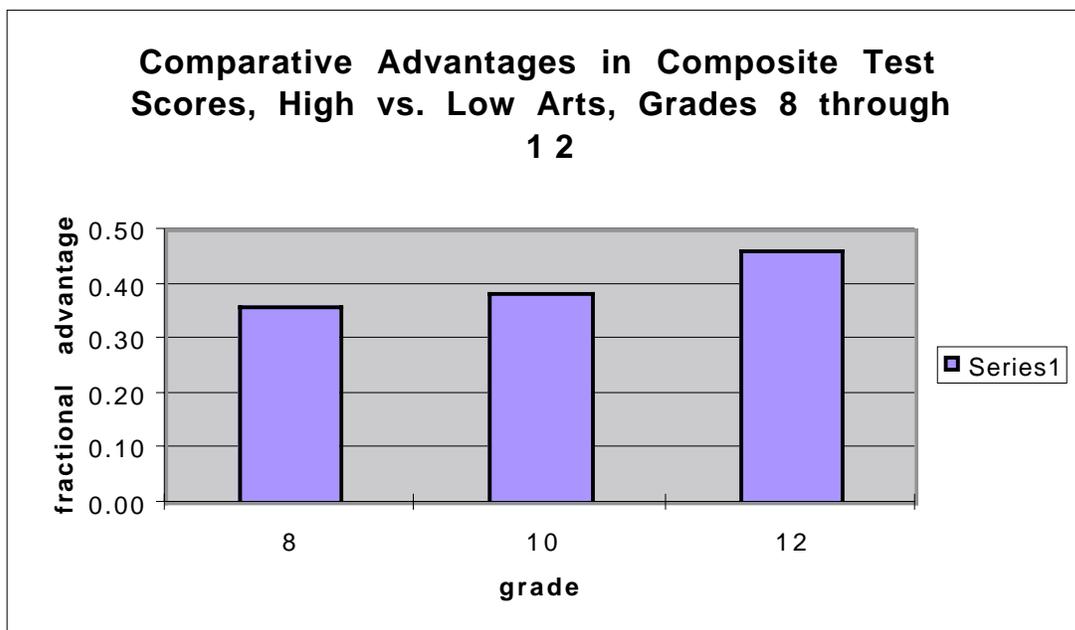
The performance differences between arts-involved and non-involved students remain about the same across grade levels in nominal terms -- showing up typically as 16 to 18 percentage point differences. For example, the percentage of low-arts students

scoring in the top half of the standardized test distribution was 47.5 percent in grade 10, while 65.7 percent of high-arts students scored above the test score median -- an 18 percentage point difference at that grade level. At grade 12, the respective figures are 39.3 and 57.4 percent, an 18.1 percentage point difference.

Within the general trends in achievement differences, it can be seen that the relative advantage of involvement in the arts increases appreciably over time. This is shown in the relative sizes of the subgroups doing well from the arts-involved and non-involved groups respectively, which grow over time. By the 12th grade, the nominal 18 percentage point difference amounts to a 46 percent advantage for the high-arts group where 57.4 percent score well compared to 39.3 percent from the low-arts group ($57.4/39.3 = 1.46$ or a 46 percent advantage).

The following chart shows what the comparative achievement advantages for involvement in the arts look like over time for all students; all group differences (except the history/geography test for low SES students) are significant at greater than a 99 percent confidence level. Most remain significant at the .999 confidence level.

Figure 3:



This general pattern of increasing advantages shows for various measures in addition to composite test scores – meaning that high arts youngster do comparatively better on multiple measures as they pass from grade 8 to grade 12.

High- Versus Low-Arts Involvement and Low SES Student Performance.

SES and Involvement in the Arts. As shown in Figure 4 below, we continue to find when accounting for grade 12, as expected, substantial differences in the family income and education levels (Socioeconomic Status, or SES) between our high arts and low arts groups. The probability of being “high arts” remains almost twice as high for students from economically advantaged families; and the probability of low arts involvement is about twice as high if one comes from an economically disadvantaged family.

This is why our subsequent analyses of achievement differences restricted to low SES students are very important. Not only are achievement issues typically more profound for children from families with less education and fewer economic resources. But high SES children simply have more opportunities to be involved in the arts, and when we compare groups by involvement only, the differences are more likely to be caused by differences in family background than anything else.

Figure 4:

Probability of High vs. Low Arts Involvement by Student SES

Probability of High Arts Involvement

High SES Quartile	.320
Low SES Quartile	.178

Probability of Low Arts Involvement

High SES Quartile	.197
Low SES Quartile	.385

Achievement Differences for Low SES Students. Here we begin with our findings for grade 8 , grade 10, and grade 12 performance differences within the low SES quartile -- the fourth of all students at the bottom of the family income and education ladder. This group represents families where parents typically graduated from high school and went no further with their educations, and families where a parent or parents never finished high school.

Achievement Differences, Low SES Students

Figure 5a:

Involvement in the Arts and 8th Grade Academic Performance and Attitudes, Low SES Students (Low Parent Education/Income)

% in each group	<u>High Involvement</u>	<u>Low Involvement</u>
Top 2 quartiles std tests	37.7%	29.8%
Mostly As and Bs in English	71.4%	58.8%
Dropping out by grade 10	3.5%	6.5%
Bored in school half or most of time	32.9%	40.1%

Figure 5b:

Involvement in the Arts and 10th Grade Academic Performance and Attitudes, Low SES Students (Low Parent Education/Income)

% in each group	<u>High Involvement</u>	<u>Low Involvement</u>
Top 2 quartiles std tests	35.2%	28.1%
Top 2 quartiles reading	37.3%	28.7%
Level 2 Reading Proficiency	39.6%	29.2%
Top 2 quartiles hist./Geog./citizenship	34.8%	30.4%

Achievement Differences for Grade 12

Figure 5c.

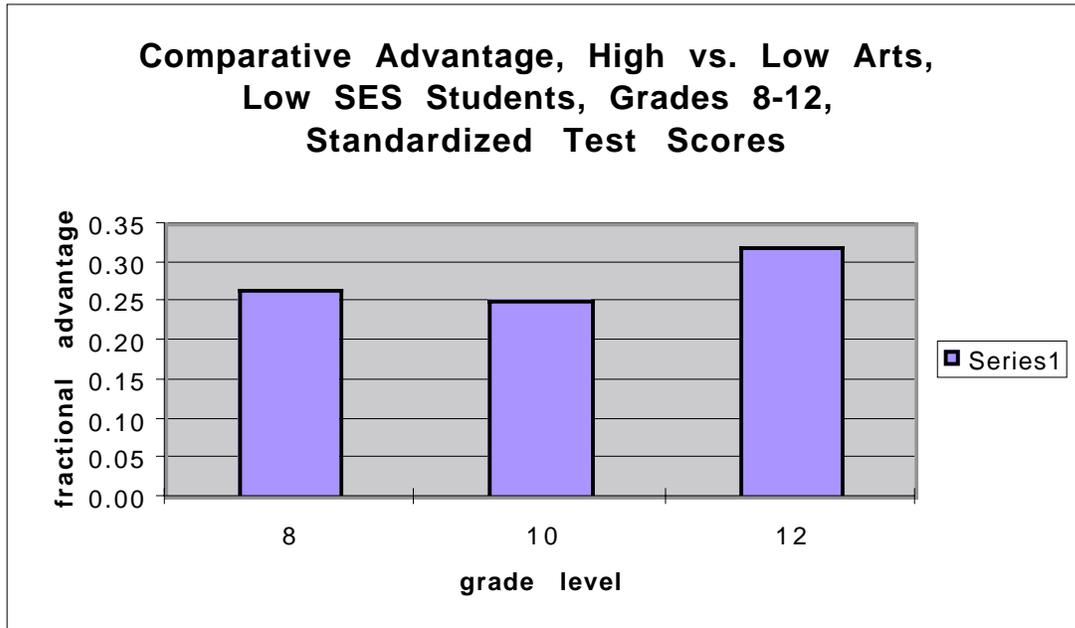
Involvement in the Arts and 12th Grade Academic Performance and Attitudes, Low SES Students (Low Parent Education/Income)

% in each group	<u>High Involvement</u>	<u>Low Involvement</u>
Top 2 quartiles std tests	30.9%	23.4%
Top 2 quartiles reading	32.9%	23.6%
Top 2 quartiles hist./Geog./cit.	30.7%	25.2%
Level 2 or 3 Reading Proficiency	37.9%	30.4%

The patterns shown for low SES students over time are similar to those shown for all students. The percentage differences in performance are smaller in nominal terms -- for example 8 to 10 percent lower for test scores. But once again, the relative advantage for arts-involved youngsters climbs over the middle and high school years,

and especially between grades 10 and 12. Figure 6 illustrates this pattern for composite standardized test scores where the comparative advantage for high arts youngsters is about 32 percent by grade 12:

Figure 6:



II. Intensive Involvement within an Arts Discipline. The Cases of Instrumental Music and Drama/Theatre.

A final strain of our work, and a departure from our first monograph which adopted a more general orientation to involvement in the arts, is a study of youngsters who exhibit very high levels of involvement within a single arts discipline over the secondary years. Readers may recall that the analyses reported above were built on a conception of involvement defined as “the more involvement in more arts, the higher the student’s involvement score.” As such, a student who only participated in an orchestra and took music lessons, no matter how intensive, would not score in the highest reaches of our involvement scale.

Yet intensive involvement in a single discipline should probably be thought to be even more important developmentally than high levels of more scattered involvement in the arts. This is surely true if specific arts act in specific ways on cognition or other developments. That is an assumption we are comfortable making and could defend at some length. In general, the argument is that different art forms involve different skills and different sorts of human interaction – in short, they impact cognitive processes differently and should be expected to result in different outcomes. We will save a more in depth discussion for another paper.

Involvement in Instrumental Music and Cognitive Development in Mathematics. We were interested in music because of accumulated studies over the past 7-8 years suggesting that certain kinds of musical experiences, especially keyboard training, seem to produce effects on cognitive functioning in young children. Additional potentially important aspects of the musical experience are learning to read music and to associate musical notation to issues of time, rhythm, and pitch. These experiences at first glance appear to involve forms of mathematical reasoning -- the fractional senses of different musical notes (whole notes, half notes, and so on), the relative distances of notes within scales, the perfect doubles and halves in the pitch frequencies of octaves, and even the relations among dynamics within a musical passage. For some instruments, such as the piano, there is an associated geometry of music that probably reinforces the spatial, temporal reasoning effects noted by Rauscher et al. For other instruments, such as the strings, there are complex (differing at different points on the neck of a cello, for example) linear geometries associated with pitch that bring spatial reasoning to the production of musical sounds and phrases.

What is research suggesting? While it would appear that the domains of music and mathematics are widely divergent, an increasing number of studies focusing on participation in musical activity and cognitive development in mathematics suggest that the two are closely related. An important skill developed while a child begins the study of music is reading musical notation; this notation describes elements of rhythm and pitch, which are the fundamental building blocks of music. It is the analysis of music at this basic level which reveals the most obvious connection between music and mathematics (Bahna-James, 1991).

Rhythm, here defined as a numerical pattern of beats occurring over time, is represented by a series of notes ranging from whole notes (usually 1 beat per measure) to quarter notes (4 beats per measure) to eighth, sixteenth and even 32nd and 64th notes. Two fundamental mathematical skills are required in order to understand the time meaning represented in a note: the ability to count beats, which allows for an understanding of the absolute value of a note in a measure, and general fractional or proportional sense, which allows for an understanding of each note type in relation to the other.

A second feature depicted by musical notation is pitch or frequency, which denotes the relative tonal distances between notes within scales, chords and intervals. These relationships in and of themselves are abstract and difficult to conceptualize; the use of musical instruments such as the violin, clarinet, or piano helps make these tonal relationships concrete. The keyboard in particular has been singled out in research by Rauscher and Shaw (1997) on spatial-temporal reasoning, as a form of reasoning ability postulated to directly affect mathematical understanding. The results from their work show that keyboard training is a more effective intervention on spatial-temporal reasoning skills than singing lessons and computer training and suggests that mastering a musical instrument aids in developing mathematical understanding.

Initial studies correlating the grades of secondary school students in music theory and math classes (Bahna-James, 1991) and teacher evaluation of instrumental and scholastic achievement for elementary school students (Klinedinst, 1991) revealed a

variety of significant relationships between mathematics achievement and music performance; sight-singing and arithmetic, algebra and geometry; pitch and arithmetic; and finally tonal relationships and arithmetic and algebra. The work by Bahna-James (1991) further showed that the correlation between math grades and music theory grades of secondary school students increases when the mathematics being taught is of a more elementary level and the numerical relationships are simple, providing additional support for the notion that the fundamental components of music are inherently mathematical in nature.

Research by Shaw et al. (Boettcher, Hahn & Shaw, 1994; Grandin, Peterson & Shaw, 1998; Graziano, Shaw & Wright, 1997; Rauscher & Shaw, 1997, Rauscher & Shaw, 1998) drawing in part from the seminal work of Chase & Simon (1973) on how chess experts process information, has suggested that cognition in music, mathematics and complex games are activities which are driven by pattern recognition and manipulation, and as such are affected by spatial-temporal reasoning ability. Of particular interest is their study (mentioned above) which focuses on the effect of keyboard training on the spatial-temporal reasoning of young children as measured by a series of Object Assembly Tasks. These assembly tasks require matching, classifying, and recognizing similarities and relationships among displayed objects. That keyboard training alone (rather than training in singing or simple arithmetic through the use of computer games) had a significant effect on children's ability to classify and recognize similarities and relationships between objects provides further evidence for the contention that at the most abstract level, music, like mathematics, requires the ability to recognize patterns and relations.

Intentionality vs. Serendipity. We here report some basic explorations of differences shown by students who were heavily involved in instrumental music throughout the first three panels of the NELS:88 survey -- 8th, 10th and 12th grades. We add a word of caution at this point. Some of the studies discussed above were studies of music experiences in their natural state and their associations with mathematics learning; these were generally situations where there was no intention in the curriculum to bolster math skills -- the researchers simply wondered if increased math skills were a serendipitous byproduct of the music experience. Other studies were launched with the express intention of producing and tracking connections between learning in the two domains. Both types of studies have found connections between music and mathematics cognition.

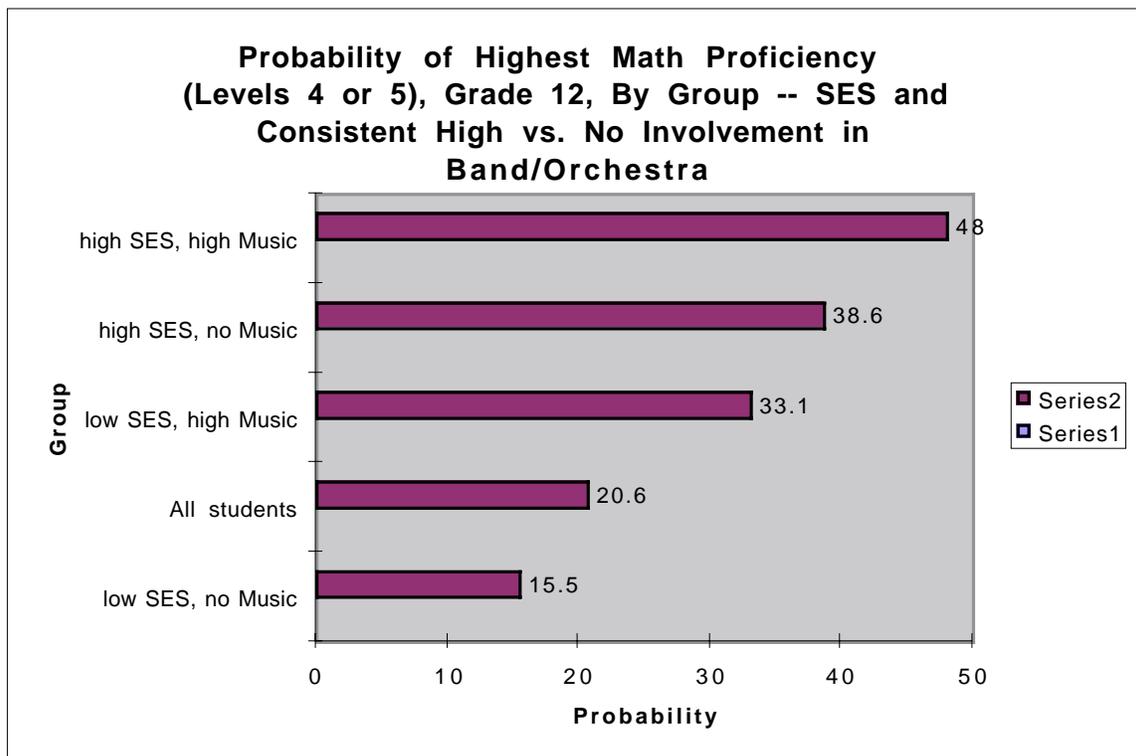
Our work here is of the first type: using a national and voluminous data base with information about involvement in music. Our main question becomes, does reported involvement in instrumental music seem to have discernable effects on mathematics learning, even though secondary school orchestras and bands do not list such a benefit on their class descriptions?

The following chart shows one early result of this work. We examined the probability that students in different groups -- differing mainly by involvement in instrumental music -- would attain the highest levels of mathematics proficiency on the 12th grade tests used in the NELS:88 study. We also differentiated our analyses by family income and education levels, or SES.

In Figure 7 below, it can be seen that the overall probability of scoring high in mathematics (that is for all 12th grade students) is about 21 percent. From this baseline,

the comparisons become quite interesting. First, all high SES students do better than the average student. Second, within groups, students concentrating in instrumental music do substantially better in mathematics than those with no involvement in music. And third, low SES students with high involvement in music do better than the average student at attaining high levels of mathematics proficiency. The performance distribution for extremely low levels of mathematics proficiency, Levels 1 and below, is a mirror opposite to the one shown here.

Figure 7



Do math skills grow over time with involvement in instrumental music?

The NELS:88 data base allow for comparisons over time, an important feature in the creation of arguments addressing the causes of observed differences between or among groups of interest. Here we compare how music-involved students compared with their non-music peers as of 8th grade and revisit the exact same students again in grade 12. Figure 8 shows performance level distributions for several groups of interest, including overall average scores, averages for all low SES students, averages of all low SES students with no music involvement, and low SES students with high involvement in orchestra and/or band. The Levels shown refer to successively higher levels of proficiency; these are scaled by specific skills and knowledge of test takers (they are criterion-referenced like the tests used for the National Assessment of Educational Progress). Level 3 would be considered high performing at grade 8; Levels 4 and 5 would be considered high performing at grade 12.

Figure 8: Math Proficiency Scores – Grade 8 vs. Grade 12

A. GRADE 8 Overall Math Proficiency Scores - PERCENTS in each level

Math Proficiency Scores v	Average N = 14,915	Average - Low SES N = 7,052	No Music - Low SES N = 1,216	Orch/Bnd - Low SES N = 260
BELOW 1	15.3	20.8	16.4	10.8
LEVEL 1	34.7	41.1	42.1	36.9
LEVEL 2	20.3	17.8	19.7	20.4
LEVEL 3	19.0	8.6	10.7	21.2

In Figure 8, it can be seen that twice as many Low SES 8th graders in Band and or Orchestra score at high levels in mathematics that Low SES 8th graders with no reported involvement in instrumental music -- 21.2 percent versus only 10.7 percent.

B. GRADE 12 Overall Math Proficiency Scores - PERCENTS in each level

Math Proficiency Level v	Average N = 14,915	Average - Low SES N = 7,052	No Music - Low SES N = 1,216	Orch/Bnd - Low SES N = 260
BELOW 1	4.7	6.4	5.3	1.9
LEVEL 1	14.8	20.9	22.8	12.7
LEVEL 2	8.9	10.5	13.1	13.5
LEVEL 3	15.6	14.6	21.1	20.8
LEVEL 4	18.3	10.9	14.5	30.4
LEVEL 5	3.0	.9	1.0	2.7

What is shown in these tables? For GRADE 8, the percentages of low SES students who would eventually show consistently high involvement in orchestra/band show math scores similar to the average student – with about the same percentages scoring very low (1) and very high (3) and, as mentioned, outscore low SES peers not involved in music 2 to 1. The differentials continue to favor students heavily involved in instrumental music by GRADE 12, especially the percentages of students performing at the highest levels (Levels 4 and 5). Thirty three percent of high-music/low SES students test at high levels of mathematics proficiency (levels 4 and 5). This 31 percent should be compared to only 21 percent for “all” students, and only 15.5 percent of no-music, low SES students who score at high levels in mathematics.

The performance gaps between the low SES students involved in music and “all” students as well as low SES non-music youth have grown over grades 8 to 12, or about 4 years.

Figure 9

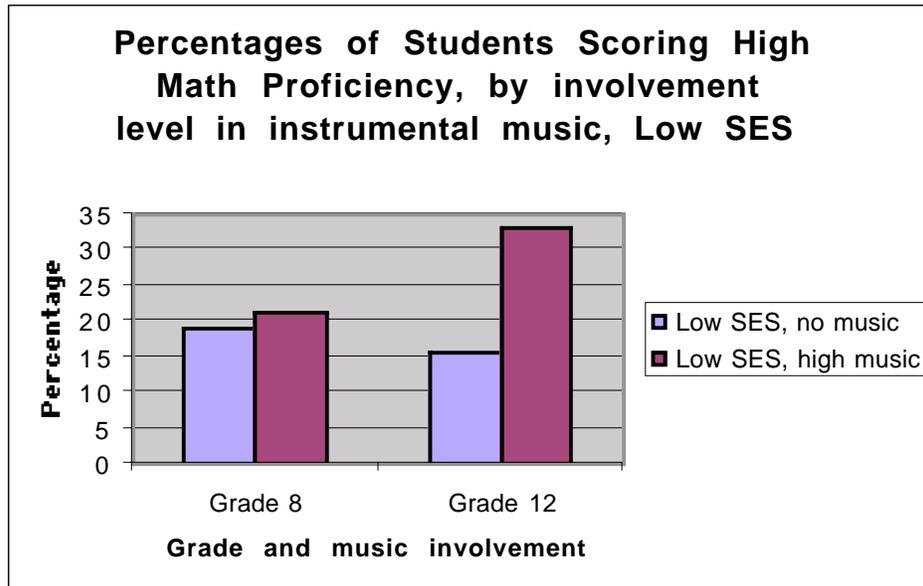


Figure 9 shows math proficiency developments for Low SES youngsters in perspective. In the NELS sample, there were 260 low SES students who qualified as intensively involved in instrumental music over the span of grades 8 through 12. As of the 8th grade, these 260 students were slightly outperforming the 7,052 low SES students with no music involvement in mathematics. By grade 12, these same 260 students were outperforming all low SES no music students at high levels of mathematics by a factor greater than 2 to 1.

The Case of Involvement in Theatre.

We turn here to another exploration of intensive involvement in a single artistic discipline, in this case the theatre arts.

Why theatre? Our interests in the theatre arts grows from a history of scholarship exploring the meaning and importance of theatre and drama in education over the past three decades. The central figures are number of prominent university faculty in Great Britain. The United Kingdom has been the setting for a substantial theatre in education (or TIE) movement during this time.³ TIE involves theatrical

³ See Jackson, Tony, *Learning Through Theatre: new perspectives on theatre in education*. Second edition. London: Routledge, 1993.

companies taking up residencies of varying duration at schools, usually bringing productions designed to provoke thought and discussion of important themes, as well as to entertain. There is also a sizeable number of drama in education devotees in England, including many of the nation's elementary school teachers. Drama in education refers to the use of drama in the classroom for various purposes – learning about history, conflict resolution, learning about oneself, learning stagecraft, learning acting, and so on.⁴ Drama in education is formally recognized as a curricular tool in the present National Curriculum in Britain, although neither drama nor theatre are required subjects. University teacher education faculties maintain lectureships and even a professorship or two in drama in education, so that teachers in training can learn to use dramatic forms in their future classrooms. Britain also boasts a remarkable individual, Dorothy Heathcote, who has become a legendary teacher trainer through a non-stop series of teacher workshops and residencies that have not slowed for 40 years as she enters her mid 70s. Ms. Heathcote advocates that teachers get into roles as they teach, along with their students; she usually presents her workshops in role to make her points.

In surveying what is known about the impact of theatre and drama on children, Tony Jackson from the University of Manchester identifies “change of understanding” as the general purpose; he goes on to emphasize that the changes of understanding can be about both form and content in theatre. Children learn about the art form as well as about other more instrumental ends related to personal or social development. Among the latter, Jackson enumerates learning about, “group interaction, discipline, language usage, self esteem, and movement skills.”⁵ Heathcote reminds us also that drama provides situations where we can or must put ourselves into the place of another; thus *empathy for others* is a possible or likely outcome of the dramatic experience.⁶

The strength of evidence for specific impacts of theatre and drama claimed by these and other scholars tends to be weak. Drama and theatre are complex events with many possible effects. Even it were feasible to design studies looking for the impact of theatre experience on such things as actor self esteem or language facility, objections by artists about taking so narrow a view of the experience would likely interfere. In any event, what we tend most to benefit from is the accumulation of case studies⁷, and the informed observations of senior scholars who have been attached to TIE or drama in education and who have come to their own understanding through the gradual acquisition of research and professional knowledge.

This study departs from English traditions of drama and theatre in education.

We turn in a moment to our exploration of developments for middle and high-schoolers intensively involved in theatre and drama. We should begin by noting that the theatre in education experiences we focus on are not strictly like the one's of central

⁴ See Bolton, Gavin, *Drama as Education: an argument for placing drama at the center of the curriculum*. Longman, 1984.

⁵ Jackson, op. cit, p. 44.

⁶ O'Neill and Johnson, op.cit. p. 129.

⁷ Tony Jackson. *Learning Through Theatre: Essays and Casebooks on Theatre in Education*. Manchester: Manchester University, 1980. Also Dorothy Heathcote, *Drama and Learning*, Chapter in O'Neill and Johnson, op.cit. pp. 90-102.

interest to scholars of drama and theatre in education in the UK. The students in our study identified as intensively involved in theatre are those who have attended a drama class once per week or more as of 8th grade, participated in a drama club as of 8th grade, taken drama coursework in grade 10, and participated in a school play or musical in grades 10 and 12. – or at least most of the above. Officers of these organizations were assigned extra “credit” toward intense involvement.

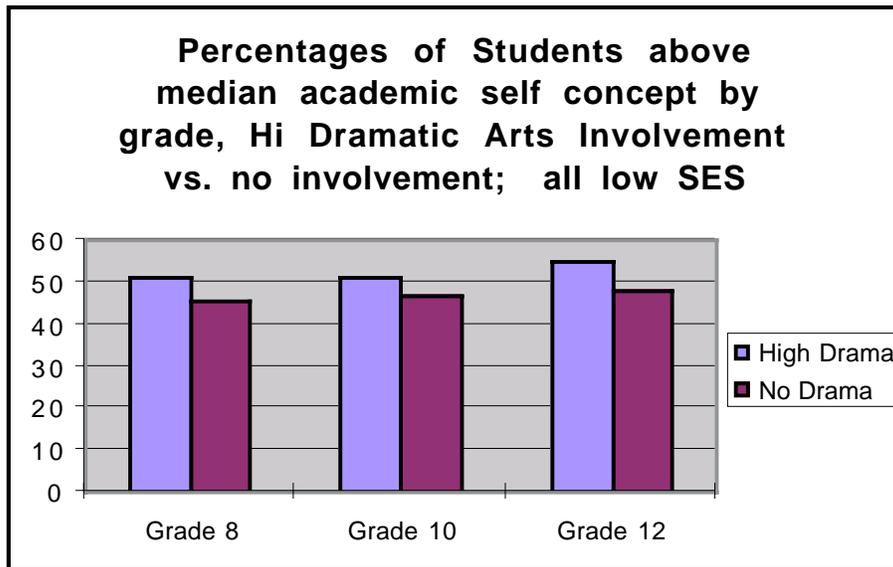
As such, our drama and theatre students were not necessarily associated with TIE (formal theatre groups in residence on campus) or with drama in education (the use of dramatic forms in the individual classroom for various purposes). These are the kingpins of drama and theatre in education in Britain and the experiences generating our hypotheses for this exploration. Let’s turn to whether or not some of the claimed benefits of drama and theatre from across the Atlantic show up in the NELS:88 data.

Theatre and Language Skills. NELS:88 does not contain a measure of spoken language skills, but the data do track the development of reading proficiency over each survey year. We examined the progression of reading skills for two groups of low SES students beginning in grade 8. One group has no involvement in theatre, and the other group is highly involved in theatre. (This group is, to be specific, the highest theatre-involved 285 low SES students in the entire NELS:88 sample.)

The pattern in the data is fairly clear: the involved students outscored the non-involved students as of 8th grade; both groups gain skill as they proceed through high school; and the difference favoring students involved in theatre grows steadily to where nearly 20 percent more are reading at high proficiency by grade 12; the advantage was only 9 percent back in grade 8. This seems reasonable in that students involved in drama and theatre, according to our definition of intensive involvement, probably spend time reading and learning lines as actors, and possibly reading to carry out research on characters and their settings. In any case, theatre is a language-rich environment and actively engages students with issues of language.

Theatre and Self Concept. Because English scholars list self esteem as a corollary of engagement with drama and theatre, we examined the progression of a general self concept measure in NELS:88 over grades 8 through 12 and compared our theatre-involved to non-involved low SES students. Figure 10 on the following page shows that the “high drama” group maintains a small edge in self concept throughout the longitudinal study. Both groups gain over the four years involved, and a slightly bigger gap favoring those intensively involved in theatre has opened up by grade 12.. By grade 12, the difference shown in Figure 11 becomes significant ($p < .058$).

Figure 10: Theatre and self concept

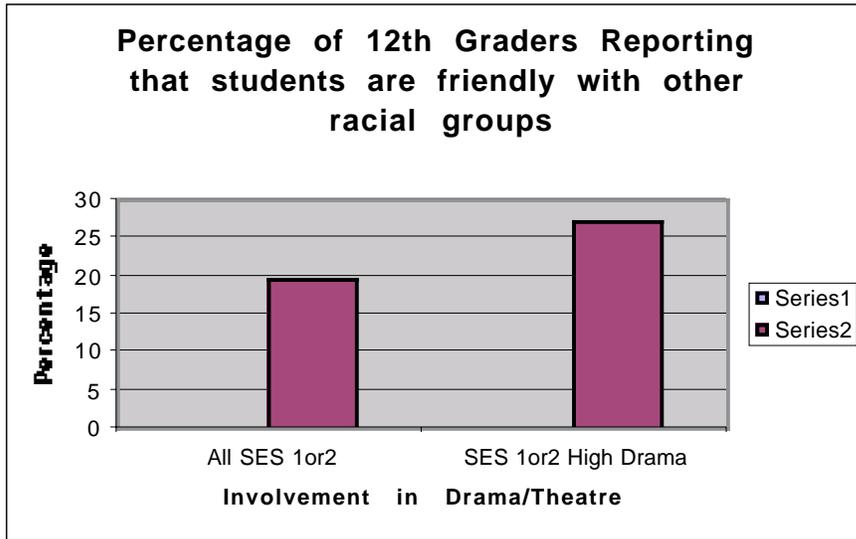


Involvement in theatre and empathy and tolerance. Dorothy Heathcote above reminded us that a dramatic experience is an opportunity to put oneself into another’s shoes. This is true when taking on a role; it is also true when, as a character in role, one labors to understand how another character encountered on the stage has conceptualized and enacted his or her role, or to comprehend how his or her character is understood by others. Theatre is loaded with potential opportunities to interact with students that one might not in the ordinary course of school life gravitate toward – including students from other economic strata and other racial groups. This holds both for interactions in role and for interactions with other members of the cast as a play or scene or improvisation is developed.

We found two indicators related to “tolerance” and “empathy” in NELS:88 and show the results on the following pages. Once again, we are comparing low SES students, one group with no involvement in theatre and the other with high involvement over all of the high school years.

Race relations. The first indicator is shown in Figure 11. This reflects student responses to the question, “Are students friendly with other racial groups?” Students involved in theatre are more likely to say yes to this question, by 28 percent to 19 percent. This may be an illustration of an effect of involvement in theatre. It also may be an artifact of unknown differences in schools attended by students where theatre programs are offered – for other unknown reasons, relations among racial groups may be more positive at the schools of our “high drama” students. This difference is not statistically significant, in part an artifact of the small low SES, high-theatre sample.

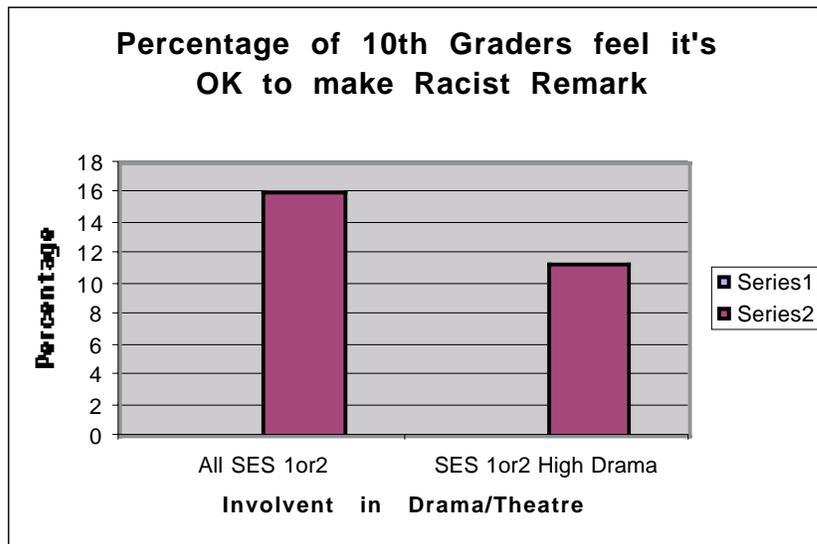
.Figure 11: Are students friendly with other racial groups?



A similar perspective is shown in Figure 12 on the following page. Here students at grade 10 were asked if it was OK to make a racist remark. About 40 percent more “no-drama” students felt that making such a remark would be OK -- about 12 percent of “high drama” students thought the same, and about 17 percent of no drama students agreed. In this case, the advantage favoring high-theatre students is statistically significant ($p < .05$).

As with the data bearing on students “getting along” with others of different races (Figure 11), what is shown in Figure 12 may indicate and effect of involvement in theatre and it may also be influenced by unknown school differences.

Figure 12: OK to make a racial remark?



Discussion

The kinds of comparisons and analyses shown above are sure to provoke several kinds of questions surrounding the meaning of the data and the approach we took to examining and displaying the figures. In this concluding section, we attempt to anticipate some of these questions and also to suggest the implications of what we report.

Are our conceptions of the arts too instrumental? The purpose of this research was to examine some of the non-arts outcomes of engagement in the arts. Because we chose this purpose does not mean that we do not recognize or value the myriad goals that education in and participation in the arts serve. Certainly involvements in the broad spectrum of arts captured in our more general assessment will mean many things to students that we did not set out to capture. Not the least of these are skills in the various arts themselves, competencies as critics of art forms, aesthetic awarenesses and appreciations valuable in their own right, and newfound powers and joys to see and express.

Our analysis of involvement in instrumental music captured a sense of instrumentality that is clearly not an intentional part of music instruction or participation for many. It just happens that research is suggesting links between music and mathematics reasoning which we took the opportunity to explore. A bigger case for instrumentalities connected to theatre and drama has been articulated in the writings and research of English scholars, and we explored a handful of such possibilities through NELS:88 data.

So yes, this analysis is concerned with instrumental, or non-arts, outcomes of the arts in education. For now, we save research on the arts-related goals of arts education and participation in the arts to other scholars and for us, to a future date.

What can be said about causation in this analysis? Establishing causation in education and social science research is difficult. The essential question that should be aimed at this type of work is what evidence supports contentions that involvement in the arts, or music, or theatre “caused” the differences in groups reported above.

Our convictions that causation is involved depend mainly on three elements of the research – sound theory, supportive evidence, and ruling out rival explanations. First is the presence of a sound theory consistent with explanations that the arts should matter. In the case of all three of our analyses, we built our instincts around previous research suggestive of causal propositions. The strength of the case is perhaps most strongly developed in the instance of music and mathematics. Incidental benefits of theatre have been argued and studied in the UK for decades. The general effects of broad involvement in the arts is supported most by research that has shown that children are more engaged and cognitively involved in school when the arts are part of the curriculum.

A second element is observational data supporting the causal theory. If one cannot find an empirical link between participation in the arts and an outcome, it is difficult to argue that the arts are causing anything. A version of this argument is that one cannot support causation without significant correlation. The tables above illustrate correlations between arts participation and various outcomes, some quite strong.

The third element is the elimination of rival hypotheses. This is carried out by trying to make your groups as similar as possible, with the only difference being in our case intensive arts participation or none. We pursued this by restricting our groups to low SES students, so that differences in family background would not be driving observed differences. We also tend to eliminate rival hypotheses by observing changes over time for the same students. In all three sections of the work, advantages favoring arts-involved students appear in many cases to grow over time. A rival hypothesis we have not ruled out is that systematically the more arts-involved students attended more effective schools over middle and high school. To be a truly preemptive explanation would require that this “better school” explanation held for all three of our main comparison frames (general arts involvement, music, and theatre), which were essentially constructed differently and involved different students and different schools.

What are the implications? This paper presents observations from a large-scale data base of U.S. secondary school students suggesting positive associations between involvement in various arts and academic and social outcomes. The work supports strong suggestions, but is not definitive. No one study ever decides things in this sort of research. Our knowledge base grows incrementally with the accumulation of consistent studies, and with the accumulation of professional knowledge by educators, school leaders, parents, students, and in this case artists involved in the schools.

The main implication of this work is that the arts appear to matter when it comes to a variety of non-arts outcomes, some of them intended and some not. The next step for us is carefully following any leads or suggestions for rival explanations in our work, mostly by applying various tests for group differences that would compete with arts involvement as explanations for what we report.

This work also suggests the value of more up-close and more controlled research that can further test our findings. This program may include randomized studies, but random assignment to involvement in the arts is difficult to conceive when the issue is long term, natural engagement with the arts, which is what this paper is concerned with. Also, long term deprivation in the arts, implied for purposeful control groups, is probably unethical and harmful. Productive approaches to additional research may include phenomenological studies that probe the meanings of art experiences to individual children or educators. They may include longitudinal studies of students heavily involved in music or theatre (or other art disciplines) at the single or multiple-school level to explore changes over time. They will include school-level or larger scale studies of initiatives attempting to bring arts integration to the curriculum.⁸ Many forms of research in this area can exhibit strengths; but all will succumb to certain weaknesses and limitations. Knowledge will come at the intersection of multiple and diverse studies of what the arts mean for human development.

⁸ The Imagination Project is currently conducting such an investigation – the 6th year evaluation of the Chicago Arts Partnerships in Education. Reports are due out mid summer of 1999.

By soliciting such active involvement, artists were attempting to break down traditional and perceived barriers between themselves, their work, and the viewer. Artists engage and collaborate with audiences in many different ways today. By opening up their process of creation to others, they give up a measure of control over their work, and give over to chance and to trust in the viewer-turned-participant. And the work of art, in turn, becomes a two-way exchange. To explore more, click on each artwork thumbnail, then click again on the larger image that appears in the box above. Marcel Duchamp, Scientists are still trying to figure out how music affects our brain and why, just like any other art, we all experience it differently. But new discoveries in understanding the physical effect of music on the human brain are made all the time. It has been revealed that music can modify the brain structure, affect the taste of beer, and make men more attractive; it also turns out that the upbeat Beatles and the depressive Nortt are equally as good at making us feel better.Â This research, explain the authors, will help us better understand why people enjoy music and may also be useful for medical research. For instance, it can give us insight into the causes of neurological disorders that dampen peopleâ€™s feelings of reward or motivation: depression, apathy, unfounded and harmful addictions. involvement : a basic wish to belong independence : a basic wish for autonomy and freedom. What are the linguistic strategies of involvement ? Example on the paper. Notice or attend to hearer Exaggerate Claim common point of view Be optimistic Indicate speaker's knows hearer's wants and is taking them into account. What are the linguistic strategies of independence ? Example on the paper. Make minimal assumptions Giver hearer the option not to do the act Minimize threat Apologize Be pessimistic. What are the three sociological dimensions of involvement ? Distance : a symmetric dimens Involvement in the arts and human development: General involvement and intensive involvement in music and theater arts. In E.B. Fiske (Ed.), Champions of change: The impact of the arts on learning (pp. 1-18). Washington, DC: Arts Education Partnership, Presidentâ€™s Committee on the Arts and the Humanities. Davis, D.W., Gordon, M.K., & Burns, B.M. (2011). Educational interventions for childhood asthma: A review and integrative model for preschoolers from low-income families. Pediatric Nursing, 37 (1), 31-38. Fahlman, M.M., Hall, H.L., & Lock, R. (2006). Ethnic and socioeconomic compariso