Cognition and Student Learning through the Arts

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In recent years, an increasing number of studies have suggested connections among cognition, social and emotional development, and the arts. Some of this research indicates that students in schools where the arts are an integral part of the academic program tend to have an academic advantage over students for whom that is not the case. This study examines factors in schools and at home that contribute most to the variance in student learning and achievement, particularly as they relate to the arts, using a sample of more than 8,000 students in grade 5. The findings suggest that in-school arts programs alone may have less of an impact on student achievement than previous research has proposed. Parental influences likely have more of an effect than school on most children, and efforts to involve parents in the arts with their children may be more productive than simply providing arts programs in schools.

Keywords: arts education, cognition, school reform, student achievement

For as long as humankind has been able to think logically, we have thought about thinking: What is it that enables us to learn and what is happening in our minds physiologically, psychologically, and educationally? As a modern society, we have been trying for more than a hundred years to understand how the brain works, and the renewed interest during the last thirty years in formalizing cognition has intrigued both practitioners and researchers who believe that student engagement in the arts has positive effects on academic achievement. It has taken centuries for thinkers to uncover evidence of arts cognition, the “emotive” part of who we are. The objective of this research is to explore the relationships among school- and home-based characteristics related to involvement in the arts, their impact on student learning, and the policy implications of these findings.

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BACKGROUND

From the time of Plato and Aristotle to the current day, the actual application of what is known about how children learn has been limited because of the lack of definitive theories and research, particularly regarding the effect of the arts on student academic success. In early education in the United States, scholars’ views of arts education varied. In the late 1800s, Horace Mann pushed to include the visual arts and music in common schools, and in the early twentieth century, John Dewey commented that any intellectual idea needs the imprint of the aesthetic for that idea to be complete. Dewey identified and supported the idea that there was a positive correlation between cognition and instruction in the arts; this linkage had a strong effect on numerous curriculum decisions in many places at that time (Gullatt 2008).

Between 1950 and 1980, most schools offered arts education for its own sake, and not to enhance any other goal. In 1974, Eisner called for the evaluation of arts programs, which eventually produced evidence suggesting that arts education positively affects aspects of living and learning beyond the
intrinsic values of the arts themselves. Shortly afterward, Jarratt (1993) raised questions concerning the lack of educational theory addressing expressive feelings in teaching and learning.

In the 1990s, some arts educators began developing new programs and practices grounded in the idea that the arts are cognitive and therefore their study could have serious academic benefits beyond the arts disciplines themselves. As a result, educators began integrating arts into other subject areas. Qualitative data noted that these programs “energized” teachers, leading to broader school change when teacher schedules were changed; additionally, parents became resources, teachers became leaders, and teaming ensued (Rabkin and Redmond 2006; Witmer 1996; Witmer 1997a; Witmer 1997b).

Recent findings in cognitive science and neuroscience are now helping to explain the arts’ potential as a powerful tool to enhance teaching and learning, showing that the brain and body make up a single, fully integrated cognitive system. Researchers have found that most thought occurs at a level well below conscious control and awareness and involves a continual stream of sensory information (Gullatt 2008). They posit that the very emotional and personal content of the arts is part of what causes the arts to become cognitively powerful (Gullatt 2008).

The work of Efland (2002) has become central to understanding the relationship between art and cognition. His work offers a strong argument for the possibility of transfer, providing a research base for seeing works of art as social conventions. It is particularly important, he claims, to direct arts learning toward the understanding that a society is reflected in its art, and that the artist plays a central role in representing that society.

Efland (2002) also demonstrates imagination as the cognitive process that enables individuals to organize or reorganize images, bringing the element of innovation to the creation of meanings that are generally less dependent on conventional ways of thinking. It is necessary, he says, to understand that visual images are embodiments of meanings and, thus, become objects of inquiry. In short, understanding artistry involves cognition. He supports two influential arguments developed by Arnheim (p. 155): first, sensory perception is already cognitive, in that it requires the perceiver to select, generalize, and abstract aspects of the objects received by the mind; and second, representation of objects also requires the ability to think within the means provided by a given medium (Efland 2002). Efland further claims that works of art are also social conventions, in that one grasps meaning from the art form in various ways, including social context and often through verbal mediation (i.e., teaching).

Eisner (2002) has also examined how the arts contribute to the growth of mind. He unabashedly argues that the ability to create a form of experience that can be regarded as aesthetic requires a “mind that animates our imaginative capacities;” be they visual, choreographic, musical, dramatic, literary, or poetic: ego, the arts require many forms of thinking. Eisner reminds us that we initially learn of our environment through sights, sounds, tastes, and smells, which are the first avenues to consciousness and become a means through which we pursue development, reminding us that a major cognitive function the arts perform is to help us notice the world in new ways and prompt awareness of things not previously noticed.

Although Eisner insists that the value of the arts does not reside in its linkages with math and language (Brown 2001), he remains a staunch supporter of the centrality of learning processes and imaginative thinking in all disciplines (Darby and Catterall 1994) and argues that the arts can serve as models for educational aspiration and practice. His five principles of art education have helped to guide other researchers who agree that each field of study provides a framework through which children can experience, organize, and understand the world by the use of different techniques and materials.

The Impact of Cognition Research on Arts Education

Sousa (2006) outlines the findings of neuroscience research that have shown the impact of arts instruction on students’ cognitive, social, and emotional development—specifically, that certain brain areas respond only to music while others are devoted to initiating and coordinating movement. He also notes that studies consistently show that students in schools where the arts are an integral part of the curriculum enjoy a number of advantages over their peers in schools without the arts. These benefits include the development of the imagination (Greene 1995), greater motivation to learn (Csikszentmihalyi 1997), increased student creativity, lower dropout rates, and increased social skills (Smith and Upitis 2005). Various studies and reports indicate that students involved in the arts exhibit higher academic achievement than their peers who are not involved in the arts (Smith and Upitis 2005). However, it should be noted that in the midst of this research, Winner and Cooper (2000) warned researchers and practitioners not to leap beyond the evidence and make causal claims where only correlation was indicated. As a result, researchers next began to look at scientific findings, and specifically breakthroughs in cognitive science, for possible causal links to the influence of the arts on learning. Among the researchers and practitioners who have been doing research and development in cognition as it applies to education are Caine and Caine (1997), Diamond and Hopson (1998), Jensen (1998), Kovalik (1999), Silver and Hanson (1995), Stevens (1999), Sylwester (1995), and Wolfe and Sorgen (1990), to name only a few.

While not as well known, Hurley and Eisner (1996) have measured the affective impacts of integrating the arts and note that an increasing amount of research supports the belief that the arts can enhance learning in other subjects. Tishman, MacGillivray, and Palmer (1999) found that children
who were able to draw inferences about fine art were able to transfer their reasoning to images in science. Lopez et al. found a strong relationship between academic and artistic efficacy, suggesting that “there is a significant cognitive transfer from arts education to other academic areas” (2000, 1).

The guiding principle of the work of Caine and Caine (1997) is that brain research confirms that multiple complex and concrete experiences are essential for meaningful learning and teaching, and that everything being learned becomes linked to the learner’s current experiences, past knowledge, and future behavior. However, the concern of some researchers and practitioners is that “critical thinking” cannot be taught in isolation, but must be included in content knowledge (Strauss 2008). Thus, opportunities must be provided for students to practice and experience skills that will become ingrained and transferred to other situations.

Robert Sylwester notes:

From my perspective, thinking is somewhat similar in that how one derives conclusions is far more important than the conclusions drawn, for it is the process which includes/excludes and focuses on different aspects toward combining them in a conclusion of action or thought. …The problem in evaluating arts is our inability of codifying particulars. Most have looked at the results of skills rather than the thinking processes which underpin them. …If one only looks at specifics of art that may be transferred, rather than focusing on the process, few skills may be demonstrated or applied elsewhere. However, the thinking processes are probably used throughout. (personal communication between Sylwester and Witmer, February 24, 2000)

Catterall, whose 1999 landmark study on transference followed over 25,000 students in American schools for ten years, has noted a renewed interest in transference and findings that show success with at-risk and failing students who “frequently characterize their success as a result of induced or revived enthusiasm for school attained through the arts” (2002, 155). He also calls for further inquiry into the “possibility that sustained and deep learning in the arts may cultivate habits of mind and dispositions impacting future problem-solving behavior” (157).

The seminal work of Winner and Hetland (2000) did not show the causal results that arts educators expected, but it did provide encouraging findings, including some relationships between arts study and verbal and mathematics skills. Their meta-analysis notes that the study of transfer effects from the arts is important (a) educationally, because any transfer effects that do exist can be put to effective use by teachers; and (b) scientifically, because it can increase our knowledge of how the mind works and how certain skills are or are not related in the brain. The authors conducted an exhaustive search for all relevant studies published in English from 1950 to 1998 but could find no experimental studies that tested which causal mechanism might underlie academic improvement as a function of arts study. Thus, the research can only reveal correlations between arts study and academic achievement and whether academic achievement improves when students are exposed to the arts, not causal effects.

It should be noted, however, that not all scholars agree with the Winner-Hetland approach and findings. Deasy (2002) cites other analyses that contradict some of Winner and Hetland’s (2000) findings and notes that while arts education research today is at an early stage of its development, the accumulation of studies over time should refine both educators’ and policymakers’ understanding. Gullatt (2007) also notes that studies on the relationship between the arts and student achievement within academic disciplines have typically been more theoretical than empirical, and Eisner (1999) has always cautioned that the purpose of the arts is not to raise achievement in other disciplines.

Implications

In 2004, the Dana Foundation brought together cognitive neuroscientists from seven U.S. universities to study the question of why arts training is associated with higher academic performance. Their findings allow a broader understanding of how to define and evaluate the possible causal relationship between arts training and the ability of the brain to learn in other cognitive domains (Gazzaniga 2008). Forthcoming conclusions are expected to lead to more definitive results in the field of cognition.

Even more recently, Stevenson and Deasy (2005) found that the arts allow students to become more engaged in school and learn to make meaning of the world from different perspectives, helping them make sense of other kinds of information. Stevenson and Deasy further note that the arts and non-arts content and skills are best taught in tandem, with the content and methods of the disciplines woven together for mutual reinforcement. This approach places students in active and meaningful roles in the classroom and connects the schools to the students’ own lives and cultures.

Both the government (Murfee 1997) and arts organizations periodically list priorities for arts education research, and, as expected, their lists are similar. The Arts Education Partnership (AEP) is perhaps the most visible organization for identifying and sponsoring areas of research priorities. The organization’s most recent list of priorities proposes further study on the specific cognitive characteristics and effects of each of the art forms, their relationship to other domains of learning, and their roles in the intellectual development of children and adolescents (Arts Education Partnership [AEP] 2004).

In recent years, an increasing number of school-based research studies have strongly suggested connections among cognition, social and emotional development, and the arts. As seen from the evidence discussed previously, students in schools where the arts disciplines are integrated with other subjects tend to have an academic advantage over students
in schools where this is not the case. The students in these studies appear to make cognitive connections that their counterparts in less arts-infused schools do not. Research further indicates that arts educators themselves believe that the arts support success across the entire school curriculum, and that the arts should be studied because they help students improve in both other subject areas and school attendance. Hamblen (1993) examined this tendency in a brief review of learning theory, and while she cautions educators against exaggerating the academic benefits of an arts curriculum without instrumental claims that are firmly grounded in theory and research, she does find many justifications for arts education in the body of work on learning theory. One of these arguments holds that arts education gives students access to “multiform forms of knowing.”

The literature suggests strong correlations between involvement in the arts and student achievement, with cognitive factors serving as the link. However, despite all research and rhetoric, these relationships have not yet been shown to be causal. What is needed is a study that will move closer to an examination of causal connections. If we could establish causal connections, decision-making would be informed from a new base, and the door would be opened to systemic school change.

METHOD

This study builds upon the work of Kienzl et al. (2006) in their descriptive analysis of the prevalence of arts instruction received by first- and third-grade public school students using data from the Early Childhood Longitudinal Study–K to determine the students’ receipt of arts instruction and the changes in weekly arts instruction between the grades. By extending our research to fifth grade and including both school- and home-based characteristics, we aimed to explore the relationships between those two sets of characteristics as they relate to involvement in the arts and its impact on student learning. We investigated five specific research questions:

1. Is there a significant difference between students who are involved in the arts out of school and students who are not involved in the arts out of school with respect to teacher ratings of student proficiency regarding reading and math concepts?
2. Is there a significant difference in teacher ratings of student proficiency regarding reading and math concepts by race?
3. Is there a significant difference in teacher ratings of student proficiency regarding reading and math concepts by gender?
4. Is there a significant difference between students who receive no arts instruction in school and students who receive some kind of arts instruction in school with respect to teacher ratings of student proficiency regarding reading and math concepts?
5. Are there any significant differences in teacher ratings of student proficiency regarding reading and math concepts by type of community (large/mid-size city; large suburb/mid-size suburb/large town; and small town/rural)?

Data Source

We analyzed the fifth grade 2004 secondary data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), which includes more than 11,600 children. This federal dataset provides detailed information on children’s health, early care, and early school experiences. The database includes student demographic and achievement data in addition to principal, teacher, and parent surveys.

The ECLS-K began in the fall of 1998 with a nationally representative sample of approximately 21,000 kindergartners from about 1,000 kindergarten programs, both public and private. These children were followed longitudinally through the eighth grade, with data collections occurring in the fall and spring of kindergarten (1998–99) and first grade (1999–2000), the spring of third (2002) and fifth grade (2004), and the eighth grade (2007). The children came from both public and private schools and diverse socioeconomic, racial, and ethnic backgrounds. As a follow-up to the Institute of Education Sciences (IES) ECLS-K study using kindergarten and third grade data, our research focused on fifth-grade data and included only children in the regular classroom (N = 8,048).

There were 3,915 boys (48.6%) and 4,133 girls (51.4%) in the sample. Approximately 60% of the sample was white, while 40% were nonwhite (11% black, 16% Hispanic, 7.5% Asian, and 5.5% other).

Procedure

Our research examined teacher perceptions of the proficiency level of reading and mathematics competencies of their fifth-grade regular classroom students (see table 1). Teachers were asked to rate the extent to which each student was proficient on each competency using a five-point scale (1 = not yet, 2 = beginning, 3 = in progress, 4 = intermediate, and 5 = proficient). The scale reflects teacher perceptions of the degree to which each child has acquired and demonstrated the mandated skills, knowledge, and behaviors. To control for variation in ratings for regular and special needs students, any student with an individualized education plan (IEP) on file was excluded from the sample. Thus, the sample size was reduced to 8,048 children.

To determine the statistical difference between group means, t-tests were calculated using the group means for those students who received some form of arts exposure after-school and those who received arts exposure only in school. In addition, t-tests were calculated to determine if there were
FINDINGS

The first research question focused on determining if any significant differences existed between students who were involved in the arts out of school and students who were not involved in the arts out of school with respect to teacher ratings of student proficiency regarding reading and math concepts. All comparisons were significant (p ≤ .001). For all reading and mathematics competencies, students who took dance, art, or music lessons and/or participated in organized performances outperformed their peers who only had exposure to arts instruction in the school curriculum.

TABLE 1
Reading and Mathematics Competencies

<table>
<thead>
<tr>
<th>Competency</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Conveys ideas clearly when speaks</td>
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<tr>
<td>2.</td>
<td>Understands and interprets text read aloud</td>
</tr>
<tr>
<td>3.</td>
<td>Uses strategies to gain information</td>
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<tr>
<td>4.</td>
<td>Reads books fluently</td>
</tr>
<tr>
<td>5.</td>
<td>Reads and comprehends expository text</td>
</tr>
<tr>
<td>6.</td>
<td>Composes multi-paragraph story</td>
</tr>
<tr>
<td>7.</td>
<td>Reflects on writing</td>
</tr>
<tr>
<td>8.</td>
<td>Makes mechanical corrections</td>
</tr>
<tr>
<td>9.</td>
<td>Demonstrates algebraic thinking</td>
</tr>
<tr>
<td>10.</td>
<td>Solves simple math problems</td>
</tr>
<tr>
<td>11.</td>
<td>Solves multi-digit problems</td>
</tr>
<tr>
<td>12.</td>
<td>Solves multi-step problems</td>
</tr>
<tr>
<td>13.</td>
<td>Solves word problems</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Competency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Subtracts number that requires regrouping</td>
</tr>
<tr>
<td>2.</td>
<td>Reduces fractions to lowest denominator</td>
</tr>
<tr>
<td>3.</td>
<td>Money management skills</td>
</tr>
<tr>
<td>4.</td>
<td>Recognizes shape properties</td>
</tr>
<tr>
<td>5.</td>
<td>Uses measuring tools accurately</td>
</tr>
<tr>
<td>6.</td>
<td>Understands place value</td>
</tr>
<tr>
<td>7.</td>
<td>Estimates quantities and checks answers</td>
</tr>
<tr>
<td>8.</td>
<td>Uses strategies for math problems</td>
</tr>
<tr>
<td>9.</td>
<td>Divides multi-digit problems</td>
</tr>
</tbody>
</table>

Notes. Each student in the sample was rated by the classroom teacher on each of the above competencies using the following 5-point Likert scale. 1 = child has not yet demonstrated skill, knowledge, or behavior; 2 = child is just beginning to demonstrate skill, knowledge, or behavior but does so very inconsistently; 3 = child demonstrates skill, knowledge, or behavior with some regularity but varies in level of competence; 4 = child demonstrates skill, knowledge, or behavior with increasing regularity and average competence but is not completely proficient; 5 = child demonstrates skill, knowledge, or behavior competently and consistently.

The one-way analysis of variance procedure was used to determine if there were any significant differences among teacher ratings by type of communities (large/mid-size city; large suburb/mid-size suburb/large town; and small town/rural). There were significant differences among the three types of communities on both reading and mathematics competencies (p ≤ .05). Overall, two groups (large/mid-size city; large suburb/mid-size suburb/large town) were not significantly different from each other, but they did differ from the small town/rural group. Only one competency in reading (“reflects on writing”) and two in mathematics (“subtracts number that requires regrouping” and “uses measuring tools accurately”) had a different result.

Table 2 describes how the frequency of art and music offerings in school differs by type of community. Note that in table 2, the highest concentration of students who have never been taught music in school comes from the large/mid-size city and the small town/rural groups (19.2% and 18.5%, respectively), which are typically the less wealthy schools. Furthermore, readers can see that the large suburb/mid-size suburb/large town group tends to offer art and music more frequently than do the other two groups.

Table 3 indicates the extent to which students have taken dance, music, art lessons or participated in organized performances by type of community. Small town/rural schools tend to have fewer opportunities for students to participate in the arts, whereas the large suburb/mid-size suburb/large town group tends to offer more opportunities. We speculate that the results presented in tables 2 and 3 may be highly related to SES and school-district wealth.
Participates in
- Tarts Lessons
- Music Lessons
- Dance Lessons

Arts Participation in the home context in which the arts are found. The ECLS-K achievement. The relationship between engagement in the arts and enhanced the work that continues to fall short of establishing a causal the complexity of defining the learning process, as well as following discussion. Our review of the literature exposed the location of the public school has long been a focal point in considerations of the relationships among equity of access, funding distribution, preserving arts learning opportunities (AEP 2004), and academic success (Kozol 1992). Conditions in urban schools usually stand out in bold relief. Our study predictably revealed that large and mid-size city (urban) schools have the highest concentration of students who have never been offered arts or music in school. However, it is important to note that significant numbers of rural schools are also in the same situation. Based on anecdotal evidence, it has been postulated that when funding is cut for such areas as the arts, urban schools, which are historically funded at a lower level than suburban schools, lose arts involvement at a faster rate than other schools. What is noteworthy, however, is that the teacher-reported student math and reading competencies are not significantly different for urban and suburban schools, but both are different from the rural schools. This information enhances the current arts-in-schools discourse in two ways.

First, the results for rural and urban schools reflect growth patterns in the United States. According to the 2000 U.S. Census, the nation experienced a 12% growth in rural areas and a 14% growth in urban areas nationally in the 1990s. Correlations between growth patterns and opportunity lead to an important question: if there is little difference between urban schools and suburban schools in most math and reading competencies, and yet there is a significant difference in the amount of opportunities provided for students to engage in the arts in school, to what extent do these results suggest that the impact that arts engagement has on learning is not necessarily grounded in the number of opportunities a student has within a week, but rather depends on whether they have any access to arts study and engagement? Researchers have recently begun to address the needs of arts study and

**TABLE 2**
Counts and Percents of Music and Art Classes in the School Curriculum, by Type of Community

<table>
<thead>
<tr>
<th>Frequency of Music in School Curriculum</th>
<th>Large/Mid-Size City</th>
<th>Large Suburb/Mid-Size Suburb/Large Town</th>
<th>Small Town/Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>490 (19.2%)</td>
<td>353 (12.6%)</td>
<td>336 (18.5%)</td>
</tr>
<tr>
<td>Less than Once A Week</td>
<td>280 (11.0%)</td>
<td>392 (14.0%)</td>
<td>200 (11.0%)</td>
</tr>
<tr>
<td>Once or Twice a Week</td>
<td>1647 (64.4%)</td>
<td>1915 (68.2%)</td>
<td>1101 (60.7%)</td>
</tr>
<tr>
<td>Three or Four Times a Week</td>
<td>85 (3.3%)</td>
<td>117 (4.2%)</td>
<td>128 (7.1%)</td>
</tr>
<tr>
<td>Daily</td>
<td>54 (2.1%)</td>
<td>29 (1.0%)</td>
<td>49 (2.7%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency of Art in School Curriculum</th>
<th>Large/Mid-Size City</th>
<th>Large Suburb/Mid-Size Suburb/Large Town</th>
<th>Small Town/Rural</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

**DISCUSSION**

This study began with the goal of exploring the relationship of school- and home-based characteristics related to involvement in the arts and their impact on student learning. The ECLS-K data for grade 5 offered a rich body of knowledge to inform this investigation. The IES work done with the ECLS-K data for grade 3 afforded additional insight for the following discussion. Our review of the literature exposed the complexity of defining the learning process, as well as the work that continues to fall short of establishing a causal relationship between engagement in the arts and enhanced achievement.

Our study took a careful look into both the school and the home context in which the arts are found. The ECLS-K database supplied us with three key variables that have been previously noted as important factors when considering the impact of arts engagement on student learning and school, community, and family involvement. A number of findings emerged that are particularly noteworthy.

The location of the public school has long been a focal point in considerations of the relationships among equity of access, funding distribution, preserving arts learning opportunities (AEP 2004), and academic success (Kozol 1992). Conditions in urban schools usually stand out in bold relief. Our study predictably revealed that large and mid-size city (urban) schools have the highest concentration of students who have never been offered arts or music in school. However, it is important to note that significant numbers of rural schools are also in the same situation. Based on anecdotal evidence, it has been postulated that when funding is cut for such areas as the arts, urban schools, which are historically funded at a lower level than suburban schools, lose arts involvement at a faster rate than other schools. What is noteworthy, however, is that the teacher-reported student math and reading competencies are not significantly different for urban and suburban schools, but both are different from the rural schools. This information enhances the current arts-in-schools discourse in two ways.

First, the results for rural and urban schools reflect growth patterns in the United States. According to the 2000 U.S. Census, the nation experienced a 12% growth in rural areas and a 14% growth in urban areas nationally in the 1990s. Correlations between growth patterns and opportunity lead to an important question: if there is little difference between urban schools and suburban schools in most math and reading competencies, and yet there is a significant difference in the amount of opportunities provided for students to engage in the arts in school, to what extent do these results suggest that the impact that arts engagement has on learning is not necessarily grounded in the number of opportunities a student has within a week, but rather depends on whether they have any access to arts study and engagement? Researchers have recently begun to address the needs of arts study and

**TABLE 3**
Counts and Percents of Participation in Dance, Music, Arts, and Organized Performances, by Type of Community (N = 7,202)

<table>
<thead>
<tr>
<th>Arts Participation</th>
<th>Large/Mid-Size City</th>
<th>Large Suburb/Mid-Size Suburb/Large Town</th>
<th>Small Town/Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Takes Dance Lessons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>394 (15.4%)</td>
<td>428 (15.2%)</td>
<td>180 (9.8%)</td>
</tr>
<tr>
<td>No</td>
<td>2169 (84.6%)</td>
<td>2379 (84.8%)</td>
<td>1652 (90.2%)</td>
</tr>
<tr>
<td>Takes Music Lessons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>834 (32.5%)</td>
<td>991 (35.3%)</td>
<td>463 (25.3%)</td>
</tr>
<tr>
<td>No</td>
<td>1730 (67.5%)</td>
<td>1816 (64.7%)</td>
<td>1369 (74.7%)</td>
</tr>
<tr>
<td>Takes Art Lessons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>289 (11.3%)</td>
<td>324 (11.5%)</td>
<td>184 (10.0%)</td>
</tr>
<tr>
<td>No</td>
<td>2275 (88.7%)</td>
<td>2483 (88.5%)</td>
<td>1648 (90.0%)</td>
</tr>
<tr>
<td>Participates in Organized Performances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>642 (25.0%)</td>
<td>752 (26.8%)</td>
<td>418 (22.8%)</td>
</tr>
<tr>
<td>No</td>
<td>1923 (75.0%)</td>
<td>2055 (73.2%)</td>
<td>1414 (77.2%)</td>
</tr>
</tbody>
</table>
engagement in rural education settings, but more work needs to be done (Duffy and Friend 2003). It may prove informative to disaggregate arts data by type of disciplinary engagement, such as music, theater, dance, and visual arts, to get a richer view of the accessibility and impact of various art forms for students attending schools in one of these types of communities.

Second, we suggest that family involvement, as it relates to arts engagement of their children, significantly impacts learning. Identifying out-of-school arts engagement as one indicator of family involvement, we looked at differences between students who had enjoyed out-of-school arts study and engagement and their achievement in reading and math and students who had only experienced in-school arts study and engagement. Our findings reveal significant differences between the groups, suggesting that family involvement in such activities as out-of-school arts does introduce a stronger base for math and reading competencies. This result reveals the need to look more closely at individual student and family factors impacting the connection between arts and academic competencies. Factors such as dispositions and student motivation may be important areas to explore as well. Similarly, family factors such as parental involvement, parent education levels, and income may also play a role. This study’s findings indicate a need for further work to gain a more detailed understanding of the characteristics of students who engage in arts study. Thus, studies including such issues as frames of mind (Gardner 1983) and mindset (Dweck 2006) might more clearly inform data.

The literature on arts education seeks to understand how engagement in the arts affects student cognition. As we noted previously, the continuing discourse on this subject reveals a plethora of definitions of cognition that, in turn, provide multiple perspectives related to the impact of arts study on cognition. The majority of the work seeks to reveal a causal effect between arts study and other achievement. Particularly in this present climate of high-stakes testing, claims of causation play a powerful role in providing policymakers and teachers with much needed support for retaining the arts in the school despite cuts in budgets and other resources (AEP 2004). Causal evidence, however, remains elusive. The complexity of the learning process continues to obviate neat conclusions and the development of adequate research designs.

In light of this reality, it is important to note that our analyses make a strong case for further exploring arts engagement in the schools and the relationship between arts study and cognition as a part of the dynamic whole of the learning process. We thus suggest framing future studies to explore the transformative nature of school arts study. Even when some form of arts study is only offered less than once a week, our findings reveal a significant difference between the achievement of fifth grade students involved in out-of-school arts programs and students not involved in out-of-school arts programs. This pervasive impact, which appears to be irre-
appeared significantly different for students engaged with arts study. On the other hand, our findings reflect a key issue with rural schools showing the impact that even a few arts opportunities in the schools can have and providing a framework for exploring arts engagement and the learning process as an integrated dynamic whole. Ongoing research in this area has the potential to add to the discourse relating the complexities of student learning through the lens of arts study and ever-changing family constellations.

CONCLUSION

To be clear, some of the research findings in the area of arts education are purely scientific, while others are associated with advocacy groups who may have biases regarding the importance of arts education and its effect on schools. We have made a concerted effort to include multiple perspectives in this article, but much of our theoretical rationale stems from primary sources of original research. Policymakers are cautioned to carefully consider the origin of any research on which policy decisions are based.

As we consider engagement in the arts and home- and community-based factors, we find that the work has just begun. As we envision the dynamic school context that is embedded within a globalized society, the exploration of the relationship of the arts in schools and student learning may not be fully understood without a comprehensive dynamic understanding of learning as unleashing "imaginative thought" (Eisner 2002). It is with this frame of mind concerning the arts in the schools that we look toward informing the discourse at a broader and deeper level as research moves forward into a transformative understanding. Clearly, parental influences likely have more of an effect on most children, and efforts to involve parents in the arts along with their children may be more productive than providing arts programs in school alone.

Based on the results of this study, it is clear that student involvement in the arts has a positive relationship with higher student achievement at some level. When arts programs are eliminated altogether, achievement scores tend to decrease. Given the strong emphasis today on increasing high-stakes test scores and with funding levels often being tied to performance, school administrators and state policymakers would be well advised to consider this positive relationship between achievement scores and arts study in making budget and program decisions that adversely affect children. Furthermore, many parents may be unaware of the positive influence that involvement in the arts may have on their child’s academic performance in other areas. Involving parents of high and low achievers alike in programs designed to inform them of the many benefits that arts involvement has for schooling and life in general may encourage greater support for such programs and higher student involvement. Furthermore, schools need to find ways to include professional development programs for teachers that focus on a team-based approach to teaching wherein the arts teachers are included with regular classroom teachers in curriculum decisions and planning across all subject areas. Such professional development efforts have been shown to be an effective approach to fully integrating the arts with core subjects.

REFERENCES
