



Arts enrichment and school readiness for children at risk

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ABSTRACT

Arts enrichment provides varied channels for acquiring school readiness skills and may offer important educational opportunities for students from diverse backgrounds and with diverse needs. Study 1 examined achievement within an arts enrichment preschool that served low-income children. Results indicated that students practiced school readiness skills through early learning, music, creative movement, and visual arts classes. Students who attended the preschool for 2 years demonstrated higher achievement than those who attended for 1 year, suggesting that maturation alone did not account for achievement gains. Across 2 years of program attendance and four time points of assessment, students improved in school readiness skills, and there were no significant effects of race/ethnicity or developmental level on achievement growth. Study 2 compared students attending the arts enrichment preschool to those attending a nearby alternative on a measure of receptive vocabulary that has been found to predict school success. At the end of 1 year of attendance, students in the arts program showed greater receptive vocabulary than those at the comparison preschool. Results suggest that arts enrichment may advance educational outcomes for children at risk.

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Advancing educational outcomes for children at risk represents a priority for early childhood education (National Association for the Education of Young Children [NAEYC], 1990). Head Start stands as a model for enhancing the school-entry academic performance of children at risk via poverty and racial/ethnic minority status (Administration on Children, Youth, and Families [ACYF], 2001). Yet Head Start attendance does not eliminate elementary school achievement gaps (ACYF, 2006). Although early childhood programs cannot be expected to erase entirely the impact of social and economic inequities on children's learning, early childhood educators must continue to search for ways that Head Start and other preschool programs might create greater opportunities for children from poor families, and those of racial/ethnic minority backgrounds, to demonstrate what they know and make achievement gains.

The arts hold interest for addressing complex questions related to the early education of children at risk. The arts may promote regulation of emotions and behavior for children facing poverty-related stressors (Lobo & Winsler, 2006). The arts may increase the cultural relevance of education for children from low-income and racial/ethnic minority backgrounds (Allen & Boykin, 1992; Griffin & Miller, 2008). Also, the arts may provide varied channels for learning core cognitive skills, to the benefit of children with developmental difficulties associated with poverty (Gregoire & Lupinetti, 2005). Yet few studies investigate arts education for young children at risk (Chapman, 2004). The present study examines achievement within an integrated arts enrichment preschool that serves children at risk and compares the receptive vocabulary of children from this and a nearby preschool. The study derives motivation from the question of whether the arts offer a mechanism for promoting school readiness for children from diverse backgrounds, and with diverse needs.

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1. Arts education

The role of arts education represents a subject of considerable controversy. Although most scholars and practitioners agree that arts education enhances artistic skills and development of the “whole child” (Zigler & Bishop-Josef, 2006), many debate whether it offers more (Catterall, 2003; Chapman, 2004). One prominent debate concerns transfer of training. Of the robust studies to date, few support claims that transfer is general, in that training in the arts bestows general intelligence (see Crnec, Wilson, & Prior, 2006, for a review). Evidence to date more strongly suggests that the arts prime specific cognitive skills (Rauscher, 2002; Schellenberg, 2001); for example, that music instruction prepares specific spatiotemporal skills (Hetland, 2000). Emerging research also suggests the arts may further children’s social–emotional “readiness for school” (Raver & Knitzer, 2002).

Social–emotional benefits of arts education may hold particular importance for young children at risk, including those from low-income and racial/ethnic minority backgrounds. Lobo and Winsler (2006) randomly assigned preschool children from a large Head Start program to either an experimental dance or attention control group. Participation in the experimental dance program related to greater positive changes with regard to social competence and internalizing and externalizing behavior problems, as rated by parents and teachers, who were blind to children’s group assignment. Although the design did not distinguish between possible mechanisms, such as self-esteem enhancement provided by success experiences, and social–emotional expression facilitated by creative movement, the results provide a compelling case for using arts education with low-income children at risk for the types of social–emotional problems that undermine academic success. These same children face multiple threats to academic functioning, including a lack of fit between home and school demands (Brand & Felner, 1996), and developmental difficulties related to poverty (Duncan & Brooks-Gunn, 1997, 2000; McLoyd, 1998), and arts education may represent a good match at multiple levels.

Children from low-income and racial/ethnic minority backgrounds often experience disconnection between home and school environments, and arts education may offer a bridge (Scripp, 2007). Cultural relevance theory holds that the relevance of education depends on incorporating students’ prior cultural knowledge, which for many racial/ethnic minority students includes expression through the arts (Allen & Boykin, 1992; Griffin & Miller, 2008; Young, 1990). Including the arts in education provides opportunities for building on students’ cultural knowledge, incorporating varied cultural traditions, and encouraging students to bring their individual realities into the classroom (Allison & Rehm, 2007; Hall, 2007). The wide range of verbal and nonverbal means for expression available through the arts may engage learners whose language traditions are devalued in mainstream education (Carrier, 2005; Crandall, Jaramillo, Olsen, & Peyton, 2001). Additionally, a combination of verbal and nonverbal means for expressing and realizing knowledge may make the classroom more accessible to students with the types of language delays common in poverty circumstances, and may further language development for these students (Gregoire & Lupinetti, 2005).

Poverty risks, ranging from prenatal malnutrition and teratogen exposure to impoverishment of the home learning environment, predict high levels of developmental difficulties for low-income children (Evans, 2004), and arts education may offer mechanisms for growth. Accessibility theory posits that the accessibility of education depends on providing opportunities for children of different developmental levels to engage meaningfully and experience success; music, creative movement, and visual arts instruction may provide these opportunities (Darby & Catterall, 1994; Eisner, 1998). Robust findings link arts education to enhanced self-esteem and motivation (Trusty & Olivia, 1994). Moreover, Sylwester (1995) has suggested that the arts may promote optimal learning because the entire body is engaged, and events are registered by several senses. The arts may give children with varied abilities opportunities to engage with learning through different sensory modalities and express knowledge in diverse ways. Although most studies to date examine arts education as auxiliary to core instruction, an integrated arts curriculum may benefit diverse learners because it provides varied channels for learning core cognitive skills (Burton, Horowitz, & Abeles, 1999).

Integration of the arts in education involves the arts just not only as *object of* but also as *mechanism for* learning. To some extent, early childhood educators integrate the arts as standard practice. When Lee Nardo, Custodero, Persellin, and Fox (2006) surveyed teachers in NAEYC-accredited preschools, a majority reported using the arts to teach school readiness skills; a song to teach days of the week or a dance to teach following directions, for example. Yet these teachers reported using arts components such as music for a small amount of time each day, and primarily to enrich the classroom environment; promoting skill development was ranked as the least important reason for using the arts.

Full integration of the arts means that an early childhood curriculum incorporates music, creative movement, and visual arts as primary mechanisms for promoting school readiness skills. This study focuses on one type of full integration in which music, creative movement, and visual arts, as well as standard homeroom or *early learning* classes, take place as part of the daily schedule and function as co-equal means for promoting language, literacy, mathematics, science, and other skills (Bresler, 1995). Music classes, for example, include training students in rhythms and songs, and using these musical tools to teach numbers and words (Scripp, 2000). Most research on the arts focuses on auxiliary arts education, and much research on early childhood education involves programs with limited arts integration, yet full integration of the arts to teach core school readiness skills holds different possibilities, and deserves investigation.

Using the arts to teach school readiness skills provides a potential solution for present challenges of early childhood education (Mishook & Kornhaber, 2006). This model may suit young learners, who show limited amenability to lectures and deskwork, and great benefit from support for development of the whole child (Hendrick, 2000; Zigler & Bishop-Josef, 2006). This model also may enhance the cultural relevance and accessibility of education for children from low-income

and racial/ethnic minority backgrounds (Allen & Boykin, 1992; Gregoire & Lupinetti, 2005; Griffin & Miller, 2008). Yet arts education is atypical for young children; especially those from low-income and racial/ethnic minority backgrounds (Chapman, 2004). For this reason, Settlement Music School's Kaleidoscope Preschool Arts Enrichment Program, which serves children predominantly from low-income and racial/ethnic minority backgrounds, stands out.

2. Kaleidoscope Preschool

Settlement Music School launched Kaleidoscope Preschool in 1990 to promote school readiness via arts enrichment, for young children at risk. The founders hoped that early arts experiences might develop artistic abilities and provide varied channels for acquiring school readiness skills. In particular, the founders expected that children from racial/ethnic minority backgrounds might benefit from the cultural relevance of arts education, and that those showing language-based learning delays related to poverty might benefit from the multiple modes of learning.

Kaleidoscope offers preschool education aimed at delivering instruction in core early childhood domains through standard early learning classes, taught by credentialed early childhood educators, as well as music, creative movement, and visual arts classes taught by credentialed artist teachers. The program operates from 8:30 a.m. to 2:45 p.m., 5 days a week, 40 weeks a year, with preschool classes grouped according to age, and an average teacher-to-student ratio of one-to-five. Early evaluation of the program suggested that outcomes of Kaleidoscope exceeded those of a nearby alternative.

Soon after the start of Kaleidoscope, Collins, Colker, and Copple (1994) conducted a study comparing the program to a nearby childcare center. Although the study did not result in a peer-reviewed publication, it did result in a published report.

According to the report, there were no significant differences between the samples of children with regard to key demographic characteristics. The Kaufman Assessment Battery for Children (K-ABC; Kaufman & Kaufman, 1983) and the Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn & Dunn, 1981) measured child cognitive and language functioning at three time points: just after program entry, near the end of a first year of attendance, and near the end of a second year. Across these points, children at Kaleidoscope improved and drew closer to age-based norms, whereas those at the comparison preschool showed less growth, and a widening gap in relation to the norms.

Evidence of a comparative advantage for students attending Kaleidoscope motivated further refinement of the arts program. Following the Collins et al. (1994) study, Kaleidoscope teachers and administrators worked to standardize the process through which the arts promoted school readiness skills. Kaleidoscope now serves as a Head Start site, is NAEYC accredited, and offers a unique type of integrated arts curriculum. The daily schedule includes multiple early learning and arts class periods; structured to incorporate various cultural traditions and opportunities for personal expression, and integrated to promote skill development in core early childhood domains.

Early learning themes guide instruction in the early learning and arts classes. For a given period of time, one theme represents a common organizing principle. If the theme is "shapes," for example, children learn about shapes by labeling shapes in their early learning class, painting shapes in art, forming shapes with their bodies in creative movement, and picking instruments of different shapes to play in music. If the theme is "patterns," children practice patterns with numbers in their early learning class, patterns with geometric shapes in art, patterns of movement in dance, and patterns of rhythm in music. Teachers build bridges between home and school by bringing various cultural traditions into the classroom, and by creating opportunities for children to express themselves as they learn about early learning themes. The core concepts are reinforced through different classes and sensory modalities, over the course of a single day, as well as across a week. Themes are repeated periodically, and developed with increasing complexity across the year. The assessment corresponds to this curricular approach and allows for evaluation of the tenability of this type of integrated arts for early childhood.

Assessment checklists correspond to each class in the daily schedule: early learning, music, creative movement, and visual arts. Each checklist includes items tapping traditional early learning content areas: language, literacy, mathematics, science, and social and cultural learning. Specific items, however, differ depending on what class the checklist corresponds to. In the mathematics area, for example, the early learning checklist includes items such as "forms a three-part pattern," the music checklist includes "alternates claps and pats with beat," the creative movement checklist includes "moves with the musical beat," and the visual arts checklist includes "repeats a subject with variation." These examples reflect the varied ways that teachers intend for children to practice school readiness skills through early learning and arts classes. Each teacher observes children only in the class he or she teaches: early learning, music, creative movement, or visual arts; and rates children's achievement on the checklist for this class. The level at which children demonstrate target skills during regular class periods forms the basis for the teacher's ratings. Thus, the ratings can be completed only if children practice target skills in all classes as intended. In this way, the ability to complete the assessment hinges on whether the curriculum has been successfully integrated such that children practice school readiness skills through arts as well as early learning classes.

Data gathered via Kaleidoscope's assessment of achievement speak to the tenability of this type of integrated arts enrichment and provide a window into how children's school readiness skills grow correspondent to participation in this program. Improvement in school readiness skills from fall to spring would not prove that children's participation in arts classes produces achievement gains. Yet a comparison of achievement for children with one year versus 2 years of program attendance, controlling for child age, might rule out an alternative hypothesis that maturation and Kaleidoscope attendance result in equal gains. Perhaps a more interesting question relates to whether certain groups of children show different achievement patterns within the program.

The theory underlying Kaleidoscope's program suggests that arts education will relate to important opportunities for children at risk, and data from the curriculum-based assessment allows for evaluation of this proposition. Cultural relevance theory suggests that arts education will provide important opportunities for children from racial/ethnic minority backgrounds to demonstrate and acquire skills (Allen & Boykin, 1992; Gregoire & Lupinetti, 2005; Griffin & Miller, 2008; Scripp, 2007). If this theory applies, children from racial/ethnic minority backgrounds might show achievement equal to those from majority backgrounds with regard to initial status, as well as growth. Furthermore, accessibility theory suggests that arts education will provide equal access for children with developmental difficulties associated with poverty (Burton et al., 1999; Darby & Catterall, 1994; Gregoire & Lupinetti, 2005). If this proposition holds, those low-income children with lower developmental levels might show lower initial achievement than their higher functioning peers, but equal growth.

These possibilities raise the question of whether children attending Kaleidoscope might show an advantage compared to those attending other preschools. A comparison of end-of-year achievement for students attending Kaleidoscope versus another preschool that meets similar quality standards might be well suited for answering this question. Yet the distinctive nature of Kaleidoscope's program poses challenges for comparison, and the design of the curriculum-based assessment to fit exclusively this type of integrated arts preschool complicates using this measure to compare achievement across preschool types. Thus, a useful comparison might include an additional measure that is recognized as sensitive to early childhood education and predictive of later school success.

3. Present investigation

The present investigation includes two studies and addresses several questions regarding arts enrichment and school readiness for children at risk. Study 1 uses Kaleidoscope's curriculum-based checklists to examine pre-academic achievement within this arts enrichment program. Preliminary analyses for Study 1 assess the tenability of this type of integrated arts enrichment for early childhood by using teachers' ability to report on the items included on the curriculum-based checklists as a measure of whether students practice school readiness skills through the arts, as intended. The expectation is that teachers in early learning, music, creative movement, and visual arts classes will report on the majority of items included on the curriculum-based checklists. This will indicate that students practice language, literacy, mathematics, and science skills in their arts classes and will suggest successful integration of core early learning domains with arts education. Contingent on this result, further analyses will examine achievement for children within the Kaleidoscope program.

The first core analysis for Study 1 uses a quasi-experimental design to compare end-of-attendance achievement for children with one year versus 2 years of program attendance, with age as a covariate. The "dose-response" hypothesis is that children with 2 years of Kaleidoscope program attendance will show greater end-of-attendance achievement than students with 1 year, controlling for age. This will suggest that achievement relates to the dose of Kaleidoscope program exposure rather than maturation alone. Such a result will suggest that examining patterns of achievement for different groups of children at Kaleidoscope will indicate how their skills change as a function of program attendance rather than simply as a function of maturation.

Remaining core analyses for Study 1 use hierarchical linear modeling (HLM) to analyze initial achievement and growth for children attending Kaleidoscope, and include variables tapping race/ethnicity and developmental level to examine patterns of achievement for these groups of low-income children. The "cultural relevance" hypothesis is that, within this integrated arts enrichment program, children from racial/ethnic minority backgrounds will show initial achievement and achievement growth equal to those from the majority group. This will support the idea that the cultural relevance of an integrated arts enrichment program provides equal opportunities for children from racial/ethnic minority backgrounds to demonstrate and acquire school readiness skills. The "accessibility" hypothesis is that, within this integrated arts enrichment program, children with lower developmental levels will show lower initial achievement but equal growth. This will support the idea that the accessibility provided by multiple channels for learning in an integrated arts program promotes equality for children with developmental difficulties associated with poverty.

Study 2 focuses on the question of whether Kaleidoscope's integrated arts enrichment program might relate to an advantage in comparison to another high-quality preschool program on an outcome measure predictive of school success. Specifically, this study compares children attending Kaleidoscope with children at a nearby preschool on a measure of receptive vocabulary at the end of a year of program attendance, controlling for start-of-year receptive vocabulary. The "advantage of the arts" hypothesis is that children attending Kaleidoscope will show receptive vocabulary greater than children attending another high-quality preschool program. This result will suggest that the arts enrichment curriculum in the Kaleidoscope program might be associated with an advantage on an outcome measure predictive of school success.

The studies in this investigation provide a window into arts enrichment and school readiness. Study 1 addresses the potential for arts programming to provide important opportunities for children from racial/ethnic minority backgrounds, as well as those with developmental delays related to the ecology of poverty. Study 2 addresses the question of whether integrated arts enrichment provides an overall advantage with regard to educational outcomes. Implications concern what integrated arts programming might offer to early childhood education's efforts to advance educational outcomes for children from diverse backgrounds, and with diverse needs.

4. Study 1

4.1. Method

This study examined pre-academic achievement for children attending Kaleidoscope's arts enrichment program. Parent interviews and child assessments provided information on variables of interest.

4.1.1. Participants

The participants in this study were 194 children, their caregivers, and their teachers. For most of the children, Kaleidoscope was their first exposure to early childhood education; less than 25% had attended another program previously. Of the children, 92 attended Kaleidoscope for 2 years and 102 attended for 1 year only. Approximately 55% of the children who attended for 1 year left to attend kindergarten. Another 45% left for other reasons, most commonly related to changes in residence and parental employment. For each year they attended Kaleidoscope, the children were enrolled in one of five preschool classes based on their age. Each of the preschool classes had different early learning teachers, and all of the classes had the same arts teachers.

Of the participating children, 44% were male, 77% African American, 3% Hispanic/Latino American, 8% Asian American, and 12% Caucasian American. Child age at initial assessment ranged from 36 to 60 months ($M = 49$ months, $SD = 7.05$). Family annual income had a range of \$41,000, with a mean of \$16,000 ($SD = \$14,900$) and the families averaged two residential adults and three children. According to available information, 99% of the children qualified for Head Start, with family income-to-needs ratios that met federal guidelines for poor or low-income status (i.e., $\leq 2X$ the poverty threshold), and 10–30% qualified for early intervention services in Pennsylvania, demonstrating a 30% or greater developmental delay. For early learning and arts classes, child achievement scores at the start of year one ranged from 30 to 85 ($M = 60.82$, $SD = 10.18$). Group comparisons on child sex, race/ethnicity, poverty status, and initial achievement revealed no significant differences between the samples.

4.1.2. Procedure

All procedures were approved by the relevant institutional review boards to ensure ethical treatment of human subjects. Participants were recruited at the time of enrollment in Kaleidoscope Preschool. Caregiver consent and child assent was obtained at the time of recruitment. During the time period of this study, 212 children enrolled in Kaleidoscope and 97% elected to participate in the research. All families spoke English and none were excluded from participation. Those included in the present study are those who attended Kaleidoscope for at least 1 year between 2003 and 2005 and had data for at least two time points of assessment. Research assistants conducted caregiver demographic interviews around the time of program enrollment, and child developmental assessments in September and October of the first year of attendance. Teachers independently completed checklists assessing children's achievement in early learning and arts classes in November and December as well as April and May of each year. Teachers were blind to each other's ratings, and did not have access to their own previous ratings when making new ones.

4.1.3. Measures

4.1.3.1. Demographics. A demographic interview for caregivers used for Head Start enrollment measured household income-to-needs ratio, as well as child age, sex, and race/ethnicity.

4.1.3.2. Developmental level. The Brigance Preschool Screen-II (Curriculum Associates, 1995) measured children's developmental level. For this screen, children respond to a number of items that correspond to language, motor, self-help, and social-emotional skill areas of development. Children's responses are scored, and the raw scores compared to those obtained by same-age children in a nationally representative sample to obtain standardized scores for children's developmental level in each skill area. Glascoe (2005) reports good sensitivity and specificity, and excellent validity and reliability for the Brigance Preschool Screen-II. Standardized scores for the present study ranged from 2 to 100 ($M = 82.77$, $SD = 15.93$).

4.1.3.3. Pre-academic achievement. Kaleidoscope's curriculum-based assessment measured children's pre-academic achievement. Kaleidoscope teachers and administrators developed the assessment in 1996, and revised and reorganized it 2003, to accommodate the Head Start Domain Outcomes Framework, grouping items according to traditional early learning content areas (i.e., language development, literacy, math, science, and social and cultural learning). The assessment includes checklists that correspond to each class in the daily schedule: early learning, music, creative movement, and visual arts. Specific items in each content area differ depending on the class.

In the language content area, for example, the early learning checklist includes items such as "retells familiar story events in sequence," the music checklist includes "memorizes age appropriate songs," the creative movement checklist includes "names body parts and what they do," and the visual arts checklist includes "discusses artwork with teachers." In the science area, the early learning checklist includes items such as "measures quantity," the music checklist includes "improvises rhythmic patterns," the creative movement checklist includes "learns movement combinations," and the visual arts checklist includes "compares amount of materials." And, in the social and cultural learning area, the early learning checklist includes items such as "chooses activities independently," the music checklist includes "prefers specific musical activities," the visual arts checklist includes "completes self-chosen projects," and the creative movement checklist includes "prefers specific

movement activities.” For each checklist, approximately 6 items tap each content area, resulting in approximately 30 items, total.

The lead teacher for each preschool class reports on children’s achievement as demonstrated in their early learning class, and arts teachers for music, creative movement, and visual arts, respectively, report on achievement as demonstrated in these classes. Teachers report on children’s achievement in the fall and spring of each year. Ratings for each checklist item range from 1, which indicates the child rarely or never demonstrates the target skill, to 4, which indicates that the child consistently demonstrates the skill. Ratings for items on a particular checklist are averaged to obtain an overall rating for the child’s achievement as demonstrated in that class.

Brown (in preparation) found that the checklists showed good ($>.80$) test-retest reliability over a period of one month for a similar sample of children ($n = 75$) who attended Kaleidoscope in the spring of 2008. The present study found that the checklists showed good internal consistency, with Cronbach’s alphas greater than .80. Also, the checklists showed sensitivity to individual differences and developmental change, and the subscales showed good convergent and divergent validity. Namely, for a given checklist (e.g., for music), the subscale for a particular construct such as language development related more highly to subscales tapping the same construct on checklists for other classes (e.g., early learning, creative movement, and visual arts) than to subscales measuring different constructs such as mathematics or science. The mean correlation for subscales measuring like constructs was .70 and the mean for subscales measuring different constructs was .24. This shows that although the ways children practice and demonstrate skills are unique to different classes, as reflected by unique checklist items (e.g., counting beats in music and forming three-part patterns in early learning), the skills they develop relate to common, underlying constructs (e.g., mathematics).

4.2. Results and discussion

4.2.1. Tenability of integrated arts enrichment

Preliminary analyses include descriptive and inferential statistics designed to assess the tenability of integrated arts enrichment by using teachers’ ability to report on the language, literacy, mathematics, science, and other items included on the curriculum-based checklists as a measure of whether students practice school readiness skills in their arts classes, as intended. Descriptive statistics showed that teachers in early learning, music, creative movement, and visual arts classes reported on all items on the respective checklists for approximately 90% of children in the present study. For approximately 10% of children, teachers did not report on all items. There were no significant differences among the classes in the percentage of items for which teachers did not report a child’s skill level. Because each teacher only observed the children in the class he or she taught, this result suggests that, as expected, early learning and all arts classes provided opportunities for children to practice the language, literacy, mathematics, science, and other school readiness skills included on the respective checklists.

4.2.2. Dose of exposure to Kaleidoscope curriculum

The first core analyses include descriptive statistics and a multivariate analysis of covariance (MANCOVA) designed to examine achievement in early learning and arts classes for children who attended Kaleidoscope for one academic year versus two academic years. Table 1 displays demographic characteristics and start- and end-of-attendance achievement levels for Kaleidoscope students with one year versus 2 years of program attendance. A one-way between-subjects MANCOVA was performed to assess the effect of 1 year versus 2 years of Kaleidoscope attendance on achievement in early learning, music, visual arts, and creative movement, with age as a covariate. This analysis compared students with 1 year versus 2 years of attendance on achievement at the end of program attendance. For those with 1 year of attendance, this time point represented the end of the first and only year. For those with 2 years, it represented the end of the second year. There were no within-cell outliers, results of evaluation of assumptions of normality, homogeneity of variance-covariance matrices, linearity, multicollinearity, and singularity were satisfactory, and covariates were judged adequately reliable for analysis. With the use of Wilks’ criterion, the combined dependent variables significantly ($p < .01$) related to the covariate $F(4, 188) = 20.15$, and to the independent variable of one year versus 2 years of attendance $F(4, 188) = 20.42$. Stepdown analysis revealed that, after covarying age, one year versus 2 years of attendance related significantly ($p < .01$) to achievement in early learning $F(1, 194) = 26.06$, $\eta^2 = .11$, music $F(1, 193) = 34.28$, $\eta^2 = .14$, creative movement $F(1, 191) = 21.57$, $\eta^2 = .09$, and visual arts $F(1, 192) = 72.08$, $\eta^2 = .25$. As hypothesized, children with 2 years of Kaleidoscope attendance showed end-of-attendance achievement greater than those with 1 year, controlling for age.

4.2.3. Initial achievement and growth

The second core analyses involve Hierarchical Linear Modeling (HLM) to examine initial achievement and growth for children who attended Kaleidoscope during 2 years and across four time points of assessment ($n = 92$). The HLM procedure was used to estimate two-level linear models of growth in children’s achievement in early learning and arts classes, respectively. Such models of growth are appropriate when multiple time points of assessment are nested within children (Bryk & Raudenbush, 1987). The first level regarded intraindividual growth, or how time related to variance in scores within individuals. A linear model was used to estimate achievement at the first time point of assessment and the rate at which achievement changed per time point of assessment, or 6-month increment. The second level regarded interindividual differences, or how person-level characteristics measured at a single time point related to variance in scores between individuals. The coefficients of the level-one equation were the outcome variables in the level-two model, which modeled how con-

Table 1
Demographic characteristics and achievement scores for Kaleidoscope students with one year versus two years of program attendance.

	Years of attendance	
	One (n = 102)	Two (n = 92)
Age at start of attendance		
Mean in months (SD)	51 (7.10)	44 (4.07)
Sex (%)		
Female	53	56
Male	47	44
Race/ethnicity (%)		
African American	77	77
Latino/Hispanic American	3	3
Asian American	7	9
Caucasian American	13	11
Poverty status (%)		
Poor	89	90
Low-income	100	100
Start-of-attendance achievement mean (SD)		
Early learning	67.35 (14.88)	62.86 (14.72)
Music	68.30 (14.36)	59.45 (11.88)
Creative movement	62.38 (15.04)	55.27 (10.09)
Visual arts	55.84 (15.35)	50.32 (16.58)
End-of-attendance achievement mean (SD)		
Early learning	81.86 (11.82)	85.08 (9.77)
Music	81.14 (10.62)	85.44 (9.00)
Creative movement	70.10 (16.46)	77.73 (13.29)
Visual arts	66.43 (14.26)	72.17 (7.63)

Note: For students with 1 year of program attendance, start-of-attendance refers to the fall of the first and only year of attendance, and end-of-attendance refers to the spring of this year. For those with 2 years of attendance, start-of-attendance refers to the fall of the first year of attendance, and end-of-attendance refers to the spring of the second year.

trols of age and sex, and key predictors of initial developmental level and race/ethnicity, related to initial achievement and achievement growth.

For all models of achievement in early learning and arts classes there was a substantial degree of variance in achievement and the sample achievement scores were estimated to be reliable estimates of the true mean. Table 2 summarizes the first level of analysis for each model. At a level of $p < .01$, initial status and growth in achievement were significantly different from zero. Variance components suggested that significant differences in initial achievement and achievement growth existed among children.

Table 3 summarizes the second level of analysis for each model, which focused on differences in scores based on the person-level characteristics of developmental level and race/ethnicity, and included controls for age and sex. At a level of $p < .05$, initial achievement differed according to age and developmental level for all classes, with older children and those with higher developmental levels showing higher initial achievement. In the case of music, older children, who showed higher initial achievement, showed less growth over time. For visual arts, initial achievement differed according to sex,

Table 2
Summary of first level of analysis for achievement growth (n = 92).

Effects	Early learning		Music		Creative movement		Visual arts	
	Co. (SE)	T-Ratio	Co. (SE)	T-Ratio	Co. (SE)	T-Ratio	Co. (SE)	T-Ratio
Initial status	59.94 (1.61)	37.31**	52.58 (1.40)	37.49**	50.21 (1.62)	31.04**	40.05 (1.86)	21.54**
Growth	6.75 (.48)	14.08**	8.71 (.37)	23.75**	5.92 (.50)	11.71**	9.76 (.54)	18.10**
Effects	Early learning		Music		Creative movement		Visual arts	
Random	Var. (SD)	Chi-square	Var. (SD)	Chi-square	Var. (SD)	Chi-square	Var. (SD)	Chi-square
Initial status	130.03 (11.40)	201.30**	90.87 (9.53)	177.94**	175.09 (13.23)	332.99**	151.46 (12.31)	174.73**
Growth	7.01 (2.65)	135.17**	6.88 (2.74)	119.24*	14.80 (3.85)	242.05**	5.02 (2.04)	120.77*
Level I	69.28 (8.32)		58.06 (7.62)		41.13 (6.41)		104.22 (10.21)	

Note: Co., coefficient; Var., variance component.

* $p < .05$.

** $p < .01$.

Table 3
Summary of second level of analysis for achievement growth ($n=92$).

Effects	Early learning		Music		Creative movement		Visual arts	
	Co. (SE)	T-Ratio	Co. (SE)	T-Ratio	Co. (SE)	T-Ratio	Co. (SE)	T-Ratio
Initial status	56.83 (3.01)	16.61**	49.93 (2.78)	17.98**	51.16 (2.56)	20.02**	45.01 (3.75)	12.01**
Age	1.14 (.40)	2.90**	1.62 (.37)	4.43**	1.00 (.34)	2.85**	1.17 (.48)	2.41*
Sex ^a	3.39 (2.74)	1.24	.23 (2.55)	.09	3.19 (2.35)	1.36	-7.93 (3.33)	-2.38*
Dev. level	.41 (.08)	4.90**	.24 (.08)	3.03**	.19 (.07)	2.67**	.31 (.10)	3.11**
Race/eth. ^b	2.23 (3.03)	.74	3.40 (2.81)	1.21	-2.83 (2.59)	-1.10	-1.91 (3.74)	-.51
Growth	8.87 (.97)	9.14**	10.25 (.83)	12.42**	6.71 (.87)	7.73**	9.36 (1.20)	7.80**
Age	-.08 (.13)	-.64	-.26 (.11)	-2.41*	-.20 (.11)	-1.74	.07 (.16)	.43
Sex ^a	-2.21 (.89)	-2.49*	-1.14 (.76)	-1.51	-1.66 (.80)	-2.07*	2.11 (1.07)	1.97
Dev. level	-.04 (.03)	-1.38	-.02 (.02)	-.98	-.03 (.03)	-.85	-.02 (.03)	-.70
Race/eth. ^b	-1.55 (.98)	-1.58	-1.39 (.84)	-1.66	-.22 (.88)	-.25	-.73 (1.20)	-.61
Effects	Early learning		Music		Creative movement		Visual arts	
Random	Var. (SD)	Chi-square	Var. (SD)	Chi-square	Var. (SD)	Chi-square	Var. (SD)	Chi-square
Initial status	90.71 (9.52)	160.14**	59.56 (7.72)	138.21**	162.60 (12.75)	306.98**	99.39 (9.97)	138.48**
Growth	6.33 (2.52)	125.24**	5.74 (2.33)	117.59*	13.88 (3.86)	235.15**	4.99 (2.03)	115.07*
Level I	69.54 (8.32)		57.45 (7.58)		63.77 (7.99)		111.78 (10.57)	

Note: Co., coefficient; Var., variance component; Race/eth., race/ethnicity.

^a Sex was scored dichotomously (1 = male).

^b Race/ethnicity was scored dichotomously (1 = African American).

* $p < .05$.

** $p < .01$.

with females showing higher initial achievement. For early learning and creative movement, achievement growth differed according to sex, with males showing less growth than females. Consistent with hypotheses, there were no significant effects of race/ethnicity on initial status and no significant effects of developmental level or race/ethnicity on achievement growth. When compared to the level-one models, the level-two models showed a significant decrease in the residual, suggesting that the addition of the person-level variables led to significant improvement in the overall models. With the addition of the level-two predictors, the models accounted for the following proportions of variance in achievement: 31% for early learning, 34% for music, 8% for creative movement, and 34% for visual arts.

Exploratory analyses examining achievement growth in sub-domains of each checklist that corresponded to the content areas of language, literacy, mathematics, science, and social and cultural learning, revealed patterns similar to those obtained for analyses of total checklist scores. Age and developmental level tended to predict initial status, with older children and those of higher developmental levels showing higher initial achievement. Consistent with hypotheses, race/ethnicity showed no significant relation to initial achievement and neither developmental level nor race/ethnicity showed significant relations to growth.

5. Study 2

5.1. Method

This study compared receptive vocabulary for children attending Kaleidoscope versus those attending a nearby preschool, at the end of a year of program attendance. Individual parent interviews and child tasks provided information on variables of interest.

5.1.1. Participants

The participants in this study were 165 children and their primary caregivers. Of the children, 63 attended Kaleidoscope and 102 attended a comparison preschool. The comparison preschool was not the one used by Collins et al. (1994); that preschool did not have NAEYC nor Head Start accreditation, and it closed prior to the present study. The comparison preschool in the present study was chosen because it served a similar neighborhood and, like Kaleidoscope, was a Head Start site and NAEYC accredited. Although several preschools met these criteria, the one selected served a relatively large number of children, lacked existing research partnerships, and had a reputation among its peer institutions for providing high-quality preschool education. Whereas Kaleidoscope used an integrated arts enrichment curriculum, the comparison program used a more typical Head Start curriculum based on the Creative Curriculum (Dodge & Colker, 1992). Of the children at Kaleidoscope, approximately 10% participated in Study 1.

Of participating children across the two preschools, 43% were female, 75% were African American, 12% Hispanic/Latino American, 10% Asian American, and 3% Caucasian American. Child age at initial assessment ranged from 36 to 60 months ($M=49$ months, $SD=7.39$). Of the primary caregivers, the average level of education was 11.64 years ($SD=1.89$ years).

Table 4
Demographic characteristics and receptive vocabulary for children attending Kaleidoscope versus comparison preschool.

	Preschool	
	Kaleidoscope (n = 63)	Comparison (n = 102)
Age at initial assessment		
Mean in months (SD)	49 (7.57)	49 (7.30)
Sex (%)		
Female	50	40
Male	50	60
Race/ethnicity (%)		
African American	75	74
Latino/Hispanic American	6	15
Asian American	13	9
Caucasian American	6	2
Primary caregiver education		
Mean in years (SD)	89	90
Family income	100	100
Mean in dollars (SD)	16,500 (13,200)	15,300 (16,700)
Family size		
Mean number of adults	2	2
Mean number of children	3	3
Receptive vocabulary		
Start of year mean (SD)	80.68 (11.12)	76.92 (15.26)
End of year mean (SD)	95.43 (14.03)	81.35 (12.82)

Family annual income had a range of \$44,000, with a mean of \$15,800 ($SD = \$15,300$), and the families averaged two adults and three children. According to available information, 100% of the children at both preschools were Head Start eligible, with family income-to-needs ratios that met federal guidelines for poor or low-income status (i.e., $\leq 2X$ the poverty threshold). Approximately half of the children at both preschools were in a second year of attendance. Of those in a first, a similar proportion (less than 25%) at each preschool had attended a previous early childhood program. Child standardized receptive vocabulary scores at the start of the year ranged from 48 to 117 ($M = 80.68$, $SD = 11.03$). Group comparisons on child sex, race/ethnicity, age, primary caregiver education, and family income-to-needs revealed no significant differences between the two samples.

5.1.2. Procedure

All procedures were approved by the relevant institutional review boards to ensure ethical treatment of human subjects. Participants were recruited in September of 2006. Caregiver consent and child assent was obtained at the time of recruitment. All families spoke English and none were excluded from participation. Research assistants completed individual interviews with caregivers at the preschools in September and October of 2006, and completed assessments with children at the preschools in September and October of 2006 and April and May of 2007.

5.1.3. Measures

5.1.3.1. Demographic interview for caregivers. A demographic interview for caregivers used for Head Start enrollment measured caregiver education and household income-to-needs ratio, as well as child age, sex, and race/ethnicity.

5.1.3.2. PPVT-III. The Peabody Picture Vocabulary Test-III (PPVT-III; Dunn & Dunn, 1997) measured child receptive vocabulary. The PPVT-III is a well validated measure with test–retest reliability of .89 (Dunn & Dunn, 1997).

5.2. Results and discussion

Analyses include descriptive statistics and an analysis of covariance (ANCOVA) designed to compare receptive vocabulary for children at Kaleidoscope ($n = 63$) versus a nearby preschool that also meets high-quality standards ($n = 102$) at the end of a year of program attendance. Table 4 displays demographic characteristics as well as start- and end-of-year receptive vocabulary scores for children attending Kaleidoscope and the comparison preschool.

A one-way, between subjects, ANCOVA was performed to assess the influence of program attendance at Kaleidoscope versus a comparison preschool on end-of-year receptive vocabulary, with start-of-the-year receptive vocabulary as a covariate. Analyses were performed weighting cells by their sample sizes to adjust for unequal n . There were no within-cell outliers, results of evaluation of assumptions of normality, homogeneity of variance–covariance matrices, linearity, multicollinearity, and singularity were satisfactory, and covariates were judged adequately reliable for analysis.

Results of the ANCOVA, suggested that end-of-year receptive vocabulary varied significantly ($p < .01$) according to the covariate of start-of-year vocabulary $F(1, 164) = 101.40$, $\eta^2 = .39$. After covarying start-of-year vocabulary, preschool program

attendance related significantly ($p < .01$) to end-of-year receptive vocabulary, with $F(1, 164) = 47.84$, $\eta^2 = .29$. Demographic variables were excluded from final models because ANCOVA analyses that included demographics did not show significant effects of these variables or change key results. As hypothesized, children at Kaleidoscope showed greater end-of-year receptive vocabulary than children at the comparison preschool.

6. General discussion

Questions concerning arts enrichment and school readiness for children at risk motivated the present investigation. Study 1 used Kaleidoscope's curriculum-based checklists to assess the tenability of integrated arts enrichment for early childhood, the dose–response relationship for program attendance and achievement, and the possibility that arts enrichment might relate to equivalent achievement growth for students of varied racial/ethnic backgrounds and developmental levels. Study 2 used a widely recognized measure of receptive vocabulary to examine whether Kaleidoscope's integrated arts enrichment program might relate to an advantage in comparison to another high-quality preschool program on an outcome that predicts school success. Results provide insight into arts enrichment for young, economically disadvantaged children.

Results of preliminary analyses for Study 1 suggest that Kaleidoscope's model of integrated arts enrichment allows preschool children to practice school readiness skills through early learning, as well as music, creative movement, and visual arts classes. Such a model of integrated arts enrichment differs from typical preschool models. Lee Nardo et al. (2006) reported that more than half of the accredited preschools use arts components such as music to enrich the general classroom environment, for example, as background to cleaning up from activities or waking up from naps. About half also use arts components to promote creativity, under the direction of either early childhood teachers or, less frequently, arts teachers who offer classes up to several times each week. A much smaller number use the arts to promote skill development, and this typically happens in limited ways.

Several popular models of early childhood education embrace limited arts integration. The Creative Curriculum, for example, includes some integration of the arts in daily routines and activities to promote creativity and learning (Dodge & Colker, 1992). Also, the Reggio Emilia model supports child-directed learning that includes using children's chosen arts activities to teach school readiness skills (Cadwell, 2002). Kaleidoscope's model, however, uses the arts to teach core cognitive skills in a full, intentional, and structured way. In this model, classes in music, creative movement, and visual arts, as well as early learning, represent a regular part of the daily schedule, and function as co-equal means for promoting language, literacy, mathematics, science, and other skills (Bresler, 1995). Arts instruction represents a central priority, and teachers organize it to promote skill development in early learning domains. Thus, the arts represent an object of learning and a central mechanism for teaching core cognitive skills.

Prior scientific literature lacks examination of such an integrated arts enrichment program for early childhood. Yet the present study suggests that the arts may be successfully integrated to promote development in early learning domains. In almost all cases, Kaleidoscope teachers reported observing children practice the language, literacy, math, science, and other school readiness skills tapped by the curriculum-based checklists, in their arts classes. Music, creative movement, and visual arts may function as mechanisms for children's development of pre-academic skills. Furthermore, these arts components may provide children with unique opportunities for skill development.

The present investigation suggests an expected dose–response relationship with regard to Kaleidoscope attendance and achievement in language, literacy, mathematics, and science skills. Study 1 found that children at the end of a second year of program attendance showed greater achievement than those at the end of a first year, controlling for age. Maturation alone, it seems, cannot account for the achievement gains that correspond to attendance in this arts enrichment program. This supports the idea that arts classes provide unique opportunities for skill development and fits with theoretical claims that the arts provide varied channels for learning core cognitive skills (Burton et al., 1999). The varied channels for learning may offer important opportunities to children from racial/ethnic minority backgrounds as well as those with developmental difficulties related to the ecology of poverty (Gregoire & Lupinetti, 2005).

Allen and Boykin (1992) have highlighted the arts as means for enhancing the cultural relevance of education. These scholars have explained that the cultural traditions of many racial/ethnic minority groups include expression through the arts and that the arts may provide culturally relevant ways for children from minority backgrounds to acquire and express knowledge. Consistent with the cultural relevance hypothesis, Study 1 of the present investigation found that children from diverse racial/ethnic backgrounds showed similar initial achievement and growth in language, literacy, mathematics, and science skills. This finding deserves attention in light of the achievement gap that separates children of racial/ethnic minority backgrounds from their Caucasian peers even after participation in Head Start and other high-quality preschool programs (ACYF, 2006). Moreover, with growing proportions of racial/ethnic minorities and non-native English speakers in this country (Hobbs & Stoops, 2002), the importance of providing multiple and non-verbal means for expressing and acquiring knowledge, particularly in the early stages of education, stands out (Gregoire & Lupinetti, 2005). A range of verbal and non-verbal options for acquiring and expressing knowledge may make the classroom more accessible to students whose language traditions are devalued in traditional education, and may promote language development for these children.

The cultural relevance of education represents just one challenge confronting racial/ethnic minority children, who also face disproportionate odds of experiencing income poverty, and correlated ecological risks (McLoyd, 1998). Although issues related to poverty must be addressed at multiple levels of the ecological system, arts enrichment may offer a useful recourse

for school. Music, creative movement, and visual arts instruction allow children to meaningfully engage at different developmental levels, and provide important success experiences for those struggling with language, literacy, and numeracy skills (Darby & Catterall, 1994; Eisner, 1998). Consistent with the accessibility hypothesis, Study 1 of the present investigation found that although developmental level predicted initial skill level, it did not predict growth. Arts enrichment may provide important opportunities for children of varied developmental levels to grow in pre-academic skills (Gregoire & Lupinetti, 2005).

In addition to documenting achievement for various groups of students within an arts enrichment program, the present study takes an initial step in addressing the question of whether the arts provide an overall advantage. As predicted by the advantage of the arts hypothesis, Study 2 found that, after a year of attendance, children in Kaleidoscope's arts enrichment program showed receptive vocabulary greater than children at a nearby preschool that served a similar population and also met Head Start and NAEYC accreditation standards. The unique nature of the Kaleidoscope program complicates comparison, and the present study suffers from notable limitations. Thus, asserting definitively that the arts offer an advantage would be premature. The present findings, however, lend support to this idea and promote the possibility that the arts may offer an advantage particularly for children at risk.

Nearly all children in the present study faced risk associated with economic disadvantage. The ecology of economic disadvantage hosts high levels of residential noise, crowding, and family instability, which undermine the predictability of daily life and challenge children's emotional and behavioral regulation (Ackerman, Brown, & Izard, 2003, 2004; Duncan & Brooks-Gunn, 1997, 2000; Evans, 2003; Evans, Gonnella, Marcynyszyn, Gentile, & Salpekar, 2005). Such emotional and behavioral difficulties, in turn, interfere with children's acquisition of cognitive skills that form the basis of school readiness (Bulotsky-Shearer, Fantuzzo, & McDermott, 2008; Fantuzzo, Bulotsky-Shearer, & McDermott, 2007; Huffman, Mehlinger, & Kerivan, 2000; Raver & Knitzer, 2002; Shonkoff & Phillips, 2000). Thus, efforts to provide equal opportunities for early childhood education must account for children's emotional and behavioral regulation.

Arts enrichment programming may provide a good fit for children who face threats to emotional and behavioral regulation, as well as cognitive functioning. Grytting (2000) has suggested that the arts promote emotional development by enhancing spatial and kinesthetic abilities, promoting interpersonal and intrapersonal intelligences, and providing opportunities for expressing emotions. Lobo and Winsler (2006) found robust evidence for the social-emotional benefits of a creative movement program for low-income children attending Head Start. Although the present study lacked measures of social-emotional functioning, it seems possible that Kaleidoscope offered an advantage in receptive vocabulary partly because it provided opportunities for children from risky environments to regulate emotions and behavior in the service of learning.

The present investigation offers important understanding of arts enrichment and early childhood education, and leaves many questions unanswered. The use of Kaleidoscope's curriculum-based checklists underwrote findings that: young children at Kaleidoscope practiced language, literacy, mathematics, science and other school readiness skills in music, creative movement, and visual arts classes; achievement gains related to the dose of exposure to the arts curriculum; children from diverse racial/ethnic minority backgrounds demonstrated similar initial achievement and growth through their arts classes; and, although children with lower developmental levels showed lower initial achievement than their higher functioning peers, they showed similar growth. The finding that achievement gains related to dose of exposure to the arts curriculum suggests that participation in Kaleidoscope promotes greater gains in school readiness skills than those associated with maturation alone, but it does not address whether Kaleidoscope offers an advantage compared to another early childhood program. The analyses comparing children with 1 year versus 2 years of attendance at Kaleidoscope did not account for level of exposure to early childhood education prior to enrollment in Kaleidoscope. Moreover, the focus on within-group diversity came at the expense of between-group comparisons, since reliance on Kaleidoscope's curriculum-based checklists complicated comparing achievement for Kaleidoscope versus another preschool.

On the whole, the unique nature of Kaleidoscope's program posed challenges for cross-program comparisons. Because Kaleidoscope's checklists corresponded to music, creative movement, and visual arts as well as early learning classes, they were not well suited for use in another program. Thus, Study 2 of the present investigation compared children at Kaleidoscope to those at a nearby preschool on another outcome; receptive vocabulary, and found those at Kaleidoscope showed higher scores at the end of a year of program attendance. The similarity of the samples with regard to key demographic variables such as family income-to-needs and primary caregiver education, and the control for start-of-year receptive vocabulary, stand as strengths of this comparison, as does the match of the programs with regard to geographic location, and Head Start and NAEYC accreditation. Yet receptive vocabulary represents just one outcome measure, and the failure to account for a wider range of family and school characteristics precludes ruling out selection effects and other "third variable" accounts.

In addition to the arts instruction, associated characteristics of the Kaleidoscope program separate it from other high-quality preschools. For example, Kaleidoscope's daily schedule involves children spending substantial portions of their time outside of their early learning classroom with arts teachers, which results in a high overall teacher-to-student ratio, and a considerable amount of planning time available to each teacher. The arts studios diverge from early learning classrooms, and the educational standards for the arts versus early learning teachers differ in nontrivial ways. That the uniqueness of this program extends beyond the integration of the arts cautions against generalizing the present findings to other integrated arts programs or broadly concluding that arts enrichment results in superior early childhood education.

Other study limitations relate to the present focus on economically disadvantaged preschool children. The finding that Kaleidoscope's integrated arts enrichment program allowed equal achievement growth for low-income children holds

importance in light of the risks posed by high-poverty environments. Yet the present investigation does not address the effects of integrated arts education for children from more advantaged economic backgrounds. Additionally, the finding that race/ethnicity did not predict achievement stands out given that racial/ethnic minority status marks risk for achievement problems. Yet the present investigation included mostly African American children and did not include enough children from other groups to separately examine achievement for multiple racial/ethnic categories.

The present investigation of integrated arts education for preschoolers holds importance given the critical nature of early experience (Bowman, Donovan, & Burns, 2001; Shonkoff & Phillips, 2000; Snow, Burns, & Griffin, 1998), but stops short of addressing possibilities for integrated arts enrichment in the school years. With increasing grade level, achievement becomes more intimately tied to language and literacy, which might limit the viability of arts enrichment as a means for delivering skills that represent the core of traditional education as children progress through school.

The transition to formal schooling in and of itself may change children's achievement trajectories (Rimm-Kaufman & Pianta, 2000; Rimm-Kaufman, Pianta, & Cox, 2000), and the present study does not address how Kaleidoscope graduates fare as they enter kindergarten programs that lack integrated arts enrichment. Yet preschool achievement matters for later school success (Campbell & Ramey, 1994, 1995; Gorey, 2001; Ramey & Ramey, 2004) and the opportunities offered by Kaleidoscope may give children advantages in their formal education.

Future studies should follow Kaleidoscope graduates across the kindergarten transition, and explore the possibilities for arts education in later grades, and for heterogeneous income groups. Future studies should include a wider variety of outcome measures, as well as more sophisticated examination of potential mechanisms for the positive effects associated with Kaleidoscope, such as the potential for arts education to increase the cultural relevance of education, provide multi-modal and non-verbal means for acquiring and expressing knowledge, and allow for regulation of emotions and behavior in the service of learning. Future, more sophisticated investigations will allow for definitive conclusions about the value of arts enrichment. The present study provides promising evidence that the arts may advance educational outcomes for children at risk.

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