The Impact of Arts Education

April 19, 2017
Socioemotional skills are critically important for success in school and life, as they include the ability to:
- manage behavior and make effective decisions,
- maintain positive self-esteem, and
- interact productively with others.

All young people need to develop these skills, but students in Philadelphia placed ‘at risk’ by poverty have experienced a steady reduction in experiences and opportunities that might foster socioemotional development.

In consultation with arts education evaluators and practitioners, the decision was made to focus the evaluation on the impact arts education partnership programs have on students’ socioemotional learning outcomes.

The arts are uniquely positioned to impact socioemotional learning, teaching the capacities (e.g., perseverance, collaboration) not often touched upon when teaching core subject matter.
RESEARCH QUESTIONS:
Can arts education partnership programs foster students’ socioemotional development in areas related to the arts such as interest in the arts, tolerance for others’ perspectives, or cultural awareness?

Can it impact areas less directly related to the arts, such as perseverance, school engagement, growth mindset, or academic goal orientation, academic self-concept, or academic self-efficacy?

METHODOLOGY:

2014: Held two grantee/evaluator meetings with inaugural grantees, selected areas of socio-emotional development on which to focus, and created research methodology based on input

Spring 2015: Selected measures to be used in the study, received District approval, and piloted data collection with sub-set of programs, using student and teacher report measures

Academic year 2015-16: Collected data using pre- and post-survey instruments and observational measures

Winter 2016/2017: Completed analyses and shared findings with WPF
Analysis of data collected from nearly 900 students found that arts education programs offered in partnership with Philadelphia schools increase students’ interest in the arts, as well as positively impact other important areas of their lives, such as:

- **Growth mindset**: When elementary school students participate in arts education partnership programs, they develop a much stronger orientation to taking on and working through challenges than peers who don’t have these opportunities.

- **Artistic identities**: Given a curriculum enriched by arts partnerships, high school students grow increasingly confident that they can achieve and succeed in the arts. Without such opportunities, their peers experience a significant drop in their motivation to pursue and excel in the arts.

- **School Engagement**: Participating in arts partnership programs helps students stay connected to and interested by school. By contrast, peers without these same opportunities experience a deep decline in school engagement.
FIGURE 1: GROWTH MINDSET AMONG ELEMENTARY-SCHOOL STUDENTS
FIGURE 2: ARTISTIC GOAL ORIENTATION AMONG HIGH SCHOOL STUDENTS
Research Findings

FIGURE 3: SCHOOL ENGAGEMENT AMONG HIGHLY-ENGAGED STUDENTS

![Graph showing school engagement among highly-engaged students pre- and post-program. The graph compares the Comparison and Treatment groups with a downward trend post-program.]

- Pre-Program: Comparison - 4.4, Treatment - 4.4
- Post-Program: Comparison - 4.2, Treatment - 4.0
Summary

Project has contributed new **knowledge** to the field.
Summary

Project has contributed new **tools** to the field.
SETTLEMENT AT A GLANCE

• 10,000 weekly services
• 6 branch locations
• $2M+ in financial aid annually
• 50+ community partnerships
KALEIDOSCOPE PRE-SCHOOL

• Daily classes in music, visual arts and creative movement
• Head Start program
• Long-term research
KALEIDOSCOPE’S IMPACT

• Teacher Training Institute for the Arts
• Research on the Music Education Pathways program
• Settlement-wide development
DR. ELEANOR BROWN

Founder/Director of the Early Childhood Cognition and Emotions Lab (ECCEL) at West Chester University

Three Longitudinal Studies on Kaleidoscope:

• 2010. Arts Enrichment and School Readiness for Children at Risk

• 2013. Arts Enrichment and Preschool Emotions for Low-Income Children at Risk

• 2016. Can the Arts Get Under the Skin? Arts and Cortisol for Economically Disadvantaged Children
CAN THE ARTS GET UNDER THE SKIN?

ELEANOR D. BROWN, MALLORY GARNETT, KATE ANDERSON, JESSA MALATESTA
WEST CHESTER UNIVERSITY OF PENNSYLVANIA
JEAN-PHILIPPE LAURENCEAU
UNIVERSITY OF DELAWARE
ACKNOWLEDGMENTS

- Settlement Music School
- Philadelphia Head Start preschools
- West Chester University research assistants
- West Chester University CASSDA
- The National Endowment for the Arts (NEA) Research- Art Works Grants Program
CAN POVERTY GET UNDER THE SKIN?
(LUPIEN, KING, MEANY, MCEWEN, 2001)
ECONOMIC HARDSHIP = RISK

- Income impoverishment

- Correlated stressors
  - Neighborhood disadvantage
  - Residential moves
  - Relationship transitions
  - Family chaos
HYPOTHALAMIC PITUITARY ADRENAL (HPA) AXIS
Diurnal Cortisol (ug/dl or micrograms/deciliters)
INFLUENCE OF HPA SYSTEM

Stress hormones and AMPA receptor trafficking in synaptic plasticity and memory
Harmen J. Krugers, Casper C. Hoogenraad & Laurent Groc
Nature Reviews Neuroscience 11, 675-681 (October 2010)
Alleviating the Impact of Poverty on HPA System Functioning

• Poverty
  - Fernald & Gunnar (2009)

• Parent-child attachment relations
  - Dozier et al. (2006, 2008)

• Emotion regulation skills
  - Kleiwer, Reid-Quiñones, Shields, & Foutz (2009)
Arts and Cortisol
Arts and Emotions for Young, Economically Disadvantaged Children

- Brown & Sax (2013)
SETTLEMENT MUSIC SCHOOL’S
KALEIDOSCOPE PRESCHOOL
ARTS ENRICHMENT PROGRAM
Part 1 - Within Kaleidoscope
- Affex system for observations of child emotion expression
- More interest, happiness, and pride in arts classes

Part 2 - Between Kaleidoscope and comparison
- Affex system for observations of child emotion expression
- Teacher ratings on the Emotion Regulation Checklist (ERC)
- More interest, happiness, and pride at arts enriched school
- Across year, greater growth in positive emotion regulation skills and improvement in negative emotion regulation problems for children in arts enriched preschool
PRESENT STUDY: CAN THE ARTS GET UNDER THE SKIN

- 310 participants
- 7440 cortisol samples
- Experimental design
- Random assignment
Table 1

*Summary of HLM Results for Effect of Homeroom versus Arts Class on Cortisol*

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-ratio</th>
<th>Approx. d.f.</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Intercept 1, β₀</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept 2, Y₀₀</td>
<td>-.93</td>
<td>.01</td>
<td>-124.71**</td>
<td>309</td>
</tr>
<tr>
<td>For Piece 1&lt;sup&gt;a&lt;/sup&gt; slope, β₁</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept 2, Y₁₀</td>
<td>.01</td>
<td>.10</td>
<td>.10</td>
<td>5265</td>
</tr>
<tr>
<td>For Piece 2&lt;sup&gt;b&lt;/sup&gt; slope, β₂</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept 2, Y₂₀</td>
<td>.04</td>
<td>.00</td>
<td>9.66**</td>
<td>5265</td>
</tr>
<tr>
<td>For Homeroom vs. Arts&lt;sup&gt;c&lt;/sup&gt;, β₃</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept 2, Y₃₀</td>
<td>.02</td>
<td>.01</td>
<td>2.77**</td>
<td>5265</td>
</tr>
</tbody>
</table>


<sup>a</sup> Piece 1 controls for average trajectory of cortisol from first to second time point of measurement (0-90min).  
<sup>b</sup> Piece 2 controls for average trajectory of cortisol from second to fourth time point of measurement (90-270min).  
<sup>c</sup> Homeroom vs. Arts is scored dichotomously (Homeroom = 1).

* *p < .05. ** p < .01.
### Table 2

**Summary of HLM Results for Effect of Number of Arts Classes on Cortisol**

<table>
<thead>
<tr>
<th>Fixed Effect</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-ratio</th>
<th>Approx. d.f.</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Intercept 1, $\beta_0$</td>
<td>-0.87</td>
<td>0.01</td>
<td>-129.93**</td>
<td>309</td>
</tr>
<tr>
<td>Intercept 2, $Y_{00}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Piece 1(^a) slope, $\beta_1$</td>
<td>-0.01</td>
<td>0.01</td>
<td>-26.05**</td>
<td>7118</td>
</tr>
<tr>
<td>Intercept 2, $Y_{10}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Piece 2(^b) slope, $\beta_2$</td>
<td>0.05</td>
<td>0.01</td>
<td>8.00**</td>
<td>7118</td>
</tr>
<tr>
<td>Intercept 2, $Y_{20}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Number of Arts(^c), $\beta_3$</td>
<td>-0.24</td>
<td>0.01</td>
<td>-2.07*</td>
<td>7118</td>
</tr>
<tr>
<td>Intercept 2, $Y_{30}$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** $N = 310$ children and 7440 observations of cortisol. Cortisol = log10 cortisol measured in ug/Dl.

\(^a\) Piece 1 controls for average trajectory of cortisol from first to second time point of measurement (0-90min).  
\(^b\) Piece 2 controls for average trajectory of cortisol from second to fourth time point of measurement (90-270min).  
\(^c\) Number of Arts = Number of arts classes (Range = 1 to 3).

* $p < .05$.  ** $p < .01$. 
CONCLUSIONS ABOUT THE ARTS

- Object and also mechanism
- Foster emotion regulation
- Can get under the skin
- May change imprint of poverty
- Key role in addressing current challenges
The Ancillary Benefits of Music Education

• Music education and academic achievement
  • Music education and standardized test scores
    (Butzlaff, 2000; Vaughn & Winner, 2000)
  • Music education and academic grades
    (Cabanac et al., 2013; Miksza, 2010; Southgate & Roscigno, 2009)

• Music education and basic cognitive function
  • IQ
    (Correlational evidence: Corrigall et al., 2013; Roden et al., 2014)
    (Causal evidence: Kaviani et al., 2014; Portowitz et al., 2009; Schellenberg, 2004)
  • Executive Functions
    (Correlational evidence: Dege et al., 2014; Schellenberg, 2011; Zuk et al., 2014)
    (Causal evidence: Bugos et al., 2007; Moreno et al., 2011)
What are Executive Functions?

“Executive functions refer to a broad set of cognitive abilities that are utilized in the service of solving novel problems and more generally for successful self-management.”

- Willoughby, Holochwost, Blanton, & Blair, 2014

**Executive Functions**

- Working Memory
- Selective Attention
- Behavioral Inhibition
Music Education & Executive Functions
Research Questions

• Was there any effect of program enrollment?

• Are there dosage effects for program enrollment?
Methods: Participants

- $N = 265$
- 135 students in program:
  - 1 year: 39.3%
  - 2 yrs: 23.7%
  - 3 yrs: 37.0%
- Academic Achievement:
  - Math and ELA grades
  - Standardized test scores
- Executive Functions
Was there any effect of program enrollment?

- Yes.
  - Higher standardized test scores.
  - Better grades
  - Improved performance on select tasks of executive functions

<table>
<thead>
<tr>
<th></th>
<th>Est.</th>
<th>SE</th>
<th>t</th>
<th>df</th>
<th>p</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Scores</td>
<td>10.7</td>
<td>3.90</td>
<td>2.74</td>
<td>217</td>
<td>.007</td>
<td>0.24</td>
</tr>
<tr>
<td>ELA Grades</td>
<td>2.45</td>
<td>.685</td>
<td>3.58</td>
<td>163</td>
<td>&lt; .001</td>
<td>0.30</td>
</tr>
<tr>
<td>Math Grades</td>
<td>3.90</td>
<td>1.52</td>
<td>2.56</td>
<td>163</td>
<td>.011</td>
<td>0.42</td>
</tr>
<tr>
<td>Flanker</td>
<td>-20.7</td>
<td>8.13</td>
<td>-2.54</td>
<td>182</td>
<td>.012</td>
<td>0.33</td>
</tr>
<tr>
<td>Memory Span</td>
<td>.201</td>
<td>.078</td>
<td>2.56</td>
<td>204</td>
<td>.011</td>
<td>0.25</td>
</tr>
<tr>
<td>Stroop</td>
<td>-265.4</td>
<td>94.7</td>
<td>-2.80</td>
<td>187</td>
<td>.006</td>
<td>0.36</td>
</tr>
<tr>
<td>Card-Sorting</td>
<td>-.012</td>
<td>.005</td>
<td>-2.41</td>
<td>206</td>
<td>.017</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Effect sizes:

\[ d = [0.18, 0.42] \]
Are there dosage effects for program enrollment?

- Yes.
  - Test scores & grades: Three years enrollment
  - Executive functions: Heterochronous (two or three years)
Limitations & Future Directions

Music Education → Executive Functions → Academic Achievement

Music Education → PFC → Executive Functions

Music Education → Cortisol → PFC → Executive Functions

Blair et al., 2011
Conclusion:

- New knowledge
- New tools
- New collaborations

#ArtsEdImpact