What Does Research Say About Montessori Theory and Practice?

SATURDAY, MARCH 11 8:00 AM - 9:15 AM
Presenters

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Agenda

Evaluating overall Montessori outcomes
Examining specific Montessori practices
New research initiatives
Evaluating overall Montessori outcomes
Growing body of evidence on Montessori effectiveness

Studies show children in Montessori environments have as good as if not better outcomes in academic and non-academic domains.

Summary Policy Brief is available:

Removing supplementary materials improved growth

Experiment: Non-Montessori materials removed from two of three classrooms

Pretests given as baseline, retest after four months

Children in “supplementary removed” classrooms
  ◦ Grew significantly more in early reading and EF
  ◦ Grew directionally more in early math
  ◦ No differences in growth in vocabulary, social knowledge, or social problem-solving skills tests

African American students scored higher in reading

African American 3rd graders
Public Montessori and other magnet schools
Montessori students scored higher in reading, but no difference in math on end of year state tests scores

Latino children saw most benefit

14,000 Title-1 pre-K Montessori & High/Scope in Miami

Beginning and end of 4-year-old pre-K year
  ◦ Socio-emotional and behavioral skills
  ◦ Pre-academic skills (cognitive, motor, and language)

Latino Montessori children
  ◦ began at most risk but had greatest gains
  ◦ ended above national averages

Black Montessori children had healthy gains but slightly greater in conventional

Culturally congruent success with Navajo children

Montessori-based curriculum congruent with Navajo cultural values

Strong growth in math, language, and social development over 3 years for Pre and K students

Entered more than a year behind in math and language, but by end virtually all at or above grade level in math

Enhanced place value knowledge

Experiment examined whether concrete models support place value learning.

“Montessori students, for whom concrete models play a major role in mathematics instruction, also demonstrated better understanding of base-10 structure than did their matched peers enrolled in mainstream elementary schools.”

(Inconsistent with results from a study published in the Journal of Montessori Research that found a benefit only in Kindergarten-age children)

Superior fine motor development

Five year olds in 4 Montessori schools and one high-performing suburban school

Practical life impact on fine motor development

Montessori moderate to large effects on fine motor development

- accuracy, speed, consistent use of dominant hand

Montessori preschoolers more active

301 children in 9 Montessori and 8 traditional preschools in SC using accelerometers

- Adjusted for sex, race/ethnicity, body mass index, parent education and neighborhood poverty index
- In-School light, MVPA and total PA higher
- Non-School and All Day MVPA higher

Specific Montessori practices
Embodied pedagogy (tracing)

Finger tracing elements showed benefit

Experiment with over 100 students
- Triangle geometry (adolescents)
- Order of operations (4th graders)

Tracing students
- Correctly solved more practice problems
- Made fewer errors on follow-up test

Prioritizing development of attention

Materials enhance attention in children with ADHD

15 non-Montessori preschoolers with ADD and ADHD

Pre-post test design experiment with a control group

Used tactile boards, sound boxes, binomial cubes and color tablets

Significant improvement on FTFK Attention test

Mixed age groups

School readiness of nationally representative sample of 3’s & 4’s

4-year-olds fewer gains in academic skills when more 3-year-olds (4 to 5 months worth of development)

Age composition unrelated to 3-year-olds’ school readiness

Author acknowledges not applicable to Montessori

Handwriting

Brain activation different with *handwriting* vs *typing* or *tracing* letters using MRI (preliterate, five-year olds)

“Reading circuit” recruited during letter perception only after handwriting—not after typing or tracing experience

More Handwriting

Handwriting superior to typing training in word writing, and, directionally, in word reading

Suggests “action-perception coupling” facilitates “sensory-motor representations established during handwriting on reading and writing.”

Math “manipulatives”

Principles for effective use of mathematics manipulatives from cognitive science

1. Use of manipulative consistently, over a long period of time
2. Begin with highly transparent concrete representations and move to more abstract representations over time
3. Avoid manipulatives that resemble everyday objects or have distracting, irrelevant features
4. Explicitly explain the relation between the manipulatives and the math concept

Philosophy of children’s autonomy

“...incapacities for autonomy are best understood as consequences of an absence of external conditions necessary for children to exercise capacities they already have internally, rather than intrinsic limitations based on their stage of life.”

Montessori theory implications for “who has responsibility for establishing the conditions under which children can flourish.”

Studies Underway
Development of Executive Function Within a Montessori Early Childhood Environment

Development of executive function in four EC children

Single-subject multiple baseline design

Executive function measured using:
- Minnesota Executive Function Scale (MEFS) iPad application
- Classic Head Toes Knees Shoulders task

AMS Mini Grant Funded
Teacher Report Fidelity Instrument Development

Instrument that can be efficiently used for future research

Based on thorough review of the literature

Initially will be tested with Montessori Teacher Research Panel

Plan to integrate into Montessori Compass Collaborative Research Project
Other Research Efforts
Journal of Montessori Research

Table of Contents: Spring 2017 - Issue 4

- Students of Color and Public Montessori Schools: A Review of the Literature
- The Effects of Choice on Reading Comprehension in 2nd-3rd Grade
- Technology in the Montessori Classroom: Teachers’ Beliefs and Technology Use

Access this journal online: www.amshq.org/researchjournal

A Publication of the American Montessori Society
Montessori Research Retreat (outside funder)
A logic model is a tool used by funders, managers, and evaluators of programs to evaluate the effectiveness of a program.

(Excerpt draft)
Resources for emerging researchers

- Free AMS Membership for 20 per year
- Research Mini Grants
- Outstanding Thesis and Dissertation Awards
- Website Resources for Grad Students
- Discounted Conference Registration
- Conference Sessions and Networking Opportunities
Poster Session at International Montessori Congress

The Research Poster Session is being planned and organised in cooperation with the American Montessori Society (AMS).

33 Proposal Submissions
24 Posters Accepted
American Educational Research Association

Journal Talk

Special Interest Group

Did you know about...

Montessori Research Facebook Interest Group

Online Research Library
www.amshq.org/research

Funding
- Research Mini Grants
- Outstanding Thesis and Dissertation Awards
Creative Potential in Montessori Students

KATIE BROWN, PHD
NATIONAL CENTER FOR MONTESSORI IN THE PUBLIC SECTOR
What is creativity?

Creative potential: “a latent ability to produce original, creative, adaptive work” (Besancon, Lubart, & Barbot, 2013)

Divergent thinking—generation

Convergent thinking—synthesis

Not well predicted by IQ
How is it measured?

Evaluation of Creative Potential (EPoC)

- Artistic-Graphic
- Mathematics
Mathematics: Divergent

Before you begin the real task, play at dragging white shapes on the grid.

They must not overlap.
Each new one should touch an old one by a side.
Make assemblies of five shapes.
The left arrow lets you go back.
When green, the right arrow lets you record an assembly.

Click below to go on.
How do Montessori students perform on measures of creativity compared to their non-Montessori peers?

Montessori group
- 91 grade 8 students, large, urban Midwestern district
- 79 grade 3 students, small, rural Southern district

Traditional group
- Small, suburban district in the West
- 297 grade 8 students
- 198 grade 3 students

Spring semester 2016
EPoC Graphic Scores: Grade 3

![Bar chart showing EPoC scores for Divergent, Convergent Abstract*, and Convergent Concrete* in Montessori and Traditional methods. The chart indicates higher scores for Divergent in Montessori and lower scores for Convergent Abstract* and Convergent Concrete* in Traditional methods.]
EPoC Graphic Scores: Grade 8

- Divergent*
- Convergent Abstract*
- Convergent Concrete*

Montessori vs Traditional
EPoC Math Scores: Grade 8

Divergent Tasks

Numbers* | Figures*
Montessori | Traditional

*Numbers and Figures indicate the scores achieved by students in Montessori and Traditional methods.
EPoC Math Scores: Grade 8

Convergent Tasks

- Numbers*
- Figures*

Montessori
Traditional
Conclusions

Montessori students exhibited greater creative potential in math, but less in artistic/graphic

Limitation: demographic differences

EPoC as measure for Montessori math

Future research

° Is there something about Montessori math?
° Montessori inputs
Help with Montessori research and get coffee on us!

First 65 teachers to register online will receive a $5 Starbucks e-gift card. Complete a Sign-Up card to receive the link via email.