



# Development of Executive Function in a Montessori Early Childhood Classroom



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## ABSTRACT

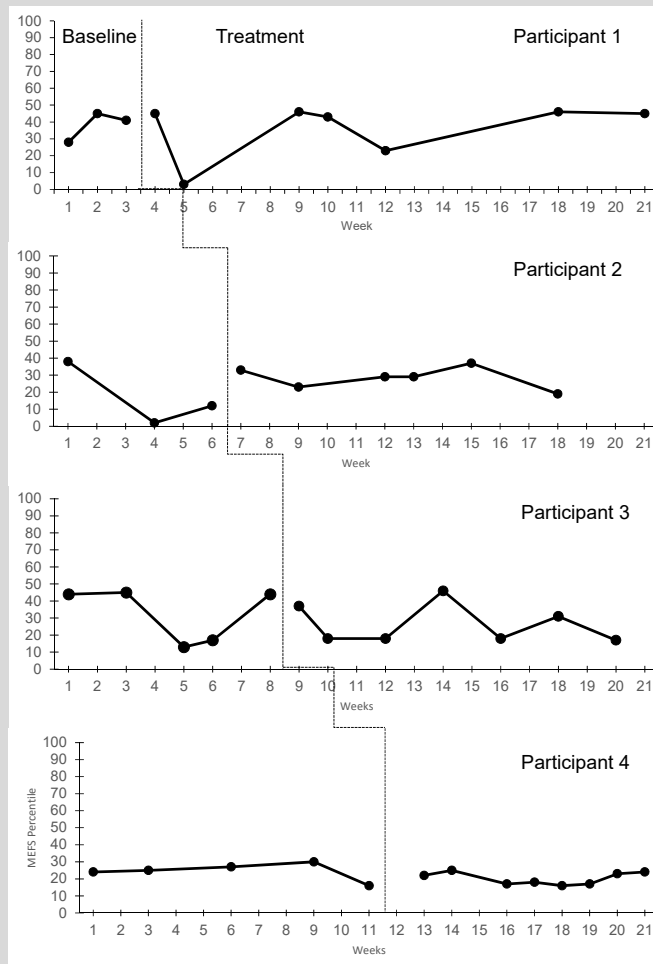
Past research has touted Montessori education as beneficial for developing executive function skills. The current study investigated the impact of participation in a Montessori early childhood classroom on the executive function of four year old students. Using a multiple-baseline, single subject design, four children's executive function and classroom behaviors were measured repeatedly during a school year. Children were considered in treatment once they reached normalization, which was measured by an instrument designed using Montessori's definition of normalization.

## METHODS

Four children were selected for the current study based on the following criteria: this was their initial year in a Montessori classroom, they were taught in the same classroom, and they had parental permission to participate. The sample included three boys and one girl.

Prior to beginning the study, the project received IRB approval and all data collectors were trained to at least 90% fidelity on the following instruments: the Minnesota Executive Function Scale, the Head Toes Knees and Shoulders (HTKS), and behavioral observations. The behavioral observations included time engaged in work tasks and time wandering, both of which were operationally defined and collected via standardized data collection sheets. Students were observed weekly from October to December and every two weeks for the remaining months. Teachers measured normalization weekly with a normalization checklist that included seven elements of Montessori's definition of normalization. This was considered baseline for the child. Once normalization was indicated for a child, data collection for normalization was stopped and the child entered treatment. Data collection for all other indicators continued during baseline and treatment. All children entered treatment at different times, creating a natural multiple-baseline design. Results were graphed over time.

## RESULTS – MEFS



Scores represent MEFS percentile.

## RESULTS – MEFS

	Before Normalization		After Normalization	
	Percentage On-Task Behavior	HTKS	Percentage On-Task Behavior	HTKS
<b>Participant 1</b>	49	4	22	14
<b>Participant 2</b>	61	15	46	10
<b>Participant 3</b>	26	9	61	4
<b>Participant 4</b>	52	9	57	7

## SUMMARY

It was hypothesized that scores of the two measures of executive function, MEFS and HTKS, would correlate with time on-task in the classroom, but the data do not support the hypothesis. The executive function scores and observable behavior (on-task) for four year old children in a Montessori primary classroom did not change dramatically over the course of a year. Scores on the HTKS actually decreased over the course of the year for most participants. Participant 1 demonstrated an unusual profile with a positive change for HTKS scores but a reduction in time on-task and MEFS percentile. Participant 2 ended the year with a higher MEFS percentile, but did not increase in time on-task or HTKS. Participant 3 showed a reduction in both standardized measures of executive function but increased time on-task and Participant 4 showed little change in any measures over the course of the year.

## SELECTED REFERENCES

- Haskins, C. (2012). Order, Organization, and Beauty in the Classroom: A Prerequisite, Not an Option. *Montessori Life: A Publication of the American Montessori Society*, 24(2), 34-39.
- Montessori, M. (1995/1967). *The absorbent mind*. New York, NY: Henry Holt & Company.
- Ponitz, C. C., McClelland, M. M., Mathews, J. S., & Morrison, F. J. (2009). A structured observation of behavioral regulation and its contribution to kindergarten outcomes. *Developmental Psychology*, 45, 605-619. doi: 10.1037/a0015365