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UNIVERSITY OF CALIFORNIA,
IRVINE

Waldorf Education: Investigations into the Development of Executive Function

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Education

by

Kimberly Telfer-Radzat

Dissertation Committee:
Professor Liane Brouillette, Chair
Professor Susanne Jaeggi
Professor Kylie Peppler

2022

DEDICATION

To my partner.

Whose unwavering support and positive attitude

helps me see the person I can be,

even when I lose sight of it myself.

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KIMBERLY TELFER-RADZAT

EDUCATION

University of California, Irvine
Ph.D., Education   **2022**

University of California, San Diego
B.A., Cum Laude, Fabric Design as a Wearable Art Form   **1989**

University of California, Irvine
State of California Multiple Subject Credential - Internship Program   **1993**

PUBLICATIONS

Telfer-Radzat, K., Brouillette, L. (2021). Arts-Embedded Education: Experiential Learning in a Waldorf First Grade Classroom. *Journal for Learning through the Arts, 17(1).*

Telfer-Radzat, K. (2020). *Shifting paradigms: From screen-free to fully digital during a worldwide pandemic.* In Fasching-Varner, Bickmore, Hays & Schrader's (Ed.) *Corona Chronicles: Necessary Narratives in Uncertain Times.* Diopress. (February, 2021).

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MANUSCRIPTS IN PREPARATION

Telfer-Radzat, K. Building Foundational Skill through Movement: Academics isn't all in the Head, To be submitted to *Journal of Play.*

Telfer-Radzat, K. Exploring Alternative Education: A Comparison on 3 Levels - Waldorf Charters, non-Waldorf Charters, and Local Public Schools, as Measured by the California Assessment of Student Performance and Progress. To be submitted to *Frontiers in Education*.

CONFERENCE PRESENTATIONS

Cowalti, L., Ramirez, S., Huang, J., **Telfer-Radzat, K**., & Peppler, K **(**2023, April 13- 16). Exploring Interdisciplinary STEAM Practices through Making a Kinetic Sculpture AERA Annual Meeting, Chicago, IL.

Cowalti, L., Ramirez, S., Huang, J., **Telfer-Radzat, K**., & Peppler, K **(**2023, April 13- 16). "**I** know a lot more boys that are interested in doing stuff like that": Gendered Perceptions of Computational Construction Kits. AERA Annual Meeting, Chicago, IL.

Telfer-Radzat, K. (July, 2022). Teaching 7th & 8th grade. *Alliance for Public Waldorf Education.*

Huang, J., Han, A., Sedas, M., **Telfer-Radzat, K**., & Peppler, K. (2022, June 6 -10). Crafting Paper Circuits: Gendered Materials for Circuitry Learning. ISLS Annual Meeting, Hiroshima, Japan.

Brouillette, L., & **Telfer-Radzat, K.** (2022, April 21 - 26). What Waldorf Schools Can Teach Us About Elliot Eisner's Insights. [Roundtable Session]. AERA Annual Meeting, San Diego, CA.

Telfer-Radzat, K., (February, 2022). Grading for Equity. *Alliance for Public Waldorf Education: February Conference.*

Telfer-Radzat, K., (February, 2022). Low Floor, High Ceiling Tasks for Waldorf Classrooms. *Alliance for Public Waldorf Education: February Conference.*

Telfer-Radzat, K. (2020, Apr 17 - 21). *Waldorf: Relying on Relationships* [Roundtable Session]. AERA Annual Meeting, San Francisco, CA. http://tinyurl.com/sy5b9n9 (Conference Canceled due to COVID)

Telfer-Radzat, K. (July, 2018). Reading, Writing, & Arithmetic with a Growth Mindset. *Waldorf Summer Teacher Conference.*

RESEARCH EXPERIENCE

University of California, Irvine

Committee: Dr. Liane Brouillette, Dr. Susan Jaeggi, Dr. Kylie, Peppler

Dissertation: Waldorf Education: Investigations into the Development of Executive Function   2017 – 2022

- Developed a qualitative study of teachers in Waldorf private school classrooms
  - o Designed, conducted, transcribed, and analyzed interview data
  - o Collected and analyzed observational data
- Developed a longitudinal, mixed methods study:
  - o Employed OLS multiple linear regressions to evaluate the development of executive function skill in private school Waldorf students in California using STATA
    - Retrieved, merged, and analyzed four years of student- archival data
    - Administered, scored and analyzed results from the Numbers Reversed test, Trial Making test, Head Shoulders, Knees and Toes task, Dimensional Card Sort and Pair-cancellation task for measuring executive function
- Developed a quantitative study comparing outcomes of students using the California Assessment of Student Progress archival data

- o   Employed OLS multiple linear regressions and fixed-effects to evaluate the academic outcomes of students in Waldorf-inspired charter schools and compared them to other charter and non-charter public school scores using STATA
  - Retrieved, merged, and analyzed five years of student- archival data

TEACHER ASSISTANTSHIPS/MENTORSHIPS

University of California, Irvine   **2017 – 2021**
EDUC 104D: The Arts and Human Development
EDUC 125: Child School Cinema
- Assisted in course development
- Used current pedagogical techniques to engage with undergraduate students.
- Monitored student engagement and assisted in student motivation.
- Presented lessons for 6 classes of 50 students.

AWARDS AND FELLOWSHIPS

University of California, Irvine   **2020**
Division of Teaching Excellence and Innovation
DTEI Fellowship

DATA ANALYSIS AND MANAGEMENT SKILLS

Quantitative software: STATA

Qualitative software: Dedoose

Fieldwork/observation experience:
- Elementary school classroom (1 – 8)

Interviewing:
- Designing and conducting structured and semi-structured interviews
- Experience interviewing school administrators, teachers, students, (in-person, via telephone & through Zoom)

Microsoft Word, Excel, PowerPoint, Google Suite, Google Classroom, Slack

Sycamore Creek Community Charter School   **2017 – present**
Participating, founding member
- Assisted in creating a charter and petition for a Waldorf-inspired public school in the Ocean View School District, CA that was approved in April of 2019.
- Provide on-going mentoring to all 6 starting teachers.
- Act as lead teacher for grades K-7.
- Assess and monitor EL & SPED population.
- Teach grades 6 & 7 in-person and virtually, all subjects.

Membership:

American Educational Research Association (AERA)
Association of Educational Therapists (AET)

CERTIFICATIONS

University of California, Irvine
The Center for the Integration of Research, Teaching and Learning   **2020**
Certificate of Completion

University of California, Riverside
Riverside, CA   **2017**
Educational Therapist Certificate

Rudolf Steiner College
Fair Oaks, CA   **2005**
Waldorf Remedial Teacher Training

Slingerland Institute
Slingerland Training
University of San Diego, CA   **1993 & 1998**

CIVIC ENGAGEMENT

Sycamore Creek Community Charter School   **2017 – present**
Participating, founding member
   • Assisted in creating a charter and petition for a Waldorf-inspired public school in the Ocean View School District, CA that was approved in April of 2019.
   • Provide on-going mentoring to all 6 starting teachers.
   • Act as lead teacher for grades K-7.
   • Assess and monitor EL & SPED population.
   • Teach grades 5th – 8th in-person and virtually, all subjects.

Teacher: grades 1 – 8, consecutively
Waldorf School of Orange County, Costa Mesa, CA   **2007 – 2016**
   • Created and implemented all content & lessons in English, mathematics, science, social studies, history, music, and art.
   • Interacted with parent body to develop a strong community.
   • Developed & implemented teaching strategies for successful social emotional development

Remedial teacher K – 12
Waldorf School of Orange County, Costa Mesa, CA   **2000 – 2007**
   • Developed and implemented the Waldorf School's remedial education program.
   • Assessed students for areas of concern and provided remediation in individual and small groups.

ABSTRACT OF THE DISSERTATION

Waldorf Education: Investigations into the Development of Executive Function

By

Kimberly M. Telfer-Radzat

Doctor of Philosophy in Education

University of California, Irvine, 2022

Professor Liane Brouillette, Chair

Despite a 100-year-old history and the existence of schools in nearly every country in the world, Waldorf education is a little known and poorly understood educational model that was developed in Europe by Austrian philosopher Rudolph Steiner. For many years it existed in the United States in the form of private schools. Few of their teachers or administrators were interested in the opinions of others regarding the effectiveness of their pedagogy. As Waldorf-inspired charter schools have grown across the U.S., there is a greater need to understand the system.

The Waldorf curriculum was created by Austrian philosopher Rudolf Steiner who was a contemporary of John Dewey and Maria Montessori, and who shared their belief in the advantages of active learning. Yet Steiner was unique among his contemporaries in his focus on an artistic approach to learning. Using interviews, observations, and student work, I identify the beliefs that Waldorf teachers hold around the idea of what it means to be a teacher and then describe the ways in which their beliefs influence the integration of the arts in the literacy curriculum. Interviews confirmed previous research asserting that the Waldorf pedagogy is understood by its teachers in a consistent way across wholly independent schools. All three teachers shared a common understanding of child development, as well as a wholistic view of teaching and learning. Their beliefs centered around three ideas: first, that each child develops at

their own pace, second, that academic achievement is not superior to physical, social, or behavioral achievement, and third, that focusing on foundational skills in grades one through three was one of the most important ways they could affect academic achievement. The teachers saw it as their role to a) be a guide and authority who b) strove to "see" the students in front of them, and c) worked reflectively to improve themselves as teachers. Their beliefs in the wholistic nature of learning led them to approach teaching with an eye towards active experiences that focused strongly on the use of imagination to strengthen each child's connection to the academic content. Their learning of the letter B, for example, was not a simple explanation of its formation and sound. The students were introduced to a story that included 'B'utterflies and 'b'oots, which they drew into their books before proceeding to discover all the words that had a similar sound and practicing the writing of the letters. Individual growth is showcased through student work as it changed over time.

The second study looked more deeply at the practices of the same teachers during a time of their teaching called *morning rhythmical work.* Using mixed-methods design, I attempt to compare the executive function development of students in these private schools to other private schools in California. Specifically, I examine how the pedagogical practices that focus on movement, song, and playful teaching in these private schools might impact executive function development, as compared with other private schools throughout the United States. Using observations and interviews, I describe the ways in which Waldorf teachers integrate movement and games into their school day. Then I used data from the ECLS-K to compare the development of the private school Waldorf students to other matched students in private schools. Although there was much evidence to suggest that the activities the teachers are engaging in with their

students do require executive function skill, due to the COVID-19 pandemic, there was no evidence found in the second part of study two.

Finally, study three used a quantitative, longitudinal, causal-comparative study design to examine the effectiveness of Waldorf education using annual state assessment scores for Waldorf-inspired charter school classrooms. This study addresses a gap in the literature as it relates to achievement among public school students in Waldorf-inspired classrooms, as compared to other non-Waldorf classrooms in grades three through eight. I found that by eighth grade students in Waldorf-inspired charter schools are performing similarly or better in ELA and math as compared to their non-Waldorf charter school and local public school comparison groups.

Keywords: Waldorf education, holistic education, executive function, arts integration

CHAPTER 1

Introduction

Waldorf education is a European educational model with a long history and worldwide presence. Referred to as "Steiner schools" in Europe, the first school opened in 1919 in Stuttgart, Germany and served the children of employees of the Waldorf-Astoria Cigarette factory. According to the website of the Association of Waldorf Schools of North America (AWSNA), Waldorf schools constitute the largest non-religious, independent school system in the world. Today there are over 1,180 private Waldorf/Steiner schools and 1,900 kindergartens across more than 80 countries around the world (European Council for Steiner Waldorf Education, 2020).

The Waldorf model is well-defined and characterized by strong oversight, which provides consistency across administratively independent schools. This makes it less problematic to study (Edwards, 2002) than related educational models like Montessori, as it is "unique in its comprehensive nature, with its explicit theory of child development, curriculum, pedagogical approach and philosophy about the role of the teacher" (Friedlaender, et al., 2015, p.99). Waldorf has been described as a providing a developmental, arts-integrated, and holistic education, which "exposes students to a wide variety of subjects, encouraging them to develop in a well-balanced way, as it helps children overcome gender stereotypes and, at the same time, expand their individual interests" (Petrash, 2002).

In recent decades, Waldorf-inspired public schools have come into being in the U.S. through the charter school movement. According to the Alliance for Public Waldorf Education, the number of Waldorf-inspired public schools has grown significantly since the first one opened in 1994 in Grass Valley, California. As of 2022 there are 57 Waldorf-inspired public schools nationwide, not including schools that are exclusively early-childhood/kindergartens. These

1

schools have grown due to grassroots movements within communities, often founded by parents who have written charters and taken them before their local school boards for approval. Each school is individually administered but is required to become a member of the Alliance for Public Waldorf Education if it wishes to use the word "Waldorf" in its name or materials.

Supporters of public Waldorf education argue that, from the beginning, this education model was intended by its founder, Rudolf Steiner, to be accessible to all, regardless of gender or social class. Steiner described the Waldorf model as, "a school for all classes" with the aim of taking "account of what is universally human" (Steiner, 1922/2004, lecture 4, p.93). In fact, at the time of their development, Steiner envisioned the schools as a means of social renewal; accessibility was a primary condition of opening that first school in Germany in 1919 (Schmeltzer, 2017). However, when the Waldorf philosophy attracted interest in the United States in 1928, regulations limited the options for implementation of the new pedagogy; so, the schools were limited to operating as private schools (Sagarin, 2011).

While Waldorf schools continue to exist primarily outside the realm of public education, interest in their methods and possible contributions in the public arena is growing, as evidenced by the continued increase in the number of Waldorf-inspired public schools opening in the U.S. Currently, there are 57 charter schools in 16 states, two of which are high schools. The Waldorf curriculum and its views of child development provide a unique opportunity to investigate the academic outcomes of students who attend alternative schools that follow educational models that have been found to be both enduring and highly consistent across the world.

A Mixed Methods Approach

The three studies in this dissertation combine both qualitative and quantitative approaches. The chapters using a qualitative approach paint a picture of the ways in which

teachers in Waldorf schools have been integrating playful activities into the school day for over 100 years. The chapters using a quantitative approach use academic outcomes as evidence of the successfulness, or not, of the Waldorf method in practice. These chapters are meant to support each other in providing the reader with 1) a background in the Waldorf pedagogy, including an understanding of the how teachers in Waldorf classrooms approach teaching and 2) with quantitative evidence in the form of standardized tests in English language arts and mathematics from public Waldorf-inspired charter schools, to determine whether, based on measures that many use to evaluate success, this alternative school system "works".

Overview of the Remaining Chapters

Chapter Two

In this chapter, I discuss the history of Waldorf education, from its founding in 1919 to its designation as the largest, non-religious private school system in the world. I end with information related to the growth of public Waldorf charter schools and the demographics related to this parallel branch of Waldorf education.

Chapter Three

This chapter presents study one, which is based on a research study that followed the first-grade classes in three independent California Waldorf schools through the fourth grade. Using interviews, observations, and student work, I describe how the Waldorf curriculum in these schools is integrated into varied social contexts, as well as the role that the arts play in early literacy instruction in Waldorf schools. I answer the questions:

1) How do Waldorf teachers understand their role as "teacher?"

2) How do Waldorf teachers integrate art and literacy skills?

3) In what ways do Waldorf teachers assess student learning

Three teachers (100% female) agreed to participate in the study. Each teacher was beginning with a cohort of between 19 and 28 first grade students and was planning to stay with the same class through eighth grade (A practice called looping). All were considered experienced teachers, with two having taken a cohort of students from first through eighth grade previously; the third, having taken a class from first through fifth grade. Two teachers also held a California state teaching credential. One of the schools had a pre-K through 8th grade program, while the other two schools served students from pre-K through 12th grade.

The students came primarily from families with incomes in the middle to high range; the average yearly tuition of the schools for grades one through eight was $15,720.00. Tuition remission is available at all three schools for families who qualify. The total number of students across the three schools in grade one was 72; at the beginning of first grade (2017) the students ranged in age from 6 years 3 months to 7 years 6 months. There were 38 girls and 34 boys in this sample of first-grade Waldorf classes in Fall 2018.

Chapter Four

This chapter presents study two, which builds upon Chapter 3. It investigates a second feature of the Waldorf pedagogy: active, integrated movement. Using the same sample as in study one, I describe a portion of the Waldorf curriculum called *morning rhythmic work*, which is utilized in Waldorf schools worldwide. I employ a mixed-methods case study design to describe this part of the curriculum and then identify the ways in which a focus on integrated movement may support the development of executive function (Creswell & Clark, 2017). Finally, I compare executive function development in Waldorf students with that of other, similar private school students in the United States using measures of working memory and

inhibitory control. Data sources include test scores, structured interviews, observations, and archival data. The sources of data were used to:

1) describe the ways in which Waldorf teachers implement play-based activities in their private school classrooms

2) investigate the teachers' impetus for spending teaching time engaged in these activities

3) investigate the connection between executive function development and Waldorf pedagogy.

analyze the connection between the activities the teachers are utilizing and the three domains of executive function: cognitive flexibility (CF); inhibitory control (IC), and working memory (WM)

Chapter Five

Chapter 5 builds upon Chapter 4 with the presentation of study three, where I examine the academic outcomes of Waldorf students in California public Waldorf charter schools using archival state testing data to compare academic outcomes first in non-Waldorf public charter schools, and then in traditional public schools. The California Assessment of Student Performance and Progress (CAASPP) measures student achievement in English language arts and math each spring. It is a state-mandated test required of all public-school students in grades three through eight and in grade eleven.

There were 26 public, Waldorf-inspired charter schools in California in 2021 (Alliance for Public Waldorf Education website, 2021). Of those, 19 were full kindergarten through eighth grade schools. It was these schools that were selected for the study, which looked at the 5-year span from the 2014-15 school year through 2018-19 school year. The schools averaged 330

students per school; an average of 58% of students enrolled identified as white. On average, the number of students who are identified as English language learners was 6%; an average of 9% were enrolled in special education, with an average of 34% were eligible for free and reduced-price meals (FRPM). FRPM was used as an indicator for economic status. The range of eligibility for FRPM for these Waldorf-inspired charter schools ranged between 1% and 77%.

County school code, district school code and zip code were used to control for geographical location and income. FRPM was used to control for socio-economic status (SES). Enrollment was also used as a control, as the number of students enrolled in a school is correlated with school climate, impacting feelings of satisfaction, positive relationships, and a feeling of safety (Greenwald et al., 1996; Koth et al., 2008; Monk et al., 1993). A longitudinal study in 2016 found that math and reading scores decline as school size increases, an effect that becomes stronger in the higher grades (Egalite et al., 2016). I address the following research question:

1) How does the development of EF skills in students attending Waldorf schools compare to those attending matched control schools?

Chapter Six

In chapter six, I summarize the key findings of the dissertation and discuss implications for policy and future research.

Reading Guide

The main chapters of this dissertation have been written as individual papers. Each chapter can be read on its own. Therefore, there may be some overlap in the methods sections and literature reviews. An adapted version of Chapter 3 has been accepted for publication in the

Journal for Learning through the Arts: A Research Journal on Arts Integration in Schools and

Communities.

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Schmeltzer, A. (2017). The Threefolding Movement, 1919: A history: Rudolf Steiner's Campaign for a Self-Governing, Self-managing, Self-educating Society. Forest Row, U.K.: Rudolf Steiner Press.

CHAPTER 2

Background

Research Settings

The research in this study has been nested to provide a micro to macro look at Waldorf education. Following a path similar to the expansion of Waldorf education in the United States, I start with a deep dive for study one into three private, Waldorf schools located in California. All are established schools and active members of the Association of Waldorf Schools of North America (AWSNA), the private school system's governing oversight body. One school is in a suburban area and serves approximately 450 students in grades PK-12. The second school is in an urban area, enrolling 137 students in grades PK-8. The third school is located a semi-rural environment and enrolls over 400 students in grades PK-12. The teacher interviews were conducted at the end of the first-grade year and the classroom observations during the spring second-grade.

In study two, our view widens as I attempt to compare the executive function development of students in these private schools to other private schools in California. Specifically, I examine how the pedagogical practices that focus on movement, song, and playful teaching in these private schools might impact executive function development, as compared with other private schools throughout the United States. Using observations and interviews, I describe the ways in which Waldorf teachers integrate movement and games into their school day. First, I identify the types of activities that are used and amount of time the class spends engaged in those activities. Then, I look at the ways in which those activities require executive function skills for success. Finally, I attempt to compare the EF development between the students in the three private Waldorf schools and a control group taken from a national dataset.

The three classrooms described in the first study constitute the treatment group (*N*=69 in first grade), with 45% identified as male and 55% identified as female.

The control group consists of students drawn from archival data from the ECLS-K 2010-11 dataset, a national, federally funded, longitudinal study that aims to learn about children's developmental, early learning and school progress experiences. The ECLS-K 2010-11 began with a kindergarten cohort in the 2010-11 school year and continued through grade 5. It is comprised of a nationally representative sample selected from both public and private schools and provides descriptive data on children's status at entry to school, transition into school and progression through the grades. By controlling for SES, geographic location, and school type, it is possible to extract a similar sample of private school students as a comparison for the Waldorf schools. The control group, after controlling for the variables listed, was comprised of 113 students at the beginning of first grade, 61 male and 43 female (59% & 41%, respectively). By the end of first grade that number had grown to include 364 students (190 males, 52% & 174 females,48%). This is typical for the ECLS-K, as schools are added to the study as it progresses.

In the third study, we broaden our view even further to include Waldorf-inspired charter schools in California, a growing trend in the Waldorf movement. These schools are required to register with Alliance for Waldorf Education and agree to the organization's oversight to use the term "Waldorf-inspired" in any of their names or on materials. These schools, although schools of choice, are also required to participate in statewide testing (CAASPP) every spring in grades three through eight and grade eleven, providing the opportunity to compare Waldorf charter school student math and ELA outcomes between non-Waldorf charter school students and traditional public-school students. By merging California Department of Education (CDE) enrollment data, Free and Reduced priced meal data (FRPM) with the school level testing data,

we can control for differences in demographics such as SES and geographical location that might affect test outcomes.

Experiential Knowledge.

I believe it is important to share that my personal history with Waldorf education is – as is everyone's who has been exposed to it – undeniably biased. It is also true, however, that this dissertation would not have been possible without that history. The questions that I carried coming into the PhD program arose directly from my years of experience as a teacher in this type of learning environment. As well, my connections with faculty and staff in both the private and public spheres of Waldorf education allowed me access to people and places that others would not have been invited into. This is not a good or bad thing; it is just the fact of the situation. I have attempted to identify my biases and/or assumptions and worked to present them in a transparent way. It is my hope that with such transparency, readers can feel confident trusting my findings.

Historical Background

Founded a century ago by Austrian philosopher Rudolf Steiner (1861 – 1925), the first Waldorf School opened with the intent of providing a free education for the children of the workers at the Waldorf-Astoria Cigarette Factory in Stuttgart, Germany. Today, private Waldorf schools constitute the world's largest, independent, non-religious network of schools (Zdrasil, 2018). From one school in Germany in 1919, Steiner's educational ideas have spread around the world to include 3,142 schools in 74 countries (Paull, 2020). The pedagogy is characterized by its holistic view of child development and connects in many ways to the theories of Piaget (developmentalism), Dewey (constructivism), and Vygotsky (Zone of Proximal Development and Activity theory). The arts are integrated throughout the curriculum: "music is taught in

conjunction with history; art is part of all science studies and writing is used to enhance the teaching of mathematics" based on a belief that learning will be absorbed more deeply if students can integrate their own artistic expression into their work (Petrash, 2010). Steiner emphasized in his original lectures the value of imitation and imagination, which are strongly linked by teachers to artistic expression. Educational activities in Waldorf settings are expected to meet the needs of each child on the physical, emotional, cognitive, social, and spiritual levels (Norland, 2013).

However, these certain aspects of the Waldorf pedagogy make widespread study of the schools challenging. The first consideration that confounds our comparison is the expectation in the U.S. that Waldorf elementary teachers stay with the same class of students from first grade through eighth grade. Referred to as "looping," this practice focuses on furthering children's socio-emotional well-being and character development through the on-going support of a teacher who has come to know each child and family deeply (Woods, et al., 2005). The second atypical practice, when comparing educational models, is a minimal use of computers and other electronic equipment by students and teachers in Waldorf elementary classrooms. In fact, private school classrooms eschew the use of screen entirely through at least sixth grade, preferencing a hands-on approach to learning as opposed to a technological one. Thirdly, the *act* of teaching is considered an art as much as a profession. Teachers are taught that the curriculum must come alive for the students through their own internalization of the material; textbooks are for teacher use, not student, as much of the content is presented through oral storytelling (Author). Students demonstrate their learning through the creation of their own textbooks, filled with drawings, diagrams and compositions. And, lastly, the schools place as much of an emphasis on developing *integrated* mental and physical capacities such as dexterity and balance, as they do on traditional academics. This can be seen in their focus on cursive writing, handwork (knitting, crochet) and

woodwork, and daily rhythmical activities – such as jumping rope, hopping, skipping, singing and recorder daily and throughout the grades. Because of these four key practices, identifying a single factor that drives outcomes has been and continues to be difficult.

Although Waldorf schools have existed for over a century and spread worldwide, evidence of their effectiveness is limited. The Association of Waldorf Schools of North America (AWSNA) specifically states,

> We believe that standardized testing is not an accurate or complete reflection of a student's knowledge, intellectual capacities, or ability to learn. Thus, our curriculum does not put focus on standardized test-taking preparation, particularly in the lower and middle grades.

> (AWSNA, 2022)

This author's search resulted in a total of only 56 papers on Google Scholar since 1970: two in the 70s, five in the 80s, 13 in the 90s. Only 20 of these were written prior to 2000. Since then, there has been an uptick in the number of people researching Waldorf education, 26 in the past 22 years, although this number is still small. Additionally, a majority of the studies are qualitative, providing descriptions of the pedagogy and the history; others provide discussions on issues related to moral education and art education. Quantitative studies focusing on outcomes for the students can be counted on one hand. This may be in part because the schools have existed primarily as private educational choices and, therefore, out of the reach of accountability measures which have been aggressively applied to public education since the 1990s.

Waldorf Charter Schools

The growth of public, Waldorf-inspired charter schools may be the reason for the uptick in research since the 2000s. The charter school movement began in 1994 when the first (non-Waldorf) charter school was opened in Minnesota. Since then, the number of charter schools has risen significantly. According to the National Center for Education Statistics (NCES, 2022), between fall 2009 and fall 2019, before the COVID-19 pandemic disrupted education worldwide, public charter school enrollment had increased 112.5%, from 1.6 million students to 3.4 million students. The number of charter schools grew over this period from approximately 5,000 to 7,500, while the number of traditional public schools decreased from 93,000 to 90,900. This resulted in the percent of all public schools that are classified as "charter schools" to increase from 5 to 8 percent, and the number of students attending charter schools to increase from 3 to 7 percent.

The Alliance for Public Waldorf Education was established in 2006 to address the sometimes-conflicting goals between private and public-school models. They regulate the use of the term *Waldorf*, advising *Waldorf-inspired* for public charters, as well as provide a space for schools to post job openings, offer teacher professional development opportunities, and resources. To use the term *Waldorf-inspired*, the Alliance requires that schools become members. One step toward that goal is that each school complete a years-long self-study showing that the seven core principles of Public Waldorf Education are fully integrated throughout the school and community. These seven principles were created to provide faculty and staff, who might have little or no training with Waldorf pedagogy when they begin their work, with a full understanding of the curriculum and the ways to understand relationships between the school, the faculty, and the community. The curriculum, as described in one section on private Waldorf schools, explains that it is:

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not a fixed or rigid document—or a set of student outcomes

progressively laid out on a prescribed timeline—but a living

instrument of educators, who become engaged in a thoughtful,

creative process, fostering the healthy growth of their students.

(Alliance, 2013, p. 9).

Additionally, and importantly for those interested in understanding how the Waldorf curriculum

works, these Waldorf-inspired charters must participate in the annual assessments that are

required of all schools which receive public funding. It is this data that can provide us with a

means to compare growth of students in Waldorf-inspired charter schools to those in other non-

Waldorf charter schools.

This dissertation strives to demonstrate one way that schools may be able to focus on

developing strong foundational skills in students while in school, without additional costs or

worry over suffering a loss of academic achievement. It hopes to dispel the idea that "earlier is

always better" and suggests that play and games are not only for the youngest of children. And

finally, it provides an alternative way for us to address the growing gap between those to have

access to a rich, varied learning experiences and those who have not.

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CHAPTER 3

Study 1. Education through Arts: Making connections across the English Language Arts Curriculum

Abstract

This study provides an overview of the first-grade art and literacy curriculum of Waldorf schools, the world's largest, non-religious, independent educational network. The Waldorf curriculum was created by Austrian philosopher Rudolf Steiner who was a contemporary of John Dewey and Maria Montessori, and who shared their belief in the advantages of active learning. Yet Steiner was unique among his contemporaries in his focus on an artistic approach to learning. Under their teacher's direction, children draw, sing, play and thus, learn the sounds of alphabet letters. Using interviews, observations, and student work, I identify the beliefs that Waldorf teachers hold around the idea of what it means to be a teacher and then describe the ways in which their beliefs influence the integration of the arts in the literacy curriculum. Interviews confirmed previous research asserting that the Waldorf pedagogy is understood by its teachers in a consistent way across wholly independent schools. All three teachers shared a common understanding of child development, as well as a wholistic view of teaching and learning. Their beliefs centered around three ideas: first, that each child develops at their own pace, second, that academic achievement is not superior to physical, social, or behavioral achievement, and third, that focusing on foundational skills in grades one through three was one of the most important ways they could affect academic achievement. The teachers saw it as their role to a) be a guide and authority who b) strove to "see" the students in front of them, and c) worked reflectively to improve themselves as teachers. Their beliefs in the wholistic nature of learning led them to approach teaching with an eye towards active experiences that focused strongly on the use of imagination to strengthen each child's connection to the academic content.

Their learning of the letter B, for example, was not a simple explanation of its formation and sound. The students were introduced to a story that included 'B'utterflies and 'b'oots, which they drew into their books before proceeding to discover all the words that had a similar sound and practicing the writing of the letters. Individual growth is showcased through student work as it changed over time.

Keywords: Waldorf education, holistic education, alternative education, ECLS-K, CAASPP

Introduction

Waldorf schools, which originated in Germany just after World War I, have now become the largest independent school network in the world (Zdrazil, 2019). In 2019 Waldorf teachers and students worldwide celebrated the 100th anniversary of an educational movement that has been both controversial and honored. Under their teacher's direction, children learn their letters and numbers through painting, singing, drawing, and listening to stories. Using a holistic approach, Waldorf schools fully integrate academics with both art and music, as well as fine and gross motor development and moral education. The curriculum was created by Austrian philosopher Rudolf Steiner, a contemporary of John Dewey and Maria Montessori. Many of the ideas Steiner drew upon were descended from the educational theories of pioneer educators Comenius and Pestalozzi (Ullrich, 1994).

According to the Association of Waldorf Schools of North America (AWSNA), the goal of the Waldorf reading pedagogy for reading is "to foster passionate readers who continue reading for pleasure throughout their lifetimes." To that end, reading is introduced in a developmentally appropriate way, focusing on oral vocabulary until students are more comfortable with written words and fully ready to engage with them. Waldorf teachers begin teaching reading in the first couple months of first grade, focusing on consonants and vowel names and sounds through teaching an artistic approach of drawing, painting, movement, and speech. The claim is that:

> (t)his artistic, deliberate process engages the children with great interest, and by the end
> of first grade, children are writing and reading sentences and short texts... This thorough
> and artistic approach to teaching literacy has been proven to build a solid base for
> advanced comprehension and vocabulary skills in later years" (Retrieved from

http://www.AWSNA.org).

Can the arts of drawing, singing, dancing, and storytelling provide a richer experiential experience for young children? Then, might these experiences foster deeper understanding to support later learning? Waldorf teachers, along with proponents of constructionism and constructivism, such as Dewey (1929), and Vygotsky (1962), and Papert (1980) believe so. This paper examines the Waldorf literacy pedagogy and the ways in which the arts are used to aid in the accessibility and understanding of reading development in young learners.

This study developed out of a larger research enquiry, focused on first through fourth grade classrooms, and undertaken at three independent Waldorf schools in California. These schools served differing (urban, suburban, and semi-rural) student populations (N=72 total students), making it possible to explore how the Waldorf curriculum was integrated into varied social contexts. The participation of the three teachers enabled me to examine both the ways in which the teachers were integrating the arts in their early literacy instruction, as well as the beliefs that motivated their lessons. I focus on the integration of art and literacy because the administrative push for ever rising tests scores in elementary school has made it difficult for current public-school teachers to find any time left for art and music (Bassok, et al., 2016; Gara, et al., 2018). Since 2007, almost 71% of U.S. schools have reduced—or eliminated—instruction time in such subjects as arts, music, history, and foreign language (Grey, 2009). It is hoped that by providing examples of how to successfully integrate art into a normal school day, without sacrificing literacy instruction, I might facilitate the reintroduction of arts and crafts instruction in public schools. Using interviews of three experienced Waldorf teachers, observations of 72 students and their teachers in three classrooms at three different schools, and four years of

student work (approximately 120 pages per year, per student), I explore the following research questions:

RQ1: How do Waldorf teachers see their role as "teacher?"

RQ2: How do Waldorf teachers integrate art and literacy skills in their classrooms?

RQ3: How do Waldorf teachers assess student learning?

The students in the Waldorf classrooms observed in this study actively processed their academic understanding through concrete experiences such as painting, drawing, modeling, singing, and acting. They then engaged as a class in reflectively observing the outcome of their explorations. Rather than spend time in repetitive practice of skill, i.e., tracing the letter *m* 20 times across a worksheet or simply drawing a line to connect the letter to a picture, students were asked to form a relationship to specific letters*:* their sound, shape and feel, thus helping them to internalize each one. This method of deeply embedding understanding through artistic experiences allowed the teachers freedom to engage their students in ways that they knew best.

Literature Review

Waldorf Schools in Historical Perspective.

The point of the current state of public education in the United States stands currently and the state of public education in Europe immediately following World War I are surprisingly similar. Steiner's beliefs about the role of education were develop specifically to address the issues of the day. Specifically, he was responding to the limited educational opportunities available to children from poor and working-class families in the early 20th century. But Steiner was not the only one interested in improving the lives of the most vulnerable in our world. Several other international movements arose that advanced a more organic educational philosophy than was being offered by the widely implemented "factory model" of education.

John Dewey in the U.S., Maria Montessori in Italy, along with Rudolf Steiner in Germany were among the innovators who advocated a child-centered model of education, emphasizing hands-on learning that included arts, crafts, and practical skills. Steiner also drew upon the educational theories of pioneer educators Comenius and Pestalozzi (Ullrich, 1994). Dewey (1897) had an international following and argued powerfully that education should not revolve around acquisition of a predetermined set of skills but should focus on the realization of a child's full potential. Maria Montessori created a tradition of encouraging children to engage in self-disciplined learning through activities that focus on practical tasks taken from everyday life. Her programs commonly served children aged two to six years, creating settings in which children had the freedom to choose which activities to pursue and to learn at their own pace. Children were grouped in multi-age classrooms, so as to encourage older children to serve as role models and to help younger children.

In contrast to Montessori programs, Waldorf schools have a defined pedagogy, which is characterized by strong oversight and consistency across schools which operate independently (Edwards, 2002). Also, Waldorf classes are homogeneous in age. Waldorf classes are usually guided by the same teacher from first through eighth grade. Formal literacy instruction begins in first grade, when the sounds of the letters of the alphabet are introduced. This delayed academic start allows younger children in the kindergartens to focus on developing important social and oral language skills.

The first Waldorf school was opened in Stuttgart, Germany in 1919; soon additional schools opened, both in Germany and elsewhere. However, Steiner died young, in 1925, and Nazism soon shut down German Waldorf schools. After World War II, the Waldorf movement rebounded, and it now continues as an international, stand-alone kindergarten to 12th grade

network of schools. When charter schools were first opening in the United States in the 1990s, Waldorf-inspired charters were at the forefront and have continued to grow nationwide.

Philosophical frameworks.

Rudolf Steiner and Waldorf education

The Waldorf philosophy is based on a holistic model, wherein experiences with make-believe, art, music, and nature are believed to be as important an aspect of human development as academics, and therefore essential for success in future academic endeavors. It was Steiner's hope that this education could "enable children to become free and autonomous human beings, able to impart purpose and direction in their lives" (Steiner Education Australia, 2022). According to the Steiner Education website, in primary school (K-8) "the core approach is through artistic presentation of material by the class teacher which promotes engagement, inspires deep learning and supports developing imaginations." Eschewing a narrow focus on the intellect, Rudolf Steiner derived his pedagogical theory from observation of thinking (cognition), feeling (emotion) and willing (doing/intentionality) in human beings (Alphen, 2011). In Steiner's view (1996), perception is an act of the will that gives rise to a 'living picture' in the mind. A vivid image arises in the moment of perception, giving perception an 'alive' quality. Perception is transformed into images through imagination. For example, when we listen to a story, we can perceive the images presented through the story-teller's words by using our imagination. This ability to imagine has the added benefit of creating engagement in the listener, perhaps leading to greater enjoyment of learning.

The "living pictures" Steiner (1996) speaks of may arise either from a subjective experience within our inner world or from an encounter with outer reality. But it is experienced in the moment, which offers the possibility of finding meaning without the interference of

preconceived ideas. This sense of immediacy, inherent in imagination, keeps us from moving too readily into the formation of fixed concepts, which play a different role. Concepts the mind created from experience are mental constructs, which draw on the essence of our experience as we perceived it. These mental constructs are stored in memory and are used to build our knowledge of the world. They provide a scaffolding upon which future understanding can rest.

Steiner (1954) also spoke of another type of concept, one which is not created by the learner. He pointed out that concepts could be flexible or fixed, depending on how they were created. Fixed concepts are formed when mental constructs are simply adopted, not created out of the learner's own experience. One example of this process is rote learning based on textbooks, where students are asked to memorize the "finished products" of someone else's thinking, for example memorizing the causes of the Civil War. Steiner argued against teaching students rigid concepts that do not leave room for further growth in a learner's perceptions and understanding. This view has much in common with the orientation of many educators who believe in experiential education and may be a key to developing (or maintaining) cognitive flexibility. Steiner explained:

> The child must be given mobile concepts—concepts whose form is constantly changing as he becomes more mature. If we have a certain idea when we are forty years of age, it should not be a mere repetition of something we learned when we were ten. It ought to have changed its form, just as our limbs and the whole of our organism have changed. (Steiner, 1954, p. 144)

Steiner (1968) held that the young child's ability to comprehend and engage is rooted in the imagination, which has a pictorial quality. He argued that, to help children develop flexible conceptual thinking, they must be given, early on, the opportunity to engage in active learning.

To give children this opportunity, Waldorf schools emphasize imaginative learning across the grades and curriculum. In the elementary grades (1-8), such learning takes place through stories and images, as well as music and poetry. The lessons are presented in human terms that encourage 'participative' imagination (Alphen, 2011). This participatory element requires the students to remain active in their learning. They are encouraged to negotiate their own interpretations and connect what they already know to what is new (Author).

Elliot Eisner and the arts

Steiner is not unique in his philosophy around education. Beyond the Waldorf curriculum, other scholars such as Elliot Eisner have begun to explore the connection between the arts and understanding, imagination and memory. Elliot Eisner (2002) saw forming representations of experience as the mind's essential function. He described these representations as having two functions: 1) furthering the individual's own understanding and 2) communicating to others the meaning an individual has formed from input they had received. Like Steiner, Eisner connected images with imagination, pointing out that imagination enables us to visualize future situations with which we might eventually need to cope. The ability to anticipate future events gives us an opportunity for mental rehearsal. We can envision the consequences of various actions we might take through our imagination. This enables us to avoid taking the risks that would be inherent in exploring these alternatives in real life. Imagination also gives us the capacity to step metaphorically into the shoes of others and vicariously experience what they have experienced.

Eisner (2002) saw art as a vehicle for dealing with the evanescent, impermanent nature of human thoughts by inscribing images into lasting materials, enabling us to preserve the images and associated ideas for later use. Like Steiner, Eisner pointed to the importance of revisiting our

ideas with fresh eyes, so that we could more carefully inspect, revise, and extend them. In this way, Eisner echoed Steiner's argument against teaching students rigid concepts that did not leave room for further growth of the learner's perceptions and understanding. Like Steiner, Eisner held that, instead of jumping to judgment based on inherited assumptions, we were better off leaving room for one to explore areas of uncertainty.

Kieran Egan and the imagination

Finally, Kieran Egan, in his work *An Imaginative Approach to Teaching* asserts that imagination is the key to actively engaging children in learning and that when it is left out, children are left with dry, abstract facts to memorize. He states: "Engaging is not a sugar-coated adjunct to learning; it is the very heart of learning. It is what brings meaning and sense and context and understanding to the knowledge we wish to teach" (2005:36). Like, Steiner and Eisner, Egan's educational models are founded on the idea that children create their understanding with mental images that they may never have experienced in person (Egan, 1986:7). The stories used in Waldorf classrooms provide a rich, imaginative source of mental images for the students to use as building blocks for future speaking and writing. The images become tools to help them relate to the world and the people in it, despite varied personal backgrounds.

The state of literacy in education

Researchers across disciplines: education, cognitive science, pediatrics, psychology, and more, agree that the two components of language, spoken and written, are critical to the success of a human being in the modern world, and that they are complex and varied processes (e.g. Anderson, Hiebert, Scott & Wilkinson, 1985, Chapman, 2000). Literacy, along with math, is a central focus of the recent push in U.S. education to improve student outcomes, particularly

between white and non-white students, the rich and the poor (National Research Council, 2011, Riordan, 2011). As a result, the curriculum offered to students in U.S. schools has increasingly narrowed its focus to those basic subjects deemed 'essential' for future utility (Au, 2011). And, unfortunately, there is little evidence that students are any more competent in the language arts than they were before implementing the narrowed focus. In fact, Durkin et al. (2021) recently found that students enrolled in a voluntary Pre-K program designed to boost students from marginalized backgrounds, scored significantly lower on standardized tests in third grade in all areas, and by sixth grade showed even larger moderate to strong differences. The authors theorize that perhaps the narrowed focus on concrete literacy skills, rather than a broader scope of instruction which can develop unconstrained skills such as vocabulary, listening comprehension, and background knowledge, is to blame. Over time these skills, which are not included under "school readiness" curriculums, are increasingly important in school but more difficult to teach and assess. In 2020, Bailey and colleagues argued that early childhood teachers need to be address skills in ways which, as Steiner has argued, are both *malleable* and fundamental.

The Arts and Literacy

Despite this push for more accountability in U.S. schools, Waldorf schools have consciously resisted the call for more and more testing. Even Waldorf-inspired charter schools attempt to minimize the amount of testing they engage in to only that which is essential for keeping their charters. This provides researchers with a unique opportunity to compare very different pedagogies. One difference between Waldorf schools and most other types of schools is that the arts are integrated into every Waldorf lesson and assignment. In fact, the act of teaching is itself regarded as an artistic endeavor. As Rudolf Steiner observed, "The heart of the Waldorf

method is that education is an art—it must speak to the child's experience. To educate the whole child, his heart and his will must be reached, as well as the mind" (Rudolf Steiner, 1954/1923). The question remains, does it work?

There is a fair amount of research investigating the connections between arts and literacy. We know that oral storytelling develops strong vocabulary skills that are directly related to later reading comprehension (Kim, 2017; Ouellette et al., 2010; Verhoeven et al., 2008). Hepburn et al., (2010) explained that when unknown vocabulary is embedded in an interesting context such as a story, the child is more likely to create meaning. The practice of repeated exposure is supported by the theory of associative learning identified in a study by McKeown et al., (1985) among others, which shows that the number of times a child encounters a word is a strong predictor of how well they will learn it. Also, they found that the richer and more varied the context in which that word is used is the best predictor of learning (McKeown et al., 1985). For young children in Waldorf schools, this is done through oral storytelling. One story is used as a jumping off point for a letter, the students hear the story, retell it orally, write it in their own words – make it their own.

As well, we know that long before children are taught to decipher the code that is reading, they are able to understand complex oral language. It takes years to become a skilled reader and even longer to become a skilled writer. This means that despite being able to understand complex stories with intricate plot lines, elementary students are not yet able to demonstrate that understanding using the written word. The Waldorf pedagogy allows for a very broad understanding of literacy which includes the use of creative play, drawing, painting, and storytelling. It is through these mediums that children can demonstrate their understanding, even if they are not yet proficient writers. They can show in a drawing what they understood has

happened in the story. As well, according to Comber (2001), positioning learners as creative subjects allows them "to assume complex productive and analytical capacities for engagement with what really matters," and affords them a sense of respect and high expectations.

Another important aspect of learning to read is comprehension monitoring. This is the act of reflecting on whether one understands what one is reading. The act of drawing can be considered an aspect of comprehension monitoring because when students draw, they must connect the aspects of the story into a unified picture, determining if what they remember is coherent and makes sense. Bloom (1994) classified drawing as requiring complex cognitive activity and according to Bloom's Taxonomy (1994) "create," under which illustrating falls, is considered a Cognitive Process. This practice also requires *combining* – a form of Factual Knowledge, *planning* – a form of Conceptual Knowledge, and *composing* – a form of Procedural Knowledge (Huitt, 2004). Another possible advantage of this activity is that, as Eisner (2002) points out, the drawing may aid in the forming of mental images, which in turn support reading comprehension and higher-level thinking skills (Kim, 2017).

Research Methods

The research project from which this study arose was approved by the Institutional Review Board (IRB) of the University of California, Irvine and focused on the first-grade class of 2017-18 at each of three independent Waldorf schools. Using a descriptive, mixed-methods case study design, I utilize observations and interviews with teachers in three private Waldorf schools in California. Interviews with the teachers occurred in December and January of second grade and again at the end of third and fourth grade. Student work was photographed digitally on site before it was sent home at the end of the year.

Participants and Sampling

Schools

Private schools were selected for this project because they can implement the curriculum as they believe the creator of the Waldorf curriculum intended, and do not have to comply with state regulations that require testing, adjusting to the state curriculum, or meeting state standards that correspond to a different understanding of child development. Of the 22 private Waldorf schools in California, seven were contacted based on the following three criteria:

- The school was currently teaching a full spectrum of students in Grades 1-8.

- The school was a fully accredited member of AWSNA.[1]

- The school was an established Waldorf school that had been in existence for at least eight years (Waldorf schools loop 1st – 8th grade, meaning that the same teacher stays with the same group of students, ideally for eight years.)

One school is located in a suburban area and serves approximately 450 students in grades PK-12. A second is located in an urban area, enrolling 137 students in grades PK-8. The third school is located in a semi-rural environment and enrolls over 400 students in grades PK-12. They all met the criteria above. Descriptions of these schools can be found in Table 3.1.

Teachers

Three teachers, who were about to take a new first grade class all the way through eighth grade voluntarily participated in the study. No incentives were offered for participation, although the four who volunteered appeared to hold a positive view of the power of research and were interested in understanding more about the pedagogy they were a part of. All were veteran teachers, having taught other classes in Waldorf settings before taking on the class that I would

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[1] Association of Waldorf Schools of North America

be investigating in the fall. Two teachers had taught a full loop of eight years with their previous class, and the third teacher had taught a first through fifth grade loop.

Waldorf schools engage in the practice of looping with their teachers and students. Looping is when a teacher remains with the same group of students over the course of two of more years. Therefore, Waldorf teachers stay with their first-grade students from first through eighth grade. This means that each teacher in first grade had the same students in second grade. They looped. However, in third grade teachers in two of the school's teachers were changed to someone new, who then remained with the class through fourth grade when the longitudinal study ended. In fourth grade the remaining original teacher was replaced by a new one. Interviews about the teachers' goals and objectives for each grade were conducted in December and January of second grade. A total of four teachers were interviewed. Descriptive statistics regarding the teachers, their experience, and background can be found in Table 3.2

Data Collection

Data included unidentified samples of student work from the students' "main lesson" books (provided by the teachers), teacher interviews (10 total, providing over 100 pages of data), archival data from individual schools, and field notes from a two-hour observation in each classroom. We focused on the literacy curriculum because so little empirical research currently exists on literacy instruction in U.S. Waldorf schools. The researcher used a combination of induction, deduction, and verification techniques to analyze each of the various data.

Student Work

Teachers and students in Waldorf schools do not use textbooks as the primary means of instruction. Instead, the students create main lesson (ML) books that represent a snapshot of some of the learning that occurred in previous days. By the end of the year, students have created

a portfolio that provides a tangible record of what they learned and the progress they made in the execution of their work. It was these first grade ML books that provided the student work data for this study. Three students were selected by each teacher (9 students, total) to represent the work students did in these books. All pages of these students' Main Lesson books that were related to the language arts curriculum were digitally copied in color.

At the beginning of the school year, as the teachers reported was expected, developmental levels in each class varied widely. First-graders ranged in age from six years five months to eight years, eight months. Yet, the arts-based literacy curriculum gave teachers leeway in meeting the needs of children at varied developmental levels. Each child was able to access the literacy curriculum through their own individual artistic experiences.

Interviews

Interviews with the three main lesson teachers occurred both by phone and in person in December and January of second grade. According to Feldman (1995), one purpose of ethnographic qualitative research is to develop an interpretation of what emerges from the data and shed light on how similar processes may be occurring in other settings. This requires going beyond simply describing what the participants might have said and looking more deeply into what the words mean. I interviewed all three first grade teachers after their students completed the first-grade year and were three months into the second-grade year.

A semi-structured, in-depth interview protocol was used, in keeping with an inductive, qualitative approach. This allowed the participant to help guide the conversation towards what they felt was important, thereby giving a natural weight to the words that were spoken. Although general questions had been developed ahead of time (See Appendix B for sample interview

questions), there were opportunities to ask more detailed questions for clarification or to solicit more information.

The teachers were asked to reflect on first grade and describe the goals they had had for both themselves and the students in first grade—including academic, physical, and social-emotional ends. The teachers were also asked what activities they did with the students to achieve those goals. The author was hoping to identify ways in which the teachers connected their philosophy with their practice, and thus how they understood the purpose of the playful practices they were using. Then. they were asked how/whether the goals for second grade had changed from the year before. The interviews reflected on how the year had gone and whether the goals they had set had been met or how they viewed them now if they had not. This interview procedure continued at the end of third and fourth grade, when the longitudinal study from which this study was drawn, had ended.

As the Waldorf philosophy takes a holistic view towards the education of the child and supports a developmental approach to teaching and learning, it was appropriate to allow for a broad understanding of the word *goals*. The answers to these first questions directed the rest of the conversation. All teachers addressed academic, social, emotional, and behavioral goals. Each conversation was recorded and lasted between 45 minutes and 1 hour. They were later transcribed and sent to each teacher to confirm the accuracy of understanding. Illustrative quotes are used throughout this paper to give richer detail to the observations.

Archival Records

I gathered school-level policy papers on curriculum content, student assessment, instructional goals, and daily school schedules, along with school newsletters and records. These

included a recent report from the guiding agency for Waldorf schools, The Association of Waldorf Schools of North America (AWSNA).

Analysis

Interviews

Transcripts were typed verbatim and reviewed by the teachers for accuracy. Significant quotes, phrases and passages were highlighted. The interviews and field notes were then prepared for manual coding and analyzing. In Vivo coding was used based on the verbatim principle to transfer meaning from the participant to the researcher accurately (Coghlan et al., 2014; Fox et al., 2007; Stringer et al., 2014). According to Stringer et al., (2014) this makes it more likely to capture the meaning that is inherent in people's experience accurately. It is recognized to provide a "crucial check on whether you have grasped what is "significant"" (Charmez, 2014, p.135). Process coding followed to identify rhythms and rituals within the teachers' school life. The first-round codes were condensed into broader themes and concepts to identify the common practices among the three teachers at the three school sites. Analytic memos were also created to capture additional themes for analysis. A constant comparative method was used (Strauss et al., 1990) for both the interviews and observations, in which cycles were continually repeated until the author was certain of emerging themes based on each of the three research questions.

The interviews were important for understanding why the teachers were doing what they were doing. To this end, I read the interviews and highlighted specific beliefs and goals that were mentioned. These were written on notecards and then grouped by common themes.

Research Findings

A narrow description of the instructional methods used does not explain the alert receptiveness of the children in Waldorf classrooms or the enthusiasm with which they participated in lessons. To understand these aspects of the culture, one must appreciate the nature of the relationship between the Waldorf school, Waldorf teachers and their pupils.

RQ1: How do Waldorf teachers see their role as "teacher?"

Expectations for Waldorf teachers

The largest of the three schools in the study had produced a formal document for the Western Association of Schools and Colleges accreditation (WASC) that served as a general guideline for teachers and information for parents regarding what to expect at a given grade level. Portions of that document have been summarized here, given the expectations that the curriculum at all three schools was similar. Waldorf teachers have extensive freedom regarding methodology, teaching tools, choice of specific content and activities, as well as the order in which new skills are introduced. Beyond the general guidelines in the curriculum, a class teacher creates lessons and activities tailored to the needs and character of her or his individual class. At the beginning of the year, each class teacher is asked to present a personal adaptation of the Waldorf curriculum in the form of a Block Plan.

For Waldorf teachers, education is understood as a work in progress (Author). When teachers were asked to select students that were going to be followed based on a rating scale of "low," "medium," or "high," all three struggled to understand what exactly I meant. Sorting children, particularly first graders, is not a practice they were using. They asked me to specify whether this was by behavior, by drawing skill, by memory, or by physical skills. They were not comfortable identifying anyone with this type of label. There was a clear understanding by the three teachers that all children had gifts in one of those areas and that academic achievement was

not a more important goal than behavior, or anything else. One teacher expressed this explicitly, "As a teacher you are always scaffolding and adjusting to different levels. The students can understand that everyone has important strengths across the disciplines, and all are valued."

Perspective of Waldorf first grade teachers

The research question asked what teacher believed their role as "teacher" was. This could be rephrased as, "What is your job?" While many may expect that teachers would discuss teaching from an academic perspective, this was not the case with these teachers. For them, the overarching theme that emerged from the interviews, archival data and student work was that of relationship building. Perhaps this is because of the practice of "looping" that Waldorf and Waldorf-inspired schools engage in. In public elementary schools, children spend a year with a teacher before moving on; whereas, in a Waldorf school the teacher ideally stays with a class from first through eighth grade. So, a first-grade teacher (whether or not s/he is eventually able to stay with the class for eight years) begins first grade with the expectation of remaining with the same class until these 6-year-olds become 14- or 15-year-olds. Therefore, first-grade Waldorf teachers dedicate a significant amount of time to getting acquainted with each student.

Specifically, the teachers believed their role was to a) be a guide and authority who b) strove to "see" the students in front of them, and c) worked reflectively to improve themselves as teachers. The relationships the teachers referred to were not only those that traditionally develop between people: parents, teachers, students, and administration, but also the relationship between the students and the curriculum being delivered - their experience of it. One teacher used the friendships among students in the class as a metaphor for how the letters of the alphabet come together to form words: "The students need to understand that the individual letters come

together and create something new. Each letter has its own individuality, but the letters also become something new when they work together."

The Guide and Authority. There is a difference between being an authority (a person who inspires confidence) and being seen as authoritarian (one who controls in a rigid way). The interviewees, when referring to their role as teacher, used the words *guide, help,* and *lead* repeatedly. They believe that they are there to "facilitate learning from the perspective of one who knows what is best and can be trusted to do what is correct." The teachers shared that, from the beginning, they were expected to create their own lesson plans based on the students they were teaching, pick stories to support these plans and embrace *every* child's development. One teacher stated, "…my goals for first grade [were] to build relationship between each other (the students) and a relationship with me as authority…there was great neurodiversity [among the children]." As well, their responsibilities extended beyond the students; they worked with the parent body to create a community that could support the students throughout the entire eight-year grade span. Another shared how, now that she had more understanding her second time teaching first grade, she understood "the importance of having a community of parents and the parents as a community: how that trickles down and forms the class, too." The third stated, "[I am building] a relationship with me as the authority of the class. So that I am establishing the "knowns" of 'these are my peers, and this is my teacher'–and I mean teacher like an archetypal Teacher, capital T." She elaborated on her understanding of herself as captain of the ship with, "me as the authority of the class" who is bringing academics from the point of view of 'I have something to show you.'"

Seeing the students. A core of the Waldorf pedagogy is "meeting the student where they are.' According to Bruner (1977) and Dewey (1964) this allows one to move beyond stereotypes

and respond to individual needs and interests. For one teacher, it was being able to see a child's strengths, "being aware of their struggles," and "meeting them where they are." Another felt it led to "an understanding that as long as there is progress forward, the child is learning, at least in the early grades. It is the development of the whole child that is important."

Inner development. Inner development is the capacity to grow and change, to see the bigger picture, to work inwardly. The goal referred to the individual teaching expectations for themselves rather than the students. One teacher visualized how she wanted the upcoming year to go. Another mentioned the "need to ask for help" from higher sources when struggling and shared her strategies for when she is at a loss for what to do next:

> For the child, I really…work on stepping away from myself, ...try[ing] to be that Teacher with a capital "T." What would the archetypical teacher do in this circumstance? …And I'll stop and [create] a picture: "I wonder what this child will be like in eighth grade?"

This ability to step back and see the bigger picture was mentioned in relation to personal growth as well as academics, but in both cases seemed to relate to their own personal responsibility for the students learning. Two teachers shared that they knew the goals they had for their students were not going to be accomplished in the first year. These were long term goals, goals that would be attained gradually, over many years. Finally, the understanding that the students were constantly learning was shared by their teachers. They, too, saw themselves as learners. One shared that she sought to understand each of her students, to figure them out and learn to see the world through their eyes rather than her own.

RQ2: How do Waldorf teachers integrate art and literacy skills?

Teacher goals for literacy

To understand how the teachers integrated art and literacy, we must first identify what their goals were in the area of literacy. Overall, 116 references to goals were identified in the three interviews. They fell into two clear categories: a) general academic goals (35%) and b) non-academic goals (65%). Within the non-academic goals, two sub-categories, a) behavioral and b) socioemotional goals were identified. Most of the behavioral goals related to things such as forming the class, creating a safe classroom, and working together.

First-grade literacy goals included recognizing, replicating, and associating sounds with the letters of the alphabet, a process that is common across nearly all schools. Yet, rather than depend on worksheets and spelling tests, Waldorf teachers use storytelling to emphasize these relationships, while at the same time addressing their socioemotional and behavioral goals. For example, a story about a king was used to teach the sound made by the letter K. After the story had been told and reviewed the next day, each child drew the king in a K-shaped pose with one leg thrust forward and one arm held aloft (sometimes holding a sword at an angle mirroring that of his leg). This image became the most significant factor in the teaching moment, leaving a visual imprint in the children's minds. To help with retention, the children would have stood up and assumed the stance of the king (Author). The teacher then used the idea of "king" to remind the students of the behavior they were expecting in the classroom. Once introduced, the teacher's original drawing was posted on the wall above the blackboard. In this way, the teachers seemed to be able to connect the academic goals directly to the socioemotional goals

Figure 3.1.

The King – introducing the letter K

Another teacher spoke of building students' relationships to the letters in ways that went beyond just saying, "This is a B and this is the sound it makes." Echoing Eisner's (2002) emphasis on how imagery solidifies memory, the teacher wanted children to experience:

> the shape, the quality of the B, and seeing where that letter lives in the world: in the butterfly and the boot… relating it to the sound and the shape. Then you build a more personal relationship to the experience of learning the letters.

The teacher had children draw a picture of someone's legs, standing in the grass and wearing boots, with several butterflies flitting about. Each boot represented the lower-case b, while each of the butterfly's wings represented a capital letter B. This teacher also enlarged on that theme, explaining that focusing on the relationship between the letters and what children already know and understand could be understood as "creating a feeling of warmth. When [the letters] are alive and vibrant and *purposeful,* the students develop a love for learning and an interest in what they are doing."

Figure 3.2.

The Butterfly and the Boot. Introducing the letter B(b).
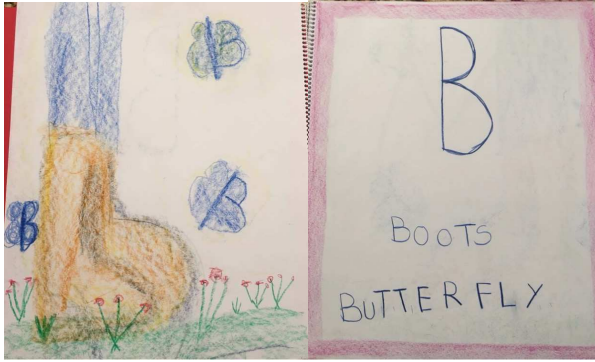
Not all children produced realistic drawings but as mentioned earlier, teachers emphasized the importance of being able to "see a child's strengths," "being aware of their struggles," and "meeting them where they are." No grades are given on this type of work in Waldorf schools. All three teachers spoke repeatedly about creating an atmosphere in which students felt "safe to be and to express and to try and to fail." They wanted to help children make connections through the act of drawing. One teacher spoke of the value of reaching out to children "through their imaginative life, helping them find relevance and [a] relationship to academic experiences…." Another teacher explained: "The letters must come alive. They have to experience them in their body, their hands and their memory." This recalls Steiner's (1996) descriptions of the "living pictures" created in a child's imagination and the memorable mental constructs drawn from them.

It is likely that because the teachers' goals in first grade were rooted in a developmental understanding of the growing child, the literacy goals reflected this wholistic perspective. The teachers believed that developing strong relationships with their students enabled them to build a foundation for reading comprehension that would lead to deeper understanding of—and appreciation for—the content students would read in later years (Association of Waldorf Schools of North America, 2019). This also harked back to Steiner's (1954) observation that children must be given mobile concepts whose form can change as the child matures.

In first grade Waldorf classrooms, lessons center around a daily story chosen by the teacher to arouse student interest. Many lessons end with artistic activities designed to help students visualize and remember key concepts. This focus on visual images and on drawing as an aid to memory has commonalties with Elliot Eisner's argument, in *The Arts and the Creation of Mind* (2002), that images formed in the mind tend to be evanescent unless stabilized, via inscription in lasting materials through art or writing. Pre-literate children, unable to make use of written language, are seen as benefiting from being able to use artistic means both to represent and to recall what they have learned.

Steiner believed that young, pre-literate children experience their mental world in pictures rather than words (Göttgens, 2011). He saw fostering a child's ability to mentally visualize a story through drawing as having an essential role in building the child's capacity to make meaning through words. In the classroom, Waldorf teachers tell vivid, descriptive stories that expose children to rich vocabulary and resonate with their feelings. The goal is to increase the likelihood that the tale (and the drawing associated with it) will be remembered and integrated with other learning (Friedlaender et al., 2015).

A year in a Waldorf first grade classroom

The first-grade language arts curriculum is built on nature stories and culturally relevant fairy tales. Visual arts play an important pedagogical role. When asked about their job as a teacher, one of the participants responded "…through their imaginative life, [I am] helping them find relevance and relationship to those academic experiences as they relate to their own growth and to what they need to be and feel more successful in the world." One way in which this is accomplished is through large drawings. As children enter the classroom in the morning, a vivid chalk drawing on the blackboard gives them a preview of the main lesson and provides a

memorable image that will help with recall.[2] Before long, first graders realize that the chalk drawing has one or more letters of the alphabet playfully embedded in it. They try to identify the letter(s): M may be represented by two mountain peaks, W by wind driven waves, or S by a salamander. Nor are the letters always pictured the same way. Specific choices are left up to the individual teacher, who will be best able to anticipate the needs of the class. After the story is told and sounds made by the target letters are discussed, children copy the drawing in their main lesson book, which becomes a portfolio of their work. The drawing process encourages an active, imaginative relationship with the letters and their sounds.

Waldorf teachers also use art activities to encourage children's development of habits of mind, such as becoming more observant, engaged, and persistent as they work on their drawings, as well as more reflective about the final product. Even though the first Waldorf school opened in Germany over a century ago, the art integration aspect of the curriculum has commonalities with the Studio Thinking Framework, developed by researchers associated with Harvard Project Zero. Over time, children gradually learn how to interpret ideas expressed in visual form, how to be attentive to the task at hand, and how to learn from mistakes (Hetland et al., 2007).

As the school year progresses, students learn the sounds for all 21 consonants. Also, they begin working on the vowels (which the teachers referred to as "singing" letters, since only the vowels can be elongated and sung with a fully open throat); the students are given poems that emphasize these sounds. Choral recitation of poems forms another key part of the curriculum. Children learn many poems by heart and integrate them with movements. Once learned, the teacher writes the now familiar poem on the board and asks the children to copy it into their main lesson books. Since the children know the words of the poem, they begin to make connections

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[2] Examples of drawings: https://www.chalkboarddrawing.org/bottles

between the letters they are copying and the sounds in the words in the poem. While many of the student may only be vaguely associating the complete words with how they are pronounced and spelled, the excitement is clear as they "read" the poem aloud together. Their belief that they can now read, fuels their engagement to further work on the foundational aspects of reading.

Once the children know the sounds of all the individual letters, the teacher focuses on digraphs like *th*, *sh* and *ph,* as well as word families such as *at*, *cat* and *hat*. Yet, the structure of individual lessons remains much the same. The teacher writes a poem—or part of a story that the children have heard—on the board. Having a background of what to expect combined with their phonics instruction, many children excitedly recognize the sounds and words. Only after hearing, reading, and working with the excerpts, do the children write it in their main lesson books. By the end of the year, children will have acquired considerable phonemic awareness through daily practice.

Until first grade, the children learned about the world through their own observations and through other people. When interacting with others, the children saw their faces, heard their tone of voice, took in their body language and attitude. Now, as each child begins to read, communication becomes detached from another person's presence. The child's eyes take in lines of black shapes on the page. Then, suddenly, another person's thoughts are revealed to the child (Göttgens, 2011). A miracle of sorts takes place. Before long, children can use the newly learned letters to begin putting their own thoughts down on paper by using invented spelling. As a result of this journey of discovery, the children have built a relationship to letters of the alphabet.

RQ3. How do Waldorf teachers assess student learning?

Because Waldorf teachers take such a developmental approach to teaching and learning, in first grade the ML books, alongside observation, comprise the primary assessment tool that the

teachers employed. This portfolio of work allows them to see direct evidence of improvement

over the course of the year. In the examples shown below (Figure 3.3), one can see one student's

work from the beginning of the year, the middle, then in the spring. In the first picture, they are

learning the letter G in its capital and lowercase form. The writing is faint and disconnected,

however the forms are well centered and sized accurately. In the second picture, you can see the

same two letter with better formation, sitting on the baseline, hitting the headline and the tail of

the lowercase *g* hanging down. In the spring drawing, the student has begun writing. The spacing

between the words is accurate and the "short" letters are mostly correct (the *r* at the bottom is off

balance with the *o*). There appears to still be difficulty with making the "tall" letters twice as big

as the "short" ones and the formation of making of the letters is not smooth.

Figure 3.3.

*The development of letters in first grade: G in first and second pictures (fall, winter), then
sentences (spring).*
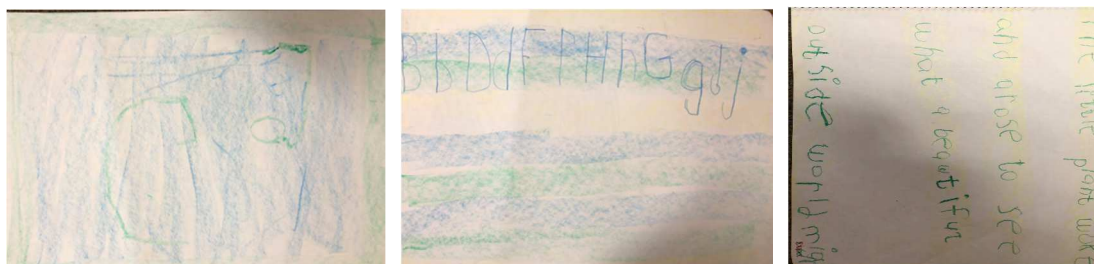
Next, if we look next at the same student in second grade (Figure 3.4), we see further

development of both copying and handwriting skills. The first image is in the fall, before cursive

writing had been taught. The second is in the winter and the third is in the spring. Here again we

can see the development of fine motor skills and spatial orientation.

Figure 3.4.

Development of writing in second grade: fall, winter, spring.

In addition to the direct information looking at portfolios can give a teacher, this medium also provides a way for the teacher to assess comprehension. Because first grade children have not yet been taught to write, the drawings serve as a way to assess whether the children understood the story. Some may display a propensity for detail with many interesting additions to the picture, while others give only a broad stroke but seem to evoke the deeper meaning behind the story. These portfolios represent just one aspect of the ways in which Waldorf teachers assess learning. The pictures below (Figure 3.5) are from the story, *The King of Ireland's Son.* In each example, low, medium, and high, one can see the emotion that the second graders were able to evoke between the father and his son, even if they could not yet express it in writing.

Figure 3.5.

Image from the King of Ireland's Son story, second grade.

However, they serve another purpose that can again be linked to the belief in wholistic child development. At the end of each year, each student is given back all their ML book work. Together, guided by the teacher, they recall the various blocks that had been taught throughout the year, starting with the most recent. By the time the students get back to the early months of the year, they can't help but notice themselves what progress they have made. As a former Waldorf teacher, I can recall comments about how much better they are at writing, how messy they were when they started, how many spelling mistakes they "used to" have. This reiterative process of looking back, allows the students to have concrete evidence of the work they have done, giving them a sense of accomplishment that they can recall when, the following year, they have more hard work to do.

Discussion

This study provided a peek into three Waldorf classrooms in the first through fourth grades and examined the ways in which the literacy curriculum is taught, along with the perspectives of the teachers who provide the instruction. The Waldorf curriculum has been said to be "unique in its comprehensive nature, with its explicit theory of child development, curriculum, pedagogical approach and philosophy about the role of the teacher" (Friedlaender et al., 2015, p.99).

I found that the three teachers hold a long-term perspective about teaching and learning and expect that development will occur not in the space of a single year, but over the course of their eight years together. In first grade, the teachers biggest concern was to develop a relationship with the students, to develop trust and set themselves up as a guiding authority. The development of the whole child was the important thing. In fact, creating form within the class, which included behavioral and socio-emotional goals, was referenced nearly twice as many times (65%) as academic goals (35%).

In education research, foundational skills are recognized as an important factor for student success in school (Blair, 2002; Blair et al., 2007; Mann et al., 2016). One area that has gained much attention is executive function. Being able to sit quietly and listen, to remember the names and sounds of the letters, to keep one's hands to oneself, to switch from one activity to another, and to create connections can all be identified as components of executive function: working memory, inhibitory control, and cognitive flexibility. From the examples the teachers gave regarding why they were interested in developing foundational skills, things like creating a safe learning environment (behavior requiring inhibitory control) and using imagination to make the curriculum come alive (cognitive flexibility), it was clear this is what they were referring to. And the reason for the focus on behavioral and socio-emotional goals seemed to come from a belief that working on foundational skills in the lower grades would pay off in middle school. They were willing to delay some academic rigor in first through fourth grade, believing that they would be able to do more, more easily, later.

When it comes to teaching reading and writing, the teachers' beliefs centered around making sure that the students were making connections between what they were learning and the world they live in. Through story, the teachers engaged the interest of the students. The work that

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they were asked to do was more complex than any worksheet or textbook could possibly be. The arts-integration in these classrooms was found to have similarities to the Studio Thinking Framework, developed by researchers associated with Harvard Project Zero. Along with developing their attention span and learning from their mistakes (which could also be said to fall into the foundational skill of executive function), the students are captivated by the chalk drawings which, as Eisner has argued, help them remember key concepts. I would argue that they also provide a means to demonstrate comprehension. One doesn't have to stick to simple stories, instead those that are rich in interesting vocabulary, full complex story lines, and subtle nuances provide the students with a broad glimpse into the world.

The drawings then play a key part in assessment. They enable the students to demonstrate what they know. As anyone who has written a dissertation knows, writing is hard. Young children do not yet have the means to express themselves in writing. The teachers shared that student work is done in a portfolio. The drawings provide testimony to student knowledge of their letters, of form and function. The drawings demonstrate their comprehension of a story. And, finally, the portfolios become an artifact that the students look through at the end of the year. It is then that they can see evidence of their own learning as they notice how much clearer or neater their writing and drawings have become.

There are now over 1,090 Waldorf schools in 64 nations (Association of Waldorf Schools of North America, n/a), which has increased the variation in the folk stories told and the historical perspectives taken in different geographic areas. Still, in our technological age, visiting a Waldorf elementary school can feel like a visit to another era, with no television or computers screens in sight. Yet, as a *New York Times* article surprisingly noted regarding a Silicon Valley Waldorf school:

The chief technology officer of eBay sends his children to a nine-classroom school here. So do employees of Silicon Valley giants like Google, Apple, Yahoo and Hewlett-Packard (Richtel, 2011).

What is the attraction for parents immersed in such high-tech enterprises? An article by Barbara Sokolov (2000), a former public-school teacher who sent her own children to a Waldorf school, provides insight. She points out that there is more to reading than the mechanical external activity of recognizing configurations of letters on a page and decoding the symbols that stand for sounds and words. The problem is that the process, referred to as developing r*eading readiness*, is dry and abstract, clashing with the natural inclinations of small children. In addition, once they begin to read, most children are given simplistic texts that correspond to the level of their decoding abilities. As a result, there is little to ignite a child's imagination, to evoke wonder or to stimulate appreciation for the beauty and complexity of language.

Recalling her experience as a fifth and sixth grade teacher, Sokolov (2000) describes the struggles of many children who had difficulty understanding or remembering what they read. They were decoding but not comprehending. She contrasts their frustration with the joyful experience of young children in Waldorf schools who learn to "live into the story," forming imaginative inner pictures, at first in response to the cues supplied by chalkboard pictures, then in response to the stories told by their teacher. As the children learned to read, their mental pictures gave meaning to the words on the page. Children who had learned to love listening to stories and to enjoy living in the visual realm of imagination did this naturally.

For children in a Waldorf first-grade classroom, the experience of listening to stories became an inner journey of exploration—as Rudolf Steiner intended. Visualization evokes feelings that make a narrative more memorable. Discussions spring naturally from children's

vicarious experiences, while listening to a story, helping them to master demanding verbal and cognitive skills. Aesthetic and linguistic means of comprehension interact in such a way as to provide a more inclusive picture of the world.

Limitations

There is much that is attractive about the child-centered pedagogy of Waldorf schools. Teachers recalled hearing parents say they wished they had the opportunity to go to a Waldorf school when they were young. However, these were parents who had chosen to send their child(ren) to a Waldorf school and who were willing to go along with aspects of the Waldorf philosophy such as limiting television-watching at home. Although scholarships were available, the parents at independent Waldorf schools in U.S. tend to be affluent. Since the first-grade teachers expected to stay with their class through eighth grade, they may have been willing to put a stronger focus on relationship-building than teachers who knew that they would be greeting a new group of students each fall. This focus on relationships helped to shape the school culture. Therefore, the findings of this study should not be generalized to other populations.

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Table 3.1

Participating Schools and Students

		Tuition	Number of Students	Ethnicity
The Bluffs Waldorf School 1st grade teacher: Bridgette	CA, Suburban - private 450 students PK - 12th	$18,490	1st (2017-18) 28 students 16F/12M	68% white 21% Asian 11% Hispanic, race specified
The Channel Waldorf School 1st grade teacher: Kristi	CA, Urban- private 137 students PK -8th	$13,650	1st (2017-18) 19 students 13F/6M	84% white 16% Asian
The Rivers Waldorf School 1st grade teacher: Anika	CA, Rural - private 450 students PK - 12th	$15,021	1st (2018-19) 25 students 9F/15M	46% white 8% black/ African American 17% Asian 8% Hispanic, race specified 17% more than 1 race

*Note. All school & teacher names have been changed to maintain privacy. *All have AWSNA membership*

Table 3.2

Teacher descriptives

	1st grade classrooms	Gender	Education	Educational Experience
The Bluffs Waldorf School – Bridgette	1	Female	B.A.+ M.A.+ CA teaching credential + Waldorf teacher training	Taught TK kindergarten (2yrs); Taught 1-8, currently in 2nd grade of second loop
The Channel Waldorf School - Kristi	1	Female	B.A. + CA teaching credential + Waldorf teacher Training	Taught 1-5 at a Waldorf-inspired charter school, currently in 2nd grade of second loop
The Rivers Waldorf School - Anika	1	Female	B.A. + Waldorf teacher training + M.A. in progress	Taught 1-8 at a Waldorf school; currently in 2nd grade of second loop

CHAPTER 4
Study 2: Building Foundational Skill through Movement: Academics isn't all in the Head.

Abstract

This study investigates two parts of a practice referred to *morning rhythmical movement,* used daily by teachers in Waldorf schools. The Waldorf curriculum was created by Austrian philosopher Rudolf Steiner who was a contemporary of John Dewey and Maria Montessori, and who shared their belief in the advantages of active learning. For part one, using interviews and observations of teachers during their two-hour morning teaching time in second grade, I noted the activities the teachers were doing with their students and how much time they spent engaged in them. The activities were then separated into categories according to whether they required executive function skill to perform, and, if yes, further sorted each into the three recognized components of executive function (EF): working memory (WM), inhibitory control (IC), and cognitive flexibility (CF). The teachers were found to spend nearly half of their morning teaching time in second grade (54 out of 120 minutes). Teachers revealed that they engaged in the activities noted because they believed that time spent on building foundational skill would enable the students to better access the curriculum in the older grades. Part two, sought to discern whether the practices could be associated with improved development of EF skill as compared to students in other private schools across the U.S. using the ECLS-K:2011 archival dataset. Due to the COVID-19 pandemic, the results of the end-of-fourth-grade assessments were inconclusive.

Keywords: Waldorf education, executive function, active learning, ECLS-K

Introduction

With the *No Child Left Behind Act* of 2001, 'accountability' became the buzzword associated with the ability of the United States to compete in the world market. The assumption was that, if we would only direct our attention to improving student tests scores, we could rescue millions of students who were slipping through the cracks and thus catapult the U.S. forward into the academic race towards the future. The curriculum was narrowed to focus on those topics that researchers had identified as key for future success: literacy and math. As a result, the school day was modified to eliminate "unnecessary" activities which had been staples in classrooms for decades. Art, physical education, woodshop, home economics, driver training and even recess, were pushed out to afford more time for mastering reading and mathematics (Berliner, 2011). Twenty years later, this great leap forward has largely failed to materialize. The United States continues to score lower than the average country in math and remains in about the same place in reading as it did in the early 2000s (OECD, 2022). More importantly, those experiencing economic hardship or discrimination based on race or ethnicity continue to struggle to realize the American Dream (Adler-Greene, 2019).

In our well-intentioned zeal to make comprehensive improvements to the U.S. educational system, we may have lost sight of the bigger picture. In the face of disappointing results, it may be time to ask ourselves what possible effects might have occurred because of those sweeping changes. If narrowing the curriculum did not improve test scores in the ways we expected, what other effect did the narrowing have? What might our children have lost in the process? While acknowledging that mastery in the areas of math and English language arts are essential components for access to a satisfying future, it is possible that focusing solely on those two subjects - to the exclusion of others - may have had unexpected consequences.

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Although researchers have begun to examine a myriad of areas for consequences of the narrowing of the curriculum, one area that has yet to be looked at fully is play. What is it about play and children's games that make them universally engaging? All children engage in play. We know that engagement is an essential element for academic success (Christenson et al., 2008; Finn 2006; Klem et al., 2004; Reschly et al., 2006a; Reschly et al., 2006b). For students who are at risk for disengagement, such as students of color or those living with economic uncertainty, it is essential. Christenson et al. (2012) suggest that student engagement is a factor that must underlie school reform. Could play and/or games which are integrated into a school day be used to engage students? And if so, is it more than engagement that is being supported?

Executive function (EF) is known to be essential for future academic success (Alloway et al., 2010; Blair et al., 2007; McClelland et al., 2000). It is a term used to refer to mental skills that include working memory, self-control, and flexible thinking. They are necessary in the classroom where students think, plan, choose and remember. Because of its importance in learning, researchers have been investigating ways in which EF development might be actively influenced. For some, this focus has centered on childhood games such as *Red Light, Green Light, Duck, Duck, Goose* or *Simon Says,* which could at one time be seen played on school yards across the nation. All three of these games require one or more of the components of EF: working memory (WM), inhibitory control (IC), and/or cognitive flexibility (CF). Recently, I had a second-grade teacher report that she had students who had never heard of the game *Duck, Duck, Goose.* Is it possible that in the push to improve reading and math scores, we may have eliminated activities that supported foundational capacities such as EF?

Examination of alternative models of education, which hold a long-term view of foundational development, may provide new ways for schools to conceptualize education and

improve the way in which instruction is presented for millions of school-age students. Waldorf education is one such alternative educational system. Yet, despite the growth of both public and private Waldorf schools, relatively little research has been carried out regarding how the Waldorf curriculum is implemented in classrooms.

Literature Review: Foundational Development

A solid foundation is essential for a strong building. Likewise, physicians, psychologists, and educators all know that there are foundational skills and capacities that are required for future learning. School readiness includes the areas of socio-emotional, cognitive, language and literacy, and physical development (Boivin et al., 2013). In the area of socio-emotional development, children must feel comfortable enough in their own skin to be able to control their actions and emotions around others while sitting in the classroom. To learn, one must have the cognitive capacity to remember (short term, long term, and working memory), reason, and problem solve. In the area of language and literacy, print awareness, orthographic symbol knowledge, phonological, morphological, and orthographic awareness are all required before children can become strong readers (Kim, 2017). And, finally, a child's fine and gross motor skills impact one's ability to write in the classroom and move on the play yard.

Yet, these skills and capacities, which we know are required to develop future skill in reading and mathematics, stand upon an even more important base. Executive function is considered by many to be a key foundational cognitive skill, but more than that, it is necessary for school readiness and long-term academic success (Blair et al., 2015; McClelland et al., 2012; McClelland et al., 2015). EF appears to be the structure upon which academic achievement rests.

Because foundational skills are viewed as a natural consequence of growing up, they are less likely to be targeted for explicit instruction, particularly in the United States. A great deal of

EF research has been conducted among populations of preschool and kindergarten children, but there has been less focused on older elementary school students. In fact, the skills identified as foundational are not even identified as goals in elementary school curricula, perhaps because we come from a perspective of *readiness* as something finite and assume that there may not be a need to address them once a child has entered school (McClelland et al., 2019). Also, accountability measures may limit the amount of time available for teachers to meet the academic goals they already have, making it challenging for them to actively focus on EF skill development in the classroom.

Executive Function

Literature investigating EF and its malleability in the classroom is growing. EF is an umbrella term referring to a set of processes that make successful navigation of one's world possible (McClelland et al., 2010). They are necessary for one to plan and execute goal-directed behaviors. Some studies have found EF to be more strongly associated with future academic success than IQ, entry-level reading, or math skills (Alloway et al., 2010; Blair et al., 2007; McClelland et al., 2000). Others claim that EF is one of the best predictors of both the academic and socio-emotional aspects of school readiness in young children (Blair, 2002; Blair et al., 2007; Mann et al., 2016). In addition, deficits in EF functioning in children are closely related to several clinical outcomes, such as attention-deficit/hyperactivity disorder, autism, and depression (Pennington et al., 1996; Snyder, 2013).

Although many researchers have focused on identifying the components that constitute EF, pinpointing distinct categorical compartments has been difficult. WM, IC, and CF have been identified as core, yet interrelated factors (Diamond, 2013; Miyake et al., 2000). As a result of this overlapping relationship, trying to design tasks that measure these skills in isolation has been

difficult. It seems that little of what we do relies on a single component of EF. The future development of tasks that can better measure EF components holds the promise of helping us all understand the complexities of this important aspect of human development. Generally, there is agreement around the existence of these three core components: WM, IC, and CF.

Working memory (WM). WM refers to the brain's ability to store the temporary information necessary for understanding language, learning, and reasoning (Baddeley, 1992). It is vitally important for early learning (e.g., Alloway et al., 2005; Gathercole et al., 2000, 2001; Gathercole et al., 2004; Jarvis et al., 2003). In reading, WM is necessary first for decoding words. A child must remember the sounds that each letter makes while sounding them out. Then for reading comprehension, the child must hold each word in memory as they read, while also constructing the meaning of the words in connection with each other, then grasping the broader meaning of the paragraph. In mathematics, WM is required to recall numbers, directions, and procedures. In the classroom, it is required to remember the sequence needed to complete tasks and to follow directions. In play, one traditional game that relies heavily on WM is *Telephone*. A 'secret' message gets passed along from child to child as exactly as possible, with the goal being to see how close the final message comes to the original. Other traditional games that require WM are *A my name is Alice*, in which each student has to say the next letter in the alphabet and come up with a name, a place, and an item that all begin with that letter and *Go Fish*, in which one needs to remember what cards other players have in their hand.

Inhibitory control (IC). IC is understood generally as the ability to put something aside in favor of something else that may not be immediately forthcoming (Anderson, 2002; Barkley, 1997a, 1997b; Diamond, 2013*)*. However, there is disagreement among researchers regarding the constructs by which it is identified. Tiego (2018) found that definitions vary widely

by context. Two generally used terms are *response inhibition* and *attentional inhibition*. Response inhibition is required when one refrains from pushing a classmate to the ground because they won't share the ball. Attentional inhibition is required when one must ignore one's desk-mate, who is whispering in your ear while you are trying to complete your worksheet. In play, games such as *Simon Says* or *Red-light, Green-light* demand that one wait (response inhibition) until the appropriate call is made. In the latter, a child must balance wanting to get to the finish line first with being called out and having to go back to the beginning. Singing in rounds or any activity that requires one to be in unison with the group requires attentional inhibition and is particularly challenging (Center on the Developing Child, 2014).

Cognitive flexibility (CF). CF refers to the ability to shift one's attention from a current "rule" to something new (Chevalier et al., 2009; Cragg et al., 2012; Diamond, 2013). In the classroom, this is needed to solve problems and connect disparate ideas. The new Common Core curriculum in California has placed a much greater emphasis on developing cognitive flexibility to create innovative thinkers and problem-solvers. Make-believe games require cognitive flexibility because children are constantly making up new "rules" as they play. DeMarie et al. (2020) argue that tag games such as *Duck, Duck, Goose* also require cognitive flexibility. During *Duck, Duck, Goose*, the participants must switch from one reality (waiting and listening to someone saying "duck"), to another (jumping up and chasing that same person) when they hear "goose." Musical chairs is another example. Finally, during dramatic play, one is required to remember the qualities of the person whom they are representing while at the same time acting out their behaviors.

While we do not yet fully understand all the complex processes that comprise the development of EF, we do know that improvement occurs when practice happens consistently

and with increasing complexity (Diamond, 2013). Currently, there is little research on the specific ways that playing traditional children's games engages students or builds EF skills in elementary school classrooms. Tools of the Mind is one program that has been implemented in early childhood classrooms with some success. It is a Vygotskian approach that focuses specifically on self-regulation development using play-based activities, including dramatic play. A randomized control trial using this approach found that it improved the children's EF skills (Barnett et al., 2008). If the development of EF skills is important to human development, discovering new ways in which to better develop these skills is also important. Using traditional, inexpensive children's games to develop EF skills would be both easy and economical.

Play

While pretend and/or imaginative play has been linked by some to EF development, particularly in preschool classrooms (Berk et al., 2013), little research has specifically been devoted to the ways in which play may support EF development in older children. Some discussions have begun around what role play and games may have in developing EF skills. In 2010, researchers found that an 8-week intervention that involved a combination of board games and computer games that targeted foundational cognitive skill development resulted in an average gain in Performance IQ of almost 10 points in children aged between seven and ten years old. This led to the conclusion that foundational cognitive training *can* influence cognitive skill (Mackey et al., 2010).

More recently, in a study titled *Red Light, Purple Light!* (2019), McClelland and her team used a variation on common childhood game to test whether self-regulation (a component of EF) could be affected by an 8-week, consistent training in specific games. While the results were not statistically significant, they did trend in the direction of improved self-regulation. Rather than

focusing on traditional imaginative play, the authors used a game that mimics the Go-No Go tasks often used to measure EF. The results show promise, as preschoolers' math scores improved significantly compared with the control group, suggesting again that EF is connected to future academic achievement. Also, they found that those who have the most room to improve (children living in poverty, for example), seem to gain the most. Given that it has been shown that play opportunities are not equitable across different groups (Allen et al., 2013; Jarret et al., 2015; DeMarie, 2010), this difference may explain the greater gains made by children who live in low-income neighborhoods and thus, have fewer chances to practice these skills.

Sociocultural Theory, Constructivism and Constructionism

As researchers expand their understanding of how students learn, the integration of play and academics has become increasingly common in recent years, and evidence has grown indicating that either one can positively or negatively affect the other (Seo & Ginsberg, 2004; Wallace & Russ, 2015). The constructivist ideas of Dewey (1929), Bruner (1961), Vygotsky (1962 & 1978), Piaget (1980), and the constructionist ideas of Papert (1980) have long postulated that human beings construct meaning through their individual experiences. From the creation of the activity to the many iterations that occur throughout the engagement, participants are constantly monitoring and updating what is working and what is not. According to the sociocultural theory of Lev Vygotsky (1978), it makes sense that games should play an important role in the development of foundational cognitive skills in children. Not only are games situated and executed in social environments, but a child's success at any one game demands repeated exposure to these social situations wherein they practice what we know are developmental milestones, e.g., the development of fine and gross motor movement. To successfully play a game such as Patty Cake, a child must learn to coordinate their eyes and hands while

remembering a poem and coordinating with another person. Childhood games also meet

Vygotsky's second criterium because they fall within a Zone of Proximal Development. Children

play them because they enjoy them, but they also challenge themselves by reciting the poems

faster or making up more complicated patterns.

Ko (2017), in a short article about Papert's constructivist theories, explains that no one,

not even those considered "great" thinkers such as Isaac Newton, immediately understand

complex ideas. True understanding comes only *after* we develop our own personal connection to

the concept. Learning occurs when we can connect what we already know to what we are trying

to understand. The iterative nature of playful games or activities enables one to take what they

learned in the last game and apply it to the current, becoming increasing more of an expert in

playing.

Play-based teaching and learning, including games and puzzles, has also been found to

support children in early childhood classrooms with their literacy and numeracy skills – as well

as their socio-emotional, cognitive, and self-regulatory abilities (Mazzocco et al., 2007;

McClelland et al., 2013; McClelland et al., 2019). However, Lillard et al. (2013) argues that the

studies to date have not been rigorous enough to draw any such conclusions. While they may

claim that there is as yet little evidence for any impact of play on EF, others believe this to be too

negative a stance and suggest that the limited evidence thus far should be viewed more

optimistically. Berk and Meyers (2013) put forward the contention that just because the nature of

the connection between EF and play is complex, this does not mean that research in this area

should be abandoned. They argue, instead, that more research needs to be done to uncover the

interactions that may exist between play and EF development.

Rudolf Steiner and Waldorf education

One educational system that embraces foundational development and integrates play throughout grade school was developed by Ruldolf Steiner. Known as Waldorf Education in the United States, it is a 100-year-old model based on the holistic belief that make-believe, art, music, and nature are as important an aspect of human development as academics, and therefore essential for success in future academic endeavors. According to the Steiner Education website, in primary school (K-8) "the core approach is through artistic presentation of material by the class teacher which promotes engagement, inspires deep learning and supports developing imaginations."

The Waldorf model is well-defined and characterized by strong oversight, which provides consistency across administratively independent schools. This makes it less problematic to study (Edwards, 2002) than related educational models like Montessori, as it is "unique in its comprehensive nature, with its explicit theory of child development, curriculum, pedagogical approach and philosophy about the role of the teacher" (Friedlaender et al., 2015, p.99). Eschewing a narrow focus on the intellect, Rudolf Steiner derived his pedagogical theory from an observation of thinking (cognition), feeling (emotion) and willing (doing/intentionality) in human beings (Alphen, 2011). He believed that perception is transformed into images through imagination, a key aspect of CF. For example, when we listen to a story, we can perceive the images presented through the story-teller's words by using our imagination, and we can "see" what doesn't really exist. Concepts the mind creates from experience can be understood as mental constructs, which draw on the essence of our experience as we perceived it. These mental constructs are stored in memory and are used to build our knowledge of the world. They provide a scaffolding upon which future learning and understanding can rest. Steiner argued against teaching rigid concepts that do not leave room for further growth in a learner's perceptions and

understanding. I suspect that this may be a key to developing (or maintaining) cognitive flexibility.

A key feature of this educational system is their emphasis on developing *integrated* mental and physical capacities such as dexterity and balance, alongside traditional academics. This can be seen in their focus on cursive writing, handwork (knitting, crochet), woodwork, and daily rhythmical activities – such as jumping rope, hopping, skipping, singing and playing the recorder daily throughout the grades. It is the practice of consistent daily rhythmical activities which have led to the hypothesis that students who engage in this type of activity every weekday, over the course of eight years, may gain skill in the area of EF by the time they enter high school.

Academic outcomes in Waldorf schools

There is not a lot of information detailing how students who attend Waldorf schools fare academically in the long term. However, the relatively recent increase in the number of Waldorf-inspired charter schools has increased the possibility of quantitative research. Although Waldorf students in the lower grades (first through fifth) generally score lower in mandatory state tests in English language arts and math than their comparison groups (due to Waldorf's developmental philosophy which embraces a slower buildup of skills) by eighth grade these students seem to consistently outperform similar students across all subjects (Friedlaender et al., 2015; Oberman, 2007).

More importantly, several studies have found that at-risk students are particularly helped by this pedagogy. Students at the Thomas E. Matthews Community School, a Waldorf-inspired school for juvenile offenders, appeared to be doing so well that an outside evaluator stated that it couldn't be judged because it did not have any problem children (Oppenheimer, 1999). McDermott and his team (1996) visited a school in the inner city of Milwaukee and found that

within three years, the number of third grade students performing above grade level had increased 37 percent. They stated that "the school was an important interruption in the way of thinking that diminishes children from the inner city, because the school had a guiding assumption that children from a low SES can learn" (McDermott et al., 1996).

Thus far, there is no research on the possible connections between playful, activity-based teaching and development of EF in Waldorf schools.

In this chapter, I investigate the ways in which Waldorf school teachers integrate activities into their daily lessons during a time known as *morning rhythmic work* and discuss whether those activities might aid in the development of EF. Using observations, teacher interviews and assessments of EF, I answer the following research questions:

RQ1: In what ways do Waldorf teachers in their private school classrooms implement play-based activity?

RQ2: What percentage of the classroom time do teachers devote to play-based activities, per EF domain: cognitive flexibility (CF); inhibitory control (IC), and working memory (WM), for each classroom?

RQ3: What beliefs do the teachers have around their active teaching of WM, IC, and CF? Then, using archival data obtained from the ECLS-K:2011 that included two standardized assessments for EF: the Numbers Reversed (NR) task to measure working memory and the Dimensional Card Sort (DCCS) to measure cognitive flexibility, I answer the final research question:

RQ4: How does the development of EF skills in students attending Waldorf schools compare to those attending matched control schools?

Thus, I attempt to determine whether longitudinal EF development in the Waldorf students (N=69) differs from students who attended non-Waldorf private schools in the United States at the end of fourth grade (N=32).

The current study fills a gap in the literature in two important ways. First, it provides a current example of ways in which games can and are being implemented in classrooms during a regular school day and, second, it provides a discussion around how future research could investigate the long-term outcomes of such a practice.

Method

According to Yin (2012), the purpose of qualitative case study research is to develop an in-depth understanding of a small number of cases, set in real-world contexts. By diving deeply into these cases, a researcher can hope to acquire "insightful appreciation" of the case and, ultimately, learn about real-world behavior and what it might mean. This mixed-methods case study is presented in two parts. The first part focuses on observations and interviews from teachers in three private Waldorf schools in California. Interviews of the teachers occurred in 2018-19 in December and January of second grade and again at the end of third and fourth grade (2019-20 and 2020-21). The interviews focused on the literacy goals of the teachers for their classrooms. The observations took place in the spring of second grade, in 2019. The second part utilizes individual student assessments and archival data from the ECLS-K:2011 and was impacted by the COVID-19 pandemic. This research study was approved by the University of California, Irvine Office of Institutional Review Board, Approval Code, HS# *2017-3957*.

Part One

Participants and Sampling

Waldorf Schools. Private schools were selected for this project because they can implement the curriculum as they believe the creator of the Waldorf curriculum intended, and do not have to comply with state regulations that require testing, adjusting to the state curriculum, or meeting state standards that correspond to a different understanding of child development. Of the 22 private Waldorf schools in California, seven were contacted based on the following three inclusion criteria:

- The school was currently teaching a full spectrum of students in Grades 1-8.

- The school was a fully accredited member of AWSNA[3].

- The school was an established Waldorf school that had been in existence for at least eight years (Waldorf schools loop first through eighth grade, meaning that the same teacher stays with the same group of students, ideally for eight years.)

One school is in a suburban area and serves approximately 450 students in grades PK-12. A second is in an urban area, enrolling 137 students in grades PK-8. The third school is in a semi-rural environment and enrolls over 400 students in grades PK-12. They all met the criteria above. Descriptions of these schools can be found in Table 4.1.

Waldorf Teachers. Because of my familiarity with Waldorf education, I was able to comfortably reach out to teachers in the upcoming first grade cohorts (2017-18 school year) at schools that I had had contact within the past to ask if they would be willing to work with me on this project. Three teachers voluntarily participated in the study. No incentives were offered for participation, although the ones who volunteered appeared to hold a positive view of the power of research and were interested in understanding more about the pedagogy that they were a part

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[3] Association of Waldorf Schools of North America

of. All were veteran teachers, having taught other classes in Waldorf settings before taking on the class I would be investigating in the fall. Two had taught a full loop of 8 years with their previous class, and the third had taught a first through fifth grade loop.

A unique feature of Waldorf education is the practice of looping. Looping is when a teacher remains with the same group of students over the course of several grade levels. In the case of Waldorf schools, teachers are expected to stay with their classes from first through eighth grade. Because of this tradition, the teachers at each of the three schools remained the same for both first and second grade. The teachers become a cohort who will moved together through the grades, each with their group of students. However, in third grade (2019-20), teachers in two of the schools changed. For the 2020-2021 fourth grade school year, the remaining original teacher who had started with her class in first grade left. She, liked the others who had stepped into the study, agreed to continue to participate in the study until it ended at the end of fourth grade.

Interviews about the teachers' goals and objectives for each grade were conducted in December and January of second grade (2018-19) and each spring after that for the remaining two years. A total of six teachers were interviewed. Descriptive statistics regarding the teachers, their experience, and background can be found in Table 4.2.

Data Collection

Observations

The curriculum in Waldorf schools is organized into three- and four-week blocks by subject, and the school day is organized around a two-hour Main Lesson (ML), which contains the primary academic content and occurs at the beginning of the school day. My three visits occurred once at each school during the first two hours of the school day. I was there from the time the students entered class until their morning break. The second-grade students at all three

schools were in a language arts block. Consistent with the Waldorf pedagogy, it is expected that the non-academic activities presented in the "circle time" are repeated daily for the entirety of the block, resulting in 15 -20 consecutive days of practice with a particular activity.

During each observation, which occurred for each of the classrooms in the spring of second grade, a timed record was kept that listed each activity, the time it started, and when it ended. Details about the purpose of the activity were noted, along with who participated, the engagement of the students, and any notes or pictures drawn on the chalkboards. Memos were later made as a reflection of the experience. Results of the number and timing of the activities can be found in Table 4.3

Interviews

Interviews with these three main lesson teachers occurred both by phone and in person in December and January of second grade (2018-19). A semi-structured, in-depth interview protocol was used, in keeping with an inductive, qualitative approach. This allowed the participant to help guide the conversation towards what they felt was important, thereby giving a natural weight to the words that were spoken. Although general questions had been developed ahead of time (See Appendix A for sample interview questions), there were opportunities to ask more detailed questions for clarification or to solicit more information.

The teachers were asked to reflect on first grade and describe the goals they had had for both themselves and their students in first grade—including academic, physical, and social-emotional ends. The teachers were also asked what activities they did with the students to achieve those goals. The author was hoping to identify ways in which the teachers connected their philosophy with their practice, and thus how they understood the purpose of the playful practices they were using. Then, they were asked how/whether the goals for second grade had

changed from the year before. The interviews reflected on how the year had gone and whether the goals they had set had been met or how they viewed them now if they had not. This interview procedure continued at the end of third and fourth grade, when the longitudinal study from which this study was drawn, had ended.

As the Waldorf philosophy takes a holistic view towards the education of the child and supports a developmental approach to teaching and learning, it was appropriate to allow for a broad understanding of the word *goals*. The answers to these first questions directed the rest of the conversation. All teachers addressed academic, social, emotional, and behavioral goals. Each conversation was recorded and lasted between 45 minutes and 1 hour. They were later transcribed and sent to each teacher to confirm the accuracy of understanding. Illustrative quotes are used throughout this paper to give richer detail to the observations.

Analysis

In Vivo coding was used to accurately transfer meaning from the participant to the researcher (Coghlan et al., 2014; Fox et al., 2007; Stringer, 2014). According to Stringer (2014), this makes it more likely that one will accurately capture the meaning that is inherent in people's experience and provides a "crucial check on whether one has grasped what is significant" (Charmez, 2014, p.135). A constant comparative method was used (Strauss et al., 1990) for both the interviews and the observations, in which cycles were continually repeated until the author was certain of emerging themes based on each of the three research questions.

Observations

During the observations, I kept a running record of both the activities that the teachers and students practiced and how long they spent engaging in them. Each activity was given a name (e.g., opening song) and the number of minutes spent engaged in it (e.g., 3 minutes). Then,

these activities were sorted into piles based on their perceived purpose. Three categories

emerged. There were those that were a) non-academic activities or games, b) academically

integrated activities or games (those that promoted both social and academic development), and

c) those that were solely academically motivated. Two research assistants were then asked to sort

the same 78 activities into those three identified categories. Through an ongoing discussion, a

consensus was reached for all activities. Dividing the minutes spent in each type of activity by

the total minutes of the morning, provided a percentage of time spent on academic or non-

academic activities.

Next, the activities were linked with the interviews and sorted to identify why the

teachers might have chosen a particular activity. This resulted in comments suggesting that the

teachers were using activities and movements to develop social skills among the class, including

being able to work as a team and understand expectations and boundaries. The second group of

comments centered around being able to work as group while providing opportunities for

students who were struggling with the above, to develop stronger foundational skill. The third

theme suggested that the teachers could make the repetitive practice of skills, such as

multiplication practice, more engaging. This answered RQ1: In what ways are Waldorf teachers

implementing play-based activities in the classroom?

To pinpoint more specifically which of the EF skills were being practiced for RQ2, each

activity was sorted again by which EF skill (WM, IC, and/or CF) was needed for success.

Harvard's Center on the Developing Child provided a framework for identifying which category

any one activity might fall into (*Enhancing and Practicing Executive Function Skills with*

Children from Infancy to Adolescence, 2014). See Table 4.4 for details on how activities were

sorted in EF categories. Those that required a student to remember something while doing

something else were labeled as WM. Those that required rhythm or synchronization, such as singing in rounds or singing combined with moving, were classified under IC (attentional inhibition). Those that required the manipulation of information to solve a puzzle, such as guessing games, were categorized under CF. Many targeted more than one component and were placed in two or all three categories.

The resulting groups revealed three new themes attached to the EF area they related to. These were those activities that a) focused on an awareness of the other (IC), b) relied on the use of one's imagination (CF), and c) incorporated several things happening at once (WM). Altogether, the groupings provided a broad overview of what was being done in each classroom during the 2-hour morning lesson.

Interviews

The interviews were important for understanding why the teachers were incorporating these activities into their teaching time and, specifically, whether they believed that what they were doing was important for EF development. To this end, I read the interviews and highlighted specific goals that were mentioned. These goals were written on notecards and then grouped by common themes. After reviewing with research assistants for clarity, two over-arching themes emerged and were identified as a) academic goals and b) socio-emotional goals. The academic goals broke down further into traditional and foundational. A traditional goal was associated with the school curriculum, such as learning to read, write, and calculate. In a traditional school curriculum, this might be, "The student will be able to name all of the letters of the alphabet." The foundational goals were those that are needed to support the traditional goals but are often not identified or seen on rubrics in schools. Examples include eye-tracking, fine motor skills, and raising one's hand. Separate but of equal importance were the socio-emotional goals. These

included references to human relationships, such as appropriate classroom behavior, reducing the fight or flight response, or making the student comfortable and motivated to learn. Research assistants were asked to recode the data using these two themes with the two subcomponents: inter-rater reliability of .82 was reached. This sorting resulted in the following figure:

Figure 4.1.

Breakdown of types of goals among three first grade teachers.
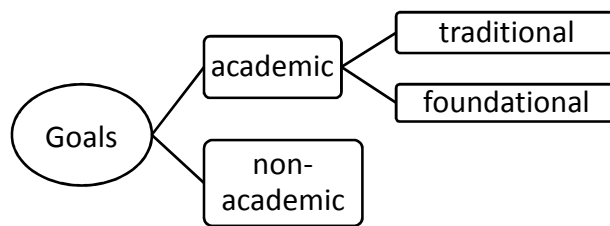
Percentages were then calculated based on the total number of references to either the academic or non-academic goals made by each teacher and tabulated for each category.

To determine how the teachers' understanding of what researchers call EF development was influencing their activity choices in the classroom and therefore answer RQ 3, statements related to both foundational and socio-emotional goals were combined. From this grouping, references to current classroom activities as *important for future academic and social development* served as proxies for EF, as it is hypothesized by researchers that EF is foundational for academic success. EF can be described as integral to both foundational development (e.g., fine motor skills are needed for both writing and reading). as well as socio-emotional development (e.g., being able to wait your turn and keeping your hands to yourself, often called self-regulation) (McClelland et al., 2019). Three skills were identified a) the development of foundational motor proficiencies, such as fine and gross motor movement b) an ability to follow directions and c) an awareness of the other.

The activities that the teachers played with their students were then analyzed. Without articulating EF specifically, they show an awareness that these underlying proficiencies are important for future development (holistic teaching).

Part Two

Archival Data

The archival data for the control group comes from the Early Childhood Longitudinal Study, Kindergarten Class of 2010-11 (ECLS-K:2011) data set, sponsored by the National Center for Educational Statistics (NCES) within the Institute of Education Sciences (IES) of the U.S. Department of Education. It was collected as part of a national, federally funded, longitudinal study that sought to learn about children's developmental, early learning and school progress experiences in the United States. The multi-source, multimethod study focuses on children's early school years experiences but includes information about home environments and after school experiences.

The study began with a kindergarten cohort (base year) in the 2010-11 school year and continued through grade 5. Data collected comes from interviews with parents, questionnaires filled out by teachers and administrators, and one-on-one assessments of students in classrooms. It was designed to reach a nationally representative sample selected from both public and private schools and provides descriptive data on children's status at entry to school, transition into school and progression through the grades. The sample came from diverse socioeconomic and racial/ethnic backgrounds. The original dataset was composed of approximately 18,000 kindergarteners from around 970 schools across the U.S. during the 2010-11 school year. These students were followed by researchers over six years, until the end of fifth grade. The study was completed in the spring 2016 and is publicly available through the NCES website.

Students were assigned to one of two groups based on whether they attended a private Waldorf school (treatment) or private non-Waldorf school (control) in the fall of their first-grade year. The control group was then restricted by income level, which, for the non-Waldorf private schools had been collected by ECLS-K researchers each year of the study and by me in consultation with the enrollment administrator for the Waldorf private schools. For each of the successive years, this group became the "baseline" and subsequent groups were restricted to only those students who remained from the baseline.

Control Group

The first grade ECLS-K group contained 18,244 students in the fall of 2010. The population of interest for the control was pulled from this group using flags for private school (x3pubpri), location (x3locale for suburbs), and family income greater than $50K per year (x2incat_i). This created a base year group of 119 first grade students enrolled at private schools (x3pubpri) located in the suburbs (x3locale) in the United States and with an income level of at level $50K per year in 2011. Fifteen of these had no gender identified and were removed, leaving a control group in first grade of 104 students, 61 identified as male (59%) and 43 identified as female (41%).

As the study progressed, the original students in the sample left the schools they were attending and were no longer in the study. This caused variance in the number of students remaining in the study over time. See Table 4.5 for demographic information and changes in enrollment between first, second, and fourth grades.

Treatment Group

The treatment group in the Fall of 2017 consisted of 69 first graders enrolled at 3 private Waldorf schools in California and described in Study 1. Two were situated in southern California

and one in a rural part of northern California. 63 of them had permission to participate in the research study and were present when the testing took place. The children came primarily from middle to high-income families and attended private Waldorf schools that had been accredited by the Association of Waldorf Schools of North America (AWSNA), the national Waldorf accrediting body. There were 31 students who were identified as male and 38 who were identified as female. The average age of the students at the time of testing at the beginning of first grade was 84 months (7-years old).

Measures

Demographics. Demographic information was collected for each child at the beginning of the study. While the ECLS-K included additional information such as that used to indicate income status, English language proficiency status (EL), and special education status, for this study only gender and income category were used, as private schools are not mandated to keep records of EL or special education status.

Gender. Gender is reported by the student's parents and was coded as "male"=1, "female"=0 in the ELCS-K. This was recoded to "male"=1 and "female"=2.

Age. Age is calculated in months at the time of testing (x3age).

School factors. The control group from the ELCS-K dataset was limited to private schools in suburban areas and limited to families with incomes of over 50K per year in 2011. This income level was chosen after consultation with the enrollment coordinator at the schools and because the students in the treatment group come from geographical locations with a high cost of living and their families have income that make payment of private school tuition possible, despite a robust tuition remission program at all schools.

Standardized Assessments. The ECLS-K:2011 measured the EF of early elementary children using the Woodcock-Johnson III version of the Numbers Reversed (NR) task and the Dimensional Card Sort task (DCCS). Both are considered reliable and valid measures. The DCCS was designed to measure inhibitory control and cognitive flexibility, both of which are considered key components of EF (Zalazo, 2006). The Numbers Reversed task measures working memory. For my research, W-scores were used because they are best able to capture growth over time. The DCCS was administered as a physical card sort in kindergarten and first grade and as an electronic card sort, which allows for the capture of response time, beginning in second grade. This feature increases the accuracy of the measure, as the students gain EF capacity over time. For first grade, the raw scores have been calculated according to the specifications reported in the ELCS-K 2011 codebook and then standardized. The Waldorf students in the treatment group were assessed individually in the fall and the spring of their 1st grade year, using the same two measures used in the ECLS-K:2011 study, the DCCS and the NR.

It is important to note that private Waldorf schools have a no-screen policy in grades K-6. So, the tablet versions of the EF measures that were used in grade two and up on the ECLS-K could not be used with the treatment group in this study.

Numbers Reversed. To assess working memory, children were administered the Numbers Reversed subtest (X3NRSSCR) of the Woodcock-Johnson III Tests of Cognitive Abilities (Woodcock et al., 2001). In this task the administrator reads aloud an increasingly long series of numbers that the student is asked to repeat back, in reverse order. The Numbers Reversed subtest of the Woodcock-Johnson Test of Cognitive Abilities is a standardized measure of working memory and commonly used with early elementary students. The dependent measure is the

number of items correctly spoken by the student in reverse order. The publisher-reported median split-half reliability for this measure is .87 (Shrank et al., 2001). I have used the W-score which was determined using norming data provided by the publisher. More specifically, each child was assigned a W-score from the publisher's norming data associated with the child's raw number-right score and the child's age in months.

   Dimensional Change Card Sort (DCCS). The ECLS-K used the DCCS task (X3DCCSCOMP) as a measure of the students' cognitive flexibility (Frye et al., 1995). Although often used for assessing the cognitive flexibility of preschoolers, it has also been recognized as suitable for a larger range of ages (Zelazo, 2006). In this task, the students are asked to sort cards via three different activities. The first is a simple sorting activity wherein they are asked to sort trucks and stars into piles based on their color (red or blue for each). The second task asks them to sort the cards by shape (truck or star). The final task requires that they "switch" directions and sort by whether the card has a black border. Scoring is based on accuracy with higher scores indicating higher cognitive flexibility. The analyses will use a combined scaled score, which reflects the total of the three "games." The developer recommends using the pre-switch score in the calculations because it better captures variability at the lower ability levels. The dependent measure is a score based on correctly sorted items in the post-switch game and the border game. Individuals who did not get at least 5/6 items correct on the post-switch task were not allowed to progress and received a 0 for the border game. Total possible points were 12. The reliability of the DCCS has been found to be high (ICC = .90; Beck et al., 2011), and it is now a standardized measure in the National Institutes of Health Toolbox (NIH) (Weintraub et al., 2013).

Analysis

      Data analysis. This section provides a step-by-step description of the procedures used to conduct the data analysis for this quantitative study. Using an analytic sample from the ECLS-K:2011, I restricted the control sample to first graders in private, suburban schools whose family's reported incomes over 50K per year. I generated descriptive statistics for age in months and gender at first grade entry for both treatment and control groups. Data collection for grade three was not possible due to the COVID pandemic.

      Statistical Analysis. To begin, I compared the treatment and control groups on age and gender and generated table of descriptive statistics. Next, to explore differences in age across groups, I performed a t-test of differences. Because there were significant differences in the ages of the students between the treatment and control groups, I ran a linear regression model, controlling for age and then gender. The following equation is estimated for the various outcomes:

$$Y_g = ß_0 + ß_1 Treat_g + ß_2(age)_g + ß_3(gender)_g + \varepsilon_{gy}$$

      Where Y_g is the standardized score of students on either the NR or the DCCS at a particular grade level $_g$. Treat is a binary indicator representing enrollment in a Waldorf private school in California versus a private non-Waldorf school. I then control for age and gender. The ε_g is an independently distributed error term. Robust standard errors are computed. These error terms assume that observations are independent and account for minor problems about the normal distribution or heteroskedasticity or errors.

<div align="center">

Findings

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Part One: RQ1

In what ways do Waldorf teachers in private school classrooms implement play-based activity?

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Although many unique activities were observed in the three classrooms, across all the activity types, synchronized activities made up the largest group. These included games that started with one focus, for example, clapping, then continued to add layers of difficulty such as saying one's times tables to the rhythm and then adding the stamping of feet or changing partners. Several stood out as particularly challenging. I will describe several seen in each classroom.

Classroom 1

In the first classroom, during a 22-minute activity, the teacher was able to integrate times table practice into an activity that required all three EF skills to be engaged simultaneously. The children began by sitting in a circle, as many young children do. They all clapped their hands together and then opened them wide. Once this rhythm had been established, the teacher took a bean bag in each hand and said, "Take the bean bag, pass the bag along," timing the phrases with the together/apart motion of the clapping. Once everyone had a bean bag, they were asked to put it on their heads and stand without allowing it to fall off. As soon as everyone was standing, she said, "When I say go, we will drop it in our hands." They next went through several iterations of tossing, passing, and throwing the bean bags in sync with counting by 2s and 3s. This is an example of an academically integrated activity that was building automaticity with numbers. It required timing and hand eye coordination, as well as the ability to resist tipping the bean bag off one's head before being asked.

For the 4-tables, the teacher was introducing a new pattern. The teacher began by stating the directions as they copied: toss the bean bag from right hand to left hand (say, "1"), toss the bean bag from left hand to the right hand (say, "2"), pass the bean bag behind the back (say,

"3"), show the bean bag on a flat hand (say, "4"). When most students had that rhythm, they stopped saying all the numbers except the one represented in the 4x table (4, 8, 12, 16, etc.) This pattern had the added complexity of requiring them to switch directions each time they passed behind the back.

Then, to bring the activities to a close, the teacher used a game of toss to practice academic understanding of letter-sound association. As beginning readers, second graders may still be developing automaticity with sound/letter association. To return the bean bags to the basket, she stated, "If your name ends with an /l/ sound, toss your bag into the basket." I could see the students all pause and think before several began to toss. Then she went through different letters until everyone had returned the bean bag they were holding. Each child had been asked to identify the last letter in their name, recall the sound it made, and then focus on tossing the bag into the basket. The first two requests required WM and IC. The children had to remember what sound went with which letter and withhold from tossing unless the sound matched the rule. The last action, making a basket, also require IC, as they had to focus on their aim and plan how hard or softly to throw the bag.

This teacher was able to articulate in her interview how WM and CF were key skills for learning to read and how what she was doing in the classroom was to build foundational skills. She shared, "…they need to be able to take [the letters] apart and put them back together and then, even more so, they [need to be able to] manipulate them. Everything we do in first grade sets them up for middle school." The ability to "manipulate them" is part of the definition of working memory.

Classroom 2

In this classroom the students were playing a traditional *Red Light, Green Light* game but had to pretend to be first snakes, slithering across the floor, and then crabs, balancing themselves with stomachs up on hands and feet, as they waited for the correct signal. The addition of play-acting (WM and CF), coordinated with the strong inhibitory control needed to be successful in this game seemed to be a scaffold that had been added once the children had already practiced the simpler version.

In the same classroom, the students stood in a circle and sang a song (I Let Her Go-Go - performed here by high school students rather than 8-year-olds) with clapping that required the children to turn in a circle and then jump to face the person behind them for the next verse. As they sang, they also were paying attention to the teacher's voice as she modulated between softer and louder voices, ending very softly. In addition to the diverse EF skills this activity required, I watched the teacher insist that it be done well and that they end in unison – something I believe was added as a scaffold. When the students did not end together the first time, she had them repeat the song. In an interview, this teacher shared, "So, the children having the hardest time with crossing the midline, keeping a rhythm, tend to have problems with their academic learning, and so…[I incorporate movement/games] so they can do the other things [academics]." This understanding was not unique to this teacher and directly illustrates a belief held by these three teachers that the purpose of the activities was to influence the future development of academic learning.

Classroom 3

In the third classroom, the teacher called out, "All sailors on deck!" and all the students stood up behind their chairs. The teacher reminded them of the path they were going to walk (WM) and then began counting with the number 1, 221. As each student took a step, they called

out the next number in order. They were all to be in unison (IC) and keep a consistent distance (CF) from each other. This seems like a simple activity but the added elements of make-believe (they were all sailors and saluted the teacher when they stood up from their chairs) and speaking in unison while walking added small degrees of difficulty that challenged the class. Speaking in unison requires IC and make-believe requires CF. You must imagine how to be different from who you are to match the character you are embodying.

In an interview conducted at the end of second grade, this teacher shared how it had been in first grade with her class.[4] She stated that "Academically, I was just trying to get everyone on the same page, knowing there would be neurodiversity and some differentiation in the room. So many of the students were not prepared to sit behind a desk and were not prepared to do writing regularly and not prepared to follow the directions and do what I asked them to do in the way I wanted them to do it." By the time I had observed the class engaged in the activity described above, the teacher volunteered that even though she had had to slow way down in first grade and focus primarily on what we would identify as EF skills, the class was now further along academically than her previous class had been at the same point in the cycle. Was it the attention paid to EF development through the types of activities described thus far which enabled the students to then access the curriculum in second grade? She certainly believed this to be so. And she was sharing that the focus on foundational skills rather than academics, did not put the students behind; in fact, it allowed them to excel academically once the foundational milestones had been achieved.

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[4] Waldorf grade-school teachers typically stay with the same group of students from first through eighth grade. This is known generally as looping.

RQ2: What percentage of classroom time was devoted to play-based activities, per EF domain: cognitive flexibility (CF); inhibitory control (IC), and working memory (WM), for each classroom?

Time on task

The instructional time each classroom teacher spent on academic versus non-academic activities is shown in Figure 4.2. Of the 2-hour main lessons, two of the teachers spent over half of the time engaged in non-academic activities. In the third classroom, the play and academics were so integrated that it was difficult to tease the two apart. For this classroom, calculations were based on whether or not the *primary* goal of the activity was academic. For example, the first activity of the day was for the students to read words from the chalkboard together and do jumping jacks based on the number of syllables in the word. A jumping jack has two parts, so a two-syllable word would be a complete jumping jack. This was academic, but the point of the activity seemed to be a) to wake the students up for the day and b) to get the rhythm of the word into their bodies; they were meant to feel the syllabication. I counted this time as non-academic. Other adult-guided activities were situated as games but were clearly academic activities. For example, at one point the teacher said, "Here are your clues. Can you find the matching word?" The students were working on reading and comprehension, but the activity was couched as a game. Because she used this technique throughout the morning, classroom three thus appeared to have a higher percentage of time spent on academics. Percentages shown in Figure 4.3 were calculated based on the total number of references to either academic or non-academic goals made by each teacher.

Figure 4.2.

Time spent on academic versus non-academic activities.

Time allotted during 2hr Main Lesson

Classroom 1: Academics 47%, Other 53%
Classroom 2: Academics 30%, Other 70%
Classroom 3: Academics 67%, Other 33%
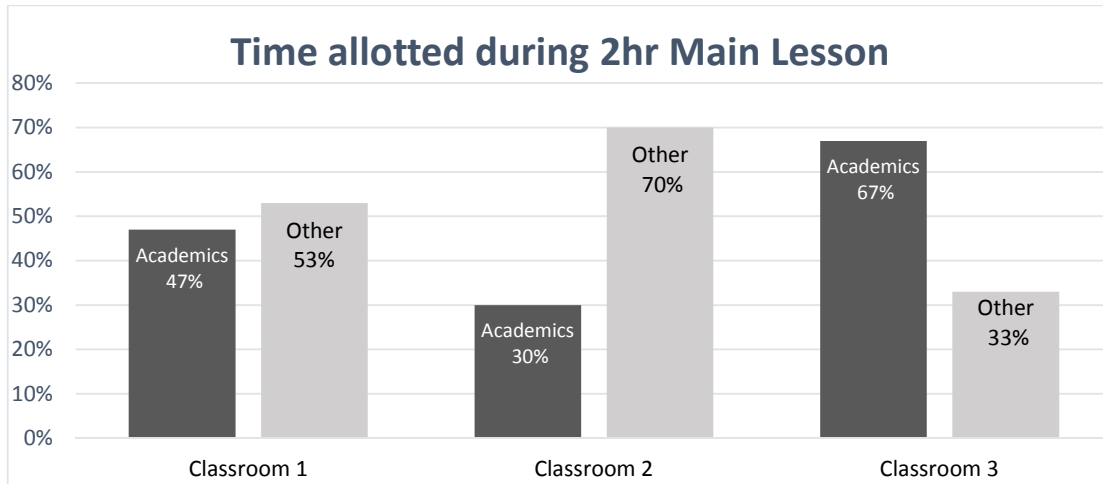
EF components

The complex nature of many of the activities I observed required an understanding of how integrated the three primary EF components can be. Therefore, it is important to view the percentages in the graph below as generalities rather than clear, distinct values. Incidents of what appear to be EF-integrated, play-based activities by percent of time per school, out of the 2-hour ML block are shown below.

Figure 4.3.

Incidents of EF by classroom.

Attention on various domains in 3 schools
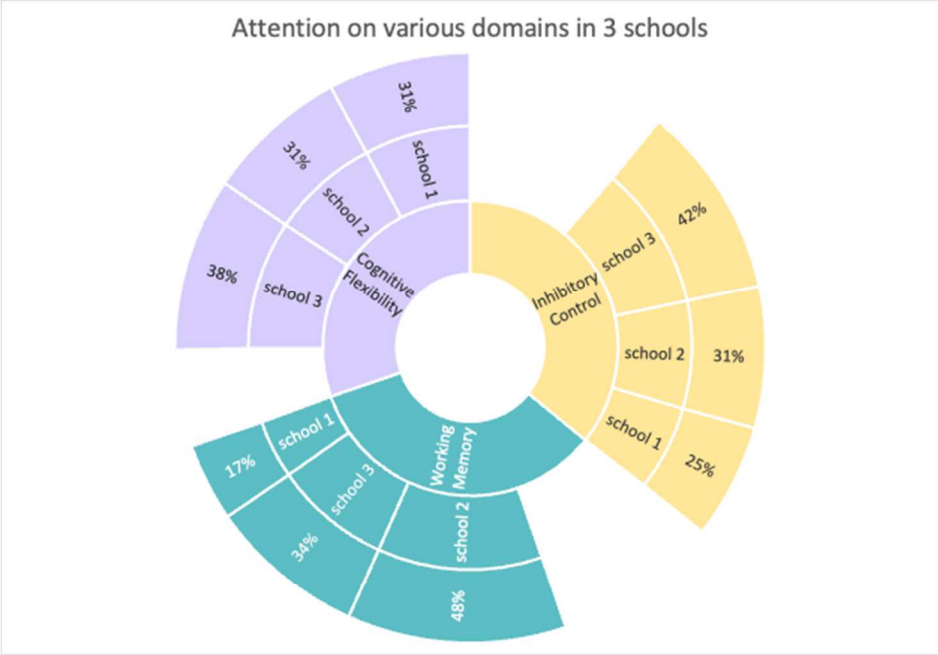
Several activities, such as hand-clapping games which required the students to a) sing together (WM), b) coordinate hand-clapping motions with a partner (IC), and c) turn and change partners on a certain word in the song (CF) were coded for all three domains, and so an activity might show up in more than one category. Eighty-one individual activities emerged from the observations in the three classrooms, resulting in averages of approximately 36% requiring WM, 44% requiring IC, and 21% requiring CF. The classroom whose teacher had been able to, almost seamlessly, integrate the activities and the academics (classroom 3), spent a greater time focused on IC. This was the same teacher who was referenced earlier as having to spend a significant amount of time in first grade (the previous year) focused on "social work." She shared why:

> Because there were children who [couldn't] think unless they were talking out
>
> loud and making noise, and [other] children who were auditorily triggered –

together it was a little bit of a…it was tricky…So by introducing intellectually

engaging activities, I was able to lead them. (Anika)

She clarified what she means by 'intellectually engaging activities' later. She added,

…the first day of school, [we] read the whole alphabet off the board and said the

ABC song. And then we [sang] it backward, and we did lots of circle activities,

too. With a ton of movement. Putting movement together with recitation…and so

pulling all of that into our body. (Anika)

By intellectual activities, it seems that she was referring not to academics, necessarily, but to

those that required integrated *effort* – EF work, specifically.

In addition, because the teachers begin with their cohort of students in first grade, which

is considered the "real" first year of formal education in Waldorf classrooms, it should be noted

that 'forming the class,' creating a safe classroom environment and working together are very

much related to developing inhibitory control.

Although approximately half the time observed saw students engaged in EF/non-

academic activities, there was variability in the complexity and integration of these across

classrooms. All three classrooms spent about 30% of their time focused on developing CF.

Classroom two had activities directed more to strengthening WM, and classroom three spent a

greater amount of time practicing IC. Understanding the beliefs of the teachers in the

classrooms, may explain these differences in focus.

RQ3: What beliefs did the teachers have around the teaching of EF?

Teacher beliefs

After the individual activities were sorted, three categories emerged. There were

activities that appeared to be solely non-academic, those that were integrated with an academic

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purpose (social and academic purpose), and those seemed uniquely designed to address academic learning. When these activities were then linked with the interviews, it became clear that the Waldorf teachers used playful activities for several reasons. They believed that by integrating the activities throughout the daily main lesson, they could build a) teamwork within the group, b) foundational skills, particularly among those who had not yet developed them, and c) academic skill.

Predominantly, they believed that time spent on foundational and/or developmental milestones, was key for later academic success. Most activities observed required each person in the group to have an awareness of the other. All three teachers seemed cognizant of the importance of focusing on this aspect of their student's development. One specifically mentioned that without the ability to regulate one's behavior in the classroom, academic learning would suffer. They all spoke about being able to work together as a whole class. When they were engaging the students in activities such as reciting a poem in a circle while tossing beanbags, playing hand clapping games, or singing, the focus was primarily on getting the students to work together as a team. The teacher in classroom three shared that in first grade they were "learning to work together socially." She wanted them to "work together as one class, with one voice for recitation and singing and one sense of movement." By second grade, she shared that, "we finally…had circle where everyone joined in."

I observed them in second grade working on a play, and the teacher stopped them several times to redo the speaking so that it sounded like one voice (IC). She was asking them to be aware of the other voices in the room and work as one. The teacher in classroom one concurred, stating, "It's more than just movement. They [are learning] to understand their boundaries and… what the expectations are." In classroom two's teacher reported that her question going into first

grade was, "Can they play?" She shared that she "watched them socially" during free-play time. This was also a time where she could see if they were able to share while playing: did they problem solve in those situations (CF)? Having looped with a previous group of students, she knew that "if this (inability to share) isn't addressed now, I know what's going to happen in fifth grade."

The second reason that the teachers gave for engaging in these activities was that they believed they could use them to actively work on building foundational skills, particularly in those students who had not yet mastered them. In first grade, the teacher in classroom three was "looking to get everyone on the same page, knowing there would be some neurodiversity and some differentiation [needed] in the room." She added, "There was a lot of healing movement [that was needed and] a lot of social work." Classroom one's teacher shared, "As a teacher, you are always scaffolding and adjusting to different levels." During one observation, I observed her pointedly say to a student how nicely he was keeping the bean bag on his head. She explained later that he was one who had challenges with self-control, and she was anticipating him throwing the bean bag up in the air. Her comment allowed him to have success in the moment. I observed the teacher in classroom two having the students do "races" across the classroom while pretending to be lizards and frogs. She had spoken about working with a specialist at the school to try to integrate retained midline barriers and improve muscle strength.

Finally, the teachers believed that using playful movement could build academic skill. The teacher from classroom one explained that she put the movement together with recitation to "get it into our body." I interpreted this to mean that she was trying to move what they were learning into a place of automaticity. The integration seemed also to keep the students who had mastered either the physical skill or the academic skill to challenge themselves with the addition

of the other. I watched the students in all three second grade classrooms engaged in activities to support the learning of the multiplication tables with marching, bean bags, and clapping. Some could do just the speaking or just the movement but that seemed not to be a problem. They were encouraged to participate as much as possible.

Results: Part Two

This part of study two is intended to connect the previously described actions of teachers during *morning rhythmical movement* with the growth of EF skill. I have used archival data from the ECLS-K:2011 which measured EF development using Woodcock Johnson's Numbers Reversed (NR) assessment of WM and Zelazo's Dimensional Change Card Sort (DCCS) as a measurement of IC. The initial analyses were done to potential differential effects on EF between the treatment and control groups. Then, controlling for age and gender, I examined the treatment effects of Waldorf education on EF development.

Groups at Baseline

Balance

Summary statistics, including age in months at baseline, can be found in Table 4.5. The percentage of students identified as male or female between the two groups was nearly equal (59% male and 41% female).

Because of an understanding that formal education is best begun, not in kindergarten, but in first grade, Waldorf schools use a guideline of "six years old by May 31 of kindergarten" when moving a student on to first grade. This is a different timeline than public school systems use. I hypothesized that there could be significant differences in the starting ages of Waldorf students as compared to their peers who are not enrolled in Waldorf schools.

Using an independent samples *t* test, the students who attended a Waldorf private school in the fall of first grade (M = 83.55, SD = 3.4) were compared to the students in the control group (M = 79.0, SD = 4.8). Results demonstrated that Waldorf students were significantly older at the beginning of first grade, $t(167) = -6.6$, $p = .00$, confirming our understanding of Waldorf enrollment practices. The significance in age between groups continued through grade four. Because there is evidence of a positive relationship between time in school (schooling effect) and cognitive ability, I controlled for age throughout the OLS regressions (Brod et al., 2017; Ceci, 1991, see also Nisbett, 2013; Nisbett et al., 2012; Zhang, 2019). Histograms showing variance between groups at baseline can been found in Appendix B.

Numbers Reversed. A t-test of all students in the treatment (M = 475.89, SD = 14.07) and control (M = 470.72, SD = 24.56) groups in fall of first grade showed that there were no significant differences for working memory $t(167) = -1.54$, $p = .13$, as assessed by the NR test, despite differences in age. However, when separated, the Waldorf girls (M = 476.42, SD = 13.0) scored significantly higher for working memory $t(77) = -2.12$, $p = .04$., than the girls in the control group (M = 476.51, SD = 22.22) at baseline. The effect size was moderate (scale range 0 – 1; $d = .48$) with a confidence interval of -.93 - .03. There was no significant difference between the boys in the treatment and control groups.

Dimensional Card Sort. A t-test of the standardized scores on the DCCS revealed significant differences between the treatment (M = 13.54, SD = 2.06) and control groups (M = 16.49; SD = 1.31) at baseline $t(169) = 11.44$, $p = .00$. and the effect size was large, (scale range 0 – 1; $d = 1.79$) with a confidence interval of 1.43 – 2.15. The students in the control group had higher scores than the treatment group. Next, I checked to see how the gender differences might be driving these differences. The boys in the treatment group (M = 14.15; SD = 2.05) scored

significantly lower on the DCCS test of cognitive flexibility than the control group (M= 16.39; SD 1.37), t (86) = 6.05, p = .00). The Waldorf girls (M = 13.16; SD = 2.03) showed an even larger difference in scores than the control group (M = 16.63; SD = 1.23), t (79) = 9.40; p = .00. This significant difference in baseline scores means that I will control for age and gender to assure that the change in scores over time is a valid representation of growth.

Further exploration into the administration of the DCCS in the ECLS-K:2011 dataset, revealed that the paper test was only used in first grade. Unfortunately, the private Waldorf schools would not allow electronic devices as a measurement tool in the classroom. Their philosophy embraces a policy of limited electronic media in the elementary grades. Thus, because there were significant differences in way the test was scored between first and second grade, I could not find a valid way to compare the student groups past first grade. Instead, I examined change between fall and spring in the groups in the first-grade year, controlling for both age and gender.

OLS Multiple Linear Regression

Tables 4.6 and 4.7. display results from OLS multiple linear regression models (e.g., unstandardized coefficients, standard errors, and sample sizes) for each of the 4 times of assessment for treatment and control groups for the NR and the DCCS tests.

NR. After controlling for age, the baseline measurement (fall of first grade) of Waldorf students showed no significant differences on the NR test of working memory, as compared to the treatment group. Controlling for gender did not change outcomes. Over the course of four years, using the NR in the fall of first grade as a baseline, students enrolled in private Waldorf schools showed no significant difference in scores when controlling for age and/or gender.

Table 4.6.

Linear regressions predicting the association between attending a Waldorf school and working memory as shown by NR

Controls	Fall 1st			Spring 1st			Spring 2nd			Spring 4th		
	No controls	Age	Gender	No controls	Age	Gender	No controls	Age	Gender	No controls	Age	Gender
Treatment Group	5.15	-1.99	-1.02	0.73	-2.43	-1.56	-2.51	-3.42	-3.11	-2.68	-3.97	-3.66
	(3.35)	(3.57)	(3.62)	(3.30)	(3.71)	(3.29)	(2.78)	(3.08)	(3.14)	(4.09)	(4.68)	(4.79)
Age		1.57***	1.60***		0.65	-1.56		0.23	0.24		0.31	0.31
		(0.36)	(0.36)		(0.36)	(3.78)		(0.33)	(0.34)		(0.55)	(0.55)
Gender			-3.92			0.64			0.07			0.67
			(3.16)			(.36)			(2.83)			4.02)
Constant	470.74***	346.57***	349.75***	478.68***	423.48***	429.57***	490.36***	467.59***	465.84***	504.52***	466.81***	466.11***
	(2.08)	(28.27)	(28.51)	(2.10)	(30.48)	(30.86)	(1.86)	(32.71)	(33.31)	(2.42)	(66.13)	(66.89)
Observations	169	169	167	151	151	149	135	135	133	94	94	93
R-squared	0.014	0.117	0.129	0.000	0.022	0.033	0.006	0.010	0.009	0.005	0.008	0.007

Standard errors in parentheses

*p<0.05; **p<0.01; ***p<0.001

DCCS. Enrollment in a Waldorf school in fall of first grade was associated with score on the standardized DCCS test of inhibitory control 2.94 points lower than the students in the treatment group, when controlling for both age and gender. This result was significant, $p < .00$. Boys in the treatment group scored lower by 2.59 points, $r(85) = .33$, $p<.00$, while girls scored lower by 3.12 points, $r(78) = .53$, $p<.00$. By the spring of first grade, the Waldorf students ($M = 14.39$, $SD = 2.38$) had fallen further below their non-Waldorf counterparts ($M = 16.67$, $SD = 1.45$) on the DCCS; $r(150) = .29$, $p<.00$. There was an improvement of .60 for age, .19 for boys, and .27 for girls noted between fall of first grade and spring of first grade. For the boys, age seemed to have a significant effect on scores, both in the fall and the spring, whereas for the girls this was not significant.

Table 4.7

Linear regressions predicting the association between attending a Waldorf school and cognitive flexibility as shown by DCCS.

	Fall 1st: No controls	Fall 1st: age	Fall 1st: all controls	Fall 1st: boys	Fall 1st: girls	Spring 1st: no controls	Spring 1st: age	Spring 1st: all controls	Spring 1st: boys	Spring 1st: girls
Treatment	-2.95***	-3.00***	-2.94***	-2.59***	-3.12***	-2.66***	-2.66***	-2.66***	-2.40***	-2.85***
	(0.26)	(0.29)	(0.30)	(0.40)	(0.42)	(0.35)	(0.36)	-0.36	(0.50)	(0.50)
Age		0.01	0.01	0.08*	-0.07	0.08*	0.08*	0.08*	0.11*	0.03
		(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)	(0.05)
Gender			-0.24					-0.02		
			-0.26					(-0.31)		
Constant	16.49***	15.66***	15.91***	10.24***	22.27***	9.99***	9.97***	9.97***	6.75	14.37**
	(0.16)	(2.32)	(2.34)	(2.94)	(3.51)	(2.86)	(2.92)	(2.92)	(3.82)	(4.38)
Observations	171	171	169	88	81	151	149	149	79	70
R-squared	0.437	0.437	0.432	0.333	0.543	0.289	0.286	0.286	0.234	0.363

Standard errors in parentheses

* p<0.05;** p<0.01; *** p<0.001"

Discussion

This study first investigated the practices Waldorf teachers use every day at the beginning of their lessons. Using observations of teachers during their two-hour morning teaching time, I recorded what activities the teachers were doing with their students and how much time they spent engaged in them. I then separated those activities which required EF from those which were strictly academic. Finally, I categorized them into three recognized domains of EF: WM, IC, and CF. For part two, the paper sought to discern whether the practices could be associated with improved development of EF skill as compared to students in other private schools across the U.S.

In part one, the practices of teachers during what they refer to as *morning rhythmical movement* were identified and sorted (RQ1). Despite a limited time in which to present academic content (120 minutes), the teachers spent nearly half (M = 45%) of the time devoted to activities that support the development of EF skill. According to Harvard's recommendation for activities that support the development of EF, the teachers were either directly or indirectly providing significant amounts of time during which their students could practice EF skill (RQ2). The interviews revealed that this was because they believed that foundational skill development is critical for future academic achievement (RQ3). These teachers' beliefs embrace a long-term approach to learning that educators in the public-school realm do not have the freedom to act on.

In one study of the nation's largest urban school districts, teachers administered an average of 112 standardized test between pre-K and grade 12, or eight per year in each classroom (Hart et al., 2015). This high-stakes testing approach is a short-term perspective on learning that is not supported by cognitive research (e.g., Brabeck, 2014; Christodoulou, 2014; Riley, 2016). It is a conclusion that has become increasingly clear not only to academics but schoolteachers as

well (Valli et al., 2007). And it is particularly true for children growing up under economic hardship (Blair et al., 2015, Deer et al., 2020, Raver, 2012). In fact, public school kindergarten teachers surveyed in 2017 revealed that they shared this understanding of the importance of what is often referred to by teachers as social skills (Curby et al., 2017). Yet, as accountability measures have tightened around assuring students do well on achievement tests in English language arts and math, there is less and less time available to devote to these foundational skills. Given the likely differences in the amount of time devoted to practicing EF activities in Waldorf and non-Waldorf classrooms, the question becomes whether there are any differences in EF development between the groups.

In the second part of this study, I investigated whether there were any associations between this time spent on EF development and EF test scores. Unfortunately, for several reasons – one of which was the COVID-19 pandemic, the results on the tests were either inconclusive or negatively related. Due to the school shutdowns, the activities that students in Waldorf schools normally engage in were no longer possible. Teachers could not engage in games and playful learning in the same ways that they had when in person. This would have reduced the amount of time spent on EF practice, thereby, likely affecting the development of EF. Although it is early, the National Center for Educational Statistics reports that they are seeing increases in classroom disruptions such as student misconduct, disrespect, and rowdiness. All of these can result when a student does not have adequate skill around inhibiting their actions (IC) or making alternative choices (CF) (U.S. Department of Education, 2022).

One question that may arise from the results of this study is whether Waldorf graduates suffer academically in the long run. Afterall, if time is being spent on learning to control one's action and emotions or improving one's ability to think flexibly, fewer minutes are being

devoted to reading and/or math. According to the admittedly limited data available, Waldorf public school graduates nationwide seem to be fairing as well as, if not better than their peers (Friedlander et al., 2015, Larson, 2012).

There can be no doubt that what we know now about best practices in the teaching of English language arts and math is better than it was fifty or even twenty years ago. Why, then, are we not doing better for our students? Perhaps, what is needed is a paradigm shift to a long-range perspective on learning, rather than one based on the single academic year. This would allow teachers autonomy as professionals, the freedom to focus on these foundational skills that we know support future learning.

Limitations and Future Research

This study, while thought-provoking in many ways, has several limitations. First, for part one, I was able to provide a glimpse into only a small number of classrooms to observe the teachers and their daily practices. Although the small sample is a valid concern, because of previous research demonstrating the consistency of teaching practices across Waldorf and Waldorf-inspired schools world-wide, as well as my own decades-long experiences within it, I believe these results represent a valid picture of what is happening in most Waldorf and Waldorf-inspired classrooms. However, differences may exist.

It would be worthwhile to investigate possible variance between the two types of systems, private and public, to see if accountability measures i.e., pressures to meet test score benchmarks, have impacted the amount of playful, game-based activity that teachers engage in. A larger study or one that could utilize video recording and consistent monthly observations might provide even more data as to the amount and type of activities that are being used in classrooms.

With regards to the second part of the study, it is significant that due to the COVID-19 pandemic, the number of students who were able to continue in the study throughout grade four was drastically reduced, and the gathering data in the spring of third grade was not possible. Another factor that is critically important was stated earlier. In an online educational setting (at least one full year for most learners), it is nearly impossible to engage students in the intended Waldorf pedagogy. The amount of integrated movement, speech work, musical engagement and active games that is normally presented is impossible. Therefore, I am not surprised to see that there are no significant differences between treatment and control groups at this time.

Additionally, this study followed students only from first through fourth grade. While the fact that a private Waldorf school allowed standardized testing in their classrooms at all makes this study unique, I believe the development of cognitive capacities such as EF may not be measurable on such a short developmental trajectory. A second study that continues all the way to eighth grade, age 14/15, might provide a different picture. Not only would the students have been exposed to four more years of activities that may or may not target EF development, but they would also have gone through more stages of normal growth, after which the changes might be measurable.

Further, I expect that more investigation linking activities with EF development would be instrumental in understanding the connections that may or may not be there. For example, new research investigating episodic memory (a type of memory that relies on experience and story) shows that working memory is mediated by episodic memory (Hoskin et al., 2019). The Waldorf curriculum relies on story as a significant part of its pedagogy, perhaps influencing EF from a different direction. In sum, the active experiences of the Waldorf curriculum may be supporting EF in ways other than the ones we first hypothesized. If these simple, inexpensive practices can

positively affect the development of even one of the components of EF, it could have important implications for the future of teaching and learning. This could be particularly important for those students who begin their education with disproportionally fewer experiences that we know are important for development in these areas.

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Table 4.1.

Participating schools and students

		Tuition	Number of Students	Ethnicity
The Bluffs Waldorf School 1st grade teacher: Bridgette	CA, Suburban - private 450 students PK - 12th	$18,490	1st (2017-18) 28 students 16F/12M	68% white 21% Asian 11% Hispanic, race specified
			2nd (2018-19) 29 students 17F/12M (2 joined) 27 original students	66% white 24% Asian 10% Hispanic
4th grade teacher: Savvy			4th (2020-21) 18 original students	No info
The Channel Waldorf School 1st grade teacher: Kristi	CA, Urban- private 137 students PK -8th	$13,650	1st (2017-18) 19 students 13F/6M (4 left)	84% white 16% Asian
			2nd (2018-19) 19 students 13F/6M (4 joined)	79% white 11% Asian 5% Hispanic 5% more than 1 race
4th grade teacher: David			4th grade (2020-21) 4 original students	No info
The Rivers Waldorf School 1st grade teacher: Anika	CA, Rural - private 450 students PK - 12th	$15,021	1st (2018-19) 25 students 9F/15M (3 left)	46% white 8% black/ African American 17% Asian 8% Hispanic, race specified 17% more than 1 race
			2nd (2018-19) 23 students 10F/13M (1 added)	58% white 5% black/African American 18% Asian 5% Hispanic, race specified 14% more than 1 race
4th grade teacher: Gina			4th grade (2020-21) 11 original students	No info

Note. All school & teacher names have been changed to maintain privacy.

* All have full AWSNA membership

Table 4.2.
Participating Teachers

	1st grade classrooms	Gender	Education	Educational Experience
The Bluffs Waldorf School – Bridgette	1	Female	B.A.+ M.A. + teaching credential + Waldorf teacher training	Taught TK kindergarten (2yrs); Taught 1-8, currently in 2nd grade of second loop
The Channel Waldorf School - Kristi	1	Female	B.A. + teaching credential + Waldorf teacher Training	Taught 1-5 at a Waldorf-inspired charter school, currently in 2nd grade of second loop
The Rivers Waldorf School - Anika	1	Female	B.A. + Waldorf teacher training + M.A. in progress	Taught 1-8 at a Waldorf school; currently in 2nd grade of second loop

Table 4.3
Time in activities.

		Academic		Socio-emotional
Overall		45%		55%
The Bluffs Waldorf School – Bridgette	Interviews	36%	53% -traditional 47% -foundational	64%
	Observations in 2nd grade	60 minutes 50 on ELA, 10 on math		
		50% of the ML		
The Channel Waldorf School – Kristi	Interviews	48%	64% - traditional 36% - foundational	52%
	Observations in 2nd grade	50 minutes on ELA		
		42% of the ML		
The Rivers Waldorf School – Anika	Interviews	50%	53% - traditional 47% - foundational	50%
	Observations in 2nd grade	73 minutes 45 on LA, 28 on math		
		61% of the ML		

Note: All names have been changed to protect privacy. Each of these teachers was in an ELA block which is why fewer minutes were given to math activities during Main Lesson.

Table 4.4.

EF code indicators[1]

Working Memory (WM)

Requires one to remember what happened

Requires one to remember a sequence

Requires on to remember a two or more things at once

Games that require strategy

Games that require copying

Singing in rounds or songs that repeat

Clapping games

Puzzles that require problem solving

Guessing games

Sports

Jump rope with speech

Learning to play an instrument

Singing or music, generally

Theater

Inhibitory Control (IC)

Requires matching of items

Requires a fast response

Games that require strategy

Games that require coordination

Games that require aerobic exercise

Singing in rounds

Clapping games

Puzzles that require problem solving

Sports

Jump rope with speech

Singing or music, generally

Theater

Cognitive Flexibility (CF)

Games that require strategy

Clapping games

Puzzles that require problem solving

Guessing games

Sports

Theater

[1]Center on the Developing Child at Harvard University. (2014). Enhancing and practicing executive function skills with children from infancy to adolescence.

Table 4.5.

Summary statistics of Treatment Group vs. Control Group: Students enrolled in a private school in the suburbs with a family income over $50K per year as compared to students enrolled in one of three private Waldorf schools in California.

	Control group			Treatment group		
	Mean	**SD**	**Count**	**Mean**	**SD**	**Count**
Demographics						
Fall 1st grade			104			68
Male		.	61		.	31
Age in months	79.36	4.8		83.62	3.55	
Spring 1st			93			67
Male						
Age in months	85.51	4.45		90.34	4.64	
Spring 2nd			83			66
Male			53			30
Age in months	98.67	4.45		101.97	4.27	
Spring 4th			61			33
Male			32			12
Age in months	120.98	3.66		125.12	3.55	

CHAPTER 5

Study 3. Exploring alternative education: a comparison on 3 levels - Waldorf charters, non-Waldorf charters, and local public schools, as measured by the California Assessment of Student Performance and Progress.

Abstract

The purpose of this quantitative, longitudinal, causal-comparative study was to examine significance in the levels of achievement in English language arts (ELA) and math between students enrolled in Waldorf-inspired charter schools and other charter and non-charter public schools in California, using the California Assessment of Student Performance and Progress (CAASPP) scores. The number of charter schools in operation in California has increased from 5 to 8 percent (an addition of approximately 2,500 schools) between 2009 and 2019, while the number of students enrolling in these charter schools in California has increased 4 percent (NCES.ed.gov, 2022). Waldorf-inspired charter schools, a growing branch of the traditionally private 100-year-old Waldorf school movement, are among the schools popping up throughout California. 19 of them have been included in this study. This study addresses a gap in the literature as it relates to achievement among public school students in Waldorf-inspired classrooms, as compared to other non-Waldorf classrooms in grades three through eight. I found that by eighth grade students in Waldorf-inspired charter schools are performing similarly or better in ELA and math as compared to their non-Waldorf charter school and local public school comparison groups.

Keywords: Waldorf education, CAASPP, charter schools, testing outcomes

Introduction

In 1991 Minnesota passed the first charter school law in the United States allowing a non-profit organization to operate a public school. Proponents hoped that these schools would become laboratories for reform, innovation, and flexibility, positively impacting the achievement gaps found among student populations (MNCharterSchools.org, 2022.) They argued that because the educational system in the United Sates is so weighed down with bureaucracy, it is difficult for schools to enact any promising new ideas with speed, making them nearly obsolete by the time they are implemented (Crawford, 2001). Along with freeing schools from bureaucracy and over-regulation, they believed that incorporating parental choice into schooling might create a culture of competition, forcing schools to improve themselves if they had to compete for students. *(*Fryer, 2012; Stein, 2015*)*. Finally, as charter schools provide a no-cost option for families seeking alternatives to their local public school, there was hope that school choice would foster more integrated classrooms (Fryer, 2012).

However, this movement is not without controversy. There are those who believe that the growth of charter schools is an ill-conceived ploy to steal money from the pockets of unsuspecting consumers. Their argument is that charter schools take much needed money from schools which are already under-funded. For example, in California, tax dollars follow individual students. This means that if the enrollment of a school decreases (because families are choosing a charter school), there is less money with which to continue running the local school, making it harder and harder to provide a quality education to those most in need.

One way in which anti-charter school movements have attempted to sway voters against charter schools is by introducing the term "for-profit charter schools." The term, according to a 2022 report by the Thomas Fordham Institute evaluating the spending and outcomes of for-profit

charter schools, is based on a "misnomer married to a misconception." The authors state that except for a handful of schools in Arizona, all U.S. charter schools must operate as nonprofit organizations and are governed and regulated by public agencies (Northern et al., 2022). In fact, due to concerns around the mixing of public tax dollars with private, for-profit enterprises, in 2018, California passed a law which made for-profit charter schools illegal.

However, there are differences found across charter schools and their student populations. Generally, these schools tend to have fewer students enrolled than public schools and smaller class sizes (Chen, 2019). Although charter schools cannot deny enrollment to any student from the area that they serve due to the student's ethnicity, English language fluency, disability status or socio-economic status (SES) (Caffee, 2018; California Department of Education, n.d.), they are allowed to establish their own discipline policies. Studies have shown that they often have higher suspension rates when compared to traditional public schools, making some wonder whether the schools eliminate the more "troublesome" students by implementing rigid discipline policies. Furthermore, critics of charter schools claim that there is an increasing segregation of public-school students by race and ethnicity that is caused by the charter school movement itself, making the social divide in America even worse (Eastman et al., 2017; Gill et al., 2001; Miner, 2017; D. Wilson et al., 2019).

Despite these concerns, the popularity of charter schools across the country has continued to grow. Table 5.1 shows the increasing enrollment of students in public charter schools in California over the course of the five years covered in this study. Even with 30 years of data from the charter school experiment, there is not yet consensus among researchers regarding the success or failure of charter schools to improve academic outcomes for their students (Turner, 2015). In fact, there is as yet no consensus on the success of charter schools. A 2009 study from

Texas used a value-added model and found that the achievement gains of students in urban-charter schools performed better in reading and mathematics than the non-charters (Ansah, 2021). An analysis using more recent data in Colorado found little to no significant differences in the English Language Arts (ELA) and math scores on the California Assessment of Student Performance and Progress (CAASPP) for students in charters versus non-charter schools, when controlling for free and reduced-price meals (FRPM) and ethnicity/race. A more recent report, Charter Schools' Effectiveness, Mechanisms, and Competitive Influence, found that across the United States, charters school students tend to perform, on average, at about the same level as their district counterparts (Cohodes et al., 2021). However, they state that charters located in urban areas consistently have students whose test scores are boosted by charter enrollment, particularly for Black, Latinx, and low-income students (Cohodes et al., 2021).

One thing that the growing California charter school movement has provided is a means for researchers to compare alternative educational models using a common assessment tool, in this case, the CAASPP. Given the importance that is placed on student test scores as proof of success at the state, school, classroom, student, and teacher levels, identifying trends among alternative pedagogies could impact ways in which we can best meet the needs of an increasingly diverse student population. This study addresses this goal by reviewing archival data of student achievement at a classroom level for a unique educational system. Using scores from classrooms in grades three through eight over five years, between the years 2015 and 2019, this study answers the question: Is there any significant difference between the levels of achievement for ELA and math among students, either over time or at any one grade-level, in Waldorf-inspired charter schools versus those in non-Waldorf classrooms, both charter and non-charter.

Philosophical Framework

Waldorf public education. Waldorf education is a 100-year-old pedagogy that was developed in Europe just after World War I (1919) for the children of the workers at the Waldorf Astoria Cigarette Company. After being shut down by Hitler during World War II, the movement rebounded as an international, independent network of schools with a well-defined pedagogy and strong oversight (Edwards, 2012). According to Friedlander et al., 2015, it is "unique in its comprehensive nature, with its explicit theory of child development, curriculum, pedagogical approach and philosophy about the role of the teacher," (p.99). The first Waldorf school in America, The Rudolf Steiner School in New York, dates itself to 1928. Waldorf schools have now become the largest independent school movement in the world (Zdrazil, 2018).

The Waldorf curriculum was created by Austrian philosopher Rudolf Steiner, a contemporary of John Dewey and Maria Montessori, who shared their belief in active learning and educating the whole child. In response to the limited educational opportunities available to children from poor and working-class families in the early 20th century, Steiner's was one of several international movements that aimed to advance more organic educational opportunities than were offered by the widely implemented factory model of education. Along with Dewey in the U.S. and Montessori in Italy, Rudolf Steiner advocated eschewing a narrow focus on the intellect and instead advocated a child-centered model of education, emphasizing hands-on learning that included arts, crafts, and practical skills (Alphen, 2011). This philosophy makes Waldorf schools largely unlike any other public or private school system in the U.S.

Waldorf classrooms are homogenous in age, compared to the starting age of traditional schools in the U.S., with a delayed start to formal academic instruction. Formal academic teaching is delayed until grade one because of a firm belief in the importance of play for a child's development. This is the first indication that the academic outcomes of these students may be

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met at a later age, as compared to traditional school systems. As well, the students in each grade remain with the same teacher as they progress from first through eighth grade, a practice known as looping. Guided by their 'Main Lesson' teacher, the students are taught through story and art, movement and music. Rather than teaching the students every subject every day or week, the curriculum is organized in three to four-week blocks referred to as Main Lesson. The first block may be language arts, the second math, and so on. Daily, in grades one through four, they spend nearly half of the Main Lesson engaged in movement and games which appear to target foundational skills such as executive function (Telfer-Radzat, 2022). Additional weekly subjects that occur after the Main Lesson include a foreign language (or two), handwork, games (a form of P.E.), violin, painting, modeling, recorder, and woodwork. The approach is designed to expose students to a wide range of topics and then focus deeply on the ways in which they connect to each other (author). Finally, the education is centered on a teacher's ability to know what the students need. Rather than textbooks and worksheets, students create portfolios which provide evidence of their growth over the course of a year. Students in grades one through five, at a minimum, forgo any testing and are not given grades. As private schools, there is little oversight from a state perspective and, really, only the consumer (parents) to please.

Prior to 1994, all Waldorf schools in the U.S. had been private. The Yuba River Charter school in California was given its charter in 1994 and became the first Waldorf-inspired charter school. Since that time - because all public schools, including charters, are required to comply with certain accountability measures - these Waldorf-inspired schools, along with all other public schools, take state assessments every spring.

Literature Review

Despite the world-wide presence of Waldorf schools, quantitative studies of their practices by external researchers have lagged worldwide. Several factors, including a pedagogy that is complex and difficult to untangle, a belief that external *proof* was unnecessary to validate their methods, along with their private school status, meant that Waldorf schools remained largely unknown to mainstream researchers. Now, the growing presence of public charter schools which have adopted the pedagogy has increased interest in their practices. The number of Waldorf-inspired charter schools has grown to 57 nationwide, according to the website of Alliance for Public Waldorf Education (PublicWaldorf.org, 2022). In California there are 26 schools in various stages of membership, from new initiatives to full member schools, and two high schools. These charter schools, along with a smaller number of Waldorf-inspired magnet schools, implement Waldorf instructional methods with the oversight of both their public-school agency and a national public Waldorf school organization (Alliance, n.d.).

How Academically Effective is Waldorf education?

Comparing academic achievement in Waldorf schools and U.S. public schools has been difficult, given that, unlike traditional public schools, Waldorf schools do not teach reading until first grade and are not required to administer state-mandated standardized testing. Yet, some comparable student populations are available.

A study from 2001, compared the achievement test scores (two years) of fourth grade economically disadvantaged minority students in a large, midwestern city in the United States (Schieffer et al., 2001). One group attended a Waldorf-inspired charter school, and the other group was drawn from a school matched for the same neighborhood and economic make-up. Results found that the public Waldorf-inspired school provided minority, low SES fourth graders

greater success across all academic areas and reported a moderate correlation between the type of education and the students' test scores (Schieffer et al., 2012).

In 2007, Ida Oberman found four urban Waldorf-inspired charter schools which, when controlling for geography, district size and other demographics, were meeting or outperforming similar schools in the state on California's Standards Test. She found that although the students were underperforming at the lower grade levels, by eighth grade, these Waldorf-inspired charter school students matched or exceeded the top ten of peer-comparable sites in both math and English Language Arts. The teachers and administrators of these schools, they believed that one of the reasons for this pattern was that the pedagogy focused on preparation in the lower grades for higher grades, year by year, e.g., building a strong foundation. They also believed that students were able to connect one academic subject to another, such as art to math, math to history, or history to science.

In 2012, researchers first compared the test scores of students in Waldorf-inspired charter schools in California with their district averages and then with a specific school matched on economic status and percent minority enrolled. They found that students attending Waldorf-inspired charter schools showed significantly lower test scores in reading in grade 2, but that by grade 6, 7, and 8, these students significantly outperformed the district averages. In math, there were significant differences in grade 3, with Waldorf students receiving lower than average scores, but the significance disappeared for all other grades. When the schools were compared individually with another non-Waldorf school having similar demographics (as determined by t-tests), no significant differences were found for reading or math. Finally, the researchers examined the impact of Waldorf education on one cohort of students over the course of seven years (grades 2 – 7) in the number of students who were either above basic level, below basic

level or in the advanced level of achievement. Waldorf students scored lower in grades 2 and 3 in reading and showed significantly (and approaching significantly) more students at above basic or advanced levels in grades 7 and 8. In math, a greater number of students remained significantly lower than their cohorts in grades 2 – 5 and showed significantly higher numbers of students achieving advanced competence by 7th grade.

Again, in 2012, Larrison et al. used standardized test scores and parent comment boards to compare Waldorf charters in California to matched, comparison charter schools. Test results suggest that Waldorf schools have a slower academic build up, resulting in lower test scores in the lower grades (1- 4). However, by grade 8 they outperformed comparison schools and were on par with some of the top schools in the state at that time.

Finally, an intensive case study was conducted at a U.S. public Waldorf magnet school in 2015. The Center for Opportunity Policy in Education at Stanford University carried out a longitudinal study at the K-8 Alice Birney Public Waldorf school in the Sacramento City Unified School District in California (Friedlaender et al., 2015). This study seems to confirm the beliefs held by the teachers interviewed in the 2007 study, and it showed that the instructional approaches used at Birney led to strong student outcomes. Quantitative analysis of student record data revealed that, compared to similar students in other district schools, Birney students had low transiency and suspension rates, as well as positive student achievement outcomes on standardized assessments. Further, while outcomes were strong for all students, outcomes were noticeably strong for Birney's large population of African American, Latino, and socio-economically disadvantaged students. African American and Latino students at Birney had a suspension rate one tenth the rate of similar students across the district. For African American, Latino and socio-economically disadvantaged students, the effect of attending Birney for five

years was correlated with an increase of 8 percentiles (i.e. from 50th percentile to 58th percentile) in English language arts achievement. This was despite Birney's adherence to the Waldorf tradition of delaying formal reading instruction until 1st grade, a lack of formal testing in classrooms, and reliance on student-made "main lesson books" (portfolios)—as opposed to state sanctioned textbooks—for instruction. These results strengthen the possibility that Waldorf pedagogy may have special benefits for traditionally marginalized students. As Laura Pappano (2011) noted in the Harvard Education Letter:

> It sounds counterintuitive for struggling students to spend class time
>
> on, say, knitting and drawing. Yet, a small but growing number of
>
> public schools are embracing Waldorf methods in hopes of engaging
>
> students in ways advocates say traditional approaches do not—and
>
> raising test scores along the way.

Despite 30 years of data from the charter school experiment, there is not yet consensus among researchers regarding the success or failure of charter schools to improve academic outcomes for their students (Turner, 2015). One thing that the growing California charter school movement has provided is a means for researchers to compare alternative educational models using a common assessment tool, in this case, the CAASPP. Greene et al. (2006) found that the best way to compare charter schools to traditional public schools is to narrow the scope of the type of charter school and use controls for demographic profiles of the student served by those schools. This study has followed that suggestion and isolated the comparison schools to charter and non-charter and controlled for family income and enrollment size of the school.

Method

This study uses secondary data analysis, which is research into previously collected archival data. The use of secondary data analysis takes advantage of a significant amount of data that has already been collected, the volume of which has grown larger as our technical understanding has grown (Johnston, 2017). It is also free to use, making it accessible to many more researchers.

Data

The tables from both the California Department of Education (CDE) and CAASPP websites were imported into STATA and merged by each school's unique County-District-School (CDS) code by the researcher. In addition to the CAASPP files, data from the California census and Free and Reduced Priced Meal (FRPM) eligibility files, found on the California Department of Education (CDE) website, were used. The CAASPP data provides information on the percent of students who "met or exceeded" the state standards in the areas of ELA and math at each grade level. The CDE files provide information on enrollment size, zip code, and income variations among schools.

Sample

The nature of the CAASPP data allows us to determine the percent of students who met or exceeded state standards for ELA or math at a particular grade. A school with three classrooms of third graders will report only the percent based on the whole cohort, not individual classrooms. There were 19 Waldorf-inspired charter schools which had students in grades three through eight, which comprised the treatment group. These treatment schools were compared to two different control groups: 1) all non-Waldorf charter schools were grouped into *Control Group One;* 2) all non-charter public schools were grouped into *Control Group Two.* Descriptive

statistics, including number of students, percent white, percent of students who qualify as English language learners, percent of students who qualify for special education services, and percent of student population who qualify for FRPM for each of the five years can be found for the treatment group in Table 5.2. Because of the relatively small number of Waldorf-inspired charter schools, it was not possible in this study to include demographic information related to race, special education, or English language proficiency. The CAASPP hides results for any group showing fewer than 10 observations.

Measures

Demographics. Demographic information is reported by parents or guardians to public schools when a child enters a school district. Additional information is collected yearly by individual school districts and is used to indicate FRPM status, English language (EL) proficiency status, and special education status. It is stored in the California Longitudinal Pupil Achievement Data System (CALPADS).

Standardized assessments. California's statewide assessments are designed by the Smarter Balanced Assessment Consortium (SBAC) and include a comprehensive portfolio of standards-aligned assessments and tools for use by educational agencies, districts, schools, and teachers to support instruction and improve learning (Smarter Balanced, 2022). The CAASPP is the test SBAC has designed for use by California for its statewide assessment. It has been used in the state of California since 2014, when it replaced the Standardized Testing and Reporting system (STAR) that had been used since 1999.

Each year the CAASPP is administered to all public-school students in California in grades 3, 4, 5, 6, 7, 8, and 11. It includes both a computer-adaptive test and a basic skill test for each of the English language arts and math assessments. A computer-adaptive test is one which

changes in response to a student's correct or incorrect answers. A student who gets an answer correct will be given a different next question that one who answered incorrectly. Previous tests in California did not have this capacity, and it is believed to be a more accurate way to measure student learning. They are based on item response theory and are believed to be more accurate, more fair, and shorter (CDE, 2022)

Students' proficiency in ELA and mathematics is measured in the spring of grades three through eight for elementary school and grade eleven for high school. Data for grades three through eight, and from 2015 -2019, are used in the current study. These are computer-based tests that have been aligned with the Common Core State Standards and are used to determine students' knowledge and skills in the tested subject area. California requires that schools meet a 95% student compliance threshold, and all but the most impacted students are expected to take the tests.

The results from the two assessments (ELA and math) are divided into 4 levels of mastery and can be found on the California School Dashboard for any public school in California. Four categories are represented by the following designations: Standard Not Met (red, level1), Standard Nearly Met (yellow, level 2), Standard Met (green, level 3), and Standard Exceeded (blue, level 4) for both ELA and Math. See Figure 1 below for an example of the state dashboard for California.

Figure 5.1.

California state dashboard
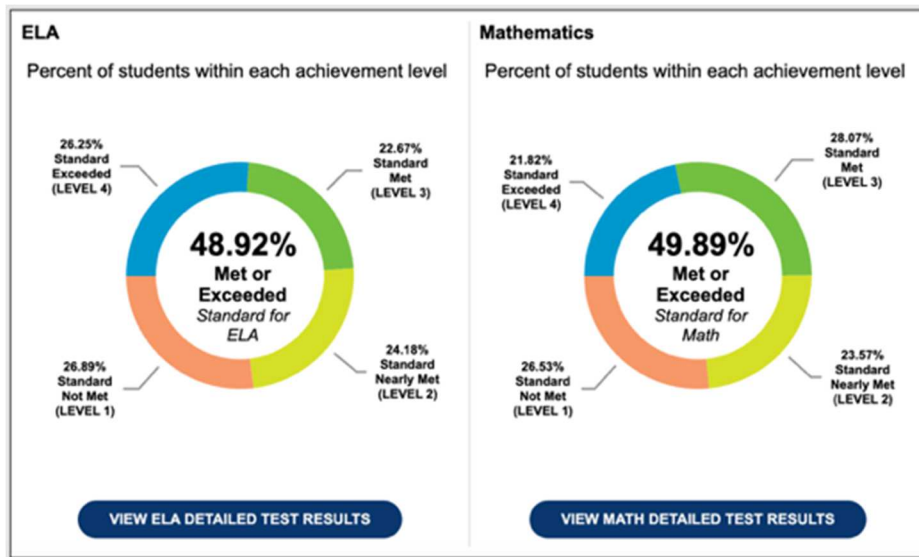
The variable, *percent of students who met or exceeded state standards* (PSMESS), is used for this study, which collapses levels three and four into one group (met or exceeded state standards) and levels one and two into the other group (did not meet or exceed state standards).

   Free or Reduced-Price Meal (Student Poverty). The state of California identifies a students as low income if they qualify for free and/or reduced lunch *or* if both parents have no more than a high school education. Free or reduced-price meal status is determined by the Federal Poverty Guidelines and each child's family income status and household size (CDE, 2019a). Schools are required to report the number of students in their schools who qualify for FRPM each year. Because a child's family finances are related to academic outcomes, this study uses FRPM to control for income-related differences in achievement.

Analysis

   Data analysis. This section provides a step-by-step description of the procedures used to conduct the data analysis for this quantitative study. Merging demographic and income data from the California Department of Education (CDE) with the CAASPP data, I used a quantitative, causal-comparative method to examine differences in achievement between classrooms of

students in Waldorf-inspired charter schools, non-Waldorf charter schools and traditional public schools. The unit of analysis for this study is grade level.

The CAASPP data from the spring of 2015, 2016, 2017, and 2018 were first downloaded from the CDE website as two separate .csv files. The first file, the *test data table*, contains school, district, county, and state aggregate CAASPP counts and scores. The second, *entities file*, contains state, county, district, and school demographic information. Using STATA SE15.1, the *test data table* file was imported and restricted by grade, testid (test 1=ELA and test 2=math), and the variable "percentagestandardmetandabove" for each of the grades three through eight, for each of the five years, and for both tests. These were then individually merged with their corresponding *entity* file, resulting in 50 individual files for each of the years and tests. Next, the individual files were merged into a single CAASPP data file containing all the required information for each year. Finally, the two files were merged 1:1 based on a CDS code created from the combined county, district, and school codes. Groups, including classrooms, comprised of 10 or fewer observations are labeled with an asterisk in the public use file to protect against identification. These were dropped from the data set. Empty cells, created when the data was merged into its wide file format and not actually missing data, was coded as missing. The resulting data file contained 68 variables and 14,247 observations.

To link the CAASPP data with that from CALPADS (FRPM and school enrollment numbers), I first downloaded the Excel files from the CDE website. The CDS code was created for each year of data, as above. Then, each year's enrollment and FRPM information was recoded for each of the five years and were merged 1:1 with the CAASPP data file. This resulted in a file with 77 variables and 12,489 observations across all schools for classrooms in grades three through eight between the spring of 2015 and 2019. One dummy variable (Wcharter) was

created to represent Waldorf charter schools, and another, (schooltype), identified the three different types of schools I was investigating: Waldorf charters = 1; non-Waldorf charters = 2; local public schools = 3.

Statistical Analysis. I began analysis by investigating the overall relationship between the three groups of California schools: local public schools (N=10,968), non-Waldorf charters (N=1,501) and Waldorf charters (N=19). A one-way analysis of variance (ANOVA) was conducted to explore differences in ELA and math scores across the three school types. The treatment group was compared with control groups one and two, separately, for each grade and year measuring the percent of students meeting or exceeding the state standard (PSMESS) in both ELA and math. As a robustness check, the Bonferroni correction was conducted to check for the bias of repeated testing effects and inflated Type I errors.

Next, a series of ordinary least squares (OLS) multiple linear regression models were conducted to estimate the association of enrollment in a Waldorf-inspired charter school with class-level ELA and math achievement during each of the 5 years between 2015 and 2019. Model One examined the differences in the PSMESS on the ELA and math assessments between the treatment group and all other public schools (charter and local public combined). Model Two examined ELA and math differences for PSMESS between the treatment group and other public non-Waldorf *charter* schools. Model Three examined ELA and math PSMESS differences between the treatment group and non-charter public schools. Model Four added controls for size of school (enrollment number), percent of students schoolwide eligible for FRPM, zip code, and district code. The choice of district code over county code is supported by the fact that school districts have, until recently, derived approximately 80% of their local revenue from local property taxes (NCES, 2022). This has had the effect of funneling more money to schools in high

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income neighborhoods because they have more income to tax. As well, a single school district can include several zip codes and even counties within it (NCES, 2022). Therefore, it is more likely that policies are consistent across districts, regardless of county.

The following equation is estimated for each of the models

$$Y_{gy} = ß_0 + ß_1 Treat_g + ß_2 (enrollment)_g + ß_2 (FRPM)_g + ß_3 (zip\ code)_g + ß_4 (district\ code)_g + \mu_c + \varepsilon_{gy}$$

Where Y_{gy} is the percent of students who met or exceeded the state standard (PSMESS) outcome for a grade level$_g$ in a particular year$_y$. Treat is a binary indicator representing enrollment in a Waldorf-inspired charter school in California. I controlled for enrollment size of school, FRPM, zip code (N=1,736), and district code (N=977). Descriptive statistics for the four groups: all schools, Waldorf schools, non-Waldorf charter schools and local public schools are shown in Table 5.3

The coefficient μ_c represents county level fixed effects. Fixed effects are used as a robustness check in Model Four. It is included to account for county-wide variation within districts. This method is recommended for nested data and allows one to control for effects of observable and un-observable unique traits such as school climate or teacher behaviors. (Murnane et al., 2010). These indicators allow each county (N=58) to have its own intercept and removes variable bias by measuring changes within groups across time. Adding the *robust* command helps correct for heteroskedasticity.

Each OLS multiple regression – other than the fixed-effects model – were computed path analyses using Stat SE 15.1. The fixed-effects model was computed using the 'areg' command and missing data were handled using the listwise deletion.

The ε_{gy} is an independently distributed error term. Robust standard errors are computed. These error terms assume that observations are independent and account for minor problems about the normal distribution or heteroskedasticity or errors. For the fixed-effects model, standard errors are clustered at the school level.

Finally, Waldorf schools are unique in their continuity of education. The students do not only remain in the same school first through eighth grade, each class and teacher remain together during those years through a practice known as looping, i.e., instruction by the same main lesson teacher from first through eighth grade. To account for the growth across time spent in a Waldorf-inspired classroom, I calculated the value of the growth of each cohort of students between third and eighth grade to examine overall growth in PSMESS for the two tests to see if there were significant differences in the amount of growth that the two groups of students (treatment vs. control 1 and 2) were achieving. It was possible in two instances to track the same cohort over several years. The class which graduated in the 2018-19 school year had scores from fourth grade onwards. The class that was in eighth grade in the 2017-18 school year had scores from third grade onward. The treatment schools would have had, theoretically, the same teacher and students over the course of the five years. In this case, it is not possible to guarantee that the same students stayed with this group over this period and so results may need to be viewed with care.

Results

Tables 5.4 through 5.7 display results from the OLS linear regression models (e.g., unstandardized coefficients, standard errors, and sample sizes) for each of the five years for each of the models one through three. Each year with its corresponding results for ELA or Math (two separate tables for each year PSMESS is given a row and the outcomes for each of the five

grades are displayed in columns. Results for model four, displaying regression models controlling for the variables of FRPM, enrollment, zip code, and district code can be found in Tables 5.8 and 5.9. Tables 5.10 and 5.11 shows results for model four with fixed effects.

Waldorf-inspired charter school enrollment vs. other charter *and* public-school options (Model One)

OLS Multiple Linear Regression

Model One. This model simply compares the PSMESS in each grade at Waldorf-inspired charter schools versus all other types of public schools (charter and local public). A table including the number of observations, standard errors and R-squared can be found in Table 5.4.

ELA. In grade three, Waldorf-inspired charter schools showed no significant difference in the number of students meeting or exceeding the state standards for ELA, on average, as the control group of all other public schools in California. In grade four, in the 14-15 and 15-16 school year, significantly more (10.2% with $p<0.05$ and 14.6% with $p<0.01$) students in Waldorf-inspired charters met or exceeded the state standard than those in all other types of public schools. In years 14-15, 15-16, and 17-18, significantly more fifth grade students met or exceeded state standards, on average, ($p<0.001$; $p<0.05$; $p<0.01$, respectively) than those in other public schools. Sixth grade students had significantly more students meeting and exceeding state standards as compared to all other public schools in years 14-15 ($p<0.05$); 15-16 ($p<0.05$), and 18-19 ($p<0.05$). By seventh grade, Waldorf-inspired charter schools had significantly more students meeting the standards, on average, in every year (14-15 $p<0.01$; 15-16 $p<0.001$; 16-17 $p<0.001$; 17-18 $p<0.05$); 18-19 $p<0.01$). Eighth grade students in Waldorf-inspired charter schools, by grade eight, had significantly more students meeting the state standards across all years. The p-value for all years except 18-19 was less than 0.001.

Because Waldorf students remain not only in the same school for first through eighth grade, but also with the same teacher, the element of time may play a significant factor in student outcomes. Overall, the treatment schools appear to have a higher PSMESS by the time they test in the spring of eighth grade. As shown in Figure 5.2, on average, just over 19% more students in the treatment group were meeting or exceeding state ELA standards by eighth grade versus 2.8% more students in the control group.

Figure 5.2

Model One: Average PSMESS for ELA

Treatment vs. Control:
(Waldorf vs. All Other Public Schools)
ELA: No Controls
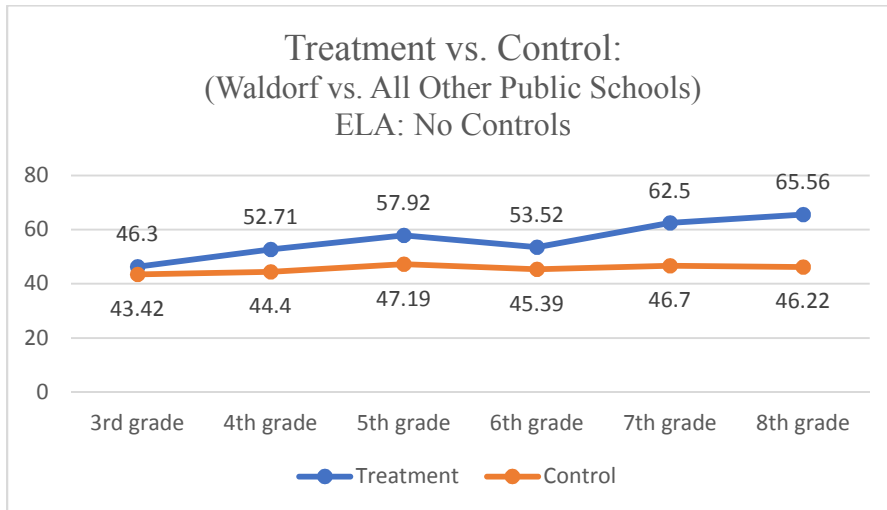
Math. In grades three through, six Waldorf-inspired charter schools show no significant differences, on average, in the PSMESS, except in the 18-19 school year where 15 percent *fewer* of the third-grade treatment group met or exceeded state standards ($p<.01$), as compared to all other types of public schools. By grade seven, significantly more students attending the treatment schools, as compared to the control group of both charter and non-charter public schools, are

meeting or exceeding the math state standards across all years, though significance varies: (14-15

p<.001; 15-16 p<.001); 16-17 p<.001); 17-18 p<.01; 18-19 p<.05). In the eighth-grade year,

again, more students from treatment group for all five years have a significantly higher PSMESS

in math, with p-values less than .001, except for 17-18 and 18-19 where the p<.01.

Figure 5.3 shows that, on average, over 16% more students in the treatment group were

meeting or exceeding math state standards by eighth grade. In the control group, 12.5% fewer

students were meeting or exceeding the math state standards by eighth grade.

Figure 5.3

Model One: Average PSMESS for Math
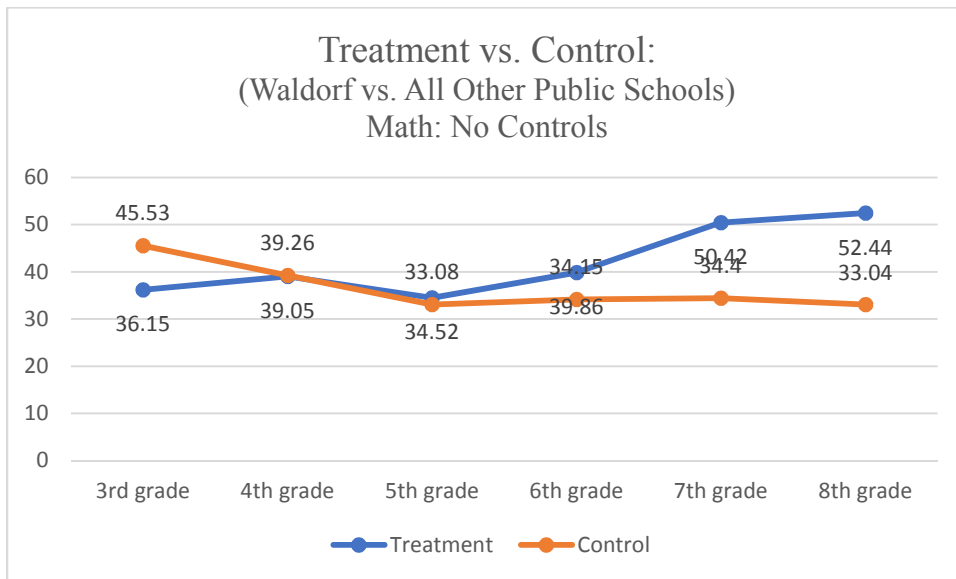
Waldorf-inspired charter school enrollment vs. non-Waldorf charter schools (Model Two)

OLS Multiple Linear Regression

Model Two. This model compares Waldorf-inspired charter schools to other public

schools identified as "charter" (coded 9 for district funded or 10 for locally funded) in the CDE

data set (Control Group One. By restricting the type of school being compared, we are looking at schools with student populations that could be considered more similar to each other. A table including the number of observations, standard errors and R-squared can be found in Table 5.5.

ELA. In third grade, there were no significant differences between the treatment and control groups, on average. In fourth grade, only in year 15-16 did the PSMESS in treatment group exceed those in Control Group One in ELA, (+13% with $p<.01$). In the years 14-15 ($p<.01$), 15-16 ($p<.05$), and 17-18 ($p<.01$), fifth grade students at the treatment schools met the ELA state standards at significantly higher rates. Grade six students performed at similar levels in years 16-17 and 17-18, but significantly more exceeded them in 14-15, 15-16, and 18-19 where nearly 12% ($p<.05$) more students met or exceeded the state standards in the first two years and 11% did so in 18-19 with a p-value of .05). In seventh grade, the PSMESS was significantly higher for ELA (14-15 $p<.05$); 15-16 $p<.01$; 16-17 $p<.001$); 17-18 ($p<.05$); 18-19 $p<.01$). By eighth grade, a significantly higher number of students in the treatment group were meeting or exceeding state standards across all five years with a p-value of 0.01 or smaller.

As shown in Figure 5.4, Waldorf schools have approximately 19% more students in their classes meeting the state standard in ELA by the eighth grade versus non-Waldorf charters which show an increase of just over 3%.

Figure 5.4.

Model two: Average PSMESS for ELA

Treatment vs. Control Group One:
(Waldorf vs. non-Waldorf Charter Schools)
ELA: No Controls
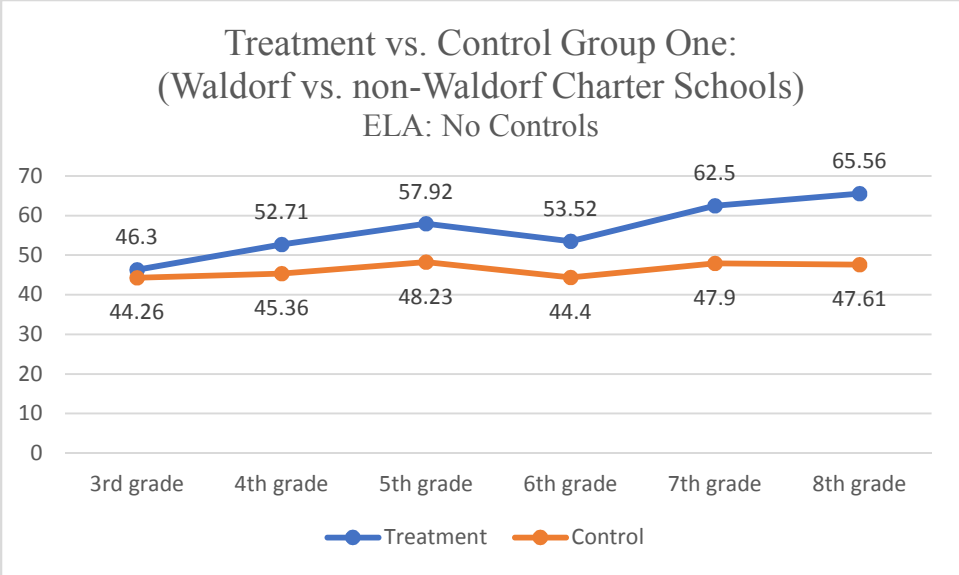
Math. In grades three through six, there were no significant differences in the PSMESS for math, with three exceptions. In third grade of the 18-19 school year, 14% fewer students at treatment schools met or exceeded state standards in math ($p<.01$). In sixth grade in 14-15 and 15-16, the treatment school students outperformed the control group by 10% ($p<.05$) and 13% ($p<.01$). In seventh grade, students at the treatment schools, on average, significantly outperformed the control groups across all years with p-values lower than .001, except in 18-19 ($p<.05$). By eighth grade, the PSMESS at treatment schools in math was highly significant across all years by an average of 25 percentage points and with a p-value of less than 0.001.

Growth in math in Figure 5.5 shows that by eighth grade 7% more students are meeting or exceeding state math standards than were in third grade. In non-Waldorf charters, there is an opposite effect. Nearly 5% fewer students are meeting the state math standards.

Figure 5.5

Model Two: PSMESS for Math

Treatment vs. Control Group One:
Waldorf vs. non-Waldorf Charter Schools
Math: No Controls
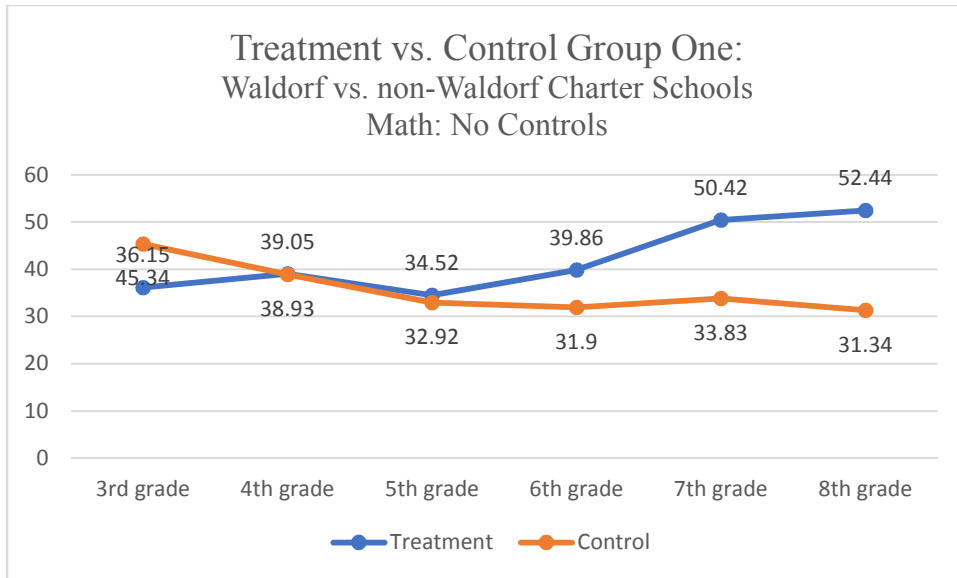
Waldorf-inspired charter school enrollment vs. local, public schools (non-charter) (Model Three)

OLS Multiple Linear Regression

Model three. This model compares the treatment schools to local public schools (Control Group Two). A table including the number of observations, standard errors and R-squared can be found in Table 5.8.

ELA. In grades three and four, there were no significant differences in PSMESS for ELA across all years, except in grade 4 during the 14-15 and 15-16 school years, where the PSMESS in math was, on average, 11% and 15% higher than local, public schools (p<.05 and p<.01, respectively). In grade five, a higher percentage of students from the treatment schools met or exceeded state standards in 14-15 (p<.001), 15-16 (p<.05), and 17-18 (p<.01). In sixth grade the two groups performed similarly, except in 14-15, when public school students were outperformed by the treatment schools by about 10 percentage points (p<.05) and in 15-16 by 11 percentage points (p<.05). The treatment group of seventh grade students significantly outperformed the control group in all years (14-15 p<.001; 15-16 p<.001; 16-17 p<.001; 17-18

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p<.05; 18-19 p<.01). By eighth grade the PSMESS in the treatment group was significantly

higher across all years (14-15 p<.001; 15-16 p<.001; 16-17 p<.001; 17-18 p<.001; 18-19 p<.01).

Figure 5.6 shows that, on average, by eighth grade 19% more students are meeting or

exceeding the state standards in ELA. Local public schools show that 2.34% more students have

met this same benchmark.

Figure 5.6

Model Three: Average PSMESS for ELA
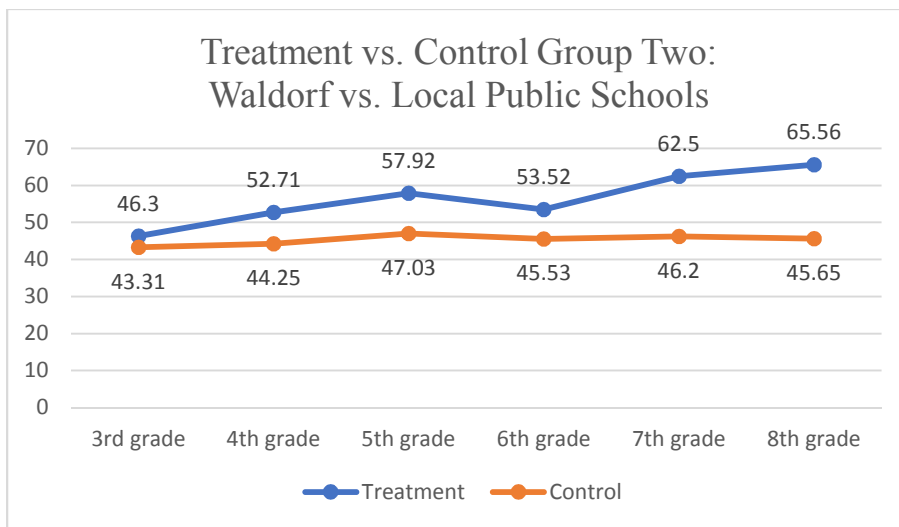
Math. When students enrolled in local public schools are compared to those enrolled in

Waldorf charter schools as a PSMESS in math, on average, no significant differences in grades

three through six are found, with two exceptions. In 18-19 the PSMESS in treatment schools in

third grade was significantly lower than the control (p<.01) and in 15-16, the treatment group in

sixth grade, on average, scored at a significantly higher percentage (p<.05). In seventh grade, all

five years showed significant differences in the PSMESS. By eighth grade, across all years, the

treatment group showed a significantly higher PSMESS, on average, than the control. They were

highly significant in years 14-15,15-16 and 16-17 with a p-value less than .001.

Figure 5.7 shows that in math, a higher percent of non-Waldorf students (45.6%) are meeting or exceeding the state math standards in third grade versus only 36% of those attending Waldorf-inspired charter schools. However, by eighth grade, the outcomes have flipped. The number of students meeting or exceeding state standards in math has increased by 16% in the Waldorf-inspired schools, while in the local public schools the percent has fallen by 12%.

Figure 5.7

Model Three: Average PSMESS for Math
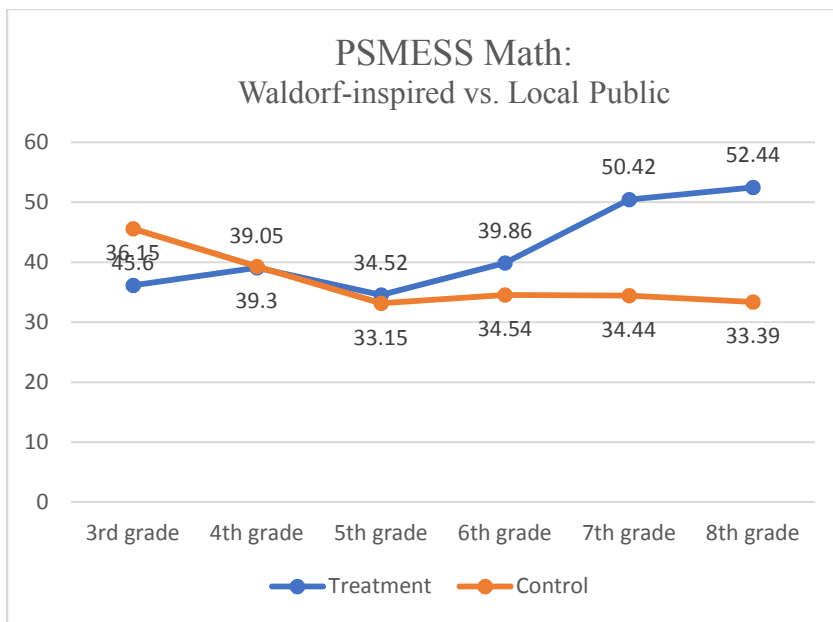
Waldorf-inspired charter school enrollment vs. non-Waldorf charters, with controls (Model Four)

OLS Multiple Linear Regression

Model four. This model controls for the enrollment size of the school, percent of students eligible for FRPM, zip code, and district code for charter schools only.

ELA. Overall, once the controls were added, there were no significant differences in the PSMESS for ELA between the treatment and *Control Group 1* in third grade except in the 18-19 school year. In this year, the PSMESS was significantly less by 14 percentage points with a p-

value of <.001. In fourth grade of the same year, the PSMESS for the treatment group was, on average, lower by 8% in ELA (p<.05). Grades five and six showed no differences. In grade seven the PSMESS was significantly more for Waldorf-inspired students in 16-17; on average eight percentage points more students were achieving or exceeding state standards than the control with p-value less than .05. By eighth grade, the treatment group again showed a higher PSMESS for ELA in years 15-16 and 16-17 with p-values less than .05. The R-squared for this model ranged between 31% and 45%, as compared to the previous models which had R-squared varying from less than one to three percent.

Figure 5.8 shows the PSMESS averaged across the five years for ELA. In third grade, non-Waldorf charters have, on average, 66% of students meeting or exceeding state standards. In the fifth grade the scores converge, and they begin to switch. In each of the five years, there were no significant differences except in the 15/16 school year in 8th grade and the 16/17 school year in 7th and 8th grade. In these grades and years, the students enrolled in the treatment group had significantly more students meeting or exceeding the state standards.

Figure 5.8

Model Four: Average PSMESS for ELA

Treament Vs. Control Group One:
Waldorf vs. non-Waldorf Charter Schools
ELA: with controls
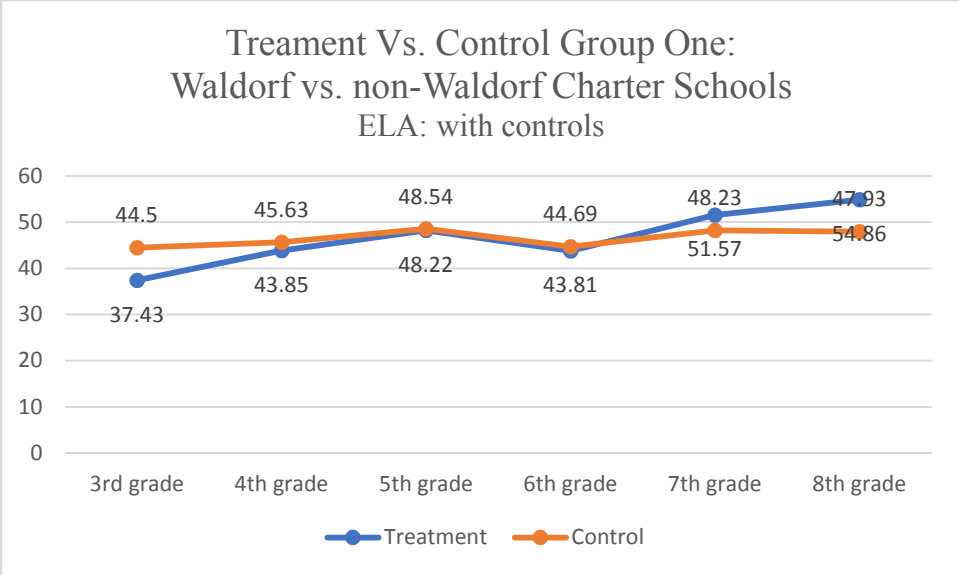
Math. In third grade, the PSMESS for the treatment group is significantly lower than PSMESS for Control Group One with a p-value less than either .01 or .001 for all years. In fourth grade, the control group continued to show significantly lower PSMESS in years 14-15 and 18-19 with a p-value less than .001 for both. In grade five, the treatment schools have a lower PSMESS, on average, in years 15-16 (p<.01), 16-17 (p<.01), and 17-18 (p<.05). Grade six showed no significant differences between the groups. Grade seven only had a significant difference in year 16-17 (p<.05). By 8th grade, Waldorf-inspired schools show a significantly higher PSMESS in years 14-15 (p<.05), 15-16 (p<.01), and 16-17 (p<.001), even when controlling for economic status, school size, zip code, and district code. The R-squared for this model for math ranged between 20% and 37%, as compared with the model without controls, where the R-squared varied between less than one and three percent.

Figure 5.9 shows the average change in PSMESS over the five years. The treatment group has, on average, significantly fewer students meeting or exceeding the state standards in third grade (28% versus 46%). In sixth grade the differences converge and by eighth grade

Waldorf-inspired charter school students show 43% of their students at or above standard, versus 32% in the control group.

Figure 5.9

Model Four: Average PSMESS for Math

Treatment vs. Control Group One: Waldorf vs. non-Waldorf Charter Schools — Math: with controls
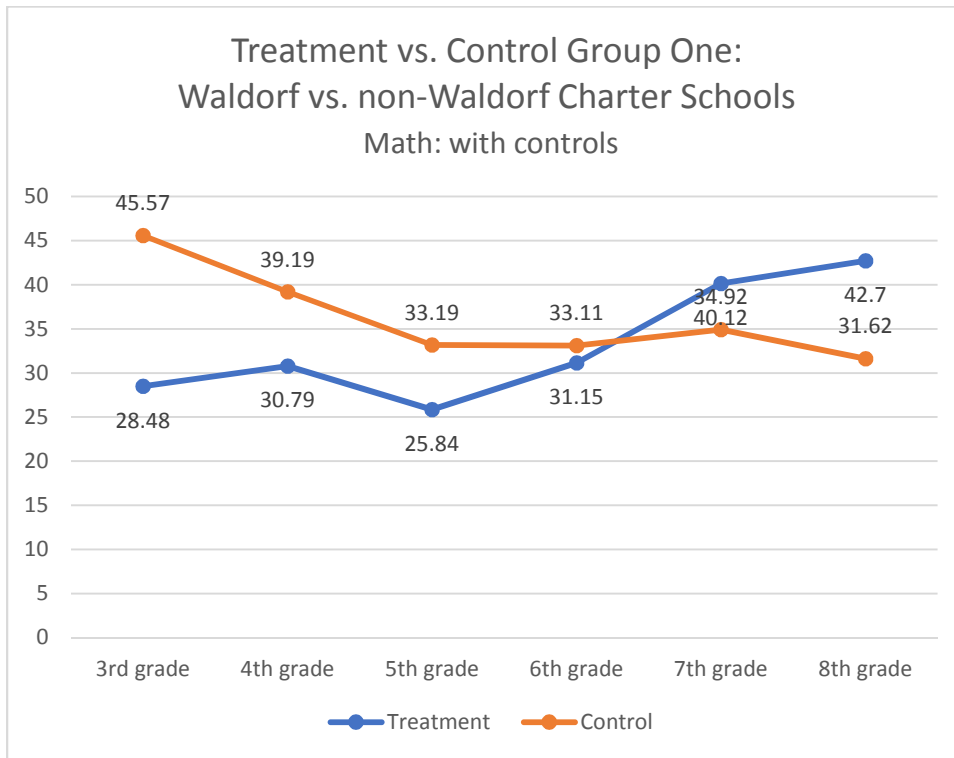
Fixed Effects.

ELA. Accounting for the nesting effect of county resulted in removing any significance in negative ELA PSMESS in all five years for the treatment group that had been seen previously. By eighth grade in years 14/15 and 15/16, there continue to be more PSMESS for the treatment group in ELA ($p<.02$ for both years). In the 16/17 school year in eighth grade, this number is approaching significance ($p<.07$).

The two groups start out at a similar point (36% control vs. 45% treatment PSMESS) in third grade and remain on a similar track. They both drop in sixth grade and then regain their

positions. Then, the treatment group begins to outperform the control group, finishing with 7% more students meeting or exceeding state standards. See Figure 5.10 below.

Figure 5.10

Model Four: Average PSMESS with fixed effects for ELA
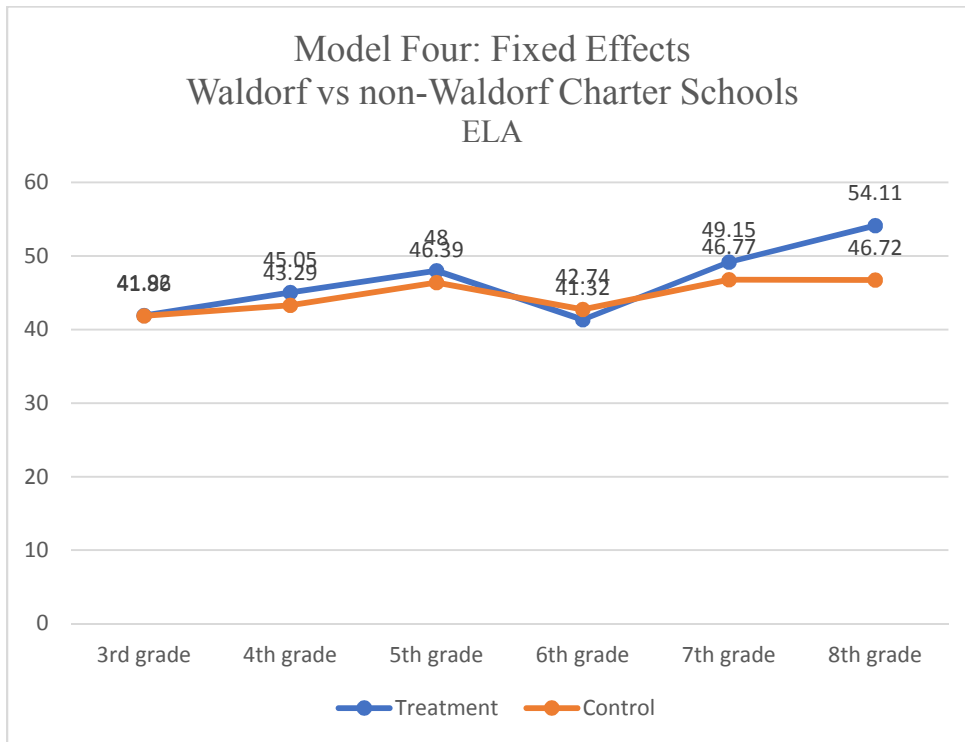
Math. For math, the negative association of PSMESS for attending a Waldorf charter school remained significant in year 14/15, 16/17, and 18/19. There were no other significant differences until eighth grade when eighth graders in the treatment group showed a significantly higher PSMESS in years 14/15 (p<.01), 15/16 (p<.01), and 16/17 (p<.00).

Similar to ELA, in math the students start out at about the same average point in 3rd grade. Growth is seen in grades four and five and both have a drop in sixth grade. At this point, the trajectory for the students in the treatment schools is steeper, and they finished eighth grade with 7% more students meeting or exceeding state standards in math, as shown in Figure 5.11.

Figure 5.11

Model Four: Fixed effects

Fixed-Effects:
Waldorf vs. non-Waldorf Charter Schools
Math
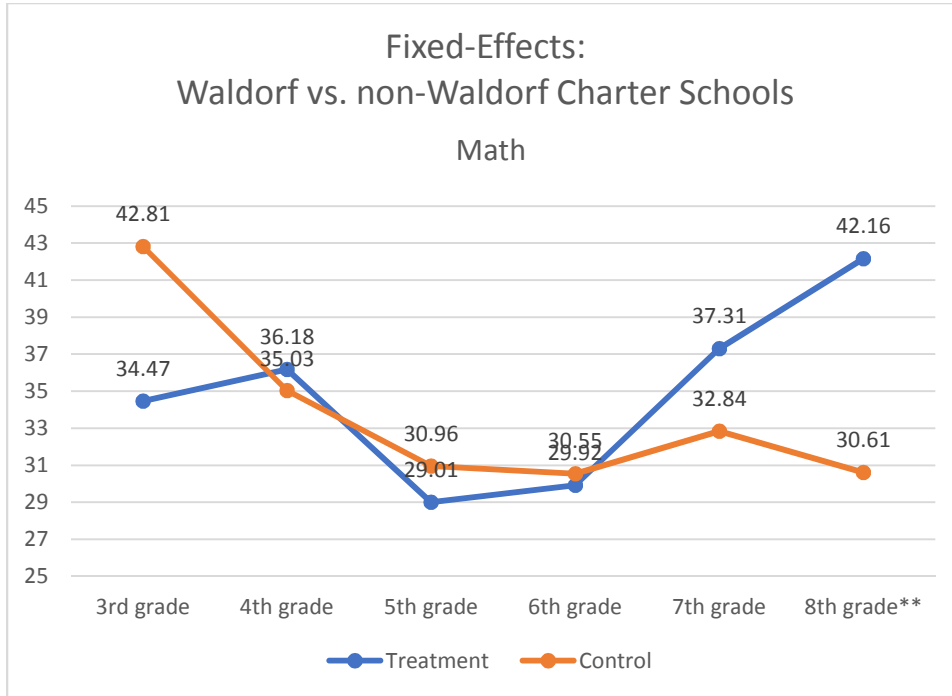
Summary of Results

At a school and grade level, without using any control variables, the differences between the treatment school and the two control groups follow a similar pattern. In the early years, generally, students attending treatment schools are meeting or exceeding the state standards at similar levels, with a few significant differences. Between fifth and sixth grade the two group converge and trend in opposite directions. By seventh grade, there are significantly more PSMESS, and this continues into eighth grade. Overall, the percent gain between third and eighth grade for Waldorf-inspired charter school students is higher than for either non-Waldorf charters or local public schools. The effect size was very small.

For math, a smaller, though not significantly, percentage of students in the treatment group are meeting the standards in third grade as compared with the control groups. By fifth

grade this begins to turn around. By seventh and eighth grade, students in the treatment group are outperforming the comparison groups by approximately 20%. The PSMESS for the treatment group in math between third and eighth grade increases by approximately 29%. Comparatively, the PSMESS for local public school and non-Waldorf charters drops between third and eighth grade from approximately 45% to 31%, meaning 14% fewer students are meeting the standards by eighth grade. Again, the effect size was very small.

Next, when I controlled for school size (enrollment), socio-economic status (FRPM), district code, and zip code, the number of instances of significance decrease for the treatment group in both ELA and math, suggesting that geography and money are important factors in whether a student performs academically, as previous research has found. There appears to be a medium effect size for ELA (Eta-squared = .4) and a small to medium one for math (Eta-squared = .3), despite growth-over-time being greater for the subject of math. However, we can see that over the course of five years, the overall achievement of the treatment group is greater, even when controlling for these factors.

There is a similar story for math achievement. In third grade, an average of 47% of students in Waldorf schools are meeting or exceeding the state standards, as compared with 64% in the control group. In sixth grade the percent of students in the two groups has converged. By eighth grade the percent has increased by an average of 15%, to 63% of the students. This difference is significant in three of the five years. In the control group, students in third grade drop from an average of 64% to only 51% in eighth grade.

When using a fixed-effects model which controlled for school size, economic status, zip code, and district code and then absorbed county differences, many of the significant differences disappeared. The graph shows that both types of charter schools experience a dip in scores in the

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fifth and sixth grade. At the sixth-grade level, as in previous models, the trends switch themselves for the two schools and the treatment schools begin to outperform the control schools. In three of the five years, for both ELA and math, the students in the treatment group had a significantly higher PSMESS that the control group.

Discussion

In this chapter, I pooled five years (2014-15 to 2018-19) of archival CAASPP test data from the CDE website, along with FRPM and enrollment numbers from the CALPADS website to examine three groups of schools based on their school type status. Using these data, I employed descriptive statistics and OLS multiple linear regression to investigate the association between enrollment in a Waldorf-inspired charter school and PSMESS on the CAASPP standardized assessments. Group one, the treatment group, was comprised of students in Waldorf-inspired charter schools. Group two was comprised of students in traditional, local public schools. Group three consisted of students enrolled in non-Waldorf charter schools. The estimates were conducted using applicable covariates which accounted for school size, socio-economic status (FRPM), zip code, and school district. In addition, I employed school-level fixed effects and reported significance results that withheld the Bonferroni correction to correct for type-one errors.

At the school/grade level, I found that at baseline (when students are first tested in 3rd grade) students in both the treatment and control groups, when controlling for variations between schools and districts and including a fixed effect for county, have a similar PSMESS for both ELA and math. However, in a majority of years, the students in the treatment group were significantly outperforming their non-Waldorf-inspired charter school counterparts by eighth grade. This is consistent with previous research investigating Waldorf academic outcomes and

supports the schools' stated belief in a long-term, developmental approach to education. Without constant testing, early academics, and state mandated textbooks, the students are achieving proficiency at either the same or a greater percent than their peers by 8th grade.

I also found that the average percent of growth from third to eighth grade for the treatment group was greater than the control group in both ELA and math. In ELA, the treatment group had more than twice the growth over five years as the control group. In math, the differences were even more pronounced. There were nearly 8% more students at standard for the treatment group while the control group had nearly 2% *fewer* students at standard in math. The overall effect of this schooling was moderate.

Given what we know about cognitive development, I do not find these results surprising. Learning doesn't happen on a fixed schedule. Yet we measure it that way. Students in our public and private schools are expected to be at a certain point by a certain time each year or measures must be taken. This study provides evidence that one alternative model of education has been able to educate its students successfully, without the constant stress of testing and traditional grades. Despite the strong push to provide traditional academics to students at younger and younger ages in the U.S., these schools have resisted and continue to approach education from a developmental perspective recommended by Dewey, Piaget, and Vygotsky. This model may find success because it focuses on developing strong foundations in the early years, better preparing the students to get to middle school ready to dive into the more complex concepts of algebra and writing.

However, it is also possible that other are other factors driving the outcomes. All who study Waldorf education realize it is unlike any other system currently in existence. There are several practices that may, on their or own or tied together, may be supporting these students.

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One of these, looping, is shown to improve scores by several months for every two years with the same teacher (McCowen, 2002; Baker, 2006; Tucker, 2006). Another may be the use of imagination through story that is linked to cognitive flexibility (Veraksa, 2022). Or, perhaps, it is the lack of high stakes testing? Many of the practices of Waldorf schools are supported by current educational research. For example, a recent literature review by Mavrelos, et al., (2020) investigated the relationship between pedagogy, intelligence, and the neuroscience of learning. They found an overlap between Waldorf teaching strategies and Multiple Intelligence Theory (MI) and concluded that although Waldorf and Waldorf-inspired schools are not MI schools, Waldorf schools do employ MI-consistent teaching strategies.

I also found that in the years 17/18 and 18/19 (the most recent years studied) many of the significant effects that had been seen in the previous three years had disappeared, although the students were still on par with their peers. This leads me to wonder whether there might be external pressures being placed on these charter schools because of their significantly low scores in the early grades. Experience with the founding of a charter school would confirm this thought. Charter schools receive or are denied renewal of their petition based on the academic indicators linked to the California Dashboard (CDE, 2022). Because the categories related to the percent of students below, nearly at, meeting, or exceeding state standards are calculated based on the *entire* school's performance, the scores that students achieve in the early years can significantly lower the average for the whole school, erasing any growth that has occurred. With the threat of school closure looming, schools may take up practices that traditional schools use when faced with "underperformance," such as after school tutoring, math specialists and adopting state math curricula. If this is happening and the true Waldorf curriculum is being manipulated to be more like non-Waldorf schools, and that may explain why fewer students are doing as well as they

were in the three previous years. This paper provides evidence of academic growth over time that could help Waldorf-inspired charter schools as they face pushback from anti-charter groups who would like to get the charters revoked.

Limitations and Future Research

This study is the first of its kind to compare the performance of students at Waldorf-inspired charter schools to students in both other charters and traditional public schools using standardized CAASPP test results. It is strong in many ways, but some limitations exist. In the case of schools with class enrollment under 10, information related to both the class scores, English language learner status, special education status and race is only available as restricted data. Because Waldorf-inspired classrooms sometimes have smaller classes in the seventh and eighth grades, this makes their data unavailable publicly and reduces the number of grades that can participate. Having access to these classes would add to the picture by providing a bigger sample, and it would be beneficial to know whether the results differ at all for certain demographic groups.

As well, some may be interested in how different genders respond to this pedagogy. I chose not to include gender in my study as it is not, as is becoming more and more clear, a binary indicator. Some may disagree with me. However, I am currently in a seventh/eighth grade classroom with at least 10% of the students who do not identify as male or female. Gender is determined through a parent survey when a child enters school, often as young as four and a half. I wonder about the accuracy of using a label that was not chosen by the students themselves. How do we know it is accurate?

Finally, although I controlled for a rigorous set of covariates related to school differences, there are many factors that I could not control for. These include practices such as looping, art-

integration, and a whole-to parts teaching practice. Future research may consider using a Propensity Score Matching model to better control for population differences. Or, perhaps, following the students through high school using their service set identifier (SSID) numbers to see how they fair in traditional high schools after spending time in a treatment school. Adding the California Science Test scores to the model might also provide some interesting results, as one RTC study in 2019 found strong correlations between the integration of the arts and retention of science content (Hardiman, 2019). I hope that future research will expand on these findings as we strive to improve the education of all children for a brighter future.

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Table 5.1.

Charter School Enrollment Growth in California

Year	2014-15	2015-16	2016-17	2017-18	2018-19
Student Enrollment	544,293	568,774	602,837	626,982	652,825
Percent of enrollment	8.70%	9.20%	10.10%	10.60%	11%

Source: Digest of Educational Statistics, 2022.

Table 5.2

Summary statistics for schools in the treatment group over five years.

		2015	2016	2017	2018	2019	AVERAGE
Alice Birney	# students	572	582	554	528	518	551
	% white	60%	60%	59%	59%	59%	59%
	EL	4%	3%	3%	3%	3%	3%
	SpEd	16%	19.00%	19%	19%	17%	18%
	EcDis	30%	32%	29%	31%	33%	31%
AM Winn	# students	387	365	389	348	333	364
	% white	42%	39%	40%	37%	38%	39%
	EL	19%	19%	20%	17%	17%	18%
	SpEd	16%	18%	19%	23%	20%	19%
	EcDis	80%	81%	77%	75%	71%	77%
Blue Oak Ch.	# students	430	433	387	375	360	397
	% white	70%	71%	73%	69%	68%	70%
	EL	0%	1%	3%	5%	4%	3%
	SpEd	11%	11%	10%	8%	10%	10%
	EcDis	59%	58%	46%	56%	55%	55%
Coastal Grove	# students	229	221	228	231	234	229
	% white	71%	77%	78%	78%	80%	77%
	EL	1%	0%	0%	0%	0%	0%
	SpEd	8%	9%	9%	8%	8%	8%
	EcDis	50%	52%	49%	54%	59%	53%
Community School for Creative Education	# students	191	192	208	252	241	217
	% white	13%	10%	8%	4%	3%	8%
	EL	23%	43%	52%	39%	48%	41%
	SpEd	16%	14%	14%	10%	14%	14%
	EcDis	74%	83%	72%	78%	59%	73%
Golden Valley Orchard (opened in 2015)	# students	x	180	222	256	259	229
	% white	x	78%	75%	73%	75%	75%
	EL	x	35%	1%	1%	15%	13%
	SpEd	x	6%	5%	5%	5%	5%
	EcDis	x	41%	30%	29%	36%	34%
Golden Valley River	# students	466	338	330	307	305	349
	% white	73%	68%	68%	70%	70%	70%
	EL	3%	3%	2%	1%	1%	2%
	SpEd	5%	8%	9%	8%	6%	7%

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	EcDis	36%	40%	34%	39%	30%	36%
Journey School	# students	400	424	470	528	589	482
	% white	65%	62%	64%	65%	64%	64%
	EL	5%	5%	3%	4%	5%	4%
	SpEd	12%	12%	11%	12%	12%	12%
	EcDis	13%	13%	5%	18%	16%	13%
Live Oak Charter	# students	284	289	296	294	293	291
	% white	85%	84%	82%	81%	85%	83%
	EL	1%	1%	1%	1%	1%	1%
	SpEd	9%	10%	11%	11%	9%	10%
	EcDis	21%	20%	18%	21%	17%	19%
Mariposa	# students	362	369	393	386	397	381
	% white	82%	81%	76%	75%	73%	77%
	EL	5%	6%	8%	7%	8%	7%
	SpEd	10%	11%	10%	8%	7%	9%
	EcDis	4%	4%	4%	10%	13%	7%
Monterey Bay Charter	# students	335	358	387	422	464	393
	% white	60%	58%	57%	59%	59%	59%
	EL	4%	3%	3%	3%	4%	3%
	SpEd	9%	9%	10%	11%	10%	10%
	EcDis	30%	35%	35%	23%	24%	29%
Novato Charter	# students	265	268	270	268	271	268
	% white	83%	81%	77%	73%	70%	77%
	EL	0%	1%	1%	0%	2%	1%
	SP.Ed	9%	8%	10%	11%	10%	10%
	EcDis	1%	3%	11%	15%	10%	8%
Ocean Charter	# students	460	458	506	504	521	490
	% white	54%	52%	54%	50%	49%	52%
	EL	3%	19%	4%	7%	6%	8%
	SpEd	12%	12%	13%	13%	12%	12%
	EcDis	18%	19%	18%	26%	22%	21%
River Oak Charter	# students	237	237	239	241	245	240
	% white	67%	675%	66%	66%	64%	188%
	EL	9%	8%	8%	8%	7%	8%
	SpEd	10%	8%	9%	9%	7%	9%
	EcDis	49%	41%	44%	52%	47%	47%
Sebastopol	# students	286	293	292	292	293	291
	% white	77%	78%	77%	75%	76%	77%
	EL	0%	0%	0%	0%	0%	0%

	SpEd	7%	7%	9%	10%	9%	8%
	EcDis	26%	29%	27%	32%	32%	29%
Stone Bridge	# students	266	265	266	274	269	268
	% white	83%	83%	82%	77%	77%	80%
	EL	6%	5%	5%	5%	15%	7%
	SP.Ed	3%	5%	6%	5%	3%	4%
	EcDis	13%	5%	5%	8%	5%	7%
Sun Ridge	# students	270	278	279	284	276	277
	% white	79%	76%	75%	78%	75%	77%
	EL	0%	2%	2%	0%	0%	1%
	SpEd	7%	5%	5%	5%	5%	5%
	EcDis	35%	17%	14%	23%	29%	24%
Woodland Star Charter	# students	230	249	246	249	251	245
	% white	65%	65%	62%	59%	59%	62%
	EL	16%	12%	12%	7%	6%	11%
	SpEd	10%	6%	8%	8%	20%	10%
	EcDis	44%	33%	31%	45%	43%	39%
Yuba River	# students	292	301	305	313	304	303
	% white	84%	88%	81%	82%	82%	83%
	EL	0%	0%	0%	0%	0%	0%
	SpEd	10%	18%	8%	6%	6%	10%
	EcDis	50%	47%	49%	56%	51%	51%
Average across all schools	330 students						
	58% white						
	6% EL						
	9% SpEd						
	34% FRPM						

Note: Information taken of the California Department of Education website, https://www.cde.ca.gov/ta/tg/ca/ November 2020. EL = English language learner, SpEd = Special Education, EcDis = economically disadvantaged.

Table 5.3.

Descriptive Statistics of enrollment and %FRPM by school type.

	All Schools		Waldorf Charters		Non-Waldorf Charters		Local Public Schools	
	M	SD	M	SD	M	SD	M	SD
Enrollment 1415	571	248	335	104	539	501	575	207
Enrollment 1516	568	248	333	100	559	509	570	205
Enrollment 1617	564	248	340	101	570	515	564	203
Enrollment 1718	557	250	343	100	577	536	555	201
Enrollment 1819	548	253	347	111	582	559	545	199
% FRPM 1415	52.45	28.26	24.06	17.90	43.50	27.95	53.43	28.12
% FRPM 1516	52.67	27.76	26.33	19.96	44.72	27.76	53.55	27.62
% FRPM 1617	51.45	27.35	23.55	17.35	43.77	27.23	52.31	27.23
% FRPM 1718	55.60	27.13	31.64	18.22	48.81	26.40	56.35	27.10
% FRPM 1819	54.72	27.00	30.32	15.21	47.79	25.89	55.49	27.01
Observations ELA	5438		17		489		4932	
Enrollment 1415	571	248	335	104	540	501	575	207
Enrollment 1516	568	248	333	100	560	510	570	205
Enrollment 1617	564	248	340	101	570	515	564	203
Enrollment 1718	556	250	342	100	578	536	555	201
Enrollment 1819	548	253	347	111	583	560	545	199
% FRPM 1415	52.46	28.30	24.06	18	43.57	27.93	53.44	28.12
% FRPM 1516	52.68	27.76	26.33	20	44.79	27.75	53.55	27.62
% FRPM 1617	51.47	27.35	23.55	17	43.84	27.22	52.32	27.22
% FRPM 1718	55.60	27.13	31.64	18	48.87	26.40	56.35	27.10
% FRPM 1819	54.73	27.00	30.32	15	47.86	25.88	55.50	27.00
Observations MATH	5439		17		488		4934	

FRPM = percent eligible for free and/or reduced-price lunch program.

Table 5.4.

Model one. Ordinary least squares (OLS) multiple linear regression predicting the association between attendance at a Waldorf-inspired charter school versus all other public schools (including charters) and the percent of students meeting and/or exceeding state ELA standards in grades three through eight.

14/15

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	4.743	10.154*	16.432***	11.640*	14.793**	18.052***
	(4.897)	(4.961)	(4.918)	(4.755)	(4.973)	(5.036)
Constant	37.313***	38.735***	43.624***	40.860***	41.736***	42.948***
	(0.276)	(0.280)	(0.278)	(0.316)	(0.411)	(0.415)
Observations	5662	5645	5641	4088	2491	2504
R-squared	0.000	0.001	0.002	0.001	0.004	0.005

15.16

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	8.477	14.607**	11.227*	11.386*	16.972***	24.366***
	(4.967)	(4.827)	(4.758)	(4.864)	(4.875)	(5.322)
Constant	41.857***	43.183***	47.667***	45.502***	45.806***	46.634***
	(0.280)	(0.279)	(0.275)	(0.322)	(0.411)	(0.409)
Observations	5674	5685	5682	4096	2528	2542
R-squared	0.001	0.002	0.001	0.001	0.005	0.008

16/17

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	4.092	8.860	5.534	3.903	22.677***	21.407***
	(4.698)	(4.738)	(4.720)	(4.658)	(5.019)	(4.950)
Constant	43.006***	44.084***	45.735***	45.314***	47.364***	46.575***
	(0.271)	(0.274)	(0.272)	(0.316)	(0.408)	(0.401)
Observations	5714	5702	5737	4117	2574	2586
R-squared	0.000	0.001	0.000	0.000	0.008	0.007

17/18

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	3.297	7.928	12.537**	5.112	10.565*	19.054***
	(4.664)	(4.649)	(4.701)	(4.550)	(4.609)	(4.825)
Constant	47.281***	47.529***	48.285***	46.573***	48.394***	47.053***
	(0.269)	(0.268)	(0.270)	(0.309)	(0.394)	(0.401)
Observations	5706	5726	5740	4114	2599	2604
R-squared	0.000	0.001	0.001	0.000	0.002	0.006

18/19

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-6.156	0.146	8.082	8.764*	14.547**	14.468**
	(4.719)	(4.786)	(4.582)	(4.456)	(4.593)	(4.640)
Constant	47.593***	48.306***	50.471***	48.537***	49.650***	47.259***
	(0.264)	(0.261)	(0.263)	(0.302)	(0.389)	(0.391)
Observations	5753	5730	5779	4134	2652	2675
R-squared	0.000	0.000	0.001	0.001	0.004	0.004

Standard errors in parentheses

* $p<0.05$; ** $p<0.01$; *** $p<0.001$

Table 5.5.

Model one. Ordinary least squares (OLS) multiple linear regression predicting the association between attendance at a Waldorf-inspired charter school versus all other public schools (including charters) and the percent of students meeting and/or exceeding state MATH standards in grades three through eight.

14/15

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-7.745	-0.421	8.921	8.405	17.524***	17.219***
	(5.075)	(5.070)	(4.940)	(4.685)	(4.894)	(5.025)
Constant	39.912***	33.755***	29.190***	30.706***	31.888***	30.486***
	(0.286)	(0.286)	(0.279)	(0.311)	(0.404)	(0.415)
Observations	5661	5644	5640	4090	2492	2498
R-squared	0.000	0.000	0.001	0.001	0.005	0.005

15/16

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-6.308	3.532	-1.404	11.241*	17.905***	25.439***
	(5.092)	(5.039)	(4.967)	(5.019)	(4.885)	(5.540)
Constant	44.863***	37.574***	31.983***	33.229***	34.150***	32.828***
	(0.287)	(0.291)	(0.287)	(0.323)	(0.412)	(0.426)
Observations	5675	5683	5683	4093	2530	2539
R-squared	0.000	0.000	0.000	0.001	0.005	0.008

16/17

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-8.905	5.255	-0.871	4.577	20.342***	24.652***
	(4.837)	(4.953)	(4.932)	(4.736)	(5.075)	(5.145)
Constant	45.939***	39.439***	32.972***	34.368***	34.526***	33.503***
	(0.279)	(0.286)	(0.284)	(0.322)	(0.412)	(0.418)
Observations	5708	5704	5738	4115	2574	2579
R-squared	0.001	0.000	0.000	0.000	0.006	0.009

17/18

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-8.015	-0.486	-0.652	0.097	14.364**	16.120**
	(4.867)	(4.944)	(4.936)	(4.753)	(4.772)	(5.076)
Constant	47.905***	41.716***	34.755***	35.807***	35.128***	33.964***
	(0.281)	(0.285)	(0.284)	(0.323)	(0.408)	(0.422)
Observations	5709	5728	5738	4116	2600	2603
R-squared	0.000	0.000	0.000	0.000	0.003	0.004

18/19

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-15.075**	-8.947	1.011	4.334	10.545*	14.199**
	(4.916)	(5.045)	(4.942)	(4.714)	(4.815)	(4.969)
Constant	49.196***	43.817***	36.692***	36.554***	35.740***	33.778***
	(0.275)	(0.283)	(0.283)	(0.319)	(0.408)	(0.419)
Observations	5756	5730	5780	4137	2650	2670
R-squared	0.002	0.001	0.000	0.000	0.002	0.003

Standard errors in parentheses

* p<0.05; ** p<0.01; *** p<0.001"

Table 5.6.

Model two. Ordinary least squares (OLS) multiple linear regression predicting the association between attendance at a Waldorf-inspired charter school versus a non-Waldorf charter school and the percent of students meeting and/or exceeding state ELA standards in grades three through eight.

14/15

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	2.201	8.030	14.309**	11.883*	12.994*	16.624**
	(4.743)	(4.928)	(4.938)	(4.688)	(5.073)	(5.302)
Constant	39.855***	40.859***	45.746***	40.617***	43.535***	44.376***
	(0.819)	(0.859)	(0.855)	(0.817)	(0.886)	(0.933)
Observations	604	593	601	593	557	549
R-squared	0.000	0.004	0.014	0.011	0.012	0.018

15/16

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	6.584	12.917**	9.901*	11.775*	14.657**	21.769***
	(4.806)	(4.642)	(4.635)	(4.732)	(4.916)	(5.250)
Constant	43.750***	44.872***	48.993***	45.114***	48.120***	49.231***
	(0.818)	(0.807)	(0.802)	(0.814)	(0.858)	(0.852)
Observations	621	629	634	608	591	570
R-squared	0.003	0.012	0.007	0.010	0.015	0.029

16/17

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	3.589	8.361	4.387	4.754	21.376***	19.593***
	(4.629)	(4.554)	(4.499)	(4.470)	(4.895)	(4.957)
Constant	43.509***	44.583***	46.882***	44.464***	48.665***	48.390***
	(0.794)	(0.784)	(0.756)	(0.775)	(0.809)	(0.830)
Observations	645	641	672	632	622	607
R-squared	0.001	0.005	0.001	0.002	0.030	0.025

17/18

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	3.671	7.065	12.413**	6.416	9.970*	17.884***
	(4.635)	(4.525)	(4.616)	(4.384)	(4.555)	(4.849)
Constant	46.908***	48.392***	48.409***	45.269***	48.989***	48.223***
	(0.791)	(0.770)	(0.773)	(0.743)	(0.781)	(0.817)
Observations	652	657	677	662	646	634
R-squared	0.001	0.004	0.011	0.003	0.007	0.021

18/19

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-5.827	0.354	7.417	10.768*	14.011**	13.905**
	(4.708)	(4.608)	(4.473)	(4.339)	(4.601)	(4.576)
Constant	47.264***	48.097***	51.136***	46.533***	50.185***	47.822***
	(0.760)	(0.734)	(0.738)	(0.727)	(0.770)	(0.770)
Observations	690	670	698	677	679	671
R-squared	0.002	0.000	0.004	0.009	0.014	0.014

Standard errors in parentheses

* p<0.05; ** p<0.01; *** p<0.001"

Table 5.7.

Model two. Ordinary least squares (OLS) multiple linear regression predicting the association between attendance at a Waldorf-inspired charter school versus a non-Waldorf charter school and the percent of students meeting and/or exceeding state MATH standards in grades three through eight.

14/15

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
W. Charter School	-8.645	-1.581	8.137	9.811*	17.165***	18.460***
	(4.941)	(4.918)	(4.685)	(4.500)	(4.892)	(5.125)
Constant	40.812***	34.915***	29.974***	29.300***	32.247***	29.246***
	(0.854)	(0.858)	(0.810)	(0.785)	(0.855)	(0.902)
Observations	603	592	602	592	556	549
R-squared	0.005	0.000	0.005	0.008	0.022	0.023

15/16

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
W. Charter School	-6.348	3.759	-1.682	12.792**	17.606***	26.616***
	(5.038)	(4.816)	(4.777)	(4.641)	(4.903)	(5.507)
Constant	44.904***	37.346***	32.261***	31.679***	34.449***	31.650***
	(0.857)	(0.838)	(0.826)	(0.778)	(0.856)	(0.893)
Observations	622	628	635	605	590	570
R-squared	0.003	0.001	0.000	0.012	0.021	0.040

16/17

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
W. Charter School	-8.679	5.994	-0.613	6.518	20.793***	25.904***
	(4.773)	(4.707)	(4.653)	(4.408)	(5.013)	(5.098)
Constant	45.713***	38.700***	32.714***	32.427***	34.076***	32.251***
	(0.821)	(0.810)	(0.782)	(0.765)	(0.829)	(0.855)
Observations	643	641	672	631	622	605
R-squared	0.005	0.003	0.000	0.003	0.027	0.041

17/18

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-7.206	-0.264	0.257	2.654	15.791***	18.033***
	(4.885)	(4.843)	(4.784)	(4.365)	(4.577)	(5.029)
Constant	47.096***	41.494***	33.846***	33.250***	33.701***	32.051***
	(0.834)	(0.823)	(0.802)	(0.739)	(0.785)	(0.848)
Observations	652	658	676	662	646	633
R-squared	0.003	0.000	0.000	0.001	0.018	0.020

18/19

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8

W. Charter School	-14.055**	-7.329	1.882	8.015	11.639*	16.472***
	-5.026	-4.892	-4.827	-4.366	-4.709	-4.941
Constant	48.176***	42.200***	35.821***	32.873***	34.645***	31.505***
	-0.811	-0.801	-0.796	-0.731	-0.788	-0.832
Observations	691	671	698	678	679	670
R-squared	0.011	0.003	0	0.005	0.009	0.016

Standard errors in parentheses

  * p<0.05; ** p<0.01; *** p<0.001"

Table 5.8.

Model Three. Ordinary least squares (OLS) multiple linear regression predicting the PSMESS between attending the treatment school and local, public schools in grades three through eight for ELA.

14/15

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	5.037	10.395*	16.678***	11.600*	15.296**	18.441***
	(4.917)	(4.971)	(4.921)	(4.778)	(4.959)	(4.986)
Constant	37.018***	38.493***	43.378***	40.900***	41.234***	42.559***
	(0.293)	(0.296)	(0.294)	(0.342)	(0.463)	(0.463)
Observations	5076	5070	5058	3513	1951	1972
R-squared	0.000	0.001	0.002	0.002	0.005	0.007

15/16

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	8.702	14.810**	11.389*	11.321*	17.657***	25.097***
	(4.993)	(4.855)	(4.779)	(4.902)	(4.878)	(5.336)
Constant	41.631***	42.979***	47.506***	45.568***	45.121***	45.903***
	(0.297)	(0.297)	(0.293)	(0.351)	(0.468)	(0.464)
Observations	5071	5075	5067	3506	1955	1987
R-squared	0.001	0.002	0.001	0.002	0.007	0.011

16/17

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	4.154	8.922	5.682	3.753	23.080***	21.948***
	(4.714)	(4.769)	(4.753)	(4.703)	(5.073)	(4.963)
Constant	42.944***	44.022***	45.587***	45.464***	46.960***	46.034***
	(0.288)	(0.292)	(0.291)	(0.346)	(0.471)	(0.458)
Observations	5088	5080	5084	3504	1969	1996
R-squared	0.000	0.001	0.000	0.000	0.010	0.010

17/18

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	3.251	8.036	12.553**	4.870	10.756*	19.420***
	(4.683)	(4.672)	(4.720)	(4.594)	(4.643)	(4.843)
Constant	47.328***	47.420***	48.269***	46.816***	48.203***	46.687***
	(0.287)	(0.285)	(0.289)	(0.340)	(0.456)	(0.461)
Observations	5073	5088	5082	3471	1972	1988
R-squared	0.000	0.001	0.001	0.000	0.003	0.008

18/19

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8

Waldorf Charter School	-6.200	0.119	8.171	8.383	14.726**	14.651**
	(4.727)	(4.814)	(4.601)	(4.484)	(4.613)	(4.678)
Constant	47.637***	48.333***	50.382***	48.918***	49.471***	47.076***
	(0.281)	(0.279)	(0.281)	(0.331)	(0.450)	(0.453)
Observations	5081	5077	5100	3476	1992	2023
R-squared	0.000	0.000	0.001	0.001	0.005	0.005

Standard errors in parentheses

* p<0.05; ** p<0.01; *** p<0.001"

Table 5.9.

Model Three. Ordinary least squares (OLS) multiple linear regression predicting the PSMESS between attending the treatment school and local, public schools in grades three through eight for MATH.

14/15

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
W. Charter School	-7.641	-0.290	9.012	8.175	17.624***	16.881***
	(5.096)	(5.093)	(4.976)	(4.719)	(4.919)	(5.022)
Constant	39.808***	33.623***	29.099***	30.937***	31.788***	30.825***
	(0.303)	(0.303)	(0.297)	(0.338)	(0.459)	(0.467)
Observations	5076	5070	5056	3516	1953	1966
R-squared	0.000	0.000	0.001	0.001	0.007	0.006

15/16

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
W. Charter School	-6.303	3.504	-1.370	10.980*	17.994***	25.107***
	(5.108)	(5.071)	(4.994)	(5.090)	(4.901)	(5.563)
Constant	44.858***	37.601***	31.949***	33.491***	34.062***	33.160***
	(0.304)	(0.310)	(0.306)	(0.355)	(0.470)	(0.484)
Observations	5071	5074	5067	3505	1958	1984
R-squared	0.000	0.000	0.000	0.001	0.007	0.010

16/17

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
W. Charter School	-8.933	5.164	-0.904	4.236	20.203***	24.279***
	(4.851)	(4.992)	(4.973)	(4.797)	(5.113)	(5.182)
Constant	45.966***	39.530***	33.005***	34.709***	34.666***	33.876***
	(0.297)	(0.305)	(0.304)	(0.353)	(0.475)	(0.479)
Observations	5084	5082	5085	3503	1969	1991
R-squared	0.001	0.000	0.000	0.000	0.008	0.011

17/18

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
W. Charter School	-8.116	-0.514	-0.770	-0.380	13.906**	15.522**
	(4.879)	(4.964)	(4.963)	(4.823)	(4.845)	(5.112)
Constant	48.006***	41.744***	34.873***	36.283***	35.585***	34.562***
	(0.299)	(0.303)	(0.303)	(0.357)	(0.475)	(0.486)
Observations	5076	5089	5081	3473	1973	1988
R-squared	0.001	0.000	0.000	0.000	0.004	0.005

18/19

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
W. Charter School	-15.211**	-9.156	0.895	3.633	10.178*	13.459**
	(4.908)	(5.070)	(4.964)	(4.772)	(4.861)	(4.983)
Constant	49.332***	44.026***	36.808***	37.256***	36.106***	34.517***
	(0.292)	(0.302)	(0.303)	(0.353)	(0.475)	(0.483)
Observations	5083	5077	5101	3478	1990	2019
R-squared	0.002	0.001	0.000	0.000	0.002	0.004

Standard errors in parentheses

* p<0.05; ** p<0.01; *** p<0.001

Table 5.10.

Model Four. Ordinary least squares (OLS) multiple linear regression with fixed effects predicting the PSMESS between attending the treatment school and local, public schools in grades three through eight for ELA.

14/15

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-3.74	-4.36	5.61	3.74	4.49	12.85*
	(4.98)	(4.86)	(5.03)	(4.92)	(5.42)	(5.61)
% FRPM	-0.39***	-0.49***	-0.44***	-0.44***	-0.47***	-0.45***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Enrollment	0.00	-0.00	0.00	0.00	0.00*	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
District Code	-0.00	-0.00	-0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Zip Code	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	68.77***	70.11***	72.73***	61.38***	70.43***	67.44***
	(8.01)	(8.19)	(8.56)	(7.10)	(9.16)	(9.82)
Observations	402	392	394	452	425	411

15/16

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	3.61	8.00	0.78	5.51	1.31	12.17*
	(4.70)	(4.85)	(4.67)	(5.21)	(4.93)	(5.26)
% FRPM	-0.44***	-0.41***	-0.47***	-0.41***	-0.48***	-0.43***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Enrollment	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
District Code	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Zip Code	0.00	0.00	-0.00	0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	59.69***	67.24***	77.78***	66.55***	67.28***	76.19***
	(7.40)	(7.65)	(7.27)	(6.91)	(6.69)	(8.46)
Observations	414	420	425	460	451	431

16/17

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	1.61	0.66	-4.32	-11.79*	9.16	9.73

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
	(4.65)	(4.87)	(4.71)	(4.63)	(5.08)	(5.25)
% FRPM	-0.40***	-0.39***	-0.41***	-0.44***	-0.46***	-0.43***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Enrollment	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
District Code	-0.00	-0.00	-0.00	0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Zip Code	0.00	-0.00	-0.00	0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	59.37***	65.53***	70.75***	63.80***	74.15***	61.64***
	(7.58)	(7.44)	(6.45)	(6.34)	(6.22)	(6.58)
Observations	433	431	458	482	480	462

17/18

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	5.96	6.43	4.22	-6.67	-5.63	5.54
	(4.91)	(5.03)	(4.86)	(4.66)	(4.58)	(5.08)
% FRPM	-0.37***	-0.34***	-0.39***	-0.42***	-0.46***	-0.49***
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)
Enrollment	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
District Code	-0.00	-0.00	-0.00	-0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Zip Code	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	57.10***	67.89***	66.39***	62.68***	67.47***	67.48***
	(6.77)	(7.60)	(6.34)	(5.66)	(5.75)	(6.40)
Observations	439	445	463	502	499	479

18/19

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-7.10	-1.95	1.78	2.10	2.59	-3.36
	(5.00)	(4.65)	(4.68)	(4.55)	(4.91)	(4.94)
% FRPM	-0.38***	-0.38***	-0.41***	-0.42***	-0.44***	-0.43***
	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Enrollment	-0.00	-0.00*	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
District Code	-0.00	-0.00	-0.00	-0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Zip Code	0.00	-0.00	-0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Constant	63.48***	71.86***	76.05***	70.20***	72.03***	67.29***
	(7.18)	(6.48)	(6.49)	(5.62)	(6.26)	(6.15)
Observations	470	456	481	522	526	512

Standard errors in parentheses

* p<0.05; **p<0.01; ***p<0.001

Table 5.11.

Model Four. Ordinary least squares (OLS) multiple linear regression with fixed effects predicting the PSMESS between attending the treatment school and local, public schools in grades three through eight for MATH.

14/15

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-12.48*	-8.40	2.65	2.66	7.22	16.16**
	(5.58)	(5.29)	(5.03)	(4.95)	(5.38)	(6.02)
% FRPM	-0.31***	-0.38***	-0.36***	-0.38***	-0.38***	-0.35***
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)
Enrollment	-0.00	-0.00	-0.00	0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
District Code	-0.00	-0.00	-0.00	-0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Zip Code	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	69.94***	58.38***	57.68***	48.51***	63.17***	55.42***
	(8.98)	(8.92)	(8.54)	(7.15)	(9.09)	(10.50)
Observations	402	391	395	451	425	410

15/16

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-5.90	0.71	-4.16	6.31	9.16	16.23**
	(5.54)	(5.10)	(5.03)	(5.29)	(5.20)	(5.90)
% FRPM	-0.32***	-0.33***	-0.37***	-0.37***	-0.45***	-0.34***
	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Enrollment	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
District Code	-0.00	-0.00*	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Zip Code	0.00	-0.00	-0.00	-0.00	0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	55.33***	62.54***	60.61***	50.97***	52.06***	60.48***
	(8.72)	(8.04)	(7.46)	(6.66)	(7.06)	(9.49)
Observations	415	419	426	458	450	431

16/17

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-9.32	-1.24	-3.70	-5.37	4.86	18.10**
	(5.45)	(5.20)	(5.03)	(4.80)	(5.45)	(6.02)
% FRPM	-0.30***	-0.32***	-0.35***	-0.37***	-0.45***	-0.34***
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)
Enrollment	-0.00	-0.00	-0.00	-0.00	-0.00*	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
District Code	-0.00	-0.00	-0.00	0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Zip Code	-0.00	0.00	-0.00	-0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	66.50***	55.54***	60.49***	48.82***	57.55***	42.95***
	(8.89)	(7.95)	(7.14)	(6.58)	(6.66)	(7.54)
Observations	433	431	456	481	480	460

17/18

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-0.03	2.10	-6.37	-5.35	0.48	6.10
	(5.66)	(5.57)	(5.46)	(4.93)	(4.92)	(5.51)
% FRPM	-0.24***	-0.25***	-0.31***	-0.34***	-0.40***	-0.45***
	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.04)
Enrollment	-0.00*	-0.00	-0.00	-0.00	-0.00	-0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
District Code	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Zip Code	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	53.69***	55.81***	52.39***	48.87***	54.51***	55.64***
	(7.80)	(8.41)	(7.12)	(5.98)	(6.17)	(6.93)
Observations	440	446	463	502	499	479

18/19

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Waldorf Charter School	-13.99*	-4.22	1.84	1.38	0.63	1.14
	(5.79)	(5.26)	(5.53)	(4.74)	(5.18)	(5.51)
% FRPM	-0.24***	-0.27***	-0.27***	-0.34***	-0.39***	-0.39***
	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
Enrollment	-0.00*	-0.00**	-0.00*	-0.00	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
District Code	-0.00	-0.00	-0.00	-0.00	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Zip Code	-0.00	-0.00	-0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	64.59***	62.63***	61.15***	53.21***	55.95***	47.49***
	(8.31)	(7.56)	(7.67)	(5.86)	(6.61)	(6.86)
Observations	471	457	481	523	526	512

Standard errors in parentheses

* p<0.05; ** p<0.01; *** p<0.001

CHAPTER 6

Key Findings and Implications

Despite the pressures to perform felt by public schools across the United States, Waldorf schools have resisted any change in the presentation of their 100-year-old pedagogy. Instead of narrowing of their curriculum, they continue to provide students with rich experiences that integrate art, music, and movement into lessons. Unfortunately, because the pedagogy is complex and difficult to untangle, there is limited evidence of the ways in which Waldorf education may or may be successful.

The more recent growth of public, Waldorf-inspired charter schools finally provides researchers with a way to measure their effectiveness. This dissertation first provided a look into how and why first grade teachers at private Waldorf schools teach literacy. It provides a context for the next two studies. The second described the part of the day call *morning rhythmical movement* and then investigated whether a correlation could be found between this activity and the development of executive function skill. The final study used public data from the California Department of Education to measure differences in the percent of students in Waldorf charter schools who are meeting or exceeding state standards as compared to other types of publicly available elementary school classrooms to better understand the academic outcomes for these students.

Summary of Findings

Study One

In the first study, which took place between the 2017-2018 to 2018 -2019 academic years, I explored the practices of three teachers in private Waldorf school classrooms. Using interviews, observations, and student work, I sought to understand the practices and beliefs of

these teachers as they related to the teaching of literacy, using an alternative educational approach.

I found that the teachers held strong beliefs about a developmental nature of teaching and learning. Their goal was to develop strong relationships not only with their students but between the students and curriculum, the students to each other, and the parents to the group. This focus on developing relationships was likely a result of the tradition of looping that Waldorf schools practice from first through eighth grade.

Building strong foundational skills was another key goal for these teachers. They believed that directing attention to lower-level skills in the early grades would pay off with better academic outcomes for the students later. Although the teachers did not expressly say the words EF, a strong argument can be made for understanding that this is what they were referring to. They mentioned being able to manipulate letters (WM), exercise self-control (IC), and develop imagination (CF). Daily, the students had to listen to, recall, and connect the information in the story content they were told to both the academics they were learning and to their personal life.

The visual arts-integration was used to both solidify key concepts for the students and aid in the student's expression of recall, as well as providing an assessment tool as the year progressed. The teachers used the portfolios to improve student hand-eye coordination, develop spatial orientation and strengthen connections between the audio, visual and kinesthetic forms of the letters they were learning.

These findings suggest that these teachers believe that foundational skills are an important part of a developmental approach to learning and that teaching time spent addressing the strengthening both physical (balance, hand-eye coordination, fine, and gross motor skills) and cognitive capacities (WM, IC, and CF), would pay off in the older grades.

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Study Two

In this second study I looked at the teaching practices of the same three teachers from a different perspective. This time my focus was on the part of the teaching day referred to as *morning rhythmical movement,* occurring within the first two hours of the day. By using observations and running records, I identified the ways in which the teachers were teaching some of the foundational skills referred to in the interviews in study one.

The teachers in the three classrooms spent an average of 45% of their total teaching time (54 minutes) engaged in activities that support the development of EF skill. The activities were sorted into three accepted components of WM, IC, and CF. Of the three components of EF, I found that CF was most equally targeted between the three schools. This makes sense given the amount of art-integration that is part of the Waldorf pedagogy. Time spent addressing IC seemed to correlate with the teacher's reporting of how challenging they found their students, with Classroom Three reports the most challenges with student behavior and the highest amount of time spent focused on IC (42%).

The second part of the study, where I investigated whether any correlations could be found between time spent practicing EF skill and EF development, was inconclusive for several reasons. First, due to the COVID-19 pandemic, the number of students who completed the full four years of the study dropped by half, making my treatment group very small. Second, because of the school closures, the Waldorf curriculum could not be reliably implemented. Even though the teachers spoke of trying to conduct their lessons with movement and music and speak through Zoom, it was not highly successful. Finally, given the developmental nature of EF, fourth grade may be too young an age at which to see marked growth between groups. A future

study that follows the students through to the end of grade eight, might provide a better measurement.

Study Three

In the third study I examined the association between enrollment at a Waldorf-inspired charter school and other non-Waldorf charters and non-charter public schools using the CAASPP. Estimation procedures included descriptive statistics, multiple linear regressions controlling for covariates, and a county-level fixed effects model. I used the Bonferroni corrections to adjust for type one errors.

Even when controlling for factors that might result from differences in population for each type of school, I found that students enrolled in Waldorf-inspired charter schools, on average, outperformed both control groups by eighth grade in both ELA and math in three out of the five years studied. This is supports previous research examining academic outcomes in Waldorf schools.

As well, I found that for the treatment group the average amount of growth of PSMESS between third and eighth grade in ELA was twice as high as Control Group One, the non-Waldorf charter schools. As compared to Control Group Two, the growth of PSMESS between third and eighth was over 11 times higher. This was due to the significantly lower PSMESS in third grade. In math the growth is even more striking. The non-Waldorf charters had a negative growth curve, meaning they had 2% *fewer* students meeting standards by eighth grade. This negative downturn is present for Control Group Two as well but falls to 12% fewer students meeting math standards, on average, by eighth grade. Students in both local public schools and non-Waldorf charter schools, on average, are starting out with a much higher number of students where they should be, but then losing ground as they progress into the higher grades.

It appears that in math the fifth and sixth grades are key times at which the trajectory of academic outcomes may change. Perhaps this is because of the change in content covered on the CASSPP in those years? For example, new concepts that support future algebraic thinking may be introduced in fifth and sixth grade. At this time, the students have not had much time to practice working with them and thus show a markedly smaller PSMESS. By eighth grade, they would have had the necessary practice to be able to use their understanding in context to answer more questions correctly.

These findings support the argument that the developmental approach used by Waldorf-inspired charter schools can work. The slow start to academics, because of focus on more foundational types of skill, does not appear to hurt the students' long-term academic outcomes. In fact, in many years, significantly more of them were achieving state standards.

Implications and future research

The results of the current study have important implications for educators, practitioners, stakeholders, and researchers alike. They provide evidence of ways in which games and playful activities can be used to practice and possibly improve, EF development. They also found that teachers in Waldorf schools use these practices to prepare their students for future academic learning. As well, it shows that despite redirecting academic teaching time from solely academic content to foundational skill development, including a focus on EF skill, academic standards can be met by eighth grade. It provides some evidence the term school-readiness may be too limited in its scope, focusing only on the time *before* kindergarten. For students who may come to school with a narrow exposure to the world, it may be that forgoing academic content in the early years can help them develop important skill for the future.

The findings have several important policy implications. Those at the state, county and district level could change policies in such a way that teachers feel that they can take the time they need in the younger grades to address the behavioral, social, and emotional needs of their classes before jumping into more complex academic learning.

As to the disappearance of significance in the 2018 and 2019 school years, it is possible that organizational theory may be able to offer and explanation. According to Weber (1978), the appearance of legitimacy is a strong factor in how organizations, such as schools, have come to look so similar. Realizing that the entire system was political, his theory explains why authorizers, such as districts or local Departments of Education, can push charter schools to slowly move away from their "innovative" initiatives. When the standards that are to be met are used as a threat to closure, schools must make choices that will ensure their survival, enacting practices that are not in line with their pedagogy. This may be what is happening with these schools. To show that the students are learning, they are compared using a standard that doesn't fit – measuring growth on a yearly basis rather than on a continuum. These results may be useful for school administrators when they must account for low test scores in the third through fifth grades.

Conclusion

The COVID-19 pandemic that closed schools for millions of children across the globe will surely have some long-term effect on education. Currently in the United States, districts and schools are struggling to staff their classrooms, to provide much needed support to students in mental health, to feed the hungry, and on top of that provide a quality education to all. It is a daunting task. Some people hope that the disruption might provide the impetus for change that they believe has been needed for some time.

In this dissertation I examined the connections between Waldorf education and the development of EF. As well, I investigated the relationship between academic outcomes as measured by the CAASPP– in both public and private Waldorf schools and their non-Waldorf comparative cohorts. Overall, my finding shed light on the beliefs and practices of Waldorf teachers and make initial connections between the active daily games and movement they participate in and the development EF. Finally, the findings indicated that despite the amount of time that Waldorf teachers spend on activities that are not directly academic, the students are performing as well as, if not often better than, their comparable groups. Future research into the connection between EF and certain activities could have important implications for classrooms across the nation.

Appendix A
Supplementary information for study one

Interview sample questions:

1. What were you goals for 1st grade?
With clarification: and these can be different levels or classification so they can be academic goals, social goals, emotional goals, physical? (They also could be at the teacher level, class level and student level.)

2. How did you go about teaching/meeting those goals that you had set?

3. Did you meet those goals this year or were they longer-term goals?

4. Did the school provide you with some expectations about where they expected 1st graders to be, with a little leeway? Or is it totally up to you? How did that work?

5. What about remediation? How did you approach that?

6. Anything else?