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DEPARTMENT OF PSYCHOLOGY

# The Impacts of COVID-19 Related School Closures and Remote Instruction on Students with Autism Spectrum Disorders' Academic Performance

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# ABSTRACT

**Purpose:** In this study, I address the research question regarding the effects of COVID-19 related school closures and online learning for K-12 students with autism spectrum disorder (ASD) compared to their traditional in person learning environment. This topic is extremely relevant, as COVID-19 has hindered the ability for students to receive education in person and required students, families, and educators to adjust to a virtual class environment instead. For students with ASD, online learning hinders their ability to access necessary supports to assist their academic performance and limits crucial social interaction with peers and educators. In a more general sense, the study of education and the effects COVID-19 and virtual learning have had on student performance is of important value as society strives to provide the best education possible to help set children up for success. **Method:** This study utilizes the deidentified academic records of 15 students according to FERPA guidelines to determine the students' academic performance before and after COVID-19 interruptions to in-person learning. The Individualized Education Program (IEP) and Compensatory Services Worksheet of each student was used to identify their reading comprehension, reading fluency, and mathematics computation fluency goals, as well as teacher interviews to gain an understanding on the effects virtual learning has had on students' academic performance. **Results:** Results were determined through a repeated-measures analysis, and it was found that virtual learning had a negative effect on student academic performance and regression of academic progress occurred. Teachers reported difficulty in instructing students in a virtual environment and that students struggled to focus due to distractions, resulting in academic declines. **Conclusion:** It is recommended that interventions are implemented for students with ASD to mitigate academic regression and ensure that COVID-19 related school closures do not hinder long-term success of students with ASD in the future.

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# Introduction

## The COVID-19 Pandemic and School Closures

The COVID-19 pandemic has affected almost every aspect within our society over the past three years, leading to a great deal of stress and mitigative efforts to stop the spread of the readily contagious virus. In order to limit interactions with individuals outside one's direct home, most schools closed their doors while they navigated a shift to virtual instruction during spring 2020. This remote learning method of schooling then continued for many schools into the 2020-2021 school year, gradually shifting back to in-person instruction again. While these school closures were necessary in protecting students and staff from potential exposure and spreading of COVID-19, the interruption to in-person learning and adjusting to virtual learning was difficult for many students. This is especially true for students with intellectual and developmental disabilities (IDDs), as they often require a greater degree of support and services to assist them in their learning and development. When COVID-19 related school closures occurred, students with IDDs' services and learning support were interrupted, forcing students, parents, and teachers to acclimate to virtual learning and remote instruction in their homes.

## Autism Spectrum Disorder and Special Education Services

### *Characteristics of Autism Spectrum Disorder*

Autism Spectrum Disorder (ASD) is a developmental disability which affects a person's functioning in various domains. The three key areas which ASD affects are a person's communication skills, social skills development, and behavioral functioning [Centers for Disease Control and Prevention (CDC), 2020]. When considering appropriate education for children with ASD, it is important to understand what the presenting symptoms of ASD are and to consider

how each student's presentation and severity of ASD varies (Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007).

In order to capture the ranging severity of ASD symptoms and the extent to which support is needed for the individual to function, the DSM-V ranked the severity of one's ASD into three levels. Level 1 is the lowest level of impairment, titled "Requiring support", level 2 is in between and called "Requiring substantial support", and level 3 includes the most severe impairment which is "Requiring very substantial support" (American Psychiatric Association, 2013). When a child is given a diagnosis of ASD, they are also provided with a specification of the severity level of their disability. This is important to consider within the educational setting as it highlights the level of support to be needed as recommended by the psychological professional who diagnosed the disability and the DSM-V which they referenced (American Psychiatric Association, 2013).

The first category of characteristics of ASD which is important to consider is communication skills and impairments. While this area of development is not specifically required to receive a diagnosis of ASD, communication difficulties are a prominent and wide-ranging characteristic of many individuals with ASD which can greatly impair a student's academic and social functioning. Therefore, considering this characteristic is important when gaining an understanding of the ways to provide comprehensive and necessary supports to a student with ASD (Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007). When defining the communication abilities of a student with ASD, it is necessary to consider both their verbal and nonverbal communication. Some students with ASD speak and converse verbally, other students are nonverbal but able to participate in nonverbal communication through gestures or assistive technology, and some students are entirely nonverbal while also

lacking the ability to communicate in any manner. This range in communication abilities shows how defining communication simply as speaking or using sign language is not expansive enough and can result in a student missing out on services such as speech pathology or occupational therapy to promote other potential forms of communication present, such as communicating through a device (Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007).

Further communication needs which must be considered when supporting a student with ASD also tie into the characteristic of social skill deficits, and include the difficulties that many students with ASD have when initiating and maintaining conversations with others. The aspects of conversational skills which can be difficult for them include both verbal and nonverbal skills such as understanding and practicing reciprocal communication, utilizing proper vocal tone and inflection, and nonverbal conversational skills of eye contact, facial expressions, and body language (Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007).

As mentioned prior, another characteristic of ASD is having deficits in social skills development. A great deal of the difficulties that children with ASD face in social interactions is due to their inability to utilize and participate in joint attention and shared experiences. Joint attention is the ability for a person to focus on something or someone with another person, so that two individuals are coordinating their attention simultaneously on each other and a separate object, concept, event, or person (Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007). Joint attention can be initiated through pointing at something or following someone's eye gaze in order to focus one's attention on the same thing. Shared experiences refer to the idea of showing or telling others of achievements or highlighting interesting things or events to others. Deficits in these two skills leads to children with ASD being relatively self-contained and uninterested or unable to include others in their thoughts and actions.

Furthermore, additional delays in children's social skill development affects their social-emotional reciprocity, or the back-and-forth actions and responses the child takes part in when interacting with another person. This is a social norm which is often difficult for children with ASD to grasp, causing them to fall further behind in their social development compared to their peers. This, as well as the other social skill deficits children with ASD exhibit, therefore should be addressed through intervention and support to ensure the proper development of children's social skills (Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007).

The last primary trait that is characteristic of ASD is restricted and repetitive behaviors or interests, which are often maladaptive. This characteristic includes stereotypic behaviors like repeated rocking, hand or arm flapping, and the rigid use of objects such as constantly spinning or tapping them (Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007). Additionally, a repetitive behavior which is also characteristic of the communication exhibited by children with ASD is echolalia, which is the repeated imitation of words or sounds out loud. This verbal behavior is often a form of communication, but is frequently present in situations where the repeated word, phrase, or sound is out of context and therefore appears to be a stereotypy. Furthermore, these behaviors can include ritualistic behaviors or routines which often do not have a greater purpose than to provide self-stimulation. Last, children with ASD also often demonstrate very specific interests which consume their social interactions, as they become hyper focused on the discussion of these topics. All of these behaviors and routines can interfere with both academic and social development, as children with ASD become fixated on their repeated behaviors or interests and it can be hard to redirect them to educational instruction or social interactions (Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007).

It is also important to note that there are associated conditions and features that are often present when a child has a diagnosis of ASD, and these related features often impede on students' ability to participate and make progress within academic and social settings, meaning they are also important to consider when determining the services that a student with ASD is provided in school. These commonly present conditions include symptoms of Attention Deficit Hyperactivity Disorder (ADHD) such as inattention or hyperactivity, behavioral issues such as outbursts or aggression, learning difficulties like difficulty generalizing skills across settings, hyper- or hyposensitivity to stimuli, and mood problems such as anxiety or depression (Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007). Again, while these symptoms are not one of the three diagnostic characteristics of ASD, they are still often present and therefore should be addressed when considering a student's needs.

### *The Individualized Education Program and Autism Spectrum Disorder*

When considering the range and vast array of presenting symptoms students with ASD have, it becomes increasingly apparent how necessary it is that each student with ASD receives individualized attention when deciding what services, supports, and goals are applicable to them. In order to identify and ensure each student's needs are met through services which help them to achieve academic and functional success, Individualized Education Programs are often required. An Individualized Education Program (IEP) is a document created for each child who qualifies for special education services based on the diagnosis of a disability, and it is uniquely specific for each student to explain their diagnosis, how this impacts their ability to participate within the general education curriculum, what supports are needed to promote the student's success, and to provide measurable goals to track student progress. The IEP is designed to be all encompassing and therefore goes beyond the student's academic needs to consider their social, behavioral,

emotional, and physical needs, as well as any additional needs which are relevant to the student's success (Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007). To determine the contents of the IEP, IEPs are constructed with consideration and input from a team of professionals including teachers, psychologists, relevant professionals in services such as speech pathology or occupational therapy, and special education administrators.

While IEPs are not exclusively provided to students with ASD, they are commonly more complex for students with ASD than some students with other disabilities due to the extensive list of needs that must be considered when developing IEPs for this group of students. The objective of an IEP for a student with ASD should therefore be to ensure it is comprehensive in defining each of the students' skills and subskills within the three characteristic domains of ASD and related features, it includes defined and measurable academic and functional goals to track student performance, and identifies the supports and services the student is entitled to receive in order to assist them in meeting these goals (Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007). The IEP of a student with ASD should be commonly reevaluated to ensure that they are up to date and capture the most accurate picture of the student's skills, relevant goals and services needed.

### *Special Education Services Provided to Students with Autism Spectrum Disorder*

Once a student with ASD is provided an IEP detailing their skills and needs, it is the duty of the school system to ensure the services and supports detailed within the document are provided to the student. Since the characteristic symptoms, behaviors, and delays in development of a student with ASD can affect their ability to learn both directly and indirectly, the services they receive can be wide ranging and include classroom learning supports, therapies outside of the class, and further additional services which can range in setting and intensity of support

(Kodak & Bergmann, 2020; Ozonoff et al., 2005; Wilczynski et al., 2007). Moreover, these services provided can vary depending on the age of the student with ASD and the grade they are in, from K-12.

A study published in the Journal of Special Education provides insight into the types of services provided and how many students with ASD receive them (Wei et al., 2014). Based on national survey responses, the most commonly received special education service for students with ASD is speech and language therapy, with at least 66.8 to 84.6 percent of students with ASD receiving the therapy to assist them in their communication abilities (Wei et al., 2014). The second highest reported service received is occupational therapy, which focuses on improving students' skills across multiple areas such as communication, social, emotion regulation, and fine motor. According to the survey between 50.1 to 65.3 percent of students with ASD receive occupational therapy, showing its importance in helping students to improve their functioning within the school environment (Wei et al., 2014). The findings of speech-language therapy and occupational therapy being received by a majority of the population of students with ASD grades K-12 is consistent with the three characteristic features of ASD that students need support addressing in order to make academic and functional progress (communication, social skills, and behavioral abnormalities).

Furthermore, when considering the average amount of services students with ASD need, the study found that students receive between 3.65 to 3.88 services each at school, with students who had more severe diagnoses of ASD receiving more services (Wei et al., 2014). These results show how extensive the needs of students with ASD are, and how essential it is to address these varying impairments across developmental domains in order to assist the student in being able to participate in the academic environment.

A crucial point to make regarding the services and supports students with ASD receive is that, for many families, the services provided at schools are the main or only form of support the child receives due to schools being the most accessible, convenient, and available provider (Wei et al., 2014). Therefore, when these services are interrupted, such as during school closures or when there are barriers to a student attending school, the child is missing out on valuable and necessary access to the supports they need to make academic and functional progress.

**Projected Academic Outcomes of Students After COVID-19 School Closures**

Currently, there is some background research conducted (Kuhfeld et al., 2020) on how online learning and the interruption to in-person learning has affected students, but most research on the impact of COVID-19 on children's education is projective or simulated outcomes due to the novelty of the COVID-19 pandemic and the minimal available data on how school closures may impact children's education. Due to the extended length of time it will take for a study looking at the long-term effects and outcomes to be completed, studies which focus on these predicted outcomes are the most relevant background information available. One such study which attempted to predict the outcomes of COVID-19 on children's academics was conducted by Kuhfeld et al. (2020) who looked to project the effects of school closures in their study. In order to simulate the study, researchers used past situations which somewhat resembles the topic of focus, looking at the effects of a break in learning during summer vacation on children's academic performance, as well as absenteeism effects on children's academic achievement.

In this study, researchers found that academic performance routinely slows or declines during the months of summer, especially in the subject of mathematics. Furthermore, researchers have also found that absenteeism, or days away from active learning, resulted in declining test scores as well. It was seen that the association between declining test scores and days absent was

linear, and that each day students missed instructional days of learning, their academic performance worsened (Kuhfeld et al., 2020). These findings were applied to the current pandemic to predict that the greater number of days students missed instruction due to school closures, the greater the decline in academic performance would be. Furthermore, it is important to note that there are few studies which focus on students with IDDs, as most studies focus on all students grades K-12.

**Parent Opinions of Remote Instruction of Students with Disabilities**

While longitudinal studies looking at the effects of school closures and virtual learning on students with disabilities are not readily available, some researchers have looked to obtain data on the topic through studies utilizing surveys. One such study which looked to determine the opinions and effects of virtual instruction of students with disabilities during the pandemic was completed by Greenway & Eaton-Thomas (2020). In this study, the researchers aimed to determine the experiences parents had when assisting their children with remote learning. The study gathered its data by creating a 49-question survey which was completed by 238 parent participants. The survey results found that parents felt they lacked the proper resources needed to support their children and their learning difficulties (Greenway & Eaton-Thomas, 2020). Furthermore, they felt that remote learning did not meet the same quality of instruction or assurance that their child's educational, behavioral, social, or emotional needs were met. Parents also noted feeling that they were ill equipped to handle their role in helping their children with disabilities through online learning, as teachers and other special education professionals were unable to instruct the child in person and therefore the child often required a parent's assistance during virtual learning. Last, parents concluded by agreeing to the statements in which they

believe there will be long-term negative consequences on the child's educational outcomes and overall well-being due to the closure of schools (Greenway & Eaton-Thomas, 2020).

**Experiences of Educators During COVID-19 Virtual Learning**

The COVID-19 pandemic not only introduced added demands for students and families , but especially tasked teachers with the responsibility of transitioning their in-person instructional methods and curriculum to an online format. Multiple studies have been conducted exploring teachers' experiences teaching during COVID-19, many of which utilized surveys to gain a consensus of their opinions. Multiple common themes emerged from the surveys, such as the finding that teachers felt unprepared in their training to teach virtually. The stressor of quickly switching to teaching online was intensified by this limited confidence that many educators had in their ability to utilize technology within their curriculum, as many noted they felt that they lacked the skills needed to teach entirely virtually (Huck & Zhang, 2020). In addition to developing proper technological skills, educators had to develop strategies to communicate with students in a manner which kept them engaged and supported academically, emotionally, socially, and behaviorally. Without any previous training on these skills and navigating a virtual educational environment, many teachers felt overwhelmed from the start of the remote instruction (Huck & Zhang, 2020). This finding poses the concern on the quality of instruction teachers were able to provide students as they navigated the unprecedented situation. Due to the stressors and barriers they faced, it can be suggested that the academic instruction students received virtually during the pandemic was not up to the same standard as the instruction they received in-person prior to the school closures. **Gaps in Past Research**

While previous results from projective studies provide some knowledge to base our predictions on the pandemic learning effect for students with disabilities, it is only partially

relevant, as it does not formally capture the current situation brought about by the COVID-19 pandemic and does not focus specifically on students with ASD. While the entire research body on education and COVID-19 is growing, the population of students with developmental disabilities, especially those with ASD, is a vulnerable group who has not been of much direct focus. Students with ASD require greater supports and instructional assistance than children who do not have a disability, so these previous and simulated studies are not directly comparable. Furthermore, these studies could not simulate the abrupt stop to schooling that COVID-19 brought about, as this uncharted territory of an extended break to school likely plays a large role in academic performance outcomes as well.

Furthermore, the gaps in past research include the lack of information on how the interruption to children's in-person schooling due to the COVID-19 pandemic will affect their academic performance long term, and how to mediate these effects. While there are predictions that the pause in learning and virtual schooling will result in delays across various age groups and populations of children, there is limited to no concrete data demonstrating these effects. Additional gaps in research are that there are limited studies specifically focusing on students with ASD. Students with IDDs, especially with ASD benefit immensely from intensive in person support throughout learning, so is important to consider how COVID-19 affected their development in order to plan for future interventions and support.

Last, it is important to note that there is limited to no published research focusing on teachers' perceptions on the effect the pandemic has had on students with disabilities, such as those with ASD. Instead, there have been few published articles on teachers' experiences educating general education students virtually, which found that teachers struggled to educate their students virtually and felt unprepared to meet their students' needs through remote

instruction. Based on the higher level of supports and services that students with ASD need to support their academic abilities, it could be proposed that virtual instruction would be more difficult for special education teachers and therefore remote learning of students with ASD could be found to be detrimental to student performance and the quality of educators' instruction. This study hopes to expand the current knowledge base by focusing on the academic performance of students with ASD and their teachers' opinions on their performance and experiences during remote learning to determine how limited access to learning supports and proper instructional methods have affected students, and what can be done to ensure they are properly supported in the future.

## Hypotheses

There are two main hypotheses for this study. Based on past research, the first hypothesis is that the period of time that students participated in remote learning and a lack of in-person instruction will result in a statistically significant delay in academic performance for students with ASD. More specifically, I expect to see declines or stagnation in three academic areas: reading comprehension, reading fluency, and mathematics computation fluency. I expect to see these results due to the decreased access students had to necessary supports and special education services, appropriate educational materials and instruction, and the intellectual stimulation received through interaction with their teachers and peers that is available during in-person instruction.

The second hypothesis is that negative evaluations from teacher interviews regarding student achievement will emerge when considering students' academic performance before and after the COVID-19 pandemic interrupted traditional in-person instruction. I expect to discover these negative themes through teachers' retrospective descriptions due to the barriers of the virtual learning environment making it difficult to provide quality individualized instruction, effectively meet students' academic and functional needs, and to assess student progress and goals throughout the remote learning period. I also expect to hear that teachers felt unprepared for teaching online and had difficulties meeting students' needs in this learning environment, therefore leading to regression and delays in students' academic performance.

The focus is of this study is primarily on its qualitative findings due to the small sample size of students evaluated. However, the hypotheses will be statistically tested to better inform future research. Furthermore, while these hypotheses are what I expect to discover based on prior research and experiences within the field, I am also aware each student and classroom is unique,

and that the findings of my study may contrast with previous findings due to these individual differences.

# Methods

## Participants

### Student Academic Record Review

An academic record review was conducted using deidentified data from 15 students currently enrolled at a private school for students with ASD in grades K-12. Each student had a diagnosis of ASD previously determined by professionals prior to the study as documented in their academic records. Students chosen for the study were randomly selected by school administration according to inclusion criteria which required students to be currently attending the school and to have been enrolled at the school since at least Fall 2019 to ensure there were accurate academic records on file. Furthermore, each student had to be in grades kindergarten to grade 12 for inclusion consideration. Students who did not meet these criteria were removed from the pool of subjects by school administration before the school supervisor selected 15 students for record reviews. It is important to note that the 15 students included in the study did not have direct contact or involvement with the study's principal investigator. Instead, the students' academic records were deidentified according to FERPA guidelines by administrators, placed in a manila folder, and given a numeric code which had no connection to identifying information of the student.

### Teacher Interviews

Participants of the teacher interviews were recruited at the private school for students with ASD between September 2021 to December 2021. Teachers at the school were provided with information regarding the study by school administration before they were approached in person to further explain the study objective and inquire if they would be interested in participating in the study as an interview subject. Participants were then screened to determine

their eligibility in the study through a series of questions regarding the teacher's position and the length of time in which they have worked at the school. Inclusion criteria required interview participants to be head or assistant teachers and to have been employed at the school for over one year to ensure the interviewed participants had experience at the school prior to the COVID-19 pandemic. This screening information was recorded if the individual was eligible to be an interview subject, but their name was not included with this information to protect confidentiality. After screening protocol, it was determined that four teachers met the study inclusion criteria. Each of the four teachers were contacted over email and in person to determine their interest in participating. Of the four teachers, three responded and agreed to participate in the study. Teachers who agreed to participate were informed of their right to withdraw from the study at any time and that their identity would not be revealed through the study before obtaining their verbal consent prior to the interview.

## Materials

### Academic Record Review

Each student's post COVID-19 academic performance was compared to their academic performance prior to COVID-19 closures and virtual learning. Changes in academic performance were analyzed based on the students' Individualized Education Programs, or IEPs. An IEP is a document which states a student's needs, their academic and functional achievement levels, and the impact their disability has on their ability to participate in and learn the general education curriculum (United States Department of Education, 2021). Furthermore, the IEP describes the educational and functional goals for the student and the supports, services, and instructional methods that a child with a disability is to be provided by the school in order to assist them in reaching these goals. The IEP is revisited regularly to ensure students are meeting the

educational and functional goals set by the team and frequent assessments of the child's progress are recorded in order to determine the child's performance (United States Department of Education, 2021). Due to this consistent monitoring of student success, the IEP and the goals discussed within the document are a valuable resource when determining student performance over time.

In addition to reviewing the students' IEP goals, a corresponding document titled, "The 2020-21 COVID Compensatory Services Worksheet" was also utilized. This document uses IEP goals to monitor student progress after COVID-19 school closures to determine the need for additional services to recover skills. The compensatory services sheets were filled out by the teachers for each student, listing the students' goals and their performance at three separate time periods. The three time periods of data collection are: 1) At the last progress data collection point before the COVID-19 school closures on March 13, 2020 2) at a "Post-Reopening Baseline" when the schools reopened in October 2020, 3) and at a data collection point six to eight weeks after the return to in-person learning to follow up and determine how the student was adjusting back to in-person learning.

As stated above in the methods section, all IEP records and compensatory education worksheets reviewed were deidentified according to FERPA guidelines and were given a randomized code by school administration. An example of a compensatory education worksheet can be viewed below in Appendix A.

### Teacher Interview Form

Participants were interviewed using a form developed for the study to assess teachers' experiences before, during, and after the COVID-19 related school closures and remote learning period (Appendix B). The form includes the research study title, the interview participants initials, the date of the interview, and 14 open-ended questions developed to provide teachers the opportunity to expand upon relevant topics related to changes to their instruction methods, challenges experienced, and observations of students' achievement and abilities during virtual learning.

## Procedures

### Academic Record Review

Student academic records were provided to the principal investigator by the school supervisor after being deidentified according to FERPA guidelines and given a randomized code. The students' IEP goals and compensatory services worksheets were reviewed on the school campus and progress monitoring data for students' reading comprehension, reading fluency, and mathematics computation fluency were recorded. Of 15 students, 12 students' records were able to be reviewed; three students had records which were incomplete and therefore unable to be properly analyzed and compared across time. Once student academic record data was recorded, it was uploaded to Microsoft Excel to be statistically analyzed. Student academic records were kept stored securely on the school campus and destroyed at the completion of the study to ensure confidentiality.

**Teacher Interviews**

Teacher interviews were conducted in person one-on-one, with informed consent received from the participants prior to beginning each interview. The principal investigator began by asking the participant to describe their title at the school and how it has progressed over time, while also specifically noting the years which they have been working there to gather some background information on the participant's role. Following the introductory question, participants were asked to recall their typical classroom routine, instructional strategies, and student progress assessment methods utilized prior to COVID-19 before being asked to then describe if and how COVID-19 school closures changed these routines, teaching strategies, and assessments.

After describing their in-person and virtual classroom environments, the participants were asked if they found that the switch to virtual instruction hindered, helped, or did not affect their ability to effectively teach their students, as well as if they saw any changes to their students' academic performance. Additional questions followed inquiring how the return to in-person learning went for their students, and if they have seen any lasting effects of the school closures and virtual learning still present.

To wrap up the list of questions, participants were asked if they believe there will be any long-term effects their students will experience for years to come due to COVID-19 related school closures and remote learning, as well as what strategies they believe would be most effective to mediate these effects. In total, 14 questions were asked of each participant before providing the opportunity at the end of the interview for the participant to expand upon any of their answers or other relevant topics that came to mind.

Interviews lasted approximately thirty to sixty minutes in duration. The teachers' responses were transcribed during the interview to later be coded and analyzed. The completed interview forms were then uploaded to a secure folder on Microsoft OneDrive which allowed the files to be password-protected and secured by dual-authentication login access. Once finished with the interviews, the teachers' responses were coded to determine common themes for analysis, with all identifying information removed from the interview collection and analysis sheets.

## Data Analyses

### Academic Record Review

The data collected during the record review was analyzed to determine the effects of school closures and online and learning on the students with ASD compared to their traditional in person learning environment. The data examined specifically focused on students' reading comprehension, reading fluency, and mathematics computation fluency skills. Quantitative data in the form of numerical scores of students' reading comprehension, reading fluency, and mathematics computation fluency were extracted from the deidentified 2020-2021 COVID-19 Compensatory Services Worksheets based on IEP goals and were entered in Microsoft Excel and organized into data tables to clearly allow for comparison and analysis of student performance before and after COVID-19 school closures. The average scores of each goal were then calculated for each data collection period and represented through line graphs (see Figures 1, 2, 3).

Once organized into data tables, the data was imported to SPSS and analyzed through a repeated measures ANOVA to compare the students' average scores across time to determine if there was a statistically significant difference in scores before and after COVID-19 school

closures. Only students who had data from each of the three data collection periods were included in the analysis. While 15 students were included in the study, not all 15 students had IEP goals in each academic area of interest or had full data sets. Therefore, if students did not have data for their six to eight-week follow-up, they were excluded from the analysis. For reading comprehension, five students were included, for reading fluency, four students were included, and for mathematics computation fluency nine students' data were included.

**Teacher Interviews**

This study utilized teacher interviews to collect qualitative data on student performance and changes to instruction due to COVID-19 school closures. Due to the questions being open-ended, statistical data analysis was not appropriate and instead required the data to be coded before analyzing. The data was coded and analyzed using a process based on the grounded theory approach to identify common themes occurring across the interviews and to quantify the qualitative data**.** Grounded theory is the process of systematically analyzing qualitative data obtained through non-structured methods of data collection such as seen in responses to open-ended interview questions (Pidgeon & Henwood, 1997). Once coded, the data was able to be organized into a table displaying the common themes present across the three interviews (see Table 1).

# Results

## Descriptive Results for Academic Record Review

### Reading Comprehension

The repeated measures ANOVA results showed that students' reading comprehension scores were not significantly affected by time, $F(2, 8) = 2.69$, $p = .13$. Reading comprehension scores were not significantly greater before COVID-19 school closures ($M = 82.40$, $SD = 6.06$) compared to the return to in-person instruction after school closures ($M = 70.80$, $SD = 6.09$; $p = .15$) and six to eight weeks after schools were reopened ($M = 74.60$, $SD = 5.31$; $p = .12$). There was also no significant difference in reading comprehension scores when comparing the students' performance when they returned to in-person learning and were reassessed six to eight weeks later ($p = .45$).

While the repeated measures ANOVA showed that students' reading comprehension scores over time were not statistically significant, there was a decrease in scores found after COVID-19 school closures (see Figure 1). Based on each student's reading comprehension scores and the average of these scores at the three assessment periods (before COVID-19 school closures in March 2020, the return to in-person in October 2020, and a six to eight week follow up), it was found that students' reading comprehension scores declined after the COVID-19 school closures and virtual learning period. However, while the students suffered academic losses in reading comprehension skills, they were able to regain some of their losses by the six to eight week follow up after the return to in-person learning but scores still remained eight percent lower than they were prior to the closures.

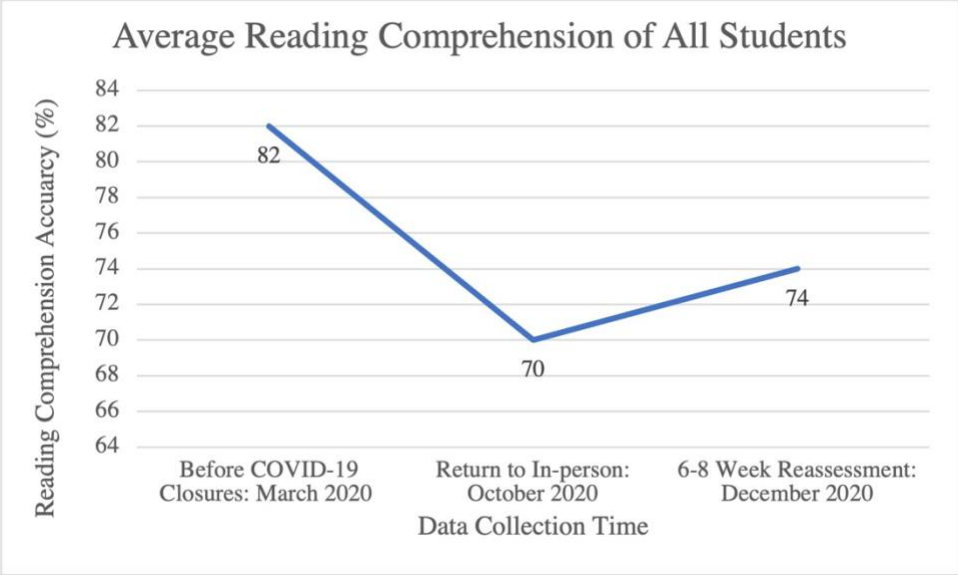



**Figure 1. Graph of Average Reading Comprehension of All Students**

## Reading Fluency

The repeated measures ANOVA results show that students' reading fluency scores were not significantly affected by time, $F(2, 6) = .295$, $p = .754$. Reading fluency scores were not significantly greater before COVID-19 school closures ($M = 60.25$, $SD = 22.70$) compared to the return to in-person instruction after school closures ($M = 56.50$, $SD = 22.46$; $p = .19$) and 6-8 weeks after schools were reopened ($M = 64.50$, $SD = 11.42$; $p = .76$). There was also no significant difference in reading fluency scores when comparing the students' performance when they returned to in-person learning and were reassessed 6-8 weeks later ($p = .57$).

While the decline in students' reading fluency scores (measured in words per minute) was not determined to be statistically significant, the scores still were negatively impacted by the time between schools closing due to COVID-19 and when they reopened, as the scores decreased when comparing the data in March 2020 and October 2020 (see Figure 2). Once back to in-person instruction, students were able to recover the losses in their scores, suggesting that within

the six to eight week period of school back in person, students were able to regain the skills they had difficulties originally retaining during the remote learning time period.

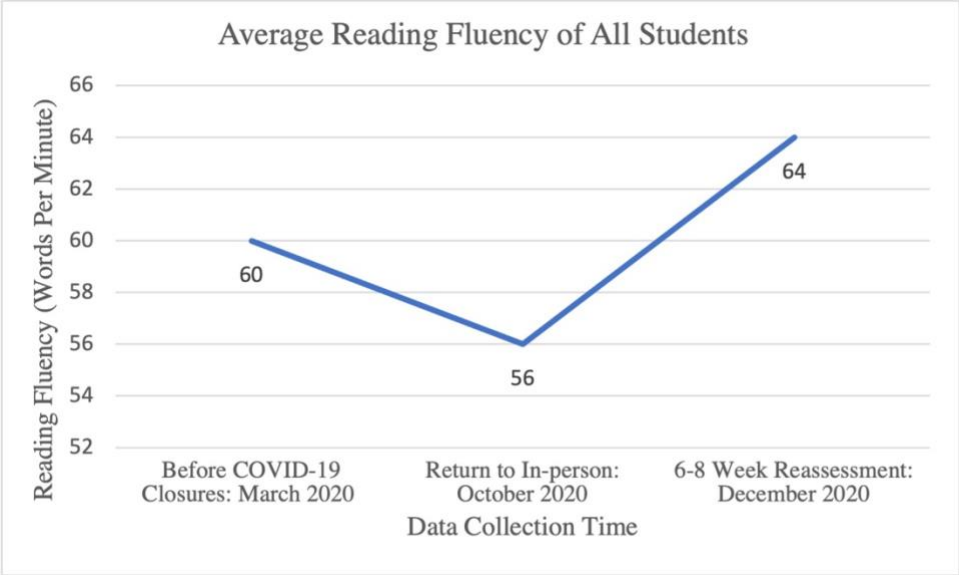



**Figure 2. Graph of Average Reading Fluency of All Students**

## Mathematics Computation Fluency

The repeated measures ANOVA results show that students' mathematics computation fluency scores were significantly affected by time, $F(2, 16) = 5.85$, $p = .01$. Mathematics computation fluency scores were significantly greater before COVID-19 school closures ($M = 75.22$, $SD = 4.88$) compared to scores at the return to in-person instruction after school closures ($M = 50.44$, $SD = 7.61$; $p = .003$). However, there was no significant difference in scores when comparing those before COVID-19 and scores from six to eight weeks after schools were reopened ($M = 75.56$, $SD = 8.52$; $p = .973$). However, there was also a significant difference in mathematics computation fluency scores when comparing the students' performance when they returned to in-person learning and when they were reassessed six to eight weeks later ($p = .03$).

When considering students' mathematics computation fluency, which was measured in percentage of computations correct, students experienced the greatest decline in scores of all three categories analyzed (see Figure 3). Students' mathematics scores were reported to be an average of 75 percent accurate prior to the school closure and then dropped a substantial amount for an average of a 25 percent decline during the time of virtual learning. Upon returning to in-person instruction, students' average mathematics computation fluency was 50 percent. This loss in mathematics computation skills, while considerable, was able to be mitigated within the six to eight weeks of being back to in-person instruction, as students' average score at this recollection point returned to 75 percent. This rise in mathematics computation fluency is notable, as it shows students were able to make up for the initial loss in mathematics computation fluency in the six to eight weeks once back in-person, but also highlights that instead of improving upon mathematics computation fluency skills over time, teachers and students had to focus on recovering skills to match their performance before COVID-19 closures.

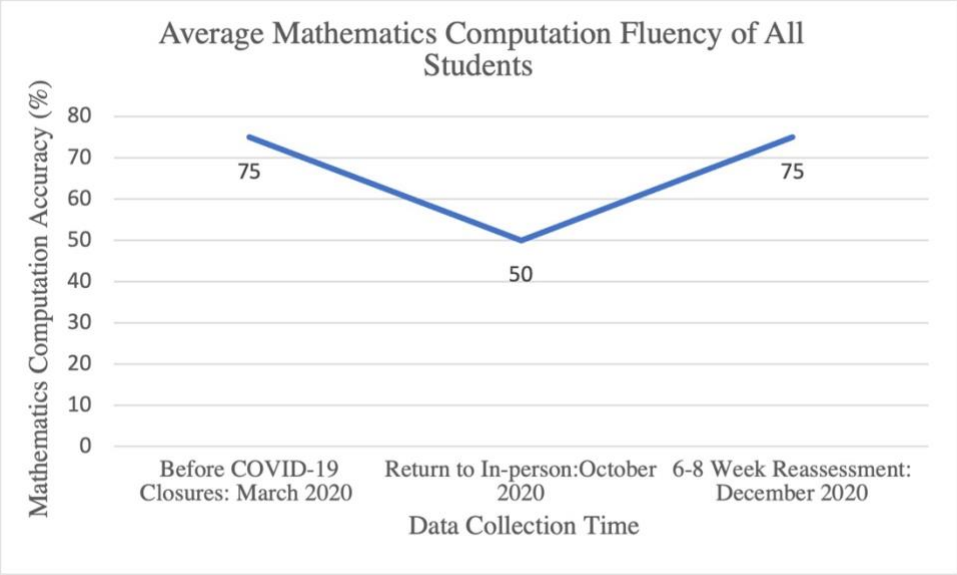



**Figure 3. Graph of Average Mathematics Computation Fluency of All Students**

## Teacher Interviews

Furthermore, qualitative data obtained through teacher interview was analyzed and coded for common themes using a grounded theory approach (Pidgeon & Henwood, 1997). These themes are illustrated in a concept table (Table 1) which captures the overarching commonalities between interviews and allowed for the qualitative data to be quantified to determine the concepts which were the most frequently present in teacher responses, concrete definitions of the concepts to be stated, and allowed for significant quotes which stood out relating to each theme to be highlighted.

The first main theme which was apparent within the interviews is the differences noted between in-person learning and the switch to remote learning. This concept was mentioned multiple times, with most teachers stating that the main differences between school in person and online being that students online learned less, collaborated with students and teachers less, and experienced more academic and behavioral difficulties to learning than when compared to in-person. Furthermore, teachers highlighted that they experienced barriers to instructing their students online, noting that they had limited time and ability to work one-on-one with each student, which hindered their ability to effectively instruct each student to the greatest potential they could.

Regarding barriers they observed students face during online learning, this theme was broken into two subtopics of physical barriers to online learning for students and cognitive-behavioral barriers to online learning. Physical barriers included things which prevented students from learning appropriately, listing things such as lack of proper technology to participate in virtual learning, lack of a proper learning set up for students at home, and the presence of distractions in their environment which impeded students' ability to focus on their online

coursework. In addition to these physical obstacles to successful remote learning, teachers mentioned cognitive and behavioral difficulties students experienced which limited their ability to learn as well. These difficulties included the presence of greater problem behaviors being exhibited, and increased levels of student agitation, boredom, and inattention.

Largely in part due to these issues and obstacles educators and students faced during remote instruction, teachers noted that they witnessed academic delays and regressions of their students during the COVID-19 school closures and remote learning period. The teachers explained that during remote learning, it was difficult to assess students' academic performance, as the methods which they utilized in-person to measure the students' reading comprehension, reading fluency, or mathematics computation fluency were not compatible with the online instructional format. This therefore made it hard for teachers to determine what specific areas students were struggling with the most during online learning. Once back in person and better able to instruct and monitor students' performance, the teachers noted that they saw academic declines in almost every one of their students.

Teachers further pointed out how these declines and delays not only limited students' academic performance or progress for a few months during the pandemic, but actually inhibited some students' ability to move up grade levels or to transition back to their home school districts as their academic performance and functional behaviors were no longer up at the appropriate levels of their same-age peers. This shows that even though most students were able to regain the academic skills they lost over the period of COVID-19 school closures, the valuable amount of time spent on reteaching and remastering goals once back in person would have been more appropriately dedicated to continuing to make gains on the skills students had before the closures to allow for moving up grade levels or transitioning back home districts.

When reviewing teacher responses, it is clear that their answers support the original hypotheses stated, as they witnessed academic declines and delays for their students due to the COVID-19 school closures and remote learning. Furthermore, the teacher interviews also help to support and confirm my hypothesis that teachers would report negative evaluations of student performance due to the barriers experienced in virtual instruction. Teachers noted that they both experienced obstacles to effectively instructing their students and that they witnessed physical and cognitive behavioral barriers to their students' ability to learn. As a whole, the teacher interviews allowed for educators to expand upon the results discovered in students' academic records, providing a qualitative component of data analysis and allowing for possible explanations to the quantitative results found.

**Table 1. General Themes of Teacher Interviews**

| Theme | Definition | Significant Quotes |
|---|---|---|
| **Differences Between In-Person and Remote Learning** | Changes between in-person teaching and teaching students with ASD through virtual instruction including teaching effectiveness and methods of instruction. | • "Honestly, my students probably learned about half of what they normally would have [in person]."<br>• "Prior to COVID-19, we were able to do more group and partner work with one another."<br>• "Prior to COVID, students were showing progress in all areas. Progress actually regressed during COVID closures for most students, all of them did not gain any sort of improvement from virtual learning. None at all. Upon returning to in-person instruction, students resumed progress but had to start at a lower point because of regression." |
| **Barriers to Online Instruction for Teachers** | Issues that teachers experienced that impaired their ability to teach their students, such as not having enough time to work with each student individually or not being familiar with technology. | • "I could not provide the one on one with the students who need that instruction on a daily basis. Therefore, rather than assisting students with one on one, I had to try and help all the students at the same time. This led to most students not being able to stay focused because they were hearing what I was teaching another student to help them."<br>• "I had little to no control or engagement during virtual instruction, students with behavioral challenges simply cannot learn virtually." |
| **Difficulties Completing Assessments** | Obstacles that teachers experienced when attempting to assess students' academic performance during school closures. | • "During the closures, it was next to impossible to get students to write any substantial material, so I had to accept a large portion of their work verbally." |
| **Physical Barriers to Online Learning** | Things which prevented students from proper learning while remote, which includes distractions at home, lack of technology | • "Many of my students did not have a proper desk set up and private space to do virtual learning."<br>• "I had a student whose parents didn't feel like waking him up at 12pm for his time, so he hardly got on because of them. " |

| | | |
|---|---|---|
| | or appropriate learning set-up at home, etc. | • "Another parent worked night shift, so it was difficult for them to get their student online." |
| **Cognitive-Behavioral Barriers to Online Learning** | Things that hindered students' ability to learn while remote which include difficulties processing material, staying focused, or regulating emotions and behaviors. | • "Lessons took a lot longer and overall learning just felt so repetitive and not exciting. Students were more easily agitated and inappropriate behaviors were more frequent."<br>• "I had a student throw their laptop and destroyed it so he could not do virtual for the rest of the time. I had little to no control or engagement during virtual instruction, students with behavioral challenges simply cannot learn virtually." |
| **Issues Returning to In-Person Learning** | Problems witnessed for students or teachers after the return back to in-person learning such as focusing or following routines. | • "I have noticed it is more difficult for students to begin in person learning and to adjust back to their normal school day schedule."<br>• "I have noticed students struggling in the area of Mathematics and being able to bounce back from where they last left off." |
| **Long-term Negative Effects** | Long term effects expected due to the COVID-19 school closures. | • "I expect to see long-term problems with students' social and emotional development, and their task follow through and completion skills.<br>• "This simply put a long pause on their learning during a critical time where they were previously making big academic gains."<br>• "I do believe each student could have a higher level of academic functioning they will never be able to reach because of the yearlong gap though. Students had to take time to relearn basic skills, time that could have been used to teach new skills." |
| **Academic Regression and Delays** | Academic effects seen after the COVID-19 school closures and remote learning such as students losing skills or students' skills leveling off. | • "Every single student showed a little regression in all subjects. We were able to catch up all but two of my students. However, this was definitely time lost that they could have been moving up grade levels."<br>• I have several students who are so close to |

| | | |
|---|---|---|
| | | returning to their home districts and this gap year made it harder because they were not grade level anymore and needed to stay longer because their behaviors were not up to par as they were before the closures."<br>• "The parents, students, and I all did not do well with virtual learning and I cannot think of a single skill that was learned through virtual instruction (aside from how to log on a computer)."<br>• "Math I would say [students] had the most struggle [with] because students forgot skills that were needed to complete other math skills, thus requiring us to reteach basic math computations." |
| **Recommended Mediative Efforts** | Strategies or suggestions teachers mentioned in order to make up for the impacts school closures and remote learning. | • "It is going to be important to have persistence moving forward, using increase engagement and one-on-one instruction with students."<br>• "I believe students attending summer school would help alleviate some of the effects. I do not think there is any other time to really make up these losses." |

# Discussion

## Reading Comprehension and Reading Fluency

Although both reading comprehension and reading fluency scores were not found to be statistically significant based on the repeated measure analysis, there is still a pattern seen in students' scores which shows that both reading comprehension and reading fluency declined when comparing student achievement of IEP goals before the COVID-19 school closures and upon the return to in-person instruction. While this study included a rather small sample size of students due to COVID-19 safety precautions and protocol, it provides insight to the possible negative effects that COVID-19 school closures and remote learning has had on students with ASD and therefore could be considered a pilot study which provides procedures and predictions into the expected effects to be seen in follow-up studies with larger sample sizes.

For students' reading comprehension scores, it is also important to note that students were unable to reach the same scores they had prior to the school closures even after six to eight weeks of relearning the material back in-person. So, while the score reductions were not found to be statistically significant, this finding shows that the COVID-19 school closures and remote learning still had a negative impact on student performance which were unable to be remediated after six to eight weeks of in-person instruction.

Furthermore, the expectation of IEP goals is that students will continually progress towards meeting these goals and improve in their skills over time. If student performance ever plateaus or declines, such as seen in both reading comprehension and reading fluency scores, then the original goal and instructional methods used by the teacher are to be reevaluated to ensure students are able to continue progressing. So, while although students were able to improve upon their reading fluency scores to make up for their loss six to eight weeks after the

reopening of the school, this catch-up period means that instead of building upon their existing skills and continually improving upon the 60 percent reading comprehension accuracy recorded in March 2020, teachers had to dedicate over a month of instruction and supports to reteach students and get back to where they were nine months prior before any further improvements could be made.

**Mathematics Computation Fluency**

The statistically significant findings regarding students' mathematics computation fluency scores shows that students did in fact decline in their academic achievement level during the COVID-19 school closures and remote learning period. These results help to confirm the hypothesis predicting that students would be negatively impacted by the school closures and switch to online learning, as their academic performance would decline due to the lack of proper services and supports. These results also support and advance the simulated outcomes predicted in the study discussed during the introduction (Kuhfeld et al., 2020) which applied the findings of student regression in mathematics during summer break to expect declines in the same subject area after COVID-19 related school closures. Furthermore, these findings show that the predicted negative outcomes the Department of Education anticipated when considering the effects of school closures on students receiving special education are correct, and therefore a comprehensive plan is necessary to ensure students receive all of the supports they need as well as compensatory services to ensure the greatest opportunities are provided to students to make up for regression or delays in students' ability to meet their IEP goals (United States Department of Education, 2021).

**Teacher Interviews**

Teacher evaluations reveal that learning appears to impair students' academic functioning, as the most frequent responses regarding the effects of online learning were that students are unable to learn as effectively online than compared to in-person instruction, as access to needed supports, one on one instruction, and beneficial class interaction opportunities are limited when in the virtual environment. These conclusions help to conceptualize the argument that COVID-19 related school closures had a detrimental effect on students with ASD, and that virtual learning is not designed in a way that supports the academic and socioemotional development of students with ASD.

As explained in the introduction, students with ASD have a multitude of communication, social, and behavioral needs which affect their ability to learn academic material. When these needs are not met through educational supports and special education services, students are more likely to struggle to participate in academic activities, focus on the academic material, and are more likely to demonstrate problem behaviors. An important theme extracted from the teacher interviews which explores this situation is that teachers felt unable to meet the complex needs of their students during virtual instruction, and therefore they witnessed a multitude of behavioral outbursts, inattention, and inability to retain the academic material from their students with ASD.

Furthermore, the teachers' responses mirrored a great deal of parents' opinions surrounding virtual learning of students with disabilities that was previously discussed earlier in this paper. Teachers and parents both noted that they felt students were not receiving the same quality of instruction during remote learning as they did in-person, and that they expect to see negative long-term impacts on students' development due to the COVID-19 related school closures. The teacher interviews also provided greater insight into the findings expressed in the

parent opinion survey, as it was discovered that educators also struggled while trying to navigate a virtual teaching environment just as parents did while assisting their children with IDDs at home. This dual perspective is important to consider when evaluating the COVID-19 remote learning situation, as both parents and teachers were left feeling unprepared and ill-equipped to support students with ASD and disabilities during the novel COVID-19 pandemic.

**As mentioned in the introduction,** ASD **is a complex disability that presents in varying manners and severities, affecting one's communication, social skills, and behaviors. Students with this complicated disability require a variety of special education services and supports, many of which require intensive and rigorous one-on-one work in order to be effective and assist the student in reaching their academic and functional goals described in their IEP. This fact therefore makes students with ASD a specifically vulnerable and unique population to focus on when considering the impacts of COVID-19 school closures and virtual learning.** I**n addition to not** receiving in-**person instruction from their teachers and social interaction with their classmates** (as conceptualized through the teacher interviews)**, the students were also lacking in** the **availability or quality of many of the services and supports they would receive at least weekly, meaning commonly needed services like speech pathology and occupational therapy could only be offered remotely, if at all.**

## Limitations

The lack of available reliable and accurate measures to analyze student performance during COVID-19 school closures/virtual learning in the spring of 2020 limits the ability to obtain data on student performance during the pandemic. This was described in the teacher interviews a challenge for educating and monitoring student progress during virtual learning, and it was also a limitation to this study as it leaves some uncertainty in the rate at which students'

academic performance declined, improved, or remained stable while participating in remote learning as we are only able to compare where students were before and after COVID-19 related school closures, and not during the remote learning period.

An additional limitation of this study's findings is the small sample size of students included in the academic record review due to the specificity of IEP goals reviewed (reading comprehension, reading fluency, and mathematics computation fluency). Furthermore, the study is limited in its size and scope due to COVID-19 safety precautions which limited recruitment of students in other schools or districts. Last, the small sample size also impacted the statistical analysis methods, as a multiple comparison test such as the Bonferroni correction, was not used due to the small data sets which therefore limits the study's validity to at least some extent.

## Future Directions for Research

When considering future directions for research, there are multiple aspects of children's education that should be investigated as schools move forward from the unprecedented closures which interrupted students' academic and social experiences. To begin, it is imperative to expand upon the results found in this pilot study, as the results found support the prediction that students with ASD's academic performance was negatively impacted by COVID-19 school closures and remote learning, however this belief would be bolstered with additional research. To build upon this study, it is recommended that future studies utilize a larger sample size, focus on additional academic and functional IEP goals in the academic record review, and incorporate the opinions of both teachers and parents. If a study of this larger scope was able to obtain similar findings, it

would enhance empirical support for the importance of the issue of COVID-19 school closures and remote learning's impact on the academic performance of students with ASD.

While as a whole, student achievement may decline due to online learning, students with disabilities are especially at risk to be negatively affected, as they do not receive the proper access to high quality instruction or their necessary supports in virtual learning environments. Furthermore, they are not able to interact and learn through socialization with peers in virtual learning, which is extremely important to ensuring their proper social development and potential for future success. This study warrants a greater discussion in efforts to mediate the long-term effects that may result from COVID-19 school closures, and is relevant for professionals within the psychology and education fields working with children with ASD and related IDDs. Additional research would be beneficial to determine the effects COVID-19 school closures and virtual learning has on other populations of students with IDDs in addition to ASD, and to gain a greater understanding of teacher evaluations and opinions of the effects of school closures on their students with IDDs.

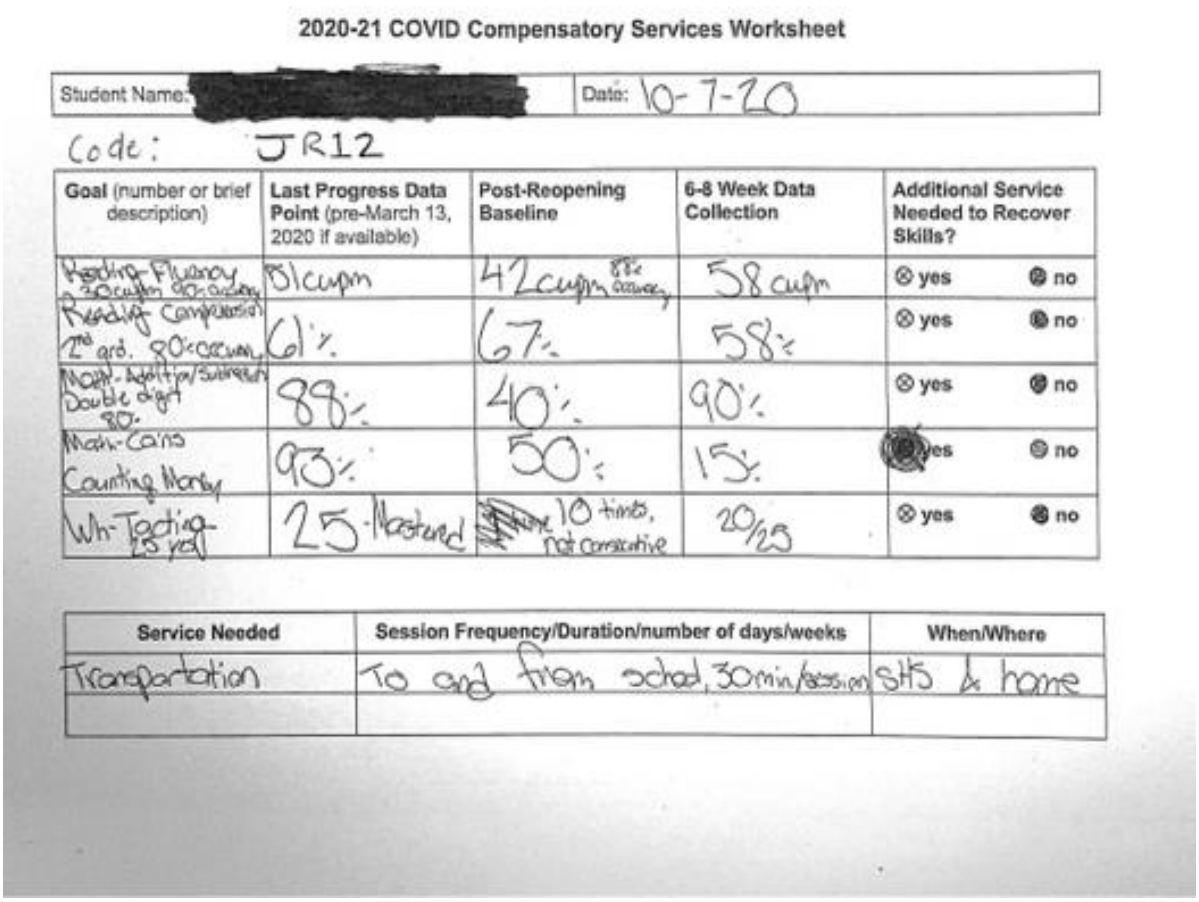
An additional important area to look into is if the results found for students with ASD are different than for all students who receive special education services or for general education students. Therefore, testing the research questions of: 1) Is there a difference regarding the impact that COVID-19 school closures had on students with ASD when compared to all students who receive special education services? and, 2) Is this a difference regarding the impact that COVID-19 school closures had on students with ASD when compared to general education students? This is a worthy area to complete future research in, as the current study completed was very specific in its focus on the effects school closures and remote learning had on students with ASD, but it is important to consider how students with other disabilities and needs for

special education services were impacted. Furthermore, it is crucial to consider how these effects compare to students in general education classrooms, as this comparison of results can help guide educators and psychologists in their future mediation efforts regarding what group of students may require more targeted or intense intervention efforts.

Furthermore, building off of the importance of researching what groups of students experienced the greatest declines or delays in academic performance, it is also beneficial to begin research into what type of interventions are most effective in mediating students' declines or delays. This is important to consider not just for students with ASD, but also for all students receiving special education services or in the general education classrooms. Any student who regressed or experienced delays due to a lack of access to proper instruction, educational supports, or social stimulation should have the right to services which will address and remediate these effects, so looking into the most effective methods of intervention will inform schools, educators, professionals in the field, and parents across the nation on the most beneficial strategies for promoting student success.

# Appendix A

## 2020-2021 COVID-19 Compensatory Services Worksheet



2020-21 COVID Compensatory Services Worksheet

Student Name: [redacted] Date: 10-7-20

Code: JR12

| Goal (number or brief description) | Last Progress Data Point (pre-March 13, 2020 if available) | Post-Reopening Baseline | 6-8 Week Data Collection | Additional Service Needed to Recover Skills? |
|---|---|---|---|---|
| Reading Fluency 30 cwpm 90% accuracy | 81 cwpm | 42 cwpm 88% accuracy | 58 cwpm | ⊗ yes ⊗ no |
| Reading Comprehension 1st grd. 80% accuracy | 61% | 67% | 58% | ⊗ yes ⊗ no |
| Math- Addition/Subtraction Double digit 80% | 89% | 40% | 90% | ⊗ yes ⊗ no |
| Math- Coins Counting Money | 93% | 50% | 15% | ⊗ yes ⊗ no |
| Wh- Testing- 25 req | 25- Mastered | 10 times, not consistent | 20/25 | ⊗ yes ⊗ no |

| Service Needed | Session Frequency/Duration/number of days/weeks | When/Where |
|---|---|---|
| Transportation | To and from school, 30 min/session | STS & home |
| | | |

**Figure 4. Example of a Student's Deidentified 2020-21 COVID Compensatory Services Worksheet**

# Appendix B

## Teacher Interview Form

Research Study Title: "The Impacts of COVID-19 Related School Closures and Remote Instruction on Students with Autism Spectrum Disorders' Academic Performance"

Interview Participant (Initials):

Date of Interview:

Questions:

1. Can you tell me a little history about your role here as an educator at Soaring Heights School and how it has progressed since you started? Please include the year in which you started at SHS and your current position title.
2. Thinking back to your classroom routine prior to COVID-19, what did a typical day look like for your students? Please include the typical instructional methods and strategies used.
3. How did COVID-19 affect your class's "typical" routine? In what ways, if any, did a "typical day" differ during COVID-19 related school closures and remote learning? Please include the typical instructional methods and strategies used.
4. What effects, if any, have you noticed regarding students' academic performance since returning back from the COVID-19 related school closures and remote learning?
5. In what ways did you find the COVID-19 school closures and virtual learning methods difficult as an educator? How do you think these difficulties affected your class's ability to learn effectively?
6. Did you witness or experience any positives of online or distanced learning? If so, in what way did remote learning benefit some of your students or you as the educator?

7. How did your teaching strategies change during remote instruction? Did you experiment with any new strategies or find any instructional modifications to be useful?
8. If you have noticed effects on student performance from school closures and remote learning, do you still see these effects now? How have they changed over time?
9. What assessment methods do you utilize to evaluate student progress? How long have you used these methods and how much validity do you believe they have?
10. How has student performance on these assessment methods changed when comparing before, during, and after COVID-19 related school closures/virtual or distanced learning?
11. What specific area(s) of academics have you seen students struggle with the most after COVID-19 school closures and virtual learning?
12. What, if any, long term effects do you believe students will experience due to school closures and remote learning?
13. What strategies or methods do you believe will be most effective in mediating any declines in academic performance related to COVID-19 school closures and virtual/distanced learning?
14. Is there anything else you would like to share that did not come up in any previous questions?

Additional Notes:

# BIBLIOGRAPHY

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Arlington, VA: American Psychiatric Association; 2013.

Center for Disease Control and Prevention. (2020). What is Autism Spectrum Disorder? Retrieved from https://www.cdc.gov/ncbddd/autism/facts.html

Greenway, C. W., & Eaton-Thomas, K. (2020). Parent experiences of home-schooling children with special educational needs or disabilities during the coronavirus pandemic. *British Journal of Special Education, 47*(4), 510-535. https://doi.org/10.1111/1467-8578.12341

Huck, C., & Zhang, J. (2020). Effects of the COVID-19 pandemic on K-12 Education: A Systematic Literature Review. *New Waves-Educational Research and Development Journal, 24(1), 53-84.*

Kodak, T., & Bergmann, S. (2020). Autism spectrum disorder: Characteristics, associated behaviors, and early intervention. Pediatric Clinics, 67(3), 525-535.

Kuhfeld, M., Soland, J., Tarasawa, B., Johnson, A., Ruzek, E., & Liu, J. (2020). Projecting the potential impact of COVID-19 school closures on academic achievement. *Educational Researcher, 49*(8), 549–565.

Kaffenberger, M. (2020). Modelling the Long-Run Learning Impact of the Covid-19 Learning Shock: Actions to (More than) Mitigate Loss. *International Journal of Educational Development, 81*, 102326., doi:10.1016/j.ijedudev.2020.102326.

Ozonoff, S., Goodlin-Jones, B. L., & Solomon, M. (2005). Evidence-based assessment of autism spectrum disorders in children and adolescents. Journal of Clinical Child and Adolescent Psychology, 34(3), 523-540.

Pidgeon, N., & Henwood, K. (1997). Using grounded theory in psychological research. In N. Hayes (Ed.), *Doing qualitative analysis in psychology* (pp. 245–273). Psychology Press/Erlbaum (UK) Taylor & Francis.

United States Department of Education. (2021, September 30). *Return to School Roadmap: Development and Implementation of Individualized Education Programs in the Least Restrictive Environment under the Individuals with Disabilities Education Act*. United States Department of Education. Retrieved from https://sites.ed.gov/idea/files/rts-iep-09-30-2021.pdf

Wei, X., Wagner, M., Christiano, E. R., Shattuck, P., & Yu, J. W. (2014). Special education services received by students with autism spectrum disorders from preschool through high school. *The Journal of Special Education*, *48*(3), 167–179. https://doi.org/10.1177/0022466913483576

Wilczynski, S., Menousek, K., Hunter, M., & Mudgal, D. (2007). Individualized Education Programs for youth with autism spectrum disorders. *Psychology in the Schools, 44*, 653-666.

**ACADEMIC VITA**

# Emily Duddy

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## EDUCATION

**The Pennsylvania State University** **University Park, PA**

Intended Majors: Bachelor of Science in Psychology Class of May 2022

Intended Minors: Human Development & Family Studies and Special Education

*Schreyer Honors College Scholar*

## LEADERSHIP AND ACTIVITIES

**Phi Chi Theta Professional Business Fraternity: Alpha Iota Chapter** University Park, PA

*Leadership Board Member* *Aug. 2020 - Present*

- Responsible for assisting the board in the planning and decision making of the organization's goals and actions while ensuring effective dissemination of information to the Phi Chi Theta brotherhood.

*The Penn State IFC/Panhellenic Dance Marathon Family Relations Director* *Aug. 2019 - Present*

- Ensure constant communication between organization and Phi Chi Theta's three THON families through planning and running events, providing them with the best THON experience throughout the year.

*Brotherhood Chair* *Jan. 2019 - May 2019*

**Pennsylvania Psychological Association** Harrisburg, PA

*Active Student Member* *Oct. 2020 - Present*

**Schreyer Honors College Orientation Mentor** University Park, PA

*Communications/Social Media Team Member* *Feb. 2019 – Aug. 2019*

- Selected through competitive interview process to lead group of Schreyer Honors College Class of 2023 through orientation programming events and preparation for future success in the upcoming year.

## WORK/VOLUNTEER EXPERIENCE

**Dr. Karen Bierman's Research Team** University Park, PA

*Research Assistant* *Aug. 2021 – present*

- Working on two current studies: GoPals and Head Start REDI, both of which are focus on school and

community-based intervention programs to determine their effects on school readiness and long-term outcomes.
- Administer assessments of preschool-aged children to determine their academic comprehension, social, and emotional skill levels, and interview parents of children to determine family dynamics and academic enrichment in the home.
- Conduct an observational data collection of parent-child interaction to determine bonding and social-emotional learning.

**Soaring Heights School for Students with Autism Spectrum Disorder** State College, PA

*School Psychologist Intern* *Sept. 2020 – present*

- Work both independently and alongside Dr. Melissa Hunter, School Psychologist, to determine student progress through coding and analyzing BASC assessments and evaluating success of intervention programs in IEP meetings.
- Created individualized visual supports to assist students with ASD in both the classroom and home environments.
- Conducting independent research for a thesis on COVID-19's effect on academic functioning of students with ASD.

**Variety Club Camp and Developmental Center** Worcester, PA

*Assistant Teacher: Extended School Year Program* *May 2021 – Aug. 2021*

- Responsible for instructing a class of students with intellectual and developmental disabilities through school curriculum and monitoring student progress towards IEP goals.
- Created weekly age-appropriate lesson plans and led students through academic activities to facilitate social skills.

**Nanny** Skippack, PA

*The Swope and Dulin Families* *Sept. 2013-Present*

- Provide support to the families by assisting children with educational tasks, engaging in creative free play, and supervising group socialization and structured recreational activities.

**LifeLink PSU** University Park, PA

*Volunteer Mentor* *Jan. 2019-Present*

- Act as a support system and peer to students with disabilities from the State College Area School District.

**The Penn State IFC/Panhellenic Dance Marathon** University Park, PA

*Student Volunteer* *Aug. 2018 – Present*

## HONORS

- Dean's List all semesters, Schreyer Honors College Scholar, Penn State Provost Award Scholarship, J. Leonhard Scholarship in Education, Scholars Diploma Recipient