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Unveiling the Hidden Impact of School Closures and Remote Learning: Academic and Emotional Challenges

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Abstract

The COVID-19 pandemic forced a rapid shift to online learning, revealing significant challenges for elementary students' foundational academic and emotional development. This study explores the impact of remote learning on students with pre-existing—yet unidentified—attention and mood-related challenges, and aims to shed light on the academic and emotional gaps observed upon the return to in-person learning. To illustrate the extent of observed academic and emotional challenges, two neuropsychological case studies are presented; changes in academic performance, attention, executive function, and emotional well-being, during and after the pandemic, are examined. Findings highlight that, for some students, remote learning catalyzed or exacerbated such challenges. Furthermore, findings underscore the importance of renewed urgency for tailored support and re-evaluation of student needs, regardless of overt risk factors, especially upon returning to traditional school environments. Strategies for academic screening and social-emotional support are proposed as a means to mitigate long-term effects of educational disruptions. It is imperative that future research not only aims to better understand the learning trends observed in this specific cohort, but in the event of inevitable future school disruptions, also endeavors to establish a blueprint for supporting student needs and minimizing educational gaps.

Keywords: academic screening, COVID-19 pandemic, elementary education, neuropsychological evaluation, remote learning, school disruptions

1. Introduction

In the aftermath of the COVID-19 pandemic, a recurrent and pertinent challenge to the educational landscape persists. Though infection rates have decreased (Centers for Disease Control and Prevention, 2024), and immunity has generally increased, obstacles to consistent and continuous education remain, including teacher strikes, student protests, and the ever-present, looming possibility of another health crisis. Prolonged absence from the traditional educational environment, irrespective of the cause, presents a significant setback for all students, and especially for those with learning disabilities, attention deficits, social-emotional difficulties, and mood-related disorders (Cortiella & Boundy, 2018).

The rapid shift to online learning during the COVID-19 pandemic highlighted the varying impacts of disrupted learning. Research shows that, on average, students fell behind by several months in core subjects, particularly reading and mathematics (Dorn et al., 2021; Baumgaertner, 2023). Such effects were even more pronounced among younger children and those from low socioeconomic status (SES) families, who faced greater barriers in accessing remote learning and support (Tomasik et al., 2021; Maldonado & De Witte, 2022; Engzell et al., 2021; Hammerstein et al., 2021). Additionally, students with learning difficulties found adapting to less structured and more independent learning environments particularly challenging (Clark et al., 2021; Schult et al., 2022). While such findings seem sensible and perhaps even obvious, what appears less frequently considered is the idea that prolonged absences and disruptions may act as a catalyst for those students yet identified with learning, attention, or mood-related challenges. The primary aim of this research is to evaluate the impact of online learning during the COVID-19 pandemic on academic and emotional development, particularly for those students in elementary school. More specifically, this paper focuses on elementary students with pre-existing yet unidentified attentional and mood-related dysfunction. More generally, this paper also aims to amplify the voices of underrepresented minors and their guardians, and particularly those students silently struggling in the wake of unprecedented learning circumstances, whose perspective and experiences are critical to understanding the extent of compounded

challenges encountered during, and as a result of, school disruptions.

2. Literature Review

2.1 Learning Barriers in a Remote Educational Environment

Given the unpredictability of school closures, and the lack of clear steps toward establishing remote learning environments that are tailored to students' individualized needs, at the least, it is essential to establish a comprehensive plan for re-assessing and adjusting educational approaches when schools are back in session. Upon the resumption of normal educational activities, special attention must be paid to opportunities for individual re-evaluation, as well as re-assessment of student needs, so as to prevent widening educational and socio-emotional gaps. An important first step in establishing a plan for assessment and intervention is to understand the learning barriers encountered by all students in a remote environment, and especially vulnerable students, which again, are hypothesized to propel underlying and unforeseen academic, social, and emotional challenges.

1) Reduced or Lack of Individualized Support**.** During the pandemic, only one-third of U.S. school districts required teachers to provide direct instruction, resulting in a variety of implementation models for remote learning (Gross, 2020). Students with learning and attention challenges require tailored support, typically delivered via a multitiered system in the public school setting. Tier I provides comprehensive, universal instruction; Tier II provides targeted, supplemental instruction; and Tier III provides intensive instruction (Thurlow et al., 2020). The sudden shift to online learning interrupted educators' ability to deliver academic instruction with such an effective, systematic approach, and particularly impacted students requiring Tier II and III support (i.e., more intensive academic needs; Myung et al., 2020). At these levels, special education professionals, including school psychologists, speech and language therapists, occupational and physical therapists, special education teachers, and paraprofessionals, struggled to provide the same quality and consistency of accommodations and modifications as were previously provided in-person (Supratiwi et al., 2021). More specifically, Individualized Education Programs (IEPs), which are specific and critical tools in supporting the educational needs of students requiring the most intensive interventions, were difficult to adhere to and deliver in remote learning environments. Interventions at this level highlight the importance of immediate corrective feedback, as well as frequent opportunities for modeling and scaffolding, both of which were significantly delayed and reduced during distance learning. Furthermore, students with attention and learning challenges require frequent check-ins and regular monitoring of progress via assessment, observation, and formal re-evaluations (Thurlow et al., 2020), all of which were procedures hindered by a lack of in-person interaction, technological limitations (i.e., inability to consistently observe students or interact with them while they work, reduced opportunity for reinforcement, limitations in re-evaluation procedures), and a shortage of qualified professionals as the pandemic progressed (Gillani et al., 2022).

2) Reduced Communication and Socialization. For all elementary students, communication and socialization skills are crucial aspects of educational programming. For students with special educational needs specifically, including attention and mood-related dysfunction, experiencing situations that develop adaptive coping skills, self-efficacy, and social relationships are critical for protecting against academic disengagement, dropout, and further cognitive and academic impairment or deterioration (Breaux et al., 2021; Dvorsky et al., 2018; Jones et al., 2021). Typically, intervention in these skill areas involve enhanced opportunities for structured, adult-supported, and consistent social interaction, including cooperative learning in the classroom, as well as peer social skill groups, where direct corrective feedback can be provided. Reliance on video conferencing and other digital communication tools during the pandemic, however, made implementation and replication of these interventions extremely difficult or, in some instances, impossible. Furthermore, without physical interaction, teachers were less equipped to utilize in-the-moment social interactions as teaching opportunities for appropriate and effective social communication, a common practice in the elementary setting. Instead, students and teachers were tasked with more frequently communicating via nonverbal means in the digital classroom (i.e., facial expressions, gestures, digital indications on video conferencing platforms, written communication via digital chat rooms), which reduced interactions overall, and required a type of social communication skill that is already significantly more difficult for students with self-regulation, attention, and technological limitations.

3) Increased Burden on Parents and Caregivers. School closures, often with little to no advance notice, place a substantial burden on parents and caregivers, who are suddenly required to assume the roles of educators and facilitators, despite lacking specialized education and training. Many parents also juggle additional responsibilities (i.e., jobs, additional caregiving duties), making it even more challenging to provide necessary support. Research indicates that the most significant parental barriers during the pandemic included limited communication with schools, time constraints, and restricted access to technology (Supratiwi et al., 2021), which further compounded aforementioned difficulties. Beyond these challenges, parents also faced additional financial burdens, such as the

cost of tutoring to supplement their child's education, or child care and supervision during work hours, which can be particularly onerous and add even more strain to resources during trying times.

4) Transitioning back to the Classroom. While parents of students with significant learning challenges faced several obstacles, parents of students without identified learning challenges were likely unaware of the impact that distance learning would have on academic progression, leading to a widening gap between grade-level expectations and acquired skills (Hammerstein et al., 2021). Many students, and especially those with social-emotional challenges, rely on the structure and routine provided by the in-person school setting to support their ability to regulate their emotions and behaviors, both in the classroom and at home. Without that structure, these students may experience an increase in maladaptive behaviors, which can have negative consequences on their academic participation and progression. Further, the return to a structured classroom environment, while generally positive, can be overwhelming for students who have adapted to the rhythms and routines of remote learning, or who have experienced prolonged periods away from any formal education. For these students, re-acclimating to the social dynamics, academic expectations, and daily routines of a traditional classroom setting requires careful management and support. The sudden shift back to a classroom, with its inherent sensory inputs, social interactions, and academic demands, can be jarring. These students might experience heightened anxiety, difficulties in concentration, and setbacks in social and emotional development.

3. Methods

3.1 Study Design and Participants

This retrospective study was conducted by reviewing neuropsychological evaluations from two patients, ages 12 and 13, who were selected based on their educational disruptions during the COVID-19 pandemic. More specifically, these two patients were chosen because they were in elementary school during the onset of the pandemic, and exhibited new or exacerbated learning, attention, or mood-related concerns post-disruption.

3.2 Data Collection

Informed consent was obtained from each patient's legal guardian, allowing for the use of de-identified neurocognitive and neuropsychiatric data for research purposes. Data included results from standardized neuropsychological tests and academic performance records.

3.3 Data Analysis and Ethical Considerations

The data was analyzed to identify patterns of changes in cognitive, academic, and emotional functioning that could be directly attributed to the impact of remote learning. Specific focus was placed on changes in literacy and mathematics skills, attention capacities, and emotional well-being. Analysis methods included qualitative reviews of behavioral observations, as well as quantitative assessments of academic and cognitive performance over time.

4. Results

4.1 Case 1. Online Learning and Executive Function: A 12-Year-Old's Journey

This case examines the neuropsychological evaluation of a 12-year-old male, referred for concerns related to attention, executive function, and general academic performance (i.e., reading, writing, and mathematics). At the onset of the pandemic, the patient was in 3rd grade; at the time of evaluation, he was in 6th grade. Of note, the patient's academic challenges first presented during his 5th grade year, when results from statewide standardized testing revealed, for the first time, below grade-level performance across domains (i.e., ELA, mathematics, science and technology). By the time he was in 6th grade, academic deficiencies had translated to a noticeable decline in his performance in the classroom, with teacher-reported concerns for reading, writing, and mathematics. Additional concerns related to executive function abilities were reported, including the patient's ability to remain organized, follow step-by-step directions, and complete assignments, none of which had been reported as concerns prior to middle school.

Neuropsychological testing revealed that the patient's estimated intellectual functioning fell in the high average range. His profile was notable for strengths in verbal comprehension, nonverbal reasoning, and working memory. Processing speed and visual spatial skills were also age-appropriate. Across executive function skills, the patient demonstrated appropriate set-shifting skills, cognitive flexibility, and problem solving. With that said, he demonstrated a significant deficit in sustained attention. Further deficits within subdomains of attention and executive function included weaknesses in attention to detail, organization, and planning. Overall, the patient's profile was consistent with a diagnosis of attention-deficit/hyperactivity disorder (ADHD). Although formal academic assessment was not conducted, neuropsychological data indicates that the patient's pattern of weaknesses negatively and significantly interfered with his encoding and subsequent learning for both visual and verbal

information, which is likely to have a direct and adverse impact on academic achievement. Overall, the timeline of presenting concerns suggests a clear correlation between a shift to online learning and the onset of this patient's academic difficulties, likely driven by pre-existing neurodevelopmental weaknesses. Specifically, while the patient had never presented with learning challenges prior, after transitioning to a remote learning environment for a significant portion of his foundational elementary years, attentional weaknesses surpassed his ability to compensate for such weaknesses, and therefore to perform adequately in the academic setting.

4.2 Case 2. Mental Health and Academics in Remote Learning: A 13-Year-Old's Journey

This case examines the academic and neuropsychological evaluation of a 13-year-old female, also referred for concerns related to attention, concentration, executive function, and academic performance, particularly in mathematics. Additional concerns included symptoms of anxiety and depression, with onset in middle school. Of note, at the beginning of the COVID-19 pandemic, the patient was in 4th grade; at the time of evaluation, she was in 7th grade. Until her 7th grade year, the patient received As and Bs, and all learning concerns (i.e., difficulties with reading, writing, mathematics, attention, behavior) were denied. At the time of evaluation, however, her grades had declined to mostly Bs and Cs, with one failing grade. Though she had never received formal educational accommodations, as her grades declined in 7th grade, she was provided with informal supports, including extra time on assignments and reduced workload, particularly in mathematics.

Neuropsychological testing revealed that the patient's estimated intellectual functioning fell in the average range. Her cognitive profile was indicative of strengths in visuospatial reasoning and verbal comprehension, yet she demonstrated deficits in processing speed, executive functions (i.e., planning, organization, and set-shifting), and sustained attention. Overall, her academic performance showed average to low average proficiency in reading, mathematics, and writing, with particular weaknesses in spelling and written output. In-depth analysis of neuropsychological testing data indicates symptoms consistent with attention-deficit/hyperactivity disorder (ADHD), as well as depression and anxiety. Anxiety symptoms were multifaceted in nature, stemming from both academic responsibilities or expectations (i.e., test-taking and writing essays) and social stressors, which are presumed to significantly contribute to the patient's declining academic performance.

5. Discussion

The cases not only highlight emerging academic and emotional difficulties resulting from academic disruptions, but also underscore the urgent need for tailored support and reassessment upon students' return to traditional schooling environments. First and foremost, both adolescents are bright individuals that exhibit cognitive strengths which will serve to support their academic and social-emotional functioning. In the context of personal strengths, however, both profiles are marked by deficits in attention and executive function, which are likely to have a direct impact on academic progression and performance. At the onset of the COVID-19 pandemic, both adolescents were elementary students, engaged in formative years of foundational learning. While no significant learning concerns were present at that time, pandemic-related disruptions suddenly and exactly aligned with academic deterioration, as evidenced by below grade-level performance across subjects, observed both in the classroom setting and on standardized testing. Both adolescents are now diagnosed with ADHD, a neurodevelopmental disorder, which is long-standing in nature and, prior to the pandemic, was likely masked by the advantageous supports provided by in-person, structured learning in the elementary setting. With the typical elementary school environment stripped away, as well as decreased opportunity for academic monitoring and intervention, these students quietly struggled to maintain performance due to underlying attentional deficits. Furthermore, as evidenced by Case 2, such challenges and subsequent academic deterioration also catalyzed mood-related dysfunction, including anxiety and reduced self-esteem. Taken together, as educators continue to work relentlessly to improve individualized support, especially in the face of school disruptions, the following are critical takeaways for consideration:

- Significant educational disruptions can not only lead to the exacerbation of learning challenges, but also the emergence. As evidenced by these two cases, attention deficits and executive function difficulties were not previously evident or functionally impairing. The transition away from traditional learning environments complicates the process of identifying students who require specific interventions, and subsequently providing them with timely support - a delay that can have lasting effects on a child's educational trajectory. As a result, it is important to highlight the potential for students to return to school with new or intensified learning needs.
- More specifically, upon the resumption of in-person learning, it is important to emphasize individualized attention and support. To assume that students will return to school at the same academic level as before a disruption is detrimental to academic achievement; students' abilities and challenges may have shifted during remote learning, necessitating a general reassessment of their needs and learning strategies. A one-size-fits-all approach risks widening the gap for those who have already fallen behind, as well as those who have

developed new challenges.

- Upon returning to in-person learning, thorough re-evaluation of each student's current academic standing and learning needs will be important. Tailored educational strategies should be designed to meet students where they are upon return, not where they were upon the onset of disruption.

6. Conclusion

While the educational impact and precise gaps in learning continue to require detailed exploration, there is no doubt that school closures and distance learning contribute to negative cognitive, social, emotional, and academic impacts that have the potential to linger without an immediate and effective remediation plan. Unfortunately, while the pandemic may have acted as an initial prompt for reliance on remote learning, continued global and/or nationwide crises maintain the relevancy of this discussion; it is imperative that experience and history are used to guide a proactive approach to addressing students' learning needs and minimizing educational gaps. The following are important considerations and proposed actions for ensuring a more effective and supportive learning environment in the wake of unexpected disruptions:

- ***Academic Screening.*** It is essential that schools leverage multiple levels of intervention by starting, first and foremost, with prevention. In other words, via school-wide screening, efforts should focus first on identifying any and all students that have fallen behind in mathematics, reading, and writing. Academic screening allows for baseline assessments, as well as early identification of learning gaps, data-driven decision-making, appropriate resource allocation, and educational equity, which will ensure that all students, regardless of background, ability, or previous academic performance, receive the support they require to succeed. Within a multi-tiered framework, those students at-risk should then be provided with appropriate, targeted interventions or, if necessary, intensive intervention provided via IEPs, to prevent academic failure.
- ***Social, Emotional, and Behavioral Screening.*** In addition to academic screening, it is equally important to implement social, emotional, and behavioral screening, as deterioration in academic performance and mental health often co-occur and are interrelated. Consistent with academic screening, a systematic approach should be utilized in order to provide interventions that are data-driven, identify students who may not present with overt symptoms, and address the heightened needs of students with learning challenges. Restorative practices, including implementing evidence-based interventions, building and maintaining family-school communication and partnership, and interdisciplinary collaboration will be essential to establish in a timely manner, so as to ensure the proper supports are in place in the event of any further learning disruptions.
- ***Planning for Technological Support.*** It is practical and important to establish a plan should distance learning resurface. Important considerations include ensuring equitable access to technology, learning materials, internet connection, and safe and supportive learning environments.
- ***Planning for Collaboration and Communication.*** As soon as possible, it is essential that schools establish a plan for enhanced communication and collaboration with families. It will be important to consider the most effective means of communication, depending on each families' availability and access to technology. Additionally, families should be kept abreast of any gaps in their child's learning, and be provided with a realistic expectation of their child's learning abilities. Communication should also be reciprocal in nature, as it is equally important that families inform the school of any concerns they have for their child's learning and/or mental health. In either case, regular communication will improve prevention efforts and/or early identification of student needs.

As the reality of continued educational disruptions persists, so too does the magnitude of educators' responsibilities; that is, ensuring a careful, compassionate, individualized, and data-driven approach to supporting students' learning needs. It is essential that future research aims to address the limitations of this study by 1) increasing the sample size to better support and describe the pattern of changes seen in students' learning needs, and 2) establish and outline more specific, tangible strategies for achieving optimal learning environments following any kind of prolonged school disruption. This study is not intended to generalize to all populations, but rather the goal is to provide insights into the specific impacts of education disruption on this cohort, which may guide future decisions. Overall, whenever school doors reopen, it is important to acknowledge that it is not merely a continuation in student learning, but for some, rather an added obstacle in an already difficult educational journey.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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No additional data are available.

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