

Perspective

# Disorder in ADHD and ASD Post-COVID-19

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**Abstract:** A diagnosis of either attention deficit/hyperactivity disorder (ADHD) or of autistic spectrum disorder (ASD) identifies an individual as unable to attend expectedly and appropriately, particularly in school settings. Until the COVID-19 pandemic, what defined the expected and the appropriate was considerate, close physical contact among people. In understanding that aerosol droplets from vocalization cause the transmission of the COVID-19 virus, what is acceptable contact has now shifted to distancing oneself from people and communicating in a way that eliminates vocal spray. The norms for socialization diametrically changed as a consequence of the pandemic. Yet, there has been no concurrent reassessment of the meaning of “disorder” related to ADHD and ASD within the school setting. A diagnosis of ADHD and/or ASD often brings with it an expectation for special education. Therefore, it is important that changes in social norms be recognized as they define the meaning of “disorder”. Investigated here is in what way each diagnosis demonstrates disorder in response to the imposed COVID-19 restrictions and how this can be anticipated to affect the schooling of those with ADHD and ASD during the pandemic.

**Keywords:** COVID-19; ADHD; ASD; social distancing; schooling



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## 1. Introduction

Social inappropriateness defines both attention deficit/hyperactivity disorder (ADHD) and autistic spectrum disorder (ASD) [1]. The concept of a disorder is a practical and political concept indicating what a community agrees clinicians may treat [2]. Since a diagnosis of either ADHD or ASD often elicits a call for special education to be provided by the school, it is important that any change in the disorderliness of the affected student as a result of COVID-19 restrictions be identified and taken into consideration in program delivery. This is especially so since there are increasing numbers of children worldwide who are assigned the diagnoses of ADHD and ASD [3] and since special education needs are changing as a result of the pandemic [4]. Yet, by July 2021, there has been no research done on the effect of social distancing in schools pertaining to COVID-19 [5].

ADHD and ASD both can be characterized as disorders of attention [6]. They are diagnosed through structured interviews [7], screening scales [8] and continuous performance tests (CPT) [9]. ADHD without intellectual disability focuses the person's attention to novelty in their environment rather than the required classroom learning [10]. In contrast, concentration in ASD without intellectual disability is directed to what retains idiosyncratic categorical permanence in the objects of focus, often irrespective of classroom learning [11]. The most recent *Diagnostic and Statistical Manual* (DSM-V) amended its diagnostic criteria, which previously precluded a dual-diagnosis under DSM-IV, to clinically formalize ADHD-ASD comorbidity [12]. This is important as the two disorders are often co-morbid for those with no intellectual impairment [13,14]. There is a shared genetic heritability between ASD and ADHD as well as common impairments in social and executive functioning [15]. Since approximately 70% of children with ASD (and most children with ADHD) do not have an intellectual disability [16], a substantial number of children may actually have a dual diagnosis of ADHD and ASD—30–50% [17].

In those expressing both ADHD and ASD unhampered by intellectual disabilities, the concentration of behaviors can lean towards either ADHD or to ASD [18]. When ADHD is in the forefront, the child is primarily inattentive, impulsive and/or hyperactive, showing their ASD tendencies with respect to social-communication difficulty [19]. If ASD is the primary diagnosis, ADHD behavior is seen to modify autistic stereotypy behavior as a result of severe hyperactivity and often impulsivity, rather than a lack of focus [20,21]. In any case, the inattention given by those with ADHD and ASD to what others identify as important is considered abnormal by society, as witnessed by the labelling of the conditions as disorders.

As a result of problems with executive functioning [22], behaviors expressing inattention set those with ADHD and/or ASD apart from the norm, causing them challenges in social situations. This is especially so in instances where those with ADHD and/or with ASD are expected to act in accordance with the demands of those in authority, as they can be characterized as having an intolerance of intrusion and higher anger reactivity [23]. The behavior is assessed as a disorder in school when the conventional need to attend is in relation to following the instructions of those entrusted with authority in schools. When those with either (or both) of these diagnoses accept that authorities define how they should evaluate their own behaviors then ADHD and/or ASD also become personal problems, diminishing the child's own expectation of social success [24].

Schools are places where students, including those with ADHD and/or ASD lacking intellectual disabilities, are counted on to abide by the demands of those in authority—teachers and school administrators [25]. Pre-COVID-19 this entailed following norms of how to physically associate in considerate, close contact with others outside the child's family. It was difficulties in producing the anticipated behaviors demanded by those in authority that defined the disorders of both ADHD and ASD in the school setting. However, post-COVID-19, the rules governing social contact in school settings changed dramatically to reject the previously accepted manner of associating with others to now call on students to socially distance themselves to avoid producing and receiving vocal spray. The question remains, has this change in what is expected and acceptable behavior in social situations affected the "disorder" of either or both ADHD and ASD?

To assess how the description of disordered behavior has changed with respect to the limitations imposed by COVID-19 in comparison with the pre-COVID period, qualitative process research is undertaken. This phenomenological research points to the dynamics related to the time before COVID-19 and to the time of post-COVID-19 restrictions, describing and isolating these defined temporal coherences [26]. As process research that identifies changes from one time to another, this is not an example of a 'strong' process approach that eliminates entities and explores phenomena as always changing [27]. Inductive and model-led, the aim is to give a conceptual understanding to the behaviors associated with schooling to which ASD and/or ADHD are judged to be disordered in two separate time periods.

Based on the cited research resources regarding a diagnosis of ASD or of ADHD, and those cited with respect to a dual diagnosis of ADHD + ASD as well as ASD + ADHD, an analysis of the primary classroom behaviors demonstrating inattention in those diagnosed with ADHD, ASD, ADHD + ASD and ASD + ADHD is found in Table 1. Also included in Table 1 is an analysis of additional research with respect to those with ADHD + ASD [28] and those diagnosed with ASD + ADHD [29]. The table presents four distinct options. Although the analysis conducted is narrative and not claiming numerical accuracy, if converted into percentages, these options translate approximately as follows: 'yes' = 100%, 'no' = 0%, 'sometimes'  $\leq$  50% or 'usually'  $>$  50%, in relation to the demonstrated behaviors.

**Table 1.** Primary disordered behaviors in those diagnosed with ADHD, ASD, ADHD + ASD and ASD + ADHD, pertaining to inattention in the classroom.

Disordered Behavior	ADHD	ASD	ADHD + ASD	ASD + ADHD
Inattentive	Yes	No	Yes	Sometimes
Hyperactive	Usually	No	Usually	Yes
Impulsive	Yes	No	Yes	Usually
Oppositional	Sometimes	Sometimes	Usually	Usually
Conduct disorder	Sometimes	Sometimes	Usually	Usually
Anxious	Sometimes	Usually	Usually	Yes
Depressed	Sometimes	Sometimes	Usually	Yes
Lacking social skills	Usually	Yes	Yes	Yes
Fixated on activities or objects	No	Yes	Sometimes	Yes
Repetitive behaviors	No	Yes	Sometimes	Yes
Demands routines	No	Yes	Sometimes	Yes
Extreme sensitivity to sensations	No	Usually	Sometimes	Usually

**2. Foundational Curriculum of Schooling: Pre-and Post-COVID-19**

Schooling is the social vehicle transmitting the understanding to children that authorities unrelated to them with no continuing relationship in their lives legitimately define and enforce rules by which they must abide [30]. It is essential that parents partner with this understanding to be ‘good’ parents [31]. Seemingly focused on education, this transference of rule-making and enforcing power from parents to teachers and administrators is the underlying curriculum of schooling [32]. Schooling is as much about the socialization of youth to accept outside authority as it is about teaching cognitive skills [33]. The content of this pervasive, covert curriculum became obvious as a result of the imposed COVID-19 lockdowns beginning in March 2020.

Pre-COVID-19, the foundational curriculum encouraged and demanded correct social touch with others outside the family. Considerate, close, physical contact was seen as not only desirable, it reflected the aim of social maturity [34]. Children who were unable to easily and appropriately come in physical contact with various others were considered in need of remediation, often through special education [35]. In ADHD, ASD and their comorbid associations, this inability to behave correctly regarding social touch in the school setting highlighted the disorders [36].

As the inherent curriculum of schooling, respect for others and responsibility towards them in relation to physical contact are assumed to be the fourth and fifth Rs that schools must teach [37]. Significant time was spent pre-COVID-19 on instructing children in the correct way to physically interact with one another in close contact to demonstrate respect and responsibility toward others. This included the following lessons—challenging for those with ADHD and/or ASD—taught as soon as children entered school: lining up single file when transitioning, respectfully positioning oneself as close as possible to others when assembling, actively seeking to fill in all empty spaces when gathering, and speaking face to face at arm’s length when talking with people.

From the perspective of teachers and administrators, wanting children to be comfortable standing close to each other and learning to invite this closeness may have much to do with saving time and space in transitioning and assembling in a classroom or meeting place. Yet, looking directly at faces at a relatively close distance has been considered a necessary skill beyond the classroom in society generally to help people gauge emotions and regulate their behavior [38]. It is in failing to meet one or more of these and other expectations with respect to the physical closeness of schooling pre-COVID-19 that the disorders of ADHD and ASD were especially evident in classrooms and particularly disturbing to others. Required to ignore the interpersonal distance accepted for proximity with acquaintances and friends (which can vary in relation to nationality and gender [39] as well as race [40]) and accept as appropriate the intimate distance among students demanded by school authorities, students with ASD and/or ADHD could be maltreated by other students as a result of their disordered behaviors pre-COVID-19. They then developed

additional preferences for increased interpersonal distance and derived less pleasure from the touch of others [41].

As a result of the lockdowns initially imposed on populations worldwide March 2020 in response to the spread of the COVID-19 virus, young people quickly were required to master a new assumption for how they should interact with others—close physical contact with non-family members outside their bubble was to be avoided as much as possible. In lockdown, children, as well as adults, were to stay home other than for necessary outings, which were to be kept to a minimum. And when people did go outside the home in populated areas, they were to wear masks, wash their hands frequently and keep six feet apart [42].

During lockdowns, in the interest of decreasing the spread of COVID-19, school buildings were closed and instruction undertaken online by children who remained at home [43]. Once the lockdown was initially lifted for the new academic year, fall 2020, the amount of time children spent at school as opposed to the normal school year was greatly reduced [44]. When they did come in physical contact at school, students were required to wear face coverings, sanitize their hands frequently and keep a safe distance away from teachers and other children [45]. All physical contact was forbidden and actively monitored [46]. Because the spread of COVID-19 was found to result from aerosols produced by vocalizing [47], children were required to continuously cover their mouth and nose with masks and to work silently in the classroom. They were not to project their voice in communicating, to play wind instruments, or to sing unless they used a mask and were situated in a well-ventilated area, as these activities were considered high producers of vocal spray [48]. To date, there has been little research on the psychological effect of these changes on children [49] and little is known about the long-term mental health effects of pandemics on children and adolescents [50]; however, research has been done on the effect of the pandemic on caregivers of children with ADHD and/or ASD who have been found to have been disproportionately affected by the pandemic [51].

The differences revealed in the covert curriculum of school pre-and post-COVID-19 can be arranged and compared in tabular form. Table 2 identifies the aspects of the foundational curricula pre-COVID-19, concentrating on close association [52], and post-COVID-19, when keeping a distance of two meters from others has been recommended—although this can be considered protective only if everyone simultaneously wears masks [53]. Entries pre-and post-COVID-19 for Table 2 were created as the result of a process analysis of the references cited.

**Table 2.** Comparing aspects of foundational curriculum, pre-COVID-19 and post-COVID-19.

Aspect of Curriculum	Pre-COVID-19	Post-COVID-19
Lining up single file	Respectfully close to next person	At a distance of two meters
Assembling in a meeting space	Respectfully close in all directions	Two meters in all directions
Filling rooms with people	No space left empty	Empty space of two meters
Speaking face to face	At arm’s length distance	At a distance of two meters

### 3. Reassessing Disorder in ADHD and ASD Post-COVID-19

With these new social norms resulting from limitations imposed by a response to the pandemic, the opportunity arises to reevaluate the definition of disorder associated with both ADHD and ASD post-COVID-19. Although differences in how those with ADHD and ASD process the world from the norm post-COVID-19 remain, with the new foundational focus diametrically opposed to the old regarding contact with others [54], it is important to consider how much of the difference those with ADHD and ASD display can still be recognized as “disorder” in school.

The assumption of schooling is that young people should be willing and able to follow the instructions of authorities. This assumption is realized for most children and is an important factor in defining normal [55]. What teachers maintain to be right and wrong is accepted without question by the majority of students and represents their school connectedness [56]. Considering their teachers in loco parentis, accepting that they should do as the teacher demands is relatively unproblematic for those children judged normal [57].

Unlike most children, those with ADHD or ASD do not easily recognize teacher authority as legitimate with respect to their behavior. Instead, they follow a self-initiated lifestyle [58]. For those with ADHD, this self-direction results from their personal interpretation of changes they see happening in the world. Evaluated as hyperactive, impulsive and/or inattentive in the classroom, children with ADHD are unable to attend to directions that are not of their own design as a result of delay aversion [59]. In contrast, those with ASD organize their behavior in relation to what they see as consistent within, for them, a difficult-to-interpret environment. As such, they display crisis behaviors [60]. What each child with ASD identifies as important may be very different—from each other and from the norm. In these youth not accepting their authority, teachers are less likely to modify the curriculum so that those with ADHD and ASD may succeed. Instead, they lower their expectations for those with these diagnoses [61] even when there is no comorbid intellectual impairment.

Although both ADHD and ASD are disordered in relation to embracing and following authority, because the child follows a self-oriented life-style, the effect of COVID-19 on these two disorders can be expected to be divergent in a classroom situation, both from the norm and from each other [62].

In the more restrictive classroom brought on by COVID-19, requiring additional rules and bodily limitations, it can be anticipated that those with ADHD will be seen as displaying increased disorder in their social interactions unless they understand and support the severity of the reason for their additional limitations at school brought on by COVID-19. For those students with ADHD who do not understand or are not in agreement with the necessity of the measures taken during COVID-19 in further limiting their freedom, these students may be interpreted by teachers as having increased disorder from the norm post-COVID-19 in comparison with pre-COVID-19 [63]. What research has been done has identified that adolescents with ADHD are more likely than adolescents without ADHD to experience an increase in their inattentive, hyperactive/impulsive, and oppositional/defiant symptoms [64]. If, on the other hand, schooling is primarily conducted online, those diagnosed with ADHD may have fewer problems and be seen as less disordered, as many of their disruptive social interactions are not evident when instruction is online [65].

In contrast, those with ASD feel most comfortable in the presence of others when there are strict and enforced rules for behavior [66] wherein direct contact is discouraged and people are expected to work quietly on their own. A lack of order and predictability in the school environment brings considerable stress for those with ASD [67], as many students with ASD describe touch and noise as painful [68]. Once they have been able to establish new routines, given that social distancing is the protocol for social interaction now expected at school, it can be predicted that those expressing ASD will be less frequently identified as having a disorder at school than in the past. Results of research have indicated a reduction of psychopathological symptoms in those diagnosed with ASD in response to COVID-19 limitations [69]. Online lessons, where those with ASD can go at their own pace and not have to reveal themselves in synchronous online meetings, correspond with their preferred method of learning. Thus, with less attention to their lack of social skills, there would be a decrease in their evaluation as disordered.

For those diagnosed with ADHD + ASD as well as those identified as having ASD + ADHD comorbid, the ability to cope in class is compromised post-COVID-19 [70]. In classroom situations where, pre-COVID-19, these dual-diagnosed students may have established at least partially successful methods of self-regulation, the imposed restrictions from COVID-19 have caused these students to exhibit emotional and behavioral problems that degrade the quality of classroom learning for themselves and others. This has not only had an effect in the classroom, it has led to increased stress levels in parents [71]. Learning online for these students with a dual diagnosis has been found to reduce symptoms [72].

Those diagnosed with ADHD and/or ASD are characterized in school settings as inattentive to the directions given by authorities. In this respect an “authority” for these

exceptional students represents anyone who is not trusted to understand the world that these students experience yet tries to impose their will on the diagnosed student. As such, although these disorders are recognized as such most often by teachers, they are also identifiable by other students who expect different behaviors from the ones displayed by the student with ADHD and/or ASD. Pre-COVID-19, when they were required to engage in considerate, close, physical contact, these students had a lack of comfort in trusting others with this intense level of social touch. Studied in relation to both ASD [73] and ADHD [74], this lack of trust in social touch demonstrates persistence into adult life. When students diagnosed with ADHD and/or ASD are permitted self-direction in learning, allowing them to determining the closeness of preferred interaction with others—as in online classroom interactions [75]—the disorder displayed by these young people was found to be mitigated.

It is useful to compare the expected coping outcomes both in class and online post-COVID-19 based on the traits of those with ADHD, ASD, ADHD + ASD and ASD + ADHD. This is done in Table 3. The entries were identified by a qualitative process, an analysis of the cited research.

**Table 3.** The expected results of coping behaviors of those diagnosed with ADHD, ASD, ADHD + ASD and ASD + ADHD, in relation to both in-class and online schooling formats, post-COVID-19.

Schooling Format	ADHD	ASD	ADHD + ASD	ASD + ADHD
In class	With uncontrolled symptoms—hazardous coping	Copes in time if successful routine established	With uncontrolled symptoms—hazardous coping	With uncontrolled symptoms—hazardous coping
Online	May cope well	Likely copes well	May cope well	Likely copes well

#### 4. Schooling for ADHD and ASD Post-COVID-19

Students with ADHD wherein hyperactivity and/or impulsivity is prominent find it difficult to work quietly in classrooms avoiding social touch. This is especially so in situations with low environmental stimulation [76]. Those who are primarily inattentive can be expected to be forgetful of the procedures necessary to keep safe during a pandemic [77]. ADHD is found to limit the ability to comply with COVID-19 prevention recommendations, making ADHD a risk factor for COVID-19 infection [78]. As a result, post-COVID-19, those with ADHD symptoms they are unable to control are best advised to conduct their lessons online, outside the association with other students. This is especially so because, although knowledge of ADHD symptoms and their potential impact on student learning and functioning is crucial, especially during the pandemic, teachers lack knowledge of ADHD [79]. Pre-COVID-19, the disorder at school may have been interpreted as merely inconvenient for teachers and other students. However, if they are unable to comply with the new restrictions, those displaying inattention, impulsivity and/or hyperactivity become health hazards to themselves and to others—something unacceptable during the COVID-19 pandemic.

During times when lockdowns are lifted sufficiently to permit interaction at school post-COVID-19, those with ASD will need time to adjust to the new routines as unexpected events lead to behavioral challenges in those with ASD, many of whom can be overwhelmed by negative information related to COVID-19 [80]. Once adjusted, likely they will be seen to comply with the requirements of school to socially distance themselves from others more often than either those with ADHD or those judged to be normal. This is because their particular self-direction, in preferring to distance themselves from others, is more suited to the new limitations imposed. What can be expected to decrease is their physical activity [81]. Behavior problems that those with ASD might have with the new rules for social interaction would be transitional and come as a result of changes to their routine, including the stopping of their special education, rather than the content of the changes—with which they would feel less anxious than pre-COVID-19 [82]. When all students are expected to stay away from each other and remain quiet, the disorder of

those with ASD can be anticipated to be less evident than pre-COVID-19. Furthermore, if students are not permitted to attend school as a result of lockdowns, those students with ASD lacking intellectual disability are likely to consider the online learning format to correspond well with their preferred method of learning [83]. As a result, they can be predicted to demonstrate less disorder in their behavior, both socially with online meetings and with respect to their individual learning.

The importance of the dual diagnoses of both ADHD + ASD and ASD + ADHD has become more prominent in the last decade and cannot be overstated when considering schooling. Using latent class analysis, it has been estimated that, while ADHD symptoms may occur without ASD symptoms, ASD symptoms do not occur without ADHD symptoms [84]. Youth with ADHD always have more ASD symptoms/traits than typically developing children [85]. Perhaps the reason ADHD symptoms don't always appear with ASD is that youth diagnosed with ADHD first are diagnosed with ASD on average 3 years later than those diagnosed with ADHD and ASD concurrently or ASD only [86]. The presence of higher levels of ASD symptoms in those with ADHD predict a more severe clinical, cognitive, and developmental outcome, particularly pertaining to oppositional, conduct and anxiety symptoms—especially difficult behaviors in the classroom [87]. A higher level of hyperactivity characterizes ASD + ADHD from ASD alone and is most prevalent in relation to communication difficulties [88]. To date, there has been no research on the effectiveness of online learning for those with ADHD + ASD or those with ASD + ADHD, pre- or post-COVID-19. Nevertheless, based on the characteristics identified for those with these comorbidities, a qualitative process analysis has been constructed to relate the symptoms/traits of these dual diagnosis to the qualities of online learning. These include the ability to: self-direct one's learning, focus on the content presented because it is self-selected, interact online with other students and teachers rather than in person, and represent positive features of online learning for those with these dual diagnoses. However, working from home also increases the stress of caregivers and relationships with these caregivers may become stressed when schooling is online [89].

Table 4 shows the predicted increase or decrease in the interpretation of the disorder of ADHD, ASD and possible comorbidities with respect to in class and online behavior post-COVID-19, based on the cited research. The analysis conducted is based on narrative research, and as such, it does not claim numerical accuracy. However, converted into percentages, the options chosen are as follows: 'possible' ≤ 50% chance and 'likely' > 50% chance. 'Expected' is intended to mean that initially there will be some difficulty for those with ASD to adjust to the change in routines demanded at school as a result of COVID-19 restrictions, but, after new routines are established, it is anticipated that those with ASD will have a decrease in their "disorder". This is as a result of the new limitations more closely mirroring their preferred methods of interaction with others.

**Table 4.** Predicted increase or decrease in interpretation of "disorder" during both in class and online school formats for those with ADHD, ASD, ADHD + ASD and ASD + ADHD during the COVID-19 pandemic.

Schooling Format	ADHD	ASD	ADHD + ASD	ASD + ADHD
In class	Increase	Expected decrease	Increase	Possible decrease
Online	Possible decrease	Decrease	Likely decrease	Likely decrease

### 5. Conclusions

The restrictions brought on by the COVID-19 pandemic have been ubiquitous and challenging. However, there has been little recognition given to the effect that the call for social distancing has had on dismantling the previous foundational, covert curriculum of schooling—considerate, close physical contact among students. A new set of behaviors is demanded to maintain social distancing in schools. These new behaviors necessitate a reinterpretation of what a disorder is in relation to social situations. As both ADHD and ASD are defined as being disorders, the question was asked: has this change in

what is expected and acceptable behavior in social situations as a result of imposed social distancing affected the “disorder” of either or both ADHD and ASD?

Diagnoses of ADHD and/or ASD are continuing to increase throughout the world and, with this increase, so too the greater persistence in calls for special education to be provided by the school. Resources for these programs are limited and the needs are shifting. For this reason, it is important that any change in the disorderliness of the affected student as a result of COVID-19 restrictions be identified and considered in program delivery.

ADHD and ASD are often comorbid and without intellectual disability. After a period of adjustment, based on a qualitative process analysis, it was found that those with ADHD in any degree would fare less well than those with ASD in meeting the expectations for social distancing. ADHD is in effect a risk factor for COVID-19 because of the difficulty of many of those with the diagnosis to consistently comply with the new restrictions. On the other hand, those with ASD, once they are able to develop a new routine related to mask wearing and social distancing, are not only likely to adapt to the novel restrictions, they can be envisioned to have a decrease in what teachers and school administrators see as their disorder because the requirements correspond with their preferred method of association with others. This may translate to an increased need for special education support for those with ADHD to any degree and a decrease in such support for those with ASD.

All students were isolated for more than a year during the COVID-19 outbreak, and, as a result, social, educational and psychological difficulties might be noted in children without ADHD and ASD. Yet, in creating programs for those with ADHD and with ASD, educators should be aware of the change in how each diagnosis may be viewed as a disorder in school post-COVID-19. In becoming aware, it must be recognized that the behavior of those with these diagnoses is individual to each child; therefore, reassessment of “disorder” must be done on an individual basis. Some students with ADHD may have sufficient control over their behaviors to not be a threat to in-class meetings with the increased restrictions. Therefore, there should be no comprehensive decision that a child not be permitted back in class merely because of a diagnosis of ADHD. As well, there should be no assumption that a child with ASD will necessarily develop an appropriate routine of mask wearing and social distancing and, as such, be expected to succeed with in-class format. The analysis offered is in related to what can be expected given the behaviors of those with these disorders in comparison with the imposed restrictions. It is only by understanding how what is seen as “disorder” has changed as a result of new regulations regarding COVID-19—and understanding that students with ADHD and/or ASD will respond individually in relation to their behaviors—that these children can be served in their learning and they and others attending their schools kept safe during the pandemic.

Despite its potential usefulness, this study is not without its limitations. The limitations of this research are with respect to four main areas: the type of process analysis undertaken, the exclusion of students with intellectual disabilities, the content of the tables produced in the analysis of research results and the lack of research available regarding online learning for students with ADHD, ASD, ADHD + ASD and ASD +ADHD.

Process research focuses on empirically evolving phenomena drawing on analysis that incorporates temporal progressions of activities as elements of explanation and understanding [90]. One of the biggest challenges to analyzing empirical research in this approach is interpreting the data in an ongoing state of becoming [91]. With respect to an analysis of the difference in what is considered disorder with respect to the evolution from the pre-COVID period to the post-COVID reality, this type of ‘strong’ process research would have involved looking at and evaluating the period of transition between both periods. This was not the research that was undertaken. As such, from the perspective of strong process research, the focus on the two periods as discrete elements is a limitation. However, although a limitation with respect to strong process analysis, for the purpose of this research to assess the change in the meaning of disorder with respect to ADHD and ASD, the type of analog analysis of strong process research was found to be less relevant. The reason is the focus of the research to differentiate the revolution in thinking that has taken



place, that is, in the sense of the meaning of revolution first introduced by Kuhn [92]—an entire break with the past that comes from a complete and utter change in thinking. On the other hand, this research could be furthered with strong process research to identify behaviors of the those with ADHD, ASD, ADHD + ASD and ASD +ADHD during the transition period to accepting COVID-19 limitations and again once the restrictions from COVID-19 are lifted.

The analysis that has been undertaken regards ADHD and/or ASD with no intellectually disability. It has been cited that the majority of those diagnosed with ADHD and/or ASD are not comorbid with intellectual disability, and research often highlights the lack of inclusion of those with intellectual disability [93] for this reason. There are, however, young people diagnosed with these disorders plus intellectual disability, and they have previously been studied [94]. To the extent that these young people do exist in the school system, it is a limitation of this work that they have not been included for the purpose of this analysis. On the other hand, the decision was made not to include ADHD and/or ASD with intellectual disability because the focus of the research is on how the disorder of ADHD and ASD may have changed as a result of COVID-19. To have included intellectual disability would have distracted from the extent of the change evident in the meaning of disorder with respect to ASD and ADHD alone. Still, it remains a limitation of this work, and further research can and should be conducted related to the effect intellectual disabilities have on each of ADHD, ASD, ADHD + ASD and ASD + ADHD as a result of pandemic restrictions.

The content of the tables produced in the analysis of the research results is another limitation. As the research undertaken was narrative research without a quantitative component, the results of such an analysis are open to interpretation. The intent was to identify what is most objective to the analysis by examining recent research results regarding ADHD and ASD both pre- and post-COVID-19. Nevertheless, this was inductive reasoning by one researcher and, therefore, in need of further research to test the categories and evaluations of behavior that have been reasoned to be most representational of behaviors and traits as identified in the tables. Three types of research could further such an analysis: the use of the same type of inductive reasoning by another researcher, employing another qualitative method to do the analysis and the addition of quantitative research to provide exactness to the analyses.

The final limitation to mention is the lack of research found regarding online learning for those with any of ADHD, ASD, ADHD + ASD or ASD + ADHD. As a result of this paucity of data, the information created for Tables 3 and 4 regarding online learning is preliminary and awaits further research in this area to enhance its reliability.

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