

*Search information*

Received .28-03-2026

Accepted .08-05-2026

Printed ISSN: 2352-989X

Online ISSN: 2602-6856

***The Impact of Selective Attention Deficits on  
the Acquisition of Writing Skills in Children  
with Autism Spectrum Disorder***

**Dr. Boudjemai Djouhra**

**<sup>1</sup> Higher School for Teachers of Deaf and Mute,  
(Algeria), boudiba-djouhra@hotmail.fr**

***ABSTRACT***

This study investigates the relationship between selective attention and the acquisition of writing skills in children with mild Autism Spectrum Disorder (ASD), using a descriptive-analytical approach within a natural educational setting in a specialized institution. The study relied on the Stroop Test to assess selective attention and cognitive interference inhibition, in addition to evaluating writing skills through a standardized instrument designed to identify indicators of writing difficulties and analyze the quality of written production.

The findings revealed variability in accuracy, response time, and number of errors across interference tasks, along with clear difficulties in cognitive inhibition and attentional shifting. These indicators were also associated with unstable levels of writing performance, reflected in poor page organization, inconsistent handwriting, irregular spacing, letter distortion, and slow task completion.

These results are interpreted in light of processing-capacity models and the allocation of cognitive resources, highlighting the regulatory role of selective attention in structuring and coordinating writing performance. The study recommends the adoption of integrated interventions combining speech therapy and pedagogical practice to enhance selective attention as a foundational cognitive prerequisite for improving writing quality and supporting the learning trajectory of the children concerned.

**Keywords:** selective attention, writing skills, Stroop Test, Autism Spectrum Disorder, dysgraphia

## INTRODUCTION

Writing is considered one of the fundamental academic skills because it requires the coordinated interaction of cognitive, executive, and sensorimotor processes. It is not merely a mechanical activity limited to forming letters or reproducing linguistic symbols; rather, it constitutes an organized cognitive act involving attentional control, working memory activation, sentence- and text-level planning, and continuous monitoring during execution. Handwriting quality is closely related to the learner's ability to integrate visual perception with fine motor execution, thereby enabling letters and words to be organized on the page in a legible and consistent manner. Consequently, any disturbance in cognitive regulation or motor coordination is likely to reduce the quality and accuracy of written performance (Abdel Rahman, 2022) (Abu Allam, 2020) (Diamond, 2013).

The acquisition of this skill becomes even more complex in children with Autism Spectrum Disorder (ASD) because their developmental profile is often characterized by variability in communication, increased sensory sensitivity, and difficulties in cognitive flexibility and attentional regulation. These characteristics may lead to difficulties in controlling letter formation, respecting spacing between words, and maintaining handwriting regularity, all of which affect the legibility and overall quality of written production in school settings. Recent studies indicate that such difficulties cannot be explained solely in motor terms; rather, they also involve multiple cognitive and executive dimensions, especially attentional regulation and the management of competing stimuli within the educational environment (American Psychiatric Association, 2022); (Howard. j. et al, 2023)

In this context, selective attention may be regarded as a central regulatory cognitive function that enables the learner to focus on task-relevant stimuli while filtering out irrelevant information. From the perspective of writing acquisition, this function plays a crucial role in sustaining attention to the fine details of the writing process, such as positioning letters correctly on the line, regulating their size and direction, and maintaining the appropriate motor sequence during execution, even in the presence of multiple competing stimuli in the classroom environment (Al-Qadi, 2020); (Duncan, 2010)

Despite the growing number of studies addressing academic difficulties in children with Autism Spectrum Disorder, most have focused primarily on linguistic, communicative, or behavioral dimensions. By contrast, the cognitive dimension related to attentional regulation and its relationship to the quality of written performance has received comparatively limited attention in the educational literature. Moreover, many studies have approached writing difficulties descriptively, focusing on identifying errors or offering only surface-level accounts of their manifestations without analyzing the deeper

cognitive and executive mechanisms that underlie them. This reveals an important research gap, particularly with regard to the functional relationship between selective attention and graphomotor organization in children with ASD (Ghanem, 2023); (Howard. j. et al, 2023)

From this perspective, the present study seeks to examine the role of attentional regulation, and selective attention in particular, in explaining specific aspects of written performance in children with Autism Spectrum Disorder. A more refined understanding of the relationship between these two variables may help shift the analytical focus from merely describing writing difficulties to uncovering their cognitive and executive foundations, thereby opening the way for deeper interpretive approaches. Such insight may also help orient educational and speech-therapy practices toward the design of integrated interventions that take into account the cognitive dimensions regulating learning, especially the development of attentional control, with the aim of improving writing skills and enhancing the academic performance of children with Autism Spectrum Disorder.

### **Research Problem**

Writing is one of the most complex academic skills because it depends on the simultaneous interaction of precise cognitive, linguistic, and motor processes. It is not limited to expressing ideas through written symbols; rather, it involves planning content, organizing it coherently, selecting appropriate vocabulary, controlling grammatical and orthographic structures, and mastering the fine motor movements required to execute the act of writing. From this perspective, writing may be understood as a complex cognitive activity that is closely associated with executive functions, foremost among them selective attention, which enables the learner to focus mental processing on task-relevant stimuli while inhibiting irrelevant distractions, thereby ensuring continuity, organization, and accuracy of performance (Al-Qadi, 2020); (Diamond, 2013)

Within this framework, selective attention constitutes a fundamental component of executive functioning, and its effectiveness is directly reflected in the quality of academic learning, particularly in tasks that require the simultaneous coordination of multiple mental operations. These considerations become especially important in the case of children with Autism Spectrum Disorder, given that recent literature has highlighted specific characteristics in their patterns of attentional and executive regulation that may negatively affect their ability to cope with the demands of school learning (American Psychiatric Association, 2022); (Howard. j. et al, 2023)

Recent findings suggest that children with Autism Spectrum Disorder who demonstrate better sustained attention and more efficient executive functioning tend to achieve higher levels of linguistic and communicative performance than peers who show lower efficiency in these domains. Likewise, deficits in attentional control, cognitive

inhibition, and cognitive flexibility appear to be among the most prominent cognitive characteristics associated with ASD, and their impact extends to complex educational tasks, particularly reading and writing. These findings suggest that writing difficulties in children with Autism Spectrum Disorder should not be interpreted solely in terms of linguistic or motor limitations; rather, they should be approached in light of the cognitive processes that regulate performance during learning, foremost among them selective attention (Howard. j. et al, 2023).

A reduced ability to direct attention toward essential stimuli, together with limited control over interference from competing stimuli, may lead to a decline in the quality of written performance, whether in terms of idea organization, accuracy of expression, or overall quality of execution. On this basis, the research problem of the present study is formulated in the following question:

**To what extent does impairment in selective attention affect the acquisition of writing skills in children with Autism Spectrum Disorder?**

### **Research Hypothesis**

It is hypothesized that deficits in selective attention are associated with lower levels of writing performance in children with Autism Spectrum Disorder.

### **Significance and Aim of the Study**

The significance of this study may be considered from two complementary perspectives: a scientific perspective and an applied one. Scientifically, the study seeks to clarify the relationship between selective attention and the acquisition of writing skills in children with Autism Spectrum Disorder, particularly in light of the limited number of Arabic studies that have addressed this relationship directly. From an applied perspective, its importance lies in the possibility of using its findings to guide educational and speech-therapy practices toward the development of more precise interventions aimed at enhancing selective attention and improving written performance.

Recent studies support this applied orientation. Training executive functions appears to contribute to improving attention indicators and academic performance, while strengthening executive regulation in children with Autism Spectrum Disorder may enhance their ability to direct attention toward relevant educational stimuli. Accordingly, the present study aims to describe manifestations of impairment in selective attention and to analyze their repercussions on written performance in a way that makes it possible to propose an intervention framework grounded in cognitive assessment results and applicable to the development of educational programs designed to improve writing quality and promote the school inclusion of this group (Diamond, 2013); (Howard. j. et al, 2023).

## **Attention from the Perspective of Cognitive Neuroscience**

From the perspective of cognitive neuroscience, attention is regarded as a central regulatory function that organizes information processing and directs mental activity toward stimuli that are relevant to current goals, particularly in light of the brain's limited capacity to process the vast amount of sensory input present in the surrounding environment. From this standpoint, attention does not operate merely as a general state of alertness; rather, it functions as a selective mechanism that governs the entry of information into working memory and determines which stimuli should be processed and which should be filtered out (Diamond, 2013); (Duncan, 2010).

Recent literature suggests that this regulatory process is supported by the interaction of multiple neural networks, especially frontoparietal networks involved in executive control, resource allocation, and the inhibition of task-irrelevant stimuli. In this sense, attention constitutes a foundational process underlying higher-order cognitive functions such as learning, memory, and decision-making. Within this framework, selective attention emerges as the mechanism that enables individuals to concentrate their mental resources on essential stimuli while resisting cognitive interference, which gives it particular importance in complex learning situations (Duncan, 2010).

The importance of this form of attention becomes especially evident in academic activities such as reading and writing, since performance in these domains requires the simultaneous coordination of planning, organization, linguistic retrieval, and motor regulation. Accordingly, the quality of task performance is closely linked to the efficiency of attentional regulation. From the perspective of cognitive models, this relationship may be interpreted in light of resource-allocation approaches, which assume that successful performance depends on the effective distribution of limited cognitive capacity across task demands, and that any overload in this system is likely to result in slowness or error. In this regard, tasks such as the Stroop Test provide an appropriate means of assessing the efficiency of selective attention and the ability to inhibit automatic responses (Diamond, 2013); (Stroop, 1935)

Thus, the study of attention from a cognitive-neuroscientific perspective is not confined to a purely theoretical level; rather, it constitutes an essential scientific framework for understanding cognitive difficulties associated with learning and for explaining variations in performance in complex academic tasks.

## **Writing**

Writing is a complex academic skill that results from the dynamic interaction of linguistic, cognitive, and motor processes, which operate simultaneously to produce meaningful written discourse. It is not merely a process of encoding ideas into words and sentences; rather, it entails higher-order cognitive operations such as planning,

organization, formulation, and continuous monitoring, in addition to the fine motor control required during execution. From this perspective, writing is understood as a highly demanding cognitive activity that mobilizes multiple components of executive functioning (Abu Allam, 2020) Adas, 2019).

This skill can be conceptualized through three fundamental dimensions. The first is written expression, which refers to the ability to generate, organize, and structure ideas within a coherent textual framework. The second is spelling, which reflects the accuracy of linguistic representations and the ability to apply orthographic conventions appropriately. The third is handwriting, which represents the motor dimension of writing and requires precise coordination between visual perception and manual execution (Abdel Rahman, 2022).

The mastery of writing depends on a set of developmental and cognitive determinants, including psychomotor maturity, visual-perceptual abilities, and overall cognitive development, in addition to motivational and affective factors that influence engagement in the task. These variables play a decisive role in shaping the quality of written production, particularly with regard to the clarity of letter formation, the regularity of lines, the consistency of spacing, and the fluency and speed of execution (Bakaar, 2022).

Accordingly, writing should not be analyzed solely from a linguistic perspective; rather, it must be understood within an integrated framework that takes into account the interaction of cognitive, linguistic, and motor processes. Such an approach makes it possible to identify the underlying sources of writing difficulties and to orient educational and therapeutic interventions toward the specific components that require reinforcement and remediation.

### **Autism Spectrum Disorder**

Autism Spectrum Disorder is a neurodevelopmental condition that affects cognitive, linguistic, and social development. It typically emerges in early childhood with varying degrees of severity and is primarily characterized by difficulties in communication and social interaction, alongside repetitive behaviors and restricted interests. However, contemporary approaches no longer confine the understanding of ASD to its communicative and behavioral manifestations alone; rather, they increasingly emphasize the cognitive and executive characteristics associated with the disorder, particularly those that influence information processing and the regulation of behavior in learning contexts (American Psychiatric Association, 2022).

The literature indicates that many children with Autism Spectrum Disorder display atypical sensitivity to sensory stimuli, including auditory, visual, and tactile input, which may increase distractibility in the classroom environment and reduce their ability to

focus on task-relevant information. In addition, these children often experience difficulties related to executive functioning, particularly in attentional control, cognitive flexibility, and response regulation. Such difficulties may be reflected in slowed performance, limited shifting between task components, and hesitation when carrying out academic activities (Howard. j. et al, 2023).

These characteristics are particularly important in understanding academic performance in this population. Repetitive behaviors and narrow interests may consume part of the child's available attentional resources, thereby reducing flexibility in responding to the demands of the learning situation. Moreover, expressive language difficulties may further affect academic achievement, especially in tasks that require the organization of ideas and their formulation in written form. In this sense, weak attentional control and limited selective attention may be associated with a higher frequency of errors, slower task completion, and poorer organization in complex educational tasks such as reading and writing (American Psychiatric Association, 2022); (Howard. j. et al, 2023).

Accordingly, understanding the relationship between selective attention and written performance in children with Autism Spectrum Disorder constitutes an essential scientific entry point for explaining their learning difficulties and for developing more precise and effective educational interventions.

### **Study Sample**

The study sample consisted of four male children diagnosed with mild Autism Spectrum Disorder, all of whom were receiving regular educational and speech-therapy support at the Noor Center for Autism in Rouiba, Algiers.

The small sample size is justified by the exploratory and qualitative nature of the study, which aims to provide an in-depth analysis rather than to achieve statistical generalization. A purposive sampling technique was employed to ensure a degree of homogeneity in developmental and educational characteristics. The participants were between eight and ten years of age and were all enrolled in primary education, with two children in the third year and two in the fourth year of primary school.

The educational and medical records available at the institution confirmed the absence of co-occurring developmental or neurological disorders that might have influenced the measurement outcomes. This precise characterization of the sample made it possible to examine the relationship between selective attention and the quality of written performance within a natural educational context.

### **Pilot Study**

A pilot study was conducted prior to the actual administration of the research instruments in order to verify the suitability of the methodological procedures and

regulate the conditions of field implementation. This stage contributed to testing the clarity of the instructions and the children's ability to understand the required tasks, which made it possible to introduce minor procedural adjustments aimed at improving the accuracy of administration. It also helped refine the method of recording responses and errors in a way that ensured the objectivity and stability of measurement.

In addition, this phase contributed to familiarizing the children with the testing situation and establishing a degree of rapport with the researcher, which helped reduce situational factors associated with testing and enhanced the validity of the data obtained. Thus, the pilot study provided an appropriate procedural framework for administering the main study instruments and ensuring the quality of the data collection process.

### **Study Instruments**

The present study relied on two standardized instruments to assess the two core research variables objectively, thereby ensuring a coherent methodological link between the theoretical framework and its field application. These instruments were selected based on their capacity to capture specific aspects of cognitive functioning and written performance in children with Autism Spectrum Disorder, while also being appropriate to the developmental characteristics of the targeted age group.

The first instrument was the Stroop Test, one of the most widely used measures in cognitive psychology for assessing selective attention and the ability to inhibit cognitive interference. It is widely recognized as a reliable indicator of executive attention. The test is based on a conflict between the semantic content of a written word and the color of the ink in which it is printed, requiring the participant to name the ink color rather than read the word itself. In the present study, three types of stimulus cards were used: congruent color-word cards, incongruent color-word cards, and neutral color cards. Each card was administered for a fixed duration of forty-five seconds, during which several quantitative indicators were recorded, including the number of correct responses, the number of errors, response time, and instances of hesitation. These measures provide an objective estimate of the efficiency of selective attention and the speed of cognitive processing under conditions of interference (Stroop, 1935).

The second instrument was the Writing Assessment Scale developed by Dr. Meriem Ben Bouzid, which is designed to evaluate the quality of written performance and analyze its structural components in learners. The scale consists of a standardized text comprising twenty sentences that include the various forms of letters in their different positions within words. Its administration is based on a direct copying task. Scoring is conducted according to thirty criteria distributed across three principal domains: page organization, including alignment of lines and spacing between words; word and sentence structure, in terms of accuracy and coherence during copying; and letter

production, including shape, size, direction, and continuity of connections between letters. The total score ranges from 0 to 60, with higher scores indicating greater writing difficulties.

The combined use of these two instruments allows for an integrated analysis of the children's performance. While the Stroop Test provides an objective measure of selective attention and executive control under interference conditions, the Writing Assessment Scale offers a detailed evaluation of the qualitative and structural aspects of written production. This methodological complementarity strengthens the interpretive value of the findings and enhances their relevance in relation to the study's objectives and research problem.

## Results

### Stroop Test Results

**Table 1: Quantitative Results of the Four Cases on the Stroop Test Cards**

| Case | Card | Nature of the Task                     | Words Read | Correct Responses | Performance Rate | Hesitations | Errors |
|------|------|----------------------------------------|------------|-------------------|------------------|-------------|--------|
| S/F  | a    | Reading words in black                 | 35         | 32/50             | 64%              | 3           | 0      |
|      | b    | Giving the semantic aspect of the word | 23         | 16/50             | 32%              | 5           | 2      |
|      | c    | Color recognition                      | 39         | 34/50             | 68%              | 2           | 3      |
|      | d    | Giving the color aspect of the word    | 26         | 24/50             | 48%              | 0           | 2      |
| K/H  | a    | Reading words in black                 | 30         | 30/50             | 60%              | 0           | 0      |
|      | b    | Giving the semantic aspect of the word | 20         | 17/50             | 34%              | 2           | 1      |
|      | c    | Color recognition                      | 25         | 23/50             | 46%              | 1           | 1      |
|      | d    | Giving the color aspect of the word    | 40         | 33/50             | 66%              | 5           | 5      |
| Dj/B | a    | Reading words in black                 | 40         | 40/50             | 80%              | 0           | 0      |
|      | b    | Giving the semantic aspect of the word | 30         | 30/50             | 60%              | 0           | 1      |
|      | c    | Color recognition                      | 25         | 20/50             | 40%              | 4           | 0      |
|      | d    | Giving the color aspect of the word    | 25         | 23/50             | 46%              | 2           | 0      |
| B/N  | a    | Reading words in black                 | 45         | 43/50             | 86%              | 2           | 0      |
|      | b    | Giving the semantic aspect of the word | 30         | 28/50             | 56%              | 1           | 1      |
|      | c    | Color recognition                      | 40         | 40/50             | 80%              | 0           | 0      |
|      | d    | Giving the color aspect of the word    | 25         | 28/50             | 56%              | 1           | 1      |

### Quantitative Results of the Four Cases on the Stroop Test Cards

***The Impact of Selective Attention Deficits on the Acquisition of Writing Skills in Children with Autism Spectrum Disorder.***

***Dr. Boudjemai Djouhra***

The results obtained for the four cases revealed a broadly similar performance pattern, characterized by improved achievement in simple tasks that did not require resistance to cognitive interference, such as reading words or naming colors directly, in contrast to a relative decline in tasks combining word meaning and ink color under incongruent conditions. This shift from easier to more complex performance reflects the pressure exerted by interference tasks on the mechanisms of selective attention and executive control.

An analytical reading of the findings further indicates that the differences between the cases did not lie in the nature of the difficulty itself, but rather in its degree and intensity. Performance in all cases appeared sensitive to the increase in task conflict. These findings support the view that children with Autism Spectrum Disorder may display acceptable ability in direct tasks, yet their performance tends to be affected when the demands of executive control become greater.

Accordingly, it may be concluded that the Stroop Test revealed varying degrees of weakness in the efficiency of executive selective attention among the cases under study. This result is of both interpretive and applied significance, as it contributes to understanding some of the difficulties that may later emerge in complex academic tasks, particularly reading and writing.

**Table 2: Interpretive Reading of the Four Cases' Performance on the Stroop Test**

| Case | Age / Grade Level                         | Performance in Simple Tasks                         | Performance in Interference Task                                      | Recorded Behavioral Indicator               | Interpretive Reading                                                                      |
|------|-------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------|
| S/F  | 8 years old / 3rd year of primary school  | Acceptable performance in direct word reading       | Marked decline in performance when color and meaning were incongruent | High frequency of hesitations and errors    | Indicates difficulty in inhibiting the automatic response                                 |
| K/H  | 9 years old / 3rd year of primary school  | Good performance in simple reading and color naming | Errors and hesitations appeared when shifting to interference tasks   | Relative slowness in responding             | Suggests that performance is sensitive to the degree of competition between stimuli       |
| Dj/N | 9 years old / 4th year of primary school  | High performance in reading and semantic processing | Decline in performance in color discrimination under interference     | Intermittent hesitations during performance | Reflects cognitive weakness in processing interference                                    |
| B/N  | 10 years old / 4th year of primary school | High rates in simple tasks                          | Limited errors appeared as competition between stimuli increased      | Mild hesitations and relative slowness      | Indicates relatively better ability, although the effect of interference remained present |

**Interpretive Reading of the Four Cases' Performance on the Stroop Test**

***The Impact of Selective Attention Deficits on the Acquisition of Writing Skills in Children with Autism Spectrum Disorder.***

***Dr. Boudjemai Djouhra***

An analytical reading of the results reveals that the variability observed among the four cases does not negate the presence of a clear common characteristic, namely that performance was affected by the increase in cognitive interference within the task. The greater the conflict between ink color and word meaning, the more frequent the indicators of hesitation and error became, reflecting the burden placed on executive attentional control mechanisms. In light of Al-Qadi's (2020) discussion of attentional regulation, this pattern may be regarded as an indication of relative fragility in the ability to regulate attention when the task requires resistance to competing stimuli.

The results also show that the differences between the children are not related to the existence of the difficulty itself, but rather to the degree of its severity. The performance of all cases was affected when the demands for executive control and the inhibition of automatic responses increased, which is consistent with Ghanem's (2023) interpretation of the performance of children with Autism Spectrum Disorder in complex cognitive tasks.

Accordingly, it may be stated that the Stroop Test made it possible to identify varying levels of weakness in the efficiency of executive selective attention among the participating children. It also provided findings of practical value for understanding the nature of the cognitive difficulties that may later be reflected in their performance on complex academic tasks, particularly reading and writing.

**Table 3: Quantitative and Qualitative Findings of the Writing Assessment Across the Four Cases**

| Case         | Total Score<br>(out of 60) | Overall<br>Evaluation<br>of Writing<br>Performance | Prominent Page<br>Organization<br>Features                                                                 | Graphomotor<br>(Linear)<br>Characteristics                                          | Qualitative Observations<br>Related to Letter Formation                                                      |
|--------------|----------------------------|----------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Case<br>S/F  | 45                         | Relatively<br>poor writing<br>performance          | Difficulty in<br>organizing and<br>aligning lines,<br>with overall<br>page irregularity                    | Instability in letter<br>formation and<br>weak continuity<br>between letters        | Omission or addition of<br>diacritical dots, distortion in<br>certain letter shapes, and<br>slow execution   |
| Case<br>K/H  | 48                         | Inaccurate<br>writing<br>performance               | Curved or<br>misaligned<br>lines,<br>inconsistent<br>margins, and<br>irregular<br>spacing between<br>words | Fluctuating linear<br>movement with<br>interruptions<br>during word<br>formation    | Errors in diacritical dots and<br>unnecessary additions, with<br>difficulty maintaining page<br>organization |
| Case<br>Dj/N | 50                         | Marked<br>writing<br>difficulties                  | Difficulty in line<br>orientation and<br>sequencing,<br>with irregular<br>distribution of<br>words         | Intersections<br>between letters<br>and instability in<br>the writing<br>trajectory | Omission or addition of dots<br>distortion in some letter<br>forms, with noticeable<br>slowness              |

***The Impact of Selective Attention Deficits on the Acquisition of Writing Skills in Children with Autism Spectrum Disorder.***

***Dr. Boudjemai Djouhra***

|          |    |                                  |                                                                     |                                                                       |                                                                              |
|----------|----|----------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------|
| Case B/N | 48 | Disorganized writing performance | Unstable page organization, slanted lines, and inconsistent margins | Hesitant graphomotor movement and interruptions during word formation | Omission or alteration of certain dots, with irregular spacing between words |
|----------|----|----------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------|

**Quantitative and Qualitative Findings of the Writing Assessment Across the Four Cases**

The results of the writing assessment employed in this study revealed marked writing difficulties across all four cases, as evidenced by the relatively high total scores on the rating scale and by the accompanying qualitative indicators of performance. Total scores ranged between 45 and 50 out of 60, which, according to the assessment framework, reflect a non-proficient level of writing characterized by features approaching dysgraphia-like manifestations.

These quantitative findings are further supported by qualitative observations highlighting deficits in page organization, including poor line alignment, inconsistent margins, and irregular spacing between words. In addition, the writing process was characterized by instability in the graphomotor trajectory, as well as distortions in letter formation, particularly in fine-grained elements such as diacritical dots, alongside relatively slow execution.

Importantly, these difficulties should not be interpreted merely as a lack of handwriting neatness or insufficient practice. Rather, they reflect deeper underlying impairments affecting spatial organization, fine motor coordination, and attentional regulation during writing performance. Accordingly, the writing profiles of the studied cases point to multidimensional difficulties in which motor, organizational, and attentional components are closely intertwined.

On this basis, the findings underscore the need for a multifaceted educational intervention aimed at improving page organization, strengthening graphomotor control, and enhancing attentional engagement during writing tasks.

**Table 4: Analytical Link Between Stroop Test Results and Writing Performance Indicators Across the Four Cases**

| Case     | Mean Performance in Simple Tasks (Stroop)          | Performance in Interference Tasks (Stroop)         | Key Behavioral Indicators (Hesitations/Errors)            | Total Score in Writing Assessment (out of 60) | Prominent Writing Difficulties                             | Interpretive Reading of the Relationship                 |
|----------|----------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------|------------------------------------------------------------|----------------------------------------------------------|
| Case S/F | Acceptable performance in reading and color naming | Marked decline when color-word conflict is present | Increased hesitations and errors compared to simple tasks | 45                                            | Instability in letter formation, difficulty in maintaining | Weak attentional inhibition is reflected in disorganized |

***The Impact of Selective Attention Deficits on the Acquisition of Writing Skills in Children with Autism Spectrum Disorder.***

***Dr. Boudjemai Djouhra***

|           |                                                       |                                                                         |                                                  |    |                                                                                |                                                                                                                       |
|-----------|-------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------|----|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
|           |                                                       |                                                                         |                                                  |    | continuity, omission of some diacritical dots                                  | motor execution and slowed performance                                                                                |
| Case K/H  | Good performance in simple reading tasks              | Emergence of errors and hesitations when shifting to interference tasks | Relative slowing of response with some errors    | 48 | Slanted lines, irregular spacing, and interruptions during word formation      | Sensitivity to attentional interference negatively affects the spatial organization of writing                        |
| Case Dj/N | High performance in reading and linguistic processing | Decline in color discrimination under interference conditions           | Intermittent hesitations during task execution   | 50 | Distortion of letter forms or addition of dots, with disrupted line sequencing | Cognitive load induced by interference is associated with reduced precision in letter formation                       |
| Case B/N  | Relatively high performance in some simple tasks      | Limited errors observed as stimulus competition increases               | Mild hesitations and relatively slow performance | 48 | Irregular line alignment and spacing, with fluctuating graphomotor movement    | Cognitive competition affects the stability of writing performance, despite generally acceptable baseline performance |

**Analytical Link Between Stroop Test Results and Writing Performance Indicators Across the Four Cases**

**Analytical Link Between Stroop Test Results and Writing Performance Indicators**

The analytical linkage between the results of the Stroop Test and the writing assessment reveals a clear functional relationship between selective attention efficiency and the quality of writing performance across the four cases. The Stroop Test does not merely assess response speed; rather, it examines the child's ability to regulate attentional focus, inhibit automatic responses, and resist interference from competing stimuli, all of which are cognitive processes that directly underpin the act of writing.

From a cognitive perspective, writing is not a simple motor activity but a complex, multi-component process that requires directing attention to letter form, controlling

spatial positioning within the line, organizing inter-word spacing, and simultaneously monitoring both the motor and linguistic sequencing of output. Accordingly, the difficulties observed in some children during interference tasks in the Stroop Test find their counterparts in disrupted writing performance, manifested in weak continuity of letter formation, impaired spatial organization of the page, distortions in certain written symbols, and slowed execution (Diamond, 2013); (Duncan, 2010).

This relationship appears to stem from the limited attentional resources available to the child. As the demands on executive control increase, the level of control over fine-grained writing components correspondingly declines. Moreover, these findings suggest that the observed impairments are not confined to the motor domain alone; rather, they extend to self-monitoring mechanisms, cognitive selection processes, and the coordination between attention and working memory during task execution.

In this sense, poor performance on the Stroop Test can be considered a significant interpretive indicator for understanding certain aspects of writing difficulties in children with Autism Spectrum Disorder. Specifically, reduced capacity to inhibit irrelevant stimuli and to maintain attentional control under cognitive load is directly reflected in the quality of written production, particularly in terms of accuracy, coherence, speed, and overall organization.

### **Results Interpretation**

The findings of the present study suggest that writing difficulties in children with Autism Spectrum Disorder cannot be adequately explained through a reductionist perspective that confines them solely to either motor or linguistic deficits. Rather, they should be understood within a complex functional framework in which executive and attentional processes interact with sensorimotor and organizational components. In this respect, the comparison between the results of the Stroop Test and those of the writing assessment made it possible to develop a more integrated interpretation of the relationship between the efficiency of selective attention and the quality of writing performance across the four cases.

These findings are consistent with previous research indicating that children with Autism Spectrum Disorder may demonstrate relatively adequate performance in simple tasks, yet experience greater difficulty when performance depends on executive regulation under conditions of cognitive interference. On the one hand, the Stroop Test results showed that performance declined as the demands for cognitive inhibition and resistance to interference between competing stimuli increased. This pattern points to a relative fragility in the efficiency of selective attention, particularly when the task requires suppressing automatic responses and redirecting attention toward task-relevant stimuli (Howard. j. et al, 2023).

When this finding is transposed to the writing context, it becomes clear that the child is confronted with a similar demand: writing is not limited to the production of letters, but also requires continuous monitoring of their form, direction, spatial position within the line, the regulation of spacing, attention to diacritical marks, and the maintenance of continuity without haste or loss of organization. In this sense, deficits in selective attention are directly reflected in the quality of written output (Diamond, 2013).

On the other hand, the results of the writing assessment demonstrated that the disturbances observed across the four cases were not merely superficial or aesthetic in nature, but rather affected the internal structure of the writing act itself. Difficulties were evident in page organization, line alignment, spacing consistency, continuity of letter formation, and the control of fine details such as dots and diacritical signs. These indicators confirm that writing in this population does not depend solely on the integrity of manual motor skills, but also on the child's capacity to mobilize attentional resources in order to monitor motor execution continuously.

In this regard, the deficits identified by the Stroop Test at the cognitive level found a clear extension in writing performance, thereby conferring strong interpretive value on the relationship between the two assessments. The weaker the ability to filter irrelevant stimuli or to sustain attention on task-relevant features, the greater the likelihood of disrupted spatial organization, distorted letter formation, slowed execution, and loss of continuity in writing.

The contextual dimension also represents an important complementary factor in interpreting these findings, rather than an alternative explanation. Children with Autism Spectrum Disorder are often more sensitive to environmental and emotional stimuli associated with evaluative situations, such as noise, fatigue, stress, or the density of surrounding stimuli. Consequently, performance should not be interpreted independently of the conditions under which it occurs. However, taking this dimension into account does not weaken the study's main conclusion; rather, it reinforces it by highlighting that selective attention does not operate in isolation, but interacts with task demands and contextual conditions in determining the final level of performance.

In light of this analysis, it may be concluded that the study provides a coherent scientific answer to its central research question by demonstrating that deficits in selective attention constitute a regulatory cognitive factor underlying a substantial part of writing difficulties in children with Autism Spectrum Disorder. The weaker the child's ability to inhibit cognitive interference and direct attention toward the essential components of the task, the more pronounced the disruption in writing performance becomes in terms of accuracy, organization, continuity, and speed of execution. Accordingly, writing should not be viewed as a skill independent of executive functions, but rather as an

applied manifestation of their efficiency—or dysfunction—within a complex learning situation.

## **Conclusion**

This study concludes that writing difficulties among children with Autism Spectrum Disorder should be understood within the framework of a structured interaction between selective attention, executive control, and sensorimotor organization, rather than being reduced to isolated motor or linguistic deficits. The findings demonstrate that the fragility observed in cognitive interference tasks on the Stroop Test is associated with a clear disruption in writing quality, particularly in terms of page organization, the regularity of lines and spacing, the accuracy of letter formation, and speed of execution. These findings support the hypothesis that selective attention constitutes a central cognitive determinant of writing performance in this population.

The practical significance of these findings lies in their support for implementing integrated educational and orthophonic interventions that incorporate selective attention training into writing instruction, particularly in inclusive educational settings. Such interventions may be achieved by optimizing the classroom environment, employing visual organizers, strengthening fine motor coordination, and fostering self-monitoring skills during writing tasks. In this sense, improving writing performance should not be viewed solely as a matter of motor training, but rather as part of a broader effort to support cognitive regulation and learning adaptation in children with Autism Spectrum Disorder.

However, the interpretation of these results should be considered in light of the methodological limitations of the study, particularly the small sample size and the absence of a control group. These limitations position the findings as field-based interpretive indicators with scientific and practical relevance, rather than as evidence supporting broad statistical generalization.

Accordingly, further research remains necessary, particularly studies involving larger samples, pre-post or quasi-experimental designs, and the integration of additional cognitive variables such as working memory, cognitive flexibility, and processing speed. Such efforts would contribute to the development of more refined explanatory models and the design of more effective intervention programs aimed at improving writing performance and promoting school inclusion among children with Autism Spectrum Disorder.

## References

1. Abdel Rahman, M. S. (2022). (). *Psychology of learning disabilities*. Dar Al-Fikr Al-Arabi.
2. Abu Allam, M. A. (2020). *Psychology of learning: Theoretical foundations and educational applications*. Dar Al-Masirah for Publishing and Distribution.
3. Al-Qadi, A. M. (2020). *Cognitive psychology and its educational applications*. Dar Al-Masirah for Publishing and Distribution.
4. American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders (5th ed., text rev.; DSM-5-TR)*.
5. Bakaar, A. K. (2022). *Developing thinking and language skills in children*. Dar Al-Qalam for Publishing.
6. Diamond, A. (2013). *Executive functions*. *Annual Review of Psychology*, 64, 135–168. <https://doi.org/10.1146/annurev-psych-113011-143750>.
7. Duncan, J. (2010). *The multiple-demand system of the primate brain: Mental programs for intelligent behaviour*. *Trends in Cognitive Sciences*, 14(4), 172–179. <https://doi.org/10.1016/j.tics.2010.01.004>.
8. Ghanem, M. H. (2023). *Learning disabilities: Between theory and practice*. Dar Al-Fikr Al-Arabi.
9. Howard. j. et al. (2023). *Associations between executive function and attention abilities and language and social communication skills in young autistic children*. *Autism. Advance online publication*. <https://doi.org/10.1177/13623613231154310>.
10. Stroop, J. R. (1935). *Studies of interference in serial verbal reactions*. *Journal of Experimental Psychology*, 18(6), 643–662. <https://doi.org/10.1037/h0054651>.