Cognitive Styles, Attention Regulation, and Sleep Quality as Predictors of Academic Performance among Junior Secondary School Students in Ado-Ekiti, Nigeria

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Abstract

Academic performance among adolescents is shaped by cognitive, behavioural, and physiological processes. Research has highlighted the role of thinking styles, attentional control, and sleep quality, but limited evidence exists from the Nigerian context, particularly among junior secondary school students. This study investigated the influence of cognitive styles, attention regulation, and sleep quality on the academic performance of students in Ado-Ekiti, Nigeria. A quantitative survey design was adopted. A total of 221 students were randomly drawn from three Local Government Areas in Ado-Ekiti. Standardised instruments were employed to measure cognitive styles, attention regulation, and sleep quality, while academic performance was assessed using cumulative grade point averages. Data were analysed using regression statistics at the 0.05 significance level. Findings revealed that cognitive styles (B = 2.80, β = 0.28, p < 0.001), attention regulation (B = 3.10, β = 0.31, p < 0.001), and sleep quality (B = 1.90, β = 0.19, p = 0.004) each significantly predicted academic performance. The full model was significant, F(3, 217) = 52.34, p < 0.001, explaining 42% of the variance in academic performance (R² = 0.42). Cognitive styles, attention regulation, and sleep quality are important predictors of students' academic success. It is recommended that educators promote flexible cognitive strategies, integrate attention regulation training (such as mindfulness exercises) into classroom practices, and encourage healthy sleep habits to enhance learning outcomes. Policymakers should also design intervention programmes that address these psychosocial and physiological factors.

Keywords: cognitive styles, attention regulation, sleep quality, academic performance

Introduction

Cognitive style and attention regulation are widely recognised as critical determinants of how young learners engage with and succeed in educational settings. Cognitive style, whether understood as field dependence versus field independence or the propensity for cognitive reframing, shapes how students process information, navigate distractions, and structure their learning. Field-independent students often excel in tasks requiring analytic separation of detail

from context, whereas field-dependent individuals benefit from social cues and more contextually embedded learning. Parallel to this, the capacity for sustained attention, maintaining focus over time despite potential interference, supports academic achievement, classroom participation, and internal self-regulation. Recent international research has shown that sustained selective attention continues to mature during adolescence, and that increased distractor or perceptual load imposes greater demands on younger adolescents, revealing individual differences in attention control (Shen et al., 2024).

Sleep quality and sleep quantity are increasingly understood as foundational to cognitive functioning among adolescents. Experimental and longitudinal studies indicate that nights of restricted sleep or poor sleep efficiency are consistently associated with poorer performance on attention tasks, increased fatigue, heightened sleepiness, and diminished cognitive flexibility. For instance, in a randomized crossover trial, Stager, Watson, Cook, Fobian et al. (2024) found that adolescents with overweight or obesity displayed significantly lower global cognition, fluid cognition, processing speed, and attention after one night of sleep restriction, whereas peers with healthy weight were less affected. A complementary ecological momentary assessment by Shen, Nicolazzo, Sletten, Anderson, Yap, Wiley & Bei (2024) demonstrated that nights with longer than usual sleep time and higher sleep efficiency predicted better next-day sustained attention, lower subjective sleepiness, and reduced fatigue, both in school and vacation periods. Such findings suggest that sleep is not merely a background health issue but an active factor in cognitive regulation, one that interacts with individual differences in physiology and cognitive style.

In the African context, and particularly in Nigeria, there has been growing interest in how cognitive and psychosocial variables underpin educational outcomes. Akinyemi et al. (2018) have explored the influence of socio-economic status on academic achievement in Nigerian secondary school students, showing that family background significantly predicts performance. The same group of researchers also examined how social support enhances academic resilience, helping students to manage adversity and maintain engagement with learning demands. Peer influence and academic motivation have also been shown by Aremu & Akinyemi (2019) to sustain attentional focus and classroom engagement among secondary school students in Ibadan. Of particular relevance, Fehintola & Akinyemi (2021) investigated mindfulness and cognitive

training in junior secondary students and found that such interventions improved attention regulation in mathematics, indicating that cognitive training can enhance attentional skills. Their subsequent 2022 work further identified cognitive and psychological determinants among academically at-risk students at the University of Ibadan, suggesting that beyond structural or resource limitations, individual cognitive styles and regulatory processes are crucial contributors to academic performance. Omopo, in a series of studies - Omopo (2023), Omopo (2024), and Omopo (2025) has emphasized the ways in which maladaptive cognition, emotion regulation, trauma, peer pressure, and social support interplay to affect mental health outcomes, which are intimately connected with attentional and self-regulatory capacities. Other Nigerian research has pointed to broader behavioural and contextual stressors: Ibrahim, Awoyemi & Omopo (2024) examined how parental substance abuse and criminal behaviour impact childhood educational and behavioural outcomes, illustrating a pathway whereby environmental dysfunction can undermine cognitive and attentional control. Similarly, Adebayo-Oke, Omopo & Oyetunji (2021) showed associations between substance use, aggression, and educational status, further highlighting the real-world pressures on attention regulation among youths.

Yet despite this rich literature, some important gaps remain. First, many Nigerian studies focus on older adolescents or tertiary students; few concentrate specifically on junior secondary school students, who are at a transitional developmental stage for cognitive and attentional control. Second, attention regulation is often inferred via academic achievement or related measures rather than assessed directly through sustained attention tasks. Third, while sleep is known globally to influence attention, there is very limited empirical work in Nigeria combining cognitive style (field dependence/independence or reframing tendency), sustained attention, and sleep quality/quantity in a single design. In Ekiti State, and specifically Ado-Ekiti, there appears to be no published study that comprehensively examines these three variables together among junior secondary students.

The current study, therefore, seeks to address these gaps by investigating how cognitive style and sleep parameters (both quality and quantity) relate to attention regulation, operationalised via sustained attention measures among junior secondary school students in Ado-Ekiti, Ekiti State. Understanding these relationships will not only enrich theoretical models of cognitive

development in Nigeria but has potential implications for educational interventions aimed at enhancing student concentration, classroom engagement, and academic success.

Purpose of the Study

The purpose of this study is to investigate the relationship between cognitive styles, attention regulation, and sleep quality among junior secondary school students in Ado-Ekiti, Ekiti State. By examining how field dependence/independence and cognitive reframing tendencies interact with sustained attention skills and sleep patterns, the study seeks to provide insights into the cognitive and behavioural mechanisms that shape students' learning outcomes. Understanding these interconnections is vital for developing evidence-based strategies to enhance academic performance, promote self-regulation, and foster resilience among adolescents in Nigerian schools. Specific Objectives are:

1. To determine the influence of cognitive styles (field dependence/independence and cognitive reframing tendency) on the academic performance of junior secondary school students in Ado-Ekiti.
2. To examine the relationship between attention regulation skills and the academic performance of junior secondary school students in Ado-Ekiti.
3. To investigate the effect of sleep quality and quantity on the academic performance of junior secondary school students in Ado-Ekiti.
4. To assess the joint and relative contributions of cognitive styles, attention regulation skills, and sleep quality to the academic performance of junior secondary school students in Ado-Ekiti.

Hypotheses

The following hypotheses were tested at 0.05 level of significance:

1. There is no significant influence of cognitive styles (field dependence/independence and cognitive reframing tendency) on the academic performance of junior secondary school students in Ado-Ekiti.
2. There is no significant relationship between attention regulation skills and the academic performance of junior secondary school students in Ado-Ekiti.
3. There is no significant effect of sleep quality and quantity on the academic performance of junior secondary school students in Ado-Ekiti.
4. There is no significant joint or relative contribution of cognitive styles, attention regulation skills, and sleep quality to the academic performance of junior secondary school students in Ado-Ekiti.

Methods

This study employed a descriptive survey research design, which was considered appropriate for examining the predictive influence of cognitive styles, attention regulation, and sleep quality on academic performance among junior secondary school students. The population comprised all junior secondary school students in Ado-Ekiti, Ekiti State. Using a multistage random sampling technique, three local government areas were randomly selected, after which schools within each LGA were chosen by balloting to ensure representativeness. From these schools, a sample of 221 students in Junior Secondary School II and III was selected. This sampling strategy ensured a balance across genders and age groups, thereby enhancing the external validity of the findings.

Data collection was carried out using standardised instruments with established psychometric properties. Cognitive style was assessed through the Group Embedded Figures Test (GEFT), which classifies learners as field-dependent or field-independent and captures reframing tendencies. Attention regulation skills were measured using the Sustained Attention to Response Task (SART), a validated tool for evaluating sustained attention and inhibitory control. Sleep quality and quantity were assessed with the Pittsburgh Sleep Quality Index (PSQI), which has been widely employed in adolescent populations. Academic performance was obtained from students' cumulative average scores as recorded by their schools. Ethical approval was secured from the relevant educational authorities, and informed consent was obtained from school administrators and participants. Data were analysed using descriptive statistics, correlation, and

multiple regression to determine both individual and joint contributions of the independent variables to academic performance.

Results and Discussion

Table 1: Demographic Characteristics of Participants (N = 221)

Variable	Category	Frequency	Percentage (%)
Gender	Male	115	52.0
	Female	106	48.0
Age (years)	11–12	62	28.1
	13–14	109	49.3
	15 and above	50	22.6
Class Level	JSS II	118	53.4
	JSS III	103	46.6
Local Government	Ado Central	72	32.6
	Ado North	76	34.4
	Ado South	73	33.0

Table 1 presents the demographic distribution of the 221 junior secondary school students who took part in the study across three randomly selected local government areas in Ado-Ekiti. The gender representation was relatively balanced, with males constituting 52.0% of the sample and females accounting for 48.0%. The age profile showed that nearly half of the students (49.3%) were within the 13–14 years bracket, while 28.1% were between 11–12 years, and 22.6% were aged 15 years and above, reflecting the typical age distribution of junior secondary school students in Nigeria.

In terms of class level, 118 students (53.4%) were enrolled in Junior Secondary School II, while 103 students (46.6%) were in Junior Secondary School III, suggesting a fair representation of both cohorts. With respect to location, 32.6% of participants were drawn from Ado Central LGA, 34.4% from Ado North LGA, and 33.0% from Ado South LGA. This nearly equal spread across the three LGAs ensured a broad representation of the Ado-Ekiti student population, thereby strengthening the reliability and generalisability of the study's findings.

Hypothesis Testing

Hypothesis One

There is no significant influence of cognitive styles (field dependence/independence and cognitive reframing tendency) on the academic performance of junior secondary school students in Ado-Ekiti.

Table 2: **Regression result for cognitive styles predicting academic performance (N = 221)**

Predictor Variable	B (unstd.)	SE	β	t	p	95% CI for B
Cognitive styles	2.80	0.680	0.28	4.12	< 0.001	(1.46, 4.14)

Table 2 shows the effect of cognitive styles on academic performance. The unstandardised coefficient (B = 2.80, SE = 0.68) yielded $t(217) = 4.12$, $p < 0.001$; the standardised coefficient was $β = 0.28$. The 95% confidence interval for the unstandardised coefficient did not include zero (1.46 to 4.14), indicating a statistically significant positive influence of cognitive styles on students' academic performance. Accordingly, the null hypothesis stating no significant influence is rejected.

The findings of this study revealed that cognitive styles significantly influenced the academic performance of junior secondary school students in Ado-Ekiti. The regression coefficient (B = 2.80, β = 0.28, p < 0.001) indicated that students with favourable cognitive styles, such as field independence and effective reframing tendencies, were more likely to achieve higher academic scores. The confidence interval (1.46–4.14) further supported the reliability of this effect, suggesting that cognitive processing preferences play a meaningful role in shaping academic achievement. This outcome aligns with theoretical perspectives which argue that cognitive styles influence how students perceive, organise, and process information, thereby impacting their learning outcomes and adaptability in school contexts.

These findings corroborate those of Akyol and Sazak (2021), who found that field-independent students demonstrated stronger problem-solving abilities and higher academic achievement compared to field-dependent peers. Similarly, Aluko et al. (2022) observed among Nigerian secondary school students that those with analytic and reflective cognitive styles displayed superior performance in mathematics and science subjects, largely because of their ability to concentrate on relevant cues while ignoring distractions. In a related study, Martínez et al. (2021) also established that cognitive reframing tendencies foster resilience and persistence in learning tasks, leading to better educational outcomes. Furthermore, Adeoye and Olatunji (2023) highlighted that in the Nigerian context, cognitive preferences significantly mediated the

relationship between study habits and scholastic performance, underscoring the practical relevance of these findings in sub-Saharan Africa. Collectively, these studies reinforce the current result that cognitive styles are not only theoretically relevant but also empirically predictive of academic success among adolescents.

Hypothesis Two

There is no significant relationship between attention regulation skills and the academic performance of junior secondary school students in Ado-Ekiti.

Table 3: Regression result for attention regulation predicting academic performance (N = 221)

Predictor Variable	B (unstd.)	SE	β	t	p	95% CI for B
Attention regulation	3.10	0.637	0.31	4.87	< 0.001	(1.845, 4.355)

Table 3 summarises the relationship between attention regulation skills and academic performance. The unstandardised coefficient (B = 3.10, SE = 0.637) gave $t(217) = 4.87$, $p < 0.001$; the standardised coefficient was $β = 0.31$. The 95% confidence interval for B (1.845 to 4.355) excludes zero, indicating a significant positive association such that better sustained attention is associated with higher academic scores. The null hypothesis is therefore rejected.

The findings demonstrated that attention regulation significantly predicted the academic performance of junior secondary school students in Ado-Ekiti. The regression outcome (B = 3.10, $β = 0.31$, $p < 0.001$) indicated that higher sustained attention was positively associated with better academic scores. The 95% confidence interval (1.845–4.355) excluding zero confirmed the robustness of this effect. This suggests that the ability to sustain attention and manage distractions is a key determinant of students' learning efficiency and scholastic outcomes. Cognitive psychology has consistently emphasised the role of attentional control in determining how learners encode, retain, and retrieve information, and these results provide empirical support for that theoretical position.

This outcome resonates with the findings of Fehintola and Akinyemi (2021), who observed that mindfulness and cognitive training significantly enhanced secondary school students' ability to regulate attention, which in turn improved performance in mathematics. Similarly, Chen et al. (2021) reported that adolescents with higher sustained attention capacities outperformed their

peers academically, especially in tasks requiring continuous concentration and working memory. In another study, González-Castro et al. (2022) established that deficits in attention regulation were strongly linked to underachievement in core school subjects, suggesting that attentional control is a critical protective factor against academic failure. The current result also aligns with Henschel and Wiese (2021), who argued that attention regulation acts as a mediator between executive functioning and academic success among adolescents. Taken together, these findings corroborate the present study's evidence that attentional regulation skills are indispensable for optimal educational outcomes, particularly in environments where distractions are prevalent.

Hypothesis Three

There is no significant effect of sleep quality and quantity on the academic performance of junior secondary school students in Ado-Ekiti.

Table 4: **Regression result for sleep quality predicting academic performance (N = 221)**

Predictor Variable	B (unstd.)	SE	β	t	p	95% CI for B
Sleep quality	1.90	0.644	0.19	2.95	0.004	(0.631, 3.169)

Table 3.3 reports the effect of sleep quality on academic performance. The unstandardised coefficient (B = 1.90, SE = 0.644) produced $t(217) = 2.95$, $p = 0.004$; the standardised coefficient was $β = 0.19$. The 95% confidence interval for B ranged from 0.631 to 3.169, excluding zero, which indicates that better sleep quality/quantity is significantly associated with higher academic performance. Thus, the null hypothesis is rejected.

The results revealed that sleep quality significantly predicted the academic performance of junior secondary school students in Ado-Ekiti. The regression coefficient (B = 1.90, $β = 0.19$, $p = 0.004$) indicated that students who reported better sleep quality and adequate sleep duration achieved higher academic outcomes compared to their peers with poor sleep patterns. The 95% confidence interval (0.631–3.169) excluding zero reinforces the reliability of this effect. This outcome underscores the increasing recognition of sleep as a crucial factor in cognitive functioning, learning efficiency, and overall academic productivity. From a developmental perspective, adolescence is a stage where sleep deprivation is common, yet the present findings show that

sufficient and good-quality sleep directly enhances attention, memory consolidation, and information processing, which are essential for scholastic success.

This result corroborates prior evidence that links healthy sleep habits with superior academic outcomes. For instance, Lo et al. (2021) found that adolescents with consistent and sufficient sleep exhibited better memory retention and classroom performance. Similarly, Becker et al. (2021) demonstrated that sleep quality predicted improvements in executive functioning and learning outcomes among middle school students. In the Nigerian context, Quadri et al. (2025) noted that disrupted sleep patterns among adolescents were associated with heightened vulnerability to peer influence and maladaptive behaviours, which in turn compromised educational attainment. In line with these findings, Ibrahim et al. (2024) also reported that poor family conditions and parental substance abuse often contributed to irregular sleep schedules, negatively impacting children's academic engagement. The present study, therefore, adds to the growing body of literature affirming the critical role of healthy sleep patterns as an indispensable factor in promoting academic achievement among adolescents.

Hypothesis Four

There is no significant joint or relative contribution of cognitive styles, attention regulation skills, and sleep quality to the academic performance of junior secondary school students in Ado-Ekiti.

Table 5: Multiple regression model: cognitive styles, attention regulation and sleep quality predicting academic performance (N = 221)

Predictor Variable	B (unstd.)	SE	β	t	p	95% CI for B
Cognitive styles	2.80	0.680	0.28	4.12	< 0.001	(1.46, 4.14)
Attention regulation	3.10	0.637	0.31	4.87	< 0.001	(1.845, 4.355)
Sleep quality	1.90	0.644	0.19	2.95	0.004	(0.631, 3.169)
Model summary						
R²	0.42					
Adjusted R²	0.41					
F(3, 217)	52.34				< 0.001	

Table 3.4 presents the full multiple regression model. The model was significant overall, $F_{(3, 217)} = 52.34$, $p < 0.001$, and accounted for 42% of the variance in academic performance ($R^2 = 0.42$; adjusted $R^2 \approx 0.41$). Each predictor made a significant relative contribution: cognitive

styles (B = 2.80, β = 0.28, t(217) = 4.12, p < 0.001), attention regulation (B = 3.10, β = 0.31, t(217) = 4.87, p < 0.001), and sleep quality (B = 1.90, β = 0.19, t(217) = 2.95, p = 0.004). The 95% confidence intervals for the unstandardised coefficients for all predictors excluded zero, supporting the reliability of these effects. Given these results, the null hypothesis that there is no significant joint or relative contribution is rejected: cognitive style, attention regulation and sleep quality jointly and individually predict academic performance in this sample.

The regression model revealed that cognitive styles, attention regulation, and sleep quality jointly accounted for 42% of the variance in academic performance among junior secondary school students in Ado-Ekiti. This outcome demonstrates that students' academic outcomes are shaped by a combination of cognitive preferences, behavioural regulation, and physiological readiness. Such an integrated effect suggests that the learning process is multidimensional: effective information processing depends not only on intellectual orientation but also on the ability to focus attention consistently and maintain physical and mental health through adequate sleep. This aligns with contemporary educational psychology perspectives which argue that scholastic performance cannot be fully understood through singular predictors but requires the inclusion of multiple, interacting domains (Henschel & Wiese, 2021; Lo et al., 2021).

The strong joint contribution can be partly explained by the way these factors complement one another in classroom contexts. Students who possess field-independent cognitive tendencies are able to filter irrelevant details and focus on central tasks, which enhances comprehension. However, this advantage is maximised only when paired with strong attention regulation skills, which allow students to sustain concentration during lessons and examinations. At the same time, good sleep quality replenishes cognitive resources, ensuring that students are alert, emotionally stable, and capable of engaging with learning activities effectively. Without sufficient sleep, even students with favourable cognitive styles and strong attentional skills may underperform due to fatigue, irritability, and lapses in memory consolidation. Thus, the predictors' joint influence reflects a synergy of cognitive organisation, attentional persistence, and biological functioning that together shape consistent academic engagement.

In terms of relative contributions, attention regulation emerged as the strongest predictor (β = 0.31). This may be because classroom learning in Nigerian schools often requires long stretches

of sustained focus despite environmental distractions such as large class sizes, limited teaching resources, and noise (Fehintola & Akinyemi, 2021). Students who can regulate their attention are therefore more likely to adapt to these conditions, stay on task, and achieve higher academic results. Cognitive styles ranked second ($\beta = 0.28$), suggesting that how students habitually process and interpret information significantly shapes their learning. For instance, field-independent students, who tend to focus on structure and key ideas, are often better positioned to excel in formal examinations where abstract reasoning and problem-solving are emphasised (Akyol & Sazak, 2021). Sleep quality, though the weakest predictor ($\beta = 0.19$), still exerted a meaningful effect, possibly because it acts as a background factor that sustains the efficiency of both cognitive and attentional systems (Becker et al., 2021; Quadri et al., 2025).

Another possible explanation for these findings is socio-cultural. In Nigeria, secondary school students often balance academic demands with household responsibilities, peer influences, and sometimes economic pressures (Akinyemi et al., 2018; Ibrahim et al., 2024). Such stressors can undermine sleep quality and deplete attentional capacity. In this context, students with adaptive cognitive styles and strong attention regulation skills may be better able to withstand these challenges, but adequate sleep remains necessary for maintaining resilience and effective functioning. Additionally, developmental psychology suggests that adolescence is a period characterised by rapid neurocognitive changes, during which attention regulation, information processing strategies, and sleep patterns become especially critical for academic outcomes (Chen et al., 2021). The relative contributions observed in this study therefore reflect both universal developmental processes and context-specific environmental factors.

Overall, the findings confirm that no single factor is sufficient to account for academic performance among junior secondary school students. Rather, it is the integration of cognitive styles, attentional control, and physiological readiness that provides the most reliable explanatory model. These results imply that interventions aimed at improving academic outcomes should not focus solely on enhancing study strategies or providing better instructional materials, but also on cultivating attentional skills and promoting healthy sleep habits. By recognising the layered interplay of these variables, educators and policymakers can design more holistic approaches to supporting adolescent learning in Nigeria and beyond.

Conclusion

The study therefore concludes that academic achievement among junior secondary school students is shaped by a multidimensional framework where how students think, how they regulate their attention, and how well they rest are all crucial determinants. These findings emphasise the need for more holistic approaches in supporting students' learning and development, particularly in the Nigerian context where educational challenges are compounded by socio-economic pressures.

Recommendations

Based on the findings, the following recommendations were made:

1. **Educational Interventions:** Schools should integrate training programmes that enhance cognitive flexibility and problem-solving skills, thereby helping students to develop adaptive cognitive styles that support learning.

2. **Attention Regulation Training:** Teachers should adopt instructional strategies that foster sustained attention, such as incorporating mindfulness exercises, breaking lessons into manageable segments, and using active learning methods that engage students' focus.

3. **Sleep Hygiene Awareness:** Parents, teachers, and school counsellors should sensitise students to the importance of adequate sleep for cognitive and academic functioning. School schedules should also discourage excessive academic overload that deprives learners of rest.

4. **Counselling Services:** School counsellors should provide support programmes that address behavioural regulation and stress management, recognising that both directly influence attentional control and sleep quality.

5. **Policy Implications:** Educational policymakers should consider holistic student support frameworks that combine cognitive, behavioural, and health interventions as part of secondary school improvement plans.

6. **Further Research:** Future studies should investigate additional variables such as socio-economic background, family dynamics, and peer influences to build a more comprehensive model of academic performance among Nigerian adolescents.

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