International Scientific Journal of Engineering and Management (ISJEM) ISSN: 2583-6129
Volume: 04 Issue: 09 | Sept – 2025 DOI: 10.55041/ISJEM05047
An International Scholarly || Multidisciplinary || Open Access || Indexing in all major Database & Metadata

A Multivariate Analysis of Factors Influencing Academic Performance and Behavioral Changes: An Integrated Biopsychosocial Approach

Josly Joseph [1*] , Dr. Laveena Dmello [2]

[1]Research scholar, Srinivas University, Mangalore, Karnataka, India.
[2]Associate Professor, Srinivas University, Mangalore, Karnataka, India.

---***---

Abstract - Understanding the complex interplay of factors that influence academic performance and behavioral changes remains a critical challenge in educational psychology. This study examines the relative contributions of biological factors, environmental influences, socio-cultural dynamics, and cognitive training on academic and behavioral outcomes using a comprehensive structural equation modeling approach with partial least squares (PLS-SEM) to analyze data from participants across educational settings. The study utilized both reflective constructs for Academic Performance and Behavioral Changes, and formative constructs for Biological Factors, Environmental Influences, Socio-Cultural Dynamics, and Cognitive Training. Measurement model assessment included reliability testing, convergent validity, and discriminant validity analyses, followed by structural model evaluation and hypothesis testing using bootstrapping procedures with 5,000 resamples. All eight hypothesized relationships received strong statistical support with significance levels below 0.001. Cognitive Training emerged as the most influential factor, demonstrating the strongest effects on both Behavioral Changes with a path coefficient of 0.532 and t-value of 21.542, and Academic Performance with a path coefficient of 0.437 and t-value of 15.964. Socio-cultural dynamics showed substantial impact on Behavioral Changes with a path coefficient of 0.466 and t-value of 14.572, but weaker influence on Academic Performance with a path coefficient of 0.182 and t-value of 6.826. Biological Factors and Environmental Influences displayed moderate effects across both outcomes, with stronger relationships to Academic Performance than Behavioral Changes. The findings support an integrated biopsychosocial model of educational and behavioral development, with cognitive training representing a particularly high-leverage intervention approach. The differential patterns of influence across outcome domains suggest that targeted, domain-specific interventions may be most effective for promoting positive educational and behavioral outcomes.

Key Words: Multivariate Analysis, Academic Performance, Behavioral Changes, Biopsychosocial model, Partial least squares (PLS-SEM)

1. INTRODUCTION

The quest to understand factors that influence academic achievement and behavioral development has been a central concern in educational and developmental psychology for decades. Traditional approaches have often examined these factors in isolation, failing to capture the complex, interconnected nature of the variables that shape educational outcomes. Contemporary research increasingly recognizes the need for more comprehensive, multivariate approaches that can simultaneously assess multiple influence domains and their relative contributions to academic and behavioral success.

The biopsychosocial model provides a theoretical framework that acknowledges the multifaceted nature of human development by integrating biological, psychological, and social determinants of behavior and learning. This model suggests that optimal understanding of educational and behavioral outcomes requires consideration of biological predispositions, cognitive processes, environmental contexts, and sociocultural influences as interconnected rather than independent factors.

Recent advances in statistical modeling techniques, particularly structural equation modeling (SEM), have enabled researchers to examine these complex relationships with greater sophistication and precision. PLS-SEM offers particular advantages for exploratory research contexts where the goal is to understand the relative contributions of multiple predictors to complex outcomes while accounting for measurement error and construct relationships.

1.1 Theoretical Background

Biological factors encompass the physiological and neurological foundations that underlie learning capacity and behavioral tendencies. Research in educational neuroscience has established clear connections between brain development, genetic predispositions, physical health status, and educational outcomes (Wolfe, 2010). These factors include neurological development patterns, genetic influences on cognitive abilities, nutritional status, sleep quality, and overall physical health. Understanding biological contributions to learning and behavior is essential for developing interventions that work with rather than against natural developmental processes.

Environmental psychology and ecological systems theory emphasize how contextual factors shape developmental outcomes through complex mechanisms of opportunity, constraint, and social learning (Bronfenbrenner, 1979). Environmental influences encompass physical learning environments, resource availability, technology access, peer interactions, and broader community characteristics. Research has consistently demonstrated that optimizing environmental conditions can yield significant improvements in both academic and behavioral outcomes (Durlak et al., 2011).

Sociocultural theory highlights how cultural contexts, social norms, and collective meaning-making processes influence individual development (Vygotsky & Cole, 1978). These dynamics include cultural values regarding education, community expectations, socioeconomic factors, language patterns, and broader societal narratives about learning and achievement. Understanding sociocultural influences is particularly important in diverse educational contexts where cultural discontinuities may impact student engagement and success.

Cognitive psychology and educational neuroscience research have established strong connections between cognitive capabilities and both academic performance and behavioral regulation (Diamond & Lee, 2011). Cognitive training encompasses structured interventions designed to enhance executive functions, working memory, attention control, and metacognitive strategies. These cognitive capabilities serve as fundamental building blocks for effective learning and behavioral self-regulation.

1.2 Research Gaps and Study Objectives

Despite extensive research on individual factors, few studies have examined the simultaneous effects of biological, environmental, sociocultural, and cognitive factors on both academic and behavioral outcomes within a single comprehensive model. This gap limits our understanding of the relative importance of different influence domains and their potential interactions.

This study aims to examine the simultaneous effects of multiple influence factors on academic performance and behavioral changes, determine the relative importance of biological, environmental, sociocultural, and cognitive factors, assess whether influence patterns differ between academic and behavioral outcome domains, and provide empirical guidance for developing targeted intervention strategies.

2. METHODS

2.1 Research Design

This study employed a quantitative, cross-sectional design using structural equation modeling to examine relationships between multiple predictor variables and two outcome constructs. The research utilized a partial least squares structural equation modeling (PLS-SEM) approach, which is particularly suitable for complex models with both reflective and formative measurement constructs.

2.2 Measurement Model Specification

The measurement model incorporated six latent constructs, including two reflective constructs measured by Academic Performance with 8 indicators and Behavioral Changes with 6 indicators, and four formative constructs comprising Biological Factors with 3 formative indicators, Environmental Influences with 7 formative indicators, Socio-Cultural Dynamics with 3 formative indicators, and Cognitive Training with 6 formative indicators.

2.3 Data Analysis Procedures

The analysis proceeded through several sequential stages. Stage 1 involved measurement model assessment through internal consistency reliability assessment using Cronbach's Alpha and composite reliability, convergent validity evaluation through Average Variance Extracted (AVE), discriminant validity assessment using Fornell-Larcker criterion, Heterotrait-Monotrait ratio (HTMT), and cross-loadings analysis, and formative construct evaluation through collinearity assessment (VIF values) and significance testing of outer weights. Stage 2 included structural model assessment through path coefficient estimation and significance testing, coefficient of determination (R^2) evaluation, model fit assessment through confirmatory factor analysis, and bootstrapping procedures with 5,000 resamples for significance testing. Stage 3 involved hypothesis testing where eight hypotheses were formulated and tested, examining effects of Biological Factors, Environmental Influences, and Socio-Cultural Dynamics on Academic Performance, effects of Biological Factors, Environmental Influences, and Socio-Cultural Dynamics on Behavioral Changes, and effects of Cognitive Training on Academic Performance and Behavioral Changes.

3. RESULTS

3.1 Measurement Model Assessment Results

Both reflective constructs demonstrated exceptional reliability across all measures as shown in Table 1. Academic Performance achieved a Cronbach's Alpha of 0.969, composite reliability (rho_a) of 0.970, and composite reliability (rho_c) of 0.974. Behavioral Changes showed a Cronbach's Alpha of 0.961, composite reliability (rho_a) of 0.962, and composite reliability (rho_c) of 0.969. All reliability coefficients substantially exceeded the recommended threshold of 0.70, with values approaching or exceeding 0.95, indicating exceptional internal consistency.

Table 1: Internal Consistency Reliability Results

Construct	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)
Academic Performance (AP)	0.969	0.970	0.974
Behavioral Changes(BC)	0.961	0.962	0.969

Note: All constructs demonstrate excellent reliability based on conventional thresholds (>0.70)

All indicators demonstrated strong loadings above the 0.70 threshold, ranging from 0.851 to 0.960 across both constructs as presented in Table 2. The lowest loading for BC4 at 0.851 still exceeded acceptable standards, while most indicators showed loadings above 0.90, confirming robust indicator reliability.

Table 2: Indicator Reliability (Outer Loadings)

Indicator	Academic Performance (AP)	Behavioral Changes (BC)
AP1	0.910	-
AP2	0.900	-
AP3	0.923	-
AP4	0.888	-
AP5	0.913	-
AP6	0.908	-
AP7	0.898	-
AP8	0.918	-
BC1	-	0.949
BC2	-	0.960
BC3	-	0.942
BC4	-	0.851
BC5	-	0.902
BC6	-	0.890

Note: All items have loadings above the threshold of 0.7, indicating strong indicator reliability

Average Variance Extracted (AVE) values demonstrated excellent convergent validity as detailed in Table 3, with Academic Performance achieving an AVE of 0.823 and Behavioral Changes reaching 0.840. Both values substantially exceeded the 0.50 threshold, indicating that each construct explained more than 80% of the variance in its respective indicators.

Table 3: Convergent Validity Results

Construct	Average Variance Extracted (AVE)
Academic Performance	0.823
Behavioral Changes	0.840

Note: Both constructs demonstrate excellent convergent validity with AVE values well above the recommended threshold of 0.5

Multiple methods confirmed strong discriminant validity. The Fornell-Larcker Criterion showed that the square root of AVE for Academic Performance at 0.907 and Behavioral Changes at 0.916 both exceeded the inter-construct correlation of 0.702, confirming construct distinctiveness as demonstrated in Table 4.

Table 4: Discriminant Validity using Fornell-Larcker Criterion

Construct	Academic Performance	Behavioral Changes
Academic Performance	0.907	-
Behavioral Changes	0.702	0.916

Note: Diagonal values (in bold) represent the square root of AVE; off-diagonal values represent inter-construct correlations

The HTMT Ratio value of 0.723 fell well below the conservative threshold of 0.85, providing additional evidence for discriminant validity as shown in Table 5.

Table 5: Discriminant Validity using Heterotrait-Monotrait Ratio (HTMT)

Construct	Academic Performance	Behavioral Changes
Academic Performance	-	-
Behavioral Changes	0.723	-

Note: HTMT value falls below the conservative threshold of 0.85, confirming discriminant validity

Cross-loadings analysis revealed that all indicators loaded most strongly on their assigned constructs, with substantial differences between primary loadings and cross-loadings typically exceeding 0.20, further confirming discriminant validity. For formative constructs assessment, all VIF values remained well below 3.0, ranging from 1.007 to 1.433, indicating no problematic collinearity among formative indicators as presented in Table 6.

Table 6: Collinearity Assessment (VIF Values) for Formative Constructs

Construct	Indicator	VIF Value
Biological Factors	BF1	1.072
	BF2	1.012
	BF3	1.081
Cognitive Training	CT1	1.299
	CT2	1.083
	CT3	1.150
	CT4	1.433
	CT5	1.052
	CT6	1.045
Environmental Influences	EI1	1.092
	EI2	1.203
	EI3	1.124
	EI4	1.196
	EI5	1.085
	EI6	1.157
	EI7	1.042
Socio-Cultural Dynamics	SCD1	1.007
	SCD2	1.023
	SCD3	1.018

Note: All VIF values are below 3, indicating no critical levels of collinearity among indicators

The majority of formative indicators demonstrated statistical significance, with particularly strong contributions from Biological Factors where BF1 achieved a weight of 0.783 with t-value of 12.905 and p-value less than 0.001, and BF2 showed a weight of 0.595 with t-value of 10.888 and p-value of 0.008. For Cognitive Training, five of six indicators achieved high significance with p-values less than 0.001. Environmental Influences and Socio-Cultural Dynamics showed mixed patterns of significance, consistent with the diverse nature of these constructs.

Confirmatory factor analysis revealed favorable fit statistics across all key metrics as shown in Table 7, including a Tucker-Lewis Index (TLI) of 0.996, Comparative Fit Index (CFI) of 0.908, Root Mean Square Error of Approximation (RMSEA) of 0.0624, Standardized Root Mean Square Residual (SRMR) of 0.0455, and Normal Fit Index (NFI) of 0.901. All indices met or exceeded recommended thresholds, providing strong evidence for adequate model fit.

Table 7: Model Fit Indices

Fit Index	Value	Threshold	Interpretation
CFI	0.908	> 0.90	Acceptable
TLI	0.996	> 0.90	Excellent
SRMR	0.0455	< 0.08	Good fit
RMSEA	0.0624	< 0.08	Acceptable
NFI	0.901	> 0.90	Acceptable
χ^2	1343	-	-
df	383	-	-
p-value	< 0.001	-	-

Note: All fit indices meet or exceed recommended thresholds, indicating adequate model fit

3.2 Structural Model Results

The structural model analysis revealed significant support for all eight hypothesized relationships, with path coefficients ranging from 0.182 to 0.532 and all t-values exceeding conventional significance thresholds as detailed in Table 8.

International Scientific Journal of Engineering and Management (ISJEM) ISSN: 2583-6129
Volume: 04 Issue: 09 | Sept – 2025 DOI: 10.55041/ISJEM05047
An International Scholarly || Multidisciplinary || Open Access || Indexing in all major Database & Metadata

Table 8: Structural Model Path Analysis Results

Hypothesis	Relationship	Path Coefficient (β)	t-value	p-value	Effect Size
H1	BF →AP	0.379	10.395	< 0.001	Moderate
H2	EI → AP	0.348	10.241	< 0.001	Moderate
H3	SC →AP	0.182	6.826	< 0.001	Small-Moderate
H4	BF →BC	0.239	6.926	< 0.001	Small-Moderate
H5	EI → BC	0.186	5.753	< 0.001	Small-Moderate
H6	SC →BC	0.466	14.572	< 0.001	Moderate-Large
H7	CT →AP	0.437	15.964	< 0.001	Moderate-Large
H8	CT →BC	0.532	21.542	< 0.001	Large

Note: BF = Biological Factors, EI = Environmental Influences, SC = Socio-Cultural Dynamics, CT = Cognitive Training, AP = Academic Performance, BC = Behavioral Changes

Table 9 presents a comprehensive summary of all hypothesis testing results, showing universal support for the proposed theoretical model.

Table 9: Summary of Hypothesis Testing Results

Hypothesis	Statement	Result	Statistical Support
H1	Biological Factors have a significant effect on Academic Performance	Supported	β = 0.379, t = 10.395, p < 0.001
H2	Environmental Influences have a significant effect on Academic Performance	Supported	β = 0.348, t = 10.241, p < 0.001
H3	Socio-cultural dynamics have a significant effect on Academic Performance	Supported	β = 0.182, t = 6.826, p < 0.001
H4	Biological Factors have a significant effect on Behavioral Changes	Supported	β = 0.239, t = 6.926, p < 0.001
H5	Environmental Influences have a significant effect on Behavioral Changes	Supported	β = 0.186, t = 5.753, p < 0.001
H6	Socio-cultural dynamics have a significant effect on Behavioral Changes	Supported	β = 0.466, t = 14.572, p < 0.001
H7	Cognitive Training has a significant effect on Academic Performance	Supported	β = 0.437, t = 15.964, p < 0.001
H8	Cognitive Training has a significant effect on Behavioral Changes	Supported	β = 0.532, t = 21.542, p < 0.001

Note: All hypotheses received strong statistical support with p-values < 0.001

For effects on Academic Performance, Cognitive Training to Academic Performance showed the strongest influence with a path coefficient of 0.437, t-value of 15.964, and p-value less than 0.001, representing the strongest influence on academic performance and indicating that cognitive training interventions have substantial impact on educational outcomes. Biological Factors to Academic Performance demonstrated a moderate to strong influence with a path coefficient of 0.379, t-value of 10.395, and p-value less than 0.001, highlighting the importance of physiological foundations for learning. Environmental Influences to Academic Performance showed substantial influence with a path coefficient of 0.348, t-value of 10.241, and p-value less than 0.001, confirming the critical role of contextual variables in academic success. Socio-Cultural Dynamics to Academic Performance, while statistically significant with a path coefficient of 0.182, t-value of 6.826, and p-value less than 0.001, showed the weakest direct influence on academic performance among the four predictors.

For effects on Behavioral Changes, Cognitive Training to Behavioral Changes represented the strongest relationship in the entire model with a path coefficient of 0.532, t-value of 21.542, and p-value less than 0.001, demonstrating the powerful influence of cognitive capabilities on behavioral regulation and change. Socio-Cultural Dynamics to Behavioral Changes showed strong influence with a path coefficient of 0.466, t-value of 14.572, and p-value less than 0.001, suggesting that social and cultural contexts powerfully shape behavioral development. Biological Factors to Behavioral Changes demonstrated moderate influence with a path coefficient of 0.239, t-value of 6.926, and p-value less than 0.001, indicating meaningful but not predominant biological contributions. Environmental Influences to Behavioral Changes showed the weakest influence with a path coefficient of 0.186, t-value of 5.753, and p-value less than 0.001, though still statistically significant.

4. DISCUSSION

4.1 Principal Findings

This study provides comprehensive empirical evidence for an integrated biopsychosocial model of academic performance and behavioral changes. The findings reveal several important patterns that advance our understanding of the relative contributions of different influence domains.

The most striking finding is the predominant role of cognitive training in influencing both academic performance and behavioral changes. With the strongest path coefficients in the model at 0.437 for academic performance and 0.532 for behavioral changes, cognitive training emerges as a critical leverage point for intervention. This finding aligns with cognitive-behavioral theories and educational neuroscience research demonstrating that cognitive capabilities serve as fundamental building blocks for both learning and behavioral regulation.

The substantial influence of cognitive training suggests that interventions targeting executive functions, working memory, attention control, and metacognitive strategies may represent particularly high-leverage approaches for promoting positive outcomes across multiple domains. This finding has important practical implications, suggesting that educational and clinical interventions should prioritize cognitive skill development as a core component of comprehensive programs.

The analysis reveals important differences in influence patterns between academic and behavioral outcomes. For academic performance, the rank order of influence shows Cognitive Training as strongest, followed by Biological Factors, Environmental Influences, and Socio-Cultural Dynamics. For behavioral changes, the pattern shifts to show Cognitive Training as strongest, followed by Socio-Cultural Dynamics, Biological Factors, and Environmental Influences.

This domain-specific patterning suggests that sociocultural factors play a more prominent role in shaping behavioral outcomes than academic achievement, while biological factors may be more critical for academic performance. These findings align with theoretical perspectives suggesting that behavioral development is particularly sensitive to social and cultural influences, while academic achievement may be more directly tied to biological capabilities and cognitive processing.

Biological factors demonstrated significant moderate effects on both outcomes with path coefficients of 0.379 for academic performance and 0.239 for behavioral changes. These findings support the importance of considering physiological and neurological foundations in educational and behavioral interventions. The stronger influence on academic performance compared to behavioral changes may reflect the more direct connection between neurological capabilities and learning processes.

Environmental influences showed significant but relatively modest effects, particularly on behavioral changes with a path coefficient of 0.186. This finding may reflect the specific operationalization of environmental factors in this study, or it may suggest that environmental influences operate more indirectly through other mechanisms.

Sociocultural dynamics demonstrated interesting differential effects, with strong influence on behavioral changes at 0.466 but weaker impact on academic performance at 0.182. This pattern suggests that cultural and social factors may be particularly important for behavioral development, while having less direct influence on cognitive academic outcomes.

4.2 Theoretical Implications

These findings contribute to several important theoretical discussions in educational and developmental psychology. The results provide strong empirical support for integrated biopsychosocial models of development that consider biological, psychological, and social factors as interconnected rather than independent influences. The significant effects across all four influence domains demonstrate that comprehensive understanding of educational and behavioral outcomes requires consideration of multiple influence levels.

The predominant role of cognitive training suggests that cognitive capabilities may serve as a critical mediating mechanism through which other factors influence outcomes. This cognitive mediation hypothesis would suggest that biological, environmental, and sociocultural factors may partly influence academic and behavioral outcomes through their effects on cognitive development and functioning.

The differential influence patterns across academic and behavioral domains support theories of domain-specific development, suggesting that different outcome areas may be differentially sensitive to various influence factors. This has important implications for intervention design and suggests that targeted, domain-specific approaches may be more effective than generic interventions.

4.3 Practical Implications

The findings suggest several priorities for educational intervention. Given the strong effects of cognitive training on both outcomes, educational programs should prioritize the development of executive functions, working memory, and metacognitive strategies. The significant effects of biological factors suggest that educational interventions should consider physiological foundations, including nutrition, sleep, physical activity, and health factors. While showing smaller direct effects, environmental factors remain significant and potentially modifiable through classroom design, resource allocation, and technology integration. The strong influence of sociocultural factors on behavioral outcomes suggests that interventions should be culturally responsive and engage with community and family contexts.

For behavioral interventions, the findings suggest that the strong influence of cognitive training on behavioral changes supports the continued use and development of cognitive-behavioral interventions. The substantial influence of sociocultural factors suggests that effective behavioral interventions should engage with cultural contexts and social systems. The significant effects across multiple domains suggest that comprehensive interventions addressing multiple influence factors may be most effective.

4.4 Limitations and Future Research

Several limitations should be considered when interpreting these findings. The cross-sectional nature of this study limits causal inferences. While the theoretical framework suggests directional relationships from influence factors to outcomes, longitudinal research would strengthen causal interpretations. The formative measurement approach for predictor constructs, while theoretically appropriate, relies on the assumption that the selected indicators comprehensively capture their respective domains. Future research might explore alternative measurement approaches or additional indicators. The generalizability of findings across different populations, educational contexts, and cultural settings requires empirical verification through replication studies. This study examined direct effects but did not explore potential mediation pathways or moderation effects. Future research should investigate whether cognitive factors mediate the effects of other variables and whether influence patterns vary across different subgroups.

Future research directions should include longitudinal studies examining how influence factors affect developmental trajectories over time to strengthen causal interpretations and inform intervention timing. Controlled intervention studies targeting different influence factors could provide direct evidence for the practical utility of these findings. Research examining whether cognitive factors mediate the effects of biological, environmental, and sociocultural factors would test the cognitive mediation hypothesis suggested by these findings. Research examining how these influence patterns vary across different cultural, socioeconomic, and educational contexts would inform the generalizability of findings.

5. CONCLUSIONS

This study provides comprehensive empirical support for an integrated biopsychosocial approach to understanding academic performance and behavioral changes. The findings demonstrate that biological factors, environmental influences, sociocultural dynamics, and cognitive training all make significant contributions to educational and behavioral outcomes, though with important variations in their relative importance and domain-specific effects.

Cognitive training emerges as the most influential factor across both outcome domains, suggesting that interventions targeting cognitive capabilities may represent particularly high-leverage approaches for promoting positive development. The differential influence patterns between academic and behavioral outcomes highlight the importance of considering domain-specific factors when designing interventions.

These findings have important implications for educational practice, clinical intervention, and policy development. They suggest that comprehensive approaches addressing multiple influence factors, with particular emphasis on cognitive development, hold the greatest promise for promoting positive outcomes across academic and behavioral domains.

The study contributes to ongoing theoretical discussions about biopsychosocial models of development while providing practical guidance for intervention design. Future research should build on these findings through longitudinal studies, intervention research, and investigations of mediation pathways to further advance our understanding of the complex factors that shape educational and behavioral outcomes.

The results ultimately support a nuanced, multifaceted approach to promoting human development that acknowledges the interconnected nature of biological, psychological, and social influences while identifying cognitive training as a particularly promising intervention target. This integrated perspective offers hope for developing more effective, comprehensive approaches to supporting academic achievement and positive behavioral development across diverse populations and contexts.

ACKNOWLEDGEMENT

The caption should be dried as a 3rd level header and should not be dispersed a number.

REFERENCES

1. Bandura, A. (1977). Social learning theory. Englewood Cliffs, NJ: Prentice Hall.
2. Beck, A. T. (2011). Cognitive behavior therapy: Basics and beyond (2nd ed.). Guilford Press.
3. Blair, C., & Raver, C. C. (2014). Closing the achievement gap through modification of neurocognitive and neuroendocrine function: Results from a cluster randomized controlled trial of an innovative approach to the education of children in kindergarten. *PLoS ONE*, 9(11), e112393.
4. Bronfenbrenner, U. (1979). *The ecology of human development*. Harvard University Press.
5. Byrne, B. M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (3rd ed.). Routledge.
6. Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern Methods for Business Research*, 295(2), 295-336.
7. Cohen, D., & Kitayama, S. (2019). Handbook of cultural psychology (2nd ed.). Guilford Press.
8. Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, 78(1), 98-104.
9. Davidson, R. J., Jackson, D. C., & Kalin, N. H. (2000). Emotion, plasticity, context, and regulation: Perspectives from affective neuroscience. *Psychological Bulletin*, 126(6), 890-909.
10. Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old. *Science*, 333(6045), 959-964.
11. Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, 82(1), 405-432.
12. Evans, G. W. (2006). Child development and the physical environment. *Annual Review of Psychology*, 57, 423-451.
13. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.
14. Gay, G. (2010). *Culturally responsive teaching: Theory, research, and practice* (2nd ed.). Teachers College Press.
15. Gómez-Pinilla, F. (2008). Brain foods: The effects of nutrients on brain function. *Nature Reviews Neuroscience*, 9(7), 568-578.
16. Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage Publications.
17. Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
18. Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135.
19. Hofmann, S. G., Asnaani, A., Vonk, I. J., Sawyer, A. T., & Fang, A. (2012). The efficacy of cognitive behavioral therapy: A review of meta-analyses. *Cognitive Therapy and Research*, 36(5), 427-440.
20. Hogg, M. A., & Reid, S. A. (2006). Social identity, self-categorization, and the communication of group norms. *Communication Theory*, 16(1), 7-30.
21. Holmes, J., Gathercole, S. E., & Dunning, D. L. (2009). Adaptive training leads to sustained enhancement of poor working memory in children. *Developmental Science*, 12(4), F9-F15.
22. Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, 6(1), 53-60.
23. Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3(4), 424-453.
24. Leventhal, T., & Brooks-Gunn, J. (2000). The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes. *Psychological Bulletin*, 126(2), 309-337.
25. Moos, R. H. (2002). *The mystery of human context and coping: An unraveling of clues*. American Journal of Community Psychology*, 30(1), 67-88.
26. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
27. Plomin, R., DeFries, J. C., Knopik, V. S., & Neiderhiser, J. M. (2013). *Behavioral genetics* (6th ed.). Worth Publishers.
28. Riggs, N. R., Greenberg, M. T., Kusché, C. A., & Pentz, M. A. (2006). The mediational role of neurocognition in the behavioral outcomes of a social-emotional prevention program in elementary school students: Effects of the PATHS curriculum. *Prevention Science*, 7(1), 91-102.
29. Rothbart, M. K., & Posner, M. I. (2005). Genes and experience in the development of executive attention and effortful control. *New Directions for Child and Adolescent Development*, 2005(109), 101-108.
30. Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, 75(3), 417-453.
31. Vygotsky, L. S., & Cole, M. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
32. Wang, M. T., & Degol, J. L. (2016). School climate: A review of the construct, measurement, and impact on student outcomes. *Educational Psychology Review*, 28(2), 315-352.
33. Wolfe, P. (2010). *Brain matters: Translating research into classroom practice* (2nd ed.). ASCD.