Cyprus University of Technology
Faculty of Health Sciences

Doctoral Dissertation

Enhancing Executive Function and Academic Participation in Adolescents with Attention Deficit - Hyperactivity Disorder: Development and Evaluation of a Multicomponent Occupational Therapy Intervention

Elisavet Pavlou Papagianni

Limassol, October 2026

CYPRUS UNIVERSITY OF TECHNOLOGY

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF REHABILITATION SCIENCES

Doctoral Dissertation

Enhancing Executive Function and Academic Participation in Adolescents with Attention Deficit - Hyperactivity Disorder: Development and Evaluation of a Multicomponent Occupational Therapy Intervention

Elisavet Pavlou Papagianni

Supervisor

Dr Elena Theodorou, Associate Professor

Limassol, October 2026

Approval Form

Doctoral Dissertation

Enhancing Executive Function and Academic Participation in Adolescents with Attention Deficit - Hyperactivity Disorder: Development and Evaluation of a Multicomponent Occupational Therapy Intervention

Presented by

Elisavet Pavlou Papagianni

Supervisor: Dr Elena Theodorou, Associate Professor, Department of Rehabilitation Sciences, Cyprus University of Technology.

Member of the Committee: Dr Kakia Peteinou, Professor, Deputy Dean, Department of Rehabilitation Sciences, Cyprus University of Technology.

Member of Committee: Dr Ioanna Giannoula Katsouri, Associate Professor, Head of Occupational Therapy Department, University of West Attica.

Cyprus University of Technology

Limassol, October 2026

Copyrights

Copyright© 2026, Elisavet Pavlou Papagianni

All rights reserved.

The approval of the dissertation by the Department of Rehabilitation Sciences does not necessarily imply the approval by the Department of the writer's views.

AI use Transparency

Artificial Intelligence (AI) tools were used during the preparation of this dissertation to support language editing, proofreading, grammar correction, text restructuring, and translation. AI-assisted tools were also used to improve clarity and readability, to help organize information, and to assist in identifying potentially relevant literature through electronic database searches and related retrieval processes.

All substantive scholarly activities, including the formulation of research questions, study design, methodology, data collection, data analysis, interpretation of findings, critical appraisal of the literature, synthesis of evidence, and development of conclusions, were conducted solely by the researcher. AI tools did not generate the original research data, perform independent scientific analysis, or determine the interpretation of results.

The researcher critically reviewed, verified, and revised all AI-assisted outputs and retains full responsibility for the accuracy, integrity, originality, and final content of this dissertation.

No AI tools were used to generate, analyse, or interpret the primary research data reported in this dissertation, nor to make decisions regarding the study findings, conclusions, or recommendations.

Acknowledgments

This journey has been far more challenging than I ever anticipated. There were obstacles, disappointments, and moments when progress seemed impossible. It was often a solitary road, and at times it felt isolating.

Looking back now, however, I am deeply moved by the realisation that I was never truly alone. At every stage of this journey, there were people who cared, supported me, and helped me find my way forward. Their presence, generosity, and encouragement carried me through the difficult moments and made this accomplishment possible. For that, I am sincerely and wholeheartedly grateful.

To my supervisor, who was always there, quietly present at every stage of this journey. She helped me carry the weight of the obstacles along the way, kept me moving in the right direction, and, perhaps most importantly, allowed me the freedom to explore the road ahead. Whenever I lost my way, she was there to gently guide me back. Her trust, patience, and support made this journey possible, and for that I will always be grateful.

To the students and families who took part in this research, thank you for your trust, commitment, and willingness to be part of this journey. You contributed to something much greater than this dissertation alone. Through your participation, you helped create valuable knowledge that has the potential to benefit not only yourselves, but also many other young people facing similar challenges. For your trust, your time and your belief int the value of taking part in this process, I am deeply grateful and sincerely hope that you feel proud of the role you played in making this research possible.

I have saved for last the people who have been my greatest source of strength throughout this journey. In ways that are easy to describe, and in countless others that words cannot fully capture, they have been my support, my inspiration, and my safe harbour.

To my husband, who was the rock that steadied me whenever this road became too steep and I began to lose my footing. His unwavering faith in me, especially during the moments when my own confidence faltered, gave me the strength to keep going.

To my sons, who, by pursuing their own dreams with determination and courage, taught me the value of perseverance, hard work, and optimism. Watching them strive for what mattered to them reminded me never to give up on what mattered to me.

The strength I drew from their confidence was multiplied by the certainty that, even if I stumbled or failed, they would always be there. Their love gave me the courage to continue, and their presence turned even the most difficult moments of this journey into ones that could be faced and overcome. Thank you…

ABSTRACT

Attention-Deficit/Hyperactivity Disorder (ADHD) is associated with significant difficulties in EF, academic participation, and daily occupational performance during adolescence. Despite increasing recognition of these challenges, there remains a limited evidence base for occupational therapy interventions specifically designed to address executive function (EF) difficulties in adolescents with ADHD. The present study aimed to develop and evaluate a multicomponent occupational therapy intervention , referred to as the Multicomponent Occupational Therapy Intervention (MOTI), designed to support executive functioning and academic participation in adolescents with ADHD.

Guided by cognitive, occupational, and ecological perspectives, the MOTI programme, integrated cognitive training, academic skills intervention, and parental psychoeducation within a structured intervention framework. A quasi-experimental pre-post design was employed to examine the intervention's feasibility and potential impact on EF and related functional outcomes among adolescents diagnosed with ADHD. The assessment used a multi-method approach, including performance-based and self-report measures, to capture cognitive, executive, attentional, and organisational functioning.

Findings indicated improvements across several EF domains after participation in the programme, particularly in areas associated with planning, organisation, working memory, and academic engagement. However, improvements were not observed consistently across all outcome measures, and some hypothesised effects were not fully supported. These findings suggest that a multicomponent occupational therapy approach may contribute to improvements in executive functioning and academic participation among adolescents with ADHD, while also highlighting the complexity of intervention outcomes within this population.

Beyond intervention evaluation, the study contributes to the emerging understanding of the cognitive-functional characteristics of adolescents with ADHD and demonstrates the potential value of integrating cognitive remediation, occupation-focused strategies, and family involvement within intervention design. The MOTI programme offers a theoretically informed and clinically relevant framework that may inform future occupational therapy practice, service development, and research targeting executive function difficulties in adolescence. Further investigation using larger samples, control

groups, and longitudinal follow-up is warranted to strengthen the evidence base and examine the sustainability of intervention outcomes.

Key Words: Attention Deficit Hyperactivity Disorder, Occupational Therapy, Executive Function, Adolescents, Academic Participation, Cognitive – Occupational Intervention.

TABLE OF CONTENTS

Acknowledgments vii

ABSTRACT ix

TABLE OF CONTENTS xii

TABLES xix

FIGURES xxii

ABBREVIATIONS xxiii

1 Introduction 1

1.1 Overview and purpose of the study 1

1.2 Background of study 1

1.3 Executive Function 4

1.4 OT and ADHD 6

1.5 Assessment of Academic Participation in Adolescents with ADHD 7

1.6 Conceptual Framework 9

1.7 Rationale of the Study 11

1.8 Aims and Objectives of the Study 14

1.9 Structure of the Dissertation 15

2 Literature Review 16

2.1 ADHD: Overview 16

2.2 Clinical features and diagnostic criteria 17

2.3 ADHD in ICF 21

2.4 Theoretical Models of ADHD 23

2.4.1 Executive Dysfunction and Behavioural Inhibition Models 23

2.4.2 The Cognitive-Energetic Model (CEM) of ADHD 24

2.4.3 Dual Pathway & Delay Aversion Models 25
2.4.4 Neurobiological Models 27
2.4.5 The Neurodiversity Paradigm 29
2.5 Models of ADHD: critical discussion 31
2.5.1 Adherence to a model: Implications for practice 33
2.6 Prevalence and developmental trajectory 35
2.7 Executive Functions in ADHD 37
2.7.1 Definition and overview 37
2.7.2 Core components of EF 39
2.7.3 EF in developmental, clinical and OT contexts 40
2.8 Impact on Quality of Life (QoL) 45
2.9 Impact on daily living functionality 47
2.9.1 Impact on academic participation and performance 49
2.10 ADHD in adolescence 52
2.11 Treatment Approaches 53
2.11.1 Overview of Treatment Approaches 53
2.11.2 Pharmacological Treatments 54
2.11.3 Non-pharmacological treatments 56
2.11.4 Combined Approaches (Multimodal Treatments) 59
2.11.5 Theoretical Foundations of Treatment Approaches 61
2.11.5.1 Cognitive-behavioural and EF Models 61
2.11.5.2 Neurobiological Perspectives on Treatment 62
2.11.5.3 Multifactorial and transactional models 63
2.12 OT for ADHD 64
2.12.1 OT in ADHD 64
2.12.2 Theoretical foundations for OT practice in ADHD 65

2.12.2.1 The PEOP Model 65
2.12.2.2 Model of Human Occupation (MOHO) 66
2.12.2.3 Application of the MOHO and PEOP model to ADHD 67
2.12.3 Assessment and Identification of occupational challenges 67
2.12.3.1 OT Assessment 67
2.12.4 OT Interventions for ADHD 69
2.12.4.1 Scope of OT Intervention 69
2.12.4.2 Component-Based Interventions 70
2.12.4.3 Occupation-Based Interventions 71
2.12.4.4 Family-Centred and Collaborative Practice 71
2.12.5 OT and Educational Participation 72
2.12.5.1 Occupational Challenges in the Student Role 72
2.12.5.2 Self-regulated Learning and Academic Participation 73
2.12.6 Evidence for OT Interventions in ADHD 74
2.12.6.1 Evidence for component-based interventions 74
2.12.6.2 Evidence for Occupation-Based Interventions 75
2.12.6.3 Intervention outcomes and acceptability 76
2.12.6.4 Limitations for the Evidence Base 76
2.12.7 Summary 77
2.13 Recommendations drawn from research literature 77
2.14 ADHD management and current situation in Cyprus 82
2.15 Clinical Practice Guidelines for ADHD: International perspectives and the situation in Cyprus 84
2.15.1 Overview of major guidelines 84
2.15.2 Common recommendations across guidelines 85
2.15.2.1 Assessment and Diagnosis 85

2.15.2.2 Pharmacological Interventions 85
2.15.2.3 Non-pharmacological interventions 86
2.15.2.4 Multimodal Treatment Approaches 86
2.15.3 OT within International Guidelines 86
2.15.4 The Situation in Cyprus 87
2.15.5 Implications for the present study 88
2.16 Gaps in Research 89
2.17 The Current Research 93
2.18 The Current Research 93
2.18.1 Aims and Objectives of the Study 94
2.18.2 Research Questions 94
2.18.3 Hypotheses 95
3 Research Methodology 97
3.1 Participants and recruitment 97
3.1.1 Inclusion and Exclusion Criteria 98
3.2 Justification for Repeated-Measures Design 98
3.3 Missing Data and Data Screening 98
3.4 Intervention Protocol 99
3.5 Intervention Protocol Components 100
3.5.1.1 Cognitive Training 102
3.5.1.2 Cognitive Training Delivery Tool 103
3.5.1.3 Academic Skills Training 105
3.5.1.4 Components of AST 107
3.5.1.5 Parents' Psychoeducation 111
3.5.1.6 Integration of components 114
3.5.2 Duration of Intervention, Frequency and Delivery 114

3.6 Research Design 117
3.6.1 Population and Sampling 118
3.6.1.1 Sample size and Sampling Justification 118
3.6.2 Recruitment 119
3.6.1 Ethical Considerations 119
3.7 Data Collection and measures 120
3.7.1 Sociodemographic Information 120
3.7.2 ADHD Symptom Severity 120
3.7.3 Behavioural and emotional functioning 121
3.7.4 EF and cognitive measures 122
3.7.5 Working Memory 123
3.7.6 IC and Sustained Attention 123
3.7.7 Cognitive Flexibility 124
3.7.8 Data Collection Procedure 124
3.8 Data Analysis 126
4 Results 129
4.1 Participant Characteristics 129
4.1.1 Recruitment and Retention 129
4.1.2 Demographic Profile 130
4.1.3 Family Mental Health Profile 132
4.1.4 ADHD diagnostic presentation 133
4.1.5 Treatment history 133
4.2 Pre-Intervention Measures 134
4.2.1 ADHD Core Symptoms 134
4.2.2 EF and other Cognitive Functions 136
4.2.3 Social and emotional state 142

4.2.4 General Mental health state 147
4.2.5 General Participants' profile 150
4.3 Effects of the intervention 151
4.3.1 Changes in ADHD Core Symptoms 151
4.3.2 Changes in cognitive functions 155
4.3.3 Changes in social and emotional aspects 159
4.3.4 General Mental Health state 164
4.3.5 Summary of Results 167
5 Discussion 169
5.1 Introduction 169
5.2 Preliminary Discussion: Demographic and Pre-Intervention Profile 169
5.3 Pre-Intervention Cognitive, Emotional and Behavioural Profile 171
5.4 Interpretation of key findings 172
5.5 Hypothesis 1: Working Memory Improvements 175
5.6 Hypothesis 2: CF Improvements 176
5.7 Hypothesis 3: IC Improvements 178
5.8 Hypothesis 4: General Cognitive Abilities (Processing Speed and Reaction Time) 181
5.9 Hypothesis 5: Planning and Organizational Skills 182
5.10 Hypothesis 6: Sustained Attention Improvements 183
5.11 Hypothesis 7: Psycho-Emotional Outcomes 184
5.12 Hypothesis 8: Core AHDH Symptoms 186
5.13 General Discussion 187
5.14 Summary of Intervention Effectiveness in Relation to the Present Study 189
5.15 Cultural, national and professional significance 189
5.16 Cognitive and Functional Gains 191

5.17 Service Delivery and Ecological Validity 193

5.18 Implications for Occupational Therapy Theory, Practice, Education and Policy 194

5.19 Strengths and Limitations 196

5.19.1 Strengths of the Study 196

5.19.2 Limitations of the Study 199

5.20 Future Research Directions 201

5.21 Implications and Future Directions for OT 202

5.22 Closing Conclusion 203

References 205

TABLES

Table	Page
Table 1: DSM-5 symptoms for Inattention and Hyperactivity - Impulsivity	18
Table 2: ICD-11 symptoms for Inattention and Hyperactivity – Impulsivity.	19
Table 3: ADHD-related impairments according to ICF	22
Table 4: Demographic Characteristics of Participants	130
Table 5: Family history of ADHD and Mental health conditions.	132
Table 6: ADHD diagnostic presentation by gender.	133
Table 7: Previous and Current Treatment Status of Participants	134
Table 8: Pre-Intervention Scores on the ADHD – Greek Scale.	135
Table 9: Pre-Intervention ASEBA Scores	136
Table 10: Pre-Intervention Cognifit Assessment Battery Scores	137
Table 11: Pre-Intervention Self-Reported Cognitive, Attentional and Behavioural Difficulties.	138
Table 12: Pre-Intervention Descriptive Statistics and Normality Tests for Trail Making Measures	139
Table 13: Spearman Correlations Among Pre-Intervention Trail Making Measures (N=53)	139
Table 14: Pre-Intervention Digit Span Test Performance (N=51)	140
Table 15: Pre-Intervention CAT Performance (N=53)	141
Table 16: Pre-Intervention Psychosocial Measures	142
Table 17: Descriptive statistics for pre-intervention emotional-state variables	143

Tabel 18: Descriptive Statistics for pre-intervention Syndrome and DSM scale variables on YSR (students' reports). 144

Table 19: Descriptive statistics for pre-intervention Syndrome and DSM scale variables on CBCL (parents report) 145

Table 20: Descriptive statistics and interpretive comparison of adolescents' and parents' pre-intervention ratings. 146

Table 21: Comparison of adolescents' and parents' pre-intervention ratings across psychosocial constructs. 147

Table 22: Post-Intervention means, standard deviations and changes in scores on ADHD-Greek scale. 151

Table 23: Pre-intervention and post-intervention ASEBA scores for adolescents and parents. 152

Table 24: Pre-and post-intervention median scores with Wilcoxon signed-rank test results. 153

Table 25: Combined Pre-Post Results for Trail Making Test A, B and B-A (N=32) 155

Table 26: Pre- and post-intervention Performance on CAT Omissions, Commissions and Reaction Time. 156

Table 27: Pre- and post-intervention Performance on cognitive variables measured by Cognifit™ 157

Table 28: Pre-intervention and post-intervention performance on Digit Span Forward, Backwards, and Distraction. 158

Table 29: Pre- and post-intervention Performance on the Rosenberg Self-Esteem Scale 160

Table 30: Pre- and Post-Intervention Performance on STReDI-SPeS Psychosocial Constructs 160

Table 31: Pre- and Post-Intervention Emotional-State Scores 161

Table 32: Pre- and Post-Intervention ASEBA Syndrome and DSM Scale Scores 162

Table 33: Pre- and Post-Intervention ASEBA Syndrome and DSM Scale Scores (Parents' Reports) 163

Table 34: Pre- and Post-Intervention ASEBA Scores (Adolescents' Reports) 165

Table 35: Pre- and Post-Intervention ASEBA Scores (Parents' Reports) 166

Table 36: Alignment of Research Questions, Hypotheses, Measures and Findings 173

FIGURES

Diagram	Page
Figure 1: Visual representation of the MOTI.	100
Figure 2: Data Collection Procedure	126
Figure 2: Data Collection Procedure	129

ABBREVIATIONS

ADHD	Attention Deficit Hyperactivity Disorder
EF	Executive Function / Executive Functioning
WM	Working Memory
IC	Inhibition (inhibitory) Control
CF	Cognitive Flexibility
MF	Mental Flexibility
OT	Occupational Therapy
MOTI	Multicomponent Occupational Therapy Intervention
ms	Millisecond
ASD	Autistic Spectrum Disorder
ASEBA	Achenbach System of Empirically Based Assessment
CBCL	Child Behavioural Checklist
YSR	Youth self-resport
DSM	Diagnostic and Statistical Manual
CAT	Continuous Attention Test
QoL	Quality of Life
HRQoL	Health-Related Quality of Life
AST	Academic Skills Training
CDC	Centres for Disease Control and Prevention
NICE	National Institute for Health and Care Excellence
MTA	Multimodal Treatment Study for ADHD
ODD	Oppositional Defiant Disorder

1 Introduction

1.1 Overview and purpose of the study

The present dissertation addresses a critical gap in the occupational therapy literature: the complete absence of evidence-based, developmentally appropriate Occupational Therapy (OT) interventions for adolescents with Attention Deficit Hyperactivity Disorder (ADHD) who experience executive-functioning (EF) difficulties. Despite the increasing academic and psychosocial demands placed on adolescents, no empirically supported OT protocols currently exist to guide practice with this population.

This Introduction provides a brief overview of the study's aims, context, and methodological orientation and serves as a roadmap through the structure, rationale, and progression of the chapters that follow. A comprehensive and extended discussion of the major topics will follow in the next chapters.

1.2 Background of study

ADHD is a neurodevelopmental condition characterised by persistent patterns of inattention, hyperactivity, impulsivity, and disorganisation that influence functioning and development(American Psychiatric Association, 2022) . Emerging typically in childhood, ADHD often persists in adolescence and adulthood, affecting cognitive and emotional functioning and posing substantial implications for activity performance, participation and occupational engagement.

Seen from a rehabilitation science perspective, ADHD can be understood as a condition that affects body functions, which in turn shape an individual's ability to carry out activities and to participate in life situations, consistent with the International Classification of Functioning, Disability and Health (ICF) (Alehagen et al., 2024; Bölte et al., 2024). These person-level capacities shape an individual's ability to carry out activities such as learning, self-management, and social interaction, and they affect participation in life situations across home, school, and community contexts. Consistent with the ICF, ADHD is therefore conceptualised not only as a neurodevelopmental condition but as a pattern of functioning emerging from dynamic interactions among personal capacities, environmental facilitators or barriers, and the demands of

meaningful occupations (Bölte et al., 2024). This perspective supports a holistic, context sensitive understanding of ADHD that aligns with contemporary rehabilitation science and guides the rationale for examining both executive functioning and everyday participation outcomes in adolescents.

While ADHD is commonly described in terms of difficulties, it is increasingly understood within a broader perspective of neurodevelopmental variability (J. Kent, 2024). Differences in attention regulation, activity levels, and cognitive processing may present both challenges and context-dependent strengths, particularly when environmental demands and expectations are taken into account (Kofler et al., 2014). This perspective highlights the importance of examining not only individual characteristics but also how individuals interact with their environments. This person-environment perspective is central to OT and rehabilitation frameworks such as PEO and PEOP (Bass, Marchant, et al., 2024; Larsson-Lund & Nyman, 2017; Wong & Fisher, 2015).

From this transactional perspective, adolescent's lived experiences, perceived challenges, and self-identified strengths form the springboard for designing interventions that are developmentally relevant, contextually responsive, and underscore daily occupations.

A central feature of ADHD is its association with differences in EF, a set of higher-order cognitive processes that support goal-directed behaviour (Diamond, 2013; Miyake & Friedman, 2012; Turnes & Piacentini, 2025). These include VM, IC, CF, planning, and decision-making (Friedman & Miyake, 2016; Turnes & Piacentini, 2025). EF plays a critical role in organising behaviour, regulating attention, managing time, and adapting to environmental demands.(R. Barkley, 1997; M. A. Barnes, 2023; Turnes & Piacentini, 2025)

Variability in these processes can influence how individuals engage with daily activities and respond to increasing cognitive and social expectations (M. A. Barnes, 2023; Cramm et al., 2016).

Adolescence represents a critical developmental stage during which EF undergo significant maturation, reflecting challenges in academic participation and performance, social participation and overall well-being and QoL (Poon, 2018; Serpell & Esposito,

2016; S. J. Taylor et al., 2015). During this period, individuals face increasing academic expectations, greater independence, and more complex social interactions. For adolescents with ADHD, these demands may intensify existing differences in cognitive processing and self-regulation, contributing to challenges in academic achievement, social participation, and overall well-being (Krieger et al., 2020).

Although the global prevalence of ADHD in children and adolescents is estimated at approximately 5.9% (Faraone et al., 2021) , this translates into an everyday reality within educational settings, where one or more students in a typical classroom are likely to experience ADHD-related challenges. During adolescence, challenges described above frequently manifest in school-related occupations that require planning, organisation, time management, homework completion, and examination preparation. Such activities constitute core components of the student role, one of the most central and developmentally significant occupations of adolescence. Difficulties in fulfilling this role may therefore have substantial consequences for occupational performance, participation, educational attainment, and well-being.

During adolescence, these challenges emerge within the context of significant developmental changes and increasing environmental demands, making this period particularly important for understanding how ADHD influences everyday functioning and participation.

The transition from childhood to adolescence is characterised by substantial cognitive, emotional, and social changes, during which individuals are increasingly expected to engage in self-regulated behaviours, manage their time effectively, organise tasks, and adapt to more complex learning environments (Clarkson et al., 2021; Mastorci et al., 2024). For adolescents with ADHD, however, persistent difficulties with attention regulation, impulse control, and EF may interfere with their ability to meet these developmental and environmental demands (Caye et al., 2016; Clarkson et al., 2021; Sibley, 2021). These difficulties are often magnified in contexts that require sustained attention, organisation, planning, and behavioural regulation, such as school settings (Levanon-Erez et al., 2017; Sibley et al., 2014). Consequently, the challenges experienced by adolescents with ADHD reflect not only individual characteristics but also the interaction between developmental capacities and contextual demands (Lasky et al., 2016).

Accordingly, adolescents with ADHD are at increased risk of academic underachievement, social difficulties, and emotional dysregulation (Coxe et al., 2021; Henning et al., 2021; Lawrence et al., 2021). Within the ICF, these outcomes can be understood as participation restrictions (Bölte et al., 2024; World Health Organization, n.d.). In addition, EF differences may affect engagement in everyday occupations, including activities of daily living (ADLs) and instrumental activities of daily living (IADLs), particularly those requiring organisation, task management, and the effective use of time (Fogel, 2025; Pérez-Rodríguez et al., 2026). Nevertheless, considerable heterogeneity exists within this population, and the nature and severity of difficulties vary across individuals.

From an OT perspective, understanding adolescents' experiences of such participation challenges is essential, as intervention planning should be informed not only by observed difficulties but also by adolescents' own perceptions of their strengths, barriers, and occupational needs.

1.3 Executive Function

EF refers to a set of interrelated cognitive processes that enable individuals to engage in purposeful, goal-directed behaviour (David et al., 2017; Diamond, 2013). Key components include WM, which is the ability to retain and manipulate information; IC, which is the capacity to regulate responses and behaviour; CF, which is the ability to shift between tasks or perspectives; and planning and organisation (Diamond, 2013; Miyake & Friedman P, 2012). These processes operate dynamically and in an integrated manner to support adaptive functioning and occupational competence (Cramm et al., 2013, 2016). For a more comprehensive discussion, see section 2.7 Executive Functions in ADHD.

In rehabilitation sciences, especially OT, EF is a central yet contested construct. Unlike fields such as neuropsychology, OT does not rely on a single agreed-upon definition; instead, EF is variably framed either as a set of cognitive components or as executive performance embedded within occupation, with repeated calls for a more occupation-specific conceptualisation (Cramm et al., 2013; Heaps, 2025; Josman & Meyer, 2019). Converging evidence suggests that EF remains “difficult to define,” underscoring the existence of definitional cohesion resulting in rearch and practice challenges (Baggetta

& Alexander, 2016; Cramm et al., 2013; Heaps, 2025). Consequently, OT often draws from neuropsychological terminology—such as inhibition, working memory, and cognitive flexibility—rather than relying on a settled OT-specific model (Heaps, 2025; Josman & Meyer, 2019).

Across OT literature, there are two dominant and broad conceptualizations of EF – the component-process view and the occupation-based view. The first, component-process view treats EF as a set of discrete cognitive skills including IC, WM, planning, and CF (Heaps, 2025; Josman & Meyer, 2019) On the other hand, the second conceptualization is the occupation-based view which conceptualizes EF as the integrated organization of goal-directed occupational performance – how individuals plan, initiate, sequence, adapt and complete meaningful activities in real contexts (Connor & Maeir, 2011; Cramm et al., 2013).

Similarly, major OT models do not provide any explicit and unified theory for EF. Nevertheless, OT models accommodate EF as a person factor expressed through transactional performance demands. The PEOP model describes that occupational performance arises from the dynamic relationship between a person, occupation and the environment (Bass, de Sam Lazaro, et al., 2024; Baum et al., 2021). This makes EF most coherent when understood not as an isolated inner skill but as a capacity that becomes meaningful only in relation to contextual demands and occupational goals.

Conceptualization of EF has direct implications for assessment and treatment. It is often that authors in OT literature emphasise the need for dynamic, occupation-based and naturalistic assessments which will address the nature of EF as emerging in complex, goal-directed, real-world activity (Baum et al., 2008; Cramm et al., 2013, 2016; Heaps, 2025). It is argued that one-off standardized tasks often fail to capture the simultaneous multitasking, inhibition, adaptation and contextual variation that define executive performance in daily occupations (Heaps, 2025)

In academic settings, EF are essential for following instructions, maintaining attention, organising materials, and completing assignments (Chaimaha et al., 2017; Mann et al., 2015). WM allows individuals to process and retain relevant information, IC supports sustained engagement, and CF facilitates adaptation to changing task demands (Best et al., 2009; Diamond, 2020).

Variability in EF should not be viewed solely as impairment, but rather as differences in cognitive processing that influence how individuals approach tasks and respond to complex environments. However, when the demands of a given context exceed an individual's current capacities or available supports, these differences may result in functional challenges, particularly in structured settings such as school. This variability stresses the need for flexible and highly individualized interventions.

1.4 OT and ADHD

OT plays a crucial role in addressing the functional challenges associated with ADHD, focusing on enhancing individuals' participation in meaningful occupations, including education, self-care, leisure, and social engagement. OT adopts a person-centred and context-sensitive approach, emphasising not only the development of cognitive skills but also the modification of environments and the use of compensatory strategies to support engagement.

Building on this practice-based perspective, both the PEOP model and the MOHO offer complementary, occupation-centred perspectives, shifting attention away from diagnosis alone toward understanding occupational functioning and performance in real contexts. These models provide the theoretical foundation for conceptualising how person factors, environmental conditions and occupational demands interact to shape participation for individuals with ADHD. Specifically, PEOP conceptualises performance, participation and well-being as emerging from the dynamic interaction of person factors, environmental conditions and occupational demands (Bass, de Sam Lazaro, et al., 2024; Bass, Marchant, et al., 2024; Baum et al., 2021; Larsson-Lund & Nyman, 2017). Similarly, MOHO views occupation as a dynamic system but emphasises internal processes such as volition, habituation, and performance capacity that shape an individual's engagement and adaptation to their environments (Cheung & Fung, 2020; R. R. . Taylor et al., 2024; Wong & Fisher, 2015). These core principles of the two models align with biopsychosocial and neurodiversity-informed approaches that integrate strengths, challenges, and contextual factors in the assessment and intervention of neurodevelopmental conditions such as ADHD (Dallman et al., 2022; Kornblau & Robertson, 2021). Their key distinction lies in their emphasis: while PEOP prioritises contextual and environmental structures, policies and performance outcomes (Bass,

Marchant, et al., 2024; Baum et al., 2021), MOHO provides a more detailed account of the internal systems that underpin occupational engagement (Karamali-Esmaili, 2019; R. R. . Taylor et al., 2024).

Beyond theoretical conceptualization, OT intervention approaches may include cognitive training, functional skill development, and occupation-based strategies that promote the transfer of skills to real-life contexts. Multicomponent interventions that combine cognitive training with practical skill application have received increasing attention, reflecting the complex nature of everyday demands. However, research focusing specifically on adolescents remains limited, highlighting the need for further investigation within this population.

In adolescents with ADHD, the main OT interventions focus on metacognitive / EF training, school-based skills programs and participation-focused supports, with smaller emerging literature on sensory, physical-activity and creative modalities (Ambrose, 2021; Levanon-Erez et al., 2019; Nielsen et al., 2017; Watroba et al., 2024; Wennberg et al., 2021). Evidence for effectiveness is promising but still limited overall, while adolescent-specific studies are considerably fewer than child studies (Brooks & Bannigan, 2019; Rodrigues & Sposito, 2026).

For the purposes of this document, OT interventions for ADHD are organised into four broad and overlapping categories based on their primary objectives and methods: (a) EF training e.g. (Cramm et al., 2013; Hahn-Markowitz et al., 2017; Kim et al., 2020; Rodrigues & Sposito, 2026), (b) participation-focused supports e.g. (Adamou et al., n.d.; Ianni et al., 2021; Wennberg et al., 2021), (c) family-centred interventions e.g. (Klowan et al., 2023; Rodrigues & Sposito, 2026) and (d) emerging modalities e.g.(Erarslan et al., 2026; Gudka et al., 2025; Gureasko-Moore et al., 2006). These do not constitute formal methodologies or formal categories – the terms are used to facilitate description of interventions in the basis of common goals or methodologies.

1.5 Assessment of Academic Participation in Adolescents with ADHD

Assessment constitutes a central component of OT practice, providing the foundation for clinical reasoning, collaborative goal setting, intervention planning, and outcome evaluation (Boop et al., 2020a). Within OT, assessment is not limited to identifying impairments; rather, it aims to understand how personal capacities, environmental

factors, and occupational demands interact to influence participation in meaningful life situations (Boop et al., 2020a; Maritz et al., 2018). From this perspective, assessment serves as the starting point of a dynamic process through which occupational therapists identify participation barriers and facilitators, determine intervention priorities, and evaluate change over time.

In the field of ADHD, assessment has traditionally focused on symptomatology, behavioural manifestations, and executive functioning, using well-established instruments such as symptom-based rating scales and executive-function measures like the Behavior Rating Inventory of Executive Function (BRIEF-2) (Gioia et al., 2024). These tools provide essential information about body functions—including attention regulation, working memory, inhibition, and self-monitoring—as described in the ICF (World Health Organization, 2007). They remain central to evidence-based ADHD assessment and contribute substantially to understanding cognitive processes associated with academic performance (Kofler et al., 2019; Sorge et al., 2015; Toplak, Bucciarelli, et al., 2008). Increasingly, however, contemporary perspectives—including neurodiversity-informed approaches—emphasise that cognitive differences also shape how adolescents engage in everyday activities and academic roles (Dorr & Armstrong, 2019; J. Kent, 2024). This highlights the value of complementing impairment-focused information with insights into adolescents' lived experiences of activities and participation within school contexts (Bölte et al., 2024).

OT assessments such as the Canadian Occupational Performance Measure (COPM) (Law et al., 1990), the Model of Human Occupation Screening Tool (MOHOST) (Fisher, 2013), and the Short Child Occupational Profile (SCOPE) (Bowyer et al., 2007) introduce a broader focus on occupational performance and participation. These instruments align with the Person–Environment–Occupation–Performance (PEOP) framework, which emphasises the interaction between person factors, environmental influences, and occupational demands (Bass, Marchant, et al., 2024; Baum et al., 2021), and with the Model of Human Occupation (MOHO), which foregrounds adolescents' volition, habituation, and performance capacity (R. R. Taylor et al., 2024). While these assessments are valuable for understanding participation across diverse areas of daily life, they are not specifically designed to explore the academic participation challenges frequently reported by adolescents with ADHD—such as planning schoolwork,

organising materials, managing time, completing homework, preparing for examinations, and navigating academic self-management (Langberg, Epstein, et al., 2011; Langberg et al., 2012; Larsson-Lund & Nyman, 2017; Sibley et al., 2014). These challenges reflect complex interactions among person factors, environmental expectations, and occupational demands, and may be experienced differently depending on adolescents' cognitive style, motivational patterns, and contextual fit (Lasky et al., 2016; Martin, 2014).

Within a person-centred, occupation-focused approach, PEOP and MOHO both highlight the importance of understanding adolescents' lived experience of academic participation. Neurodiversity-informed perspectives further reinforce that adolescents' own interpretations of their strengths, challenges, and environmental support or barriers are essential for understanding participation in meaningful ways (Kent, 2024; Pellicano & den Houting, 2022). Consequently, there is growing recognition of the need for assessment approaches that are sensitive to academic participation and that meaningfully incorporate adolescents' perspectives on their everyday experiences. Such approaches do not replace traditional symptoms or impairment-based tools; rather, they complement them by illuminating how adolescents understand and experience participation challenges in real-world educational contexts. This information is particularly valuable because it supports the identification of meaningful, adolescent-driven intervention targets and facilitates the development of individualized, participation-focused interventions grounded in PEOP, MOHO, and the ICF (Baum et al., 2021; Wong & Fisher, 2015).

1.6 Conceptual Framework

This study adopts a combined conceptualisation drawing from the PEOP model, the MOHO and the ICF. Together, these frameworks provide a comprehensive, biopsychosocial, and person-centred lens for understanding ADHD as a condition that affects performance through dynamic interactions among personal capacities, environmental demands, and the characteristics of everyday occupations. Literature strongly supports integrating multiple models, as combining theoretical perspectives is considered beneficial for addressing the complexity of human functioning and the multifaceted nature of occupational challenges (Ikiugu et al., 2009, 2019).

In the context of this study, which aims to develop an effective, highly individualised, and developmentally sensitive intervention protocol for adolescents with ADHD, the combination of PEOP and MOHO offers a holistic and comprehensive approach. PEOP provides a broad rehabilitation framework that conceptualises ADHD as a transactional condition, in which challenges arise when the alignment between person factors, environmental expectations, and occupational demands is disrupted (Bass, Marchant, et al., 2024; Baum et al., 2021). This perspective aligns with contemporary ADHD research emphasising heterogeneity, contextual dependence, and variability across academic, social, daily living, and vocational domains (Banaschewski et al., 2023; Celestino, 2023; Hotez et al., 2022; Hotte-Meunier et al., 2024; Levanon-Erez et al., 2017).

MOHO enriches this framework by foregrounding the adolescent's lived experience, offering an in-depth understanding of how adolescents with ADHD experience, choose, and sustain their participation in everyday occupations. Through its constructs of volition, habituation, and performance capacity, MOHO provides insight into the motivational, routine-based, and capacity-related processes that shape occupational engagement (R. R. . Taylor et al., 2024; Wong & Fisher, 2015). This includes how adolescents perceive their own abilities, cope with contextual demands, and develop adaptive patterns (Cheung & Fung, 2020; Karamali-Esmaili, 2019). In this sense, MOHO complements PEOP by illuminating the internal systems and subjective experiences that influence participation.

The integration of the ICF provides a universal, model-independent language for describing functioning, participation, and contextual influences (Bölte et al., 2018). By situating ADHD-related challenges within interactions among body functions, activities, participation domains, and environmental facilitators or barriers (Bölte et al., 2018; World Health Organization, n.d.), the ICF reinforces the study's biopsychosocial orientation and supports a holistic understanding of EF as both a person-level cognitive capacity and a contextually expressed performance construct.

Within this combined conceptualisation, Attribution Theory offers an additional, complementary perspective that is particularly relevant for adolescents. Attribution Theory examines how individuals interpret the causes of their successes and difficulties, and how these interpretations influence motivation, persistence, and engagement

(Graham & Weiner, 2011; Weiner, 1985). For adolescents with ADHD—who often navigate fluctuating performance, inconsistent feedback, and high academic demands—attributions can shape their sense of personal causation, self-efficacy, and willingness to engage in challenging tasks. Integrating Attribution Theory therefore strengthens the person-centred orientation of the study by acknowledging that adolescents' interpretations of their performance are as important as the performance itself.

This combination of PEOP, MOHO, the ICF, and Attribution Theory supports a holistic understanding of EF as cognitive abilities that interact with environmental conditions and personal interpretations, directly influencing adolescents' engagement in meaningful and age-appropriate occupations—including academic involvement, social participation, and self-management. This conceptualisation informs the design of the multicomponent Occupational Therapy Intervention (MOTI**)**, which targets person-level executive capacities, modifies occupational demands, enhances environmental supports, and incorporates adolescents' own interpretations of their performance to optimise participation.

1.7 Rationale of the Study

Despite extensive research on ADHD, important gaps remain in understanding how EF difficulties influence adolescents' participation in everyday academic occupations and how these difficulties can be effectively addressed through OT. While assessment and intervention are often discussed separately within the literature, OT practice conceptualises them as interconnected stages within a continuous clinical reasoning process involving screening, assessment, collaborative goal setting, intervention planning, implementation, and outcome evaluation. Consequently, effective intervention requires mechanisms for identifying meaningful participation barriers prior to intervention planning.

Existing assessment approaches frequently rely on teacher or parent reports and often focus primarily on symptoms, deficits, or isolated cognitive functions. Relatively few tools provide adolescents with the opportunity to describe their own experiences of academic participation and the challenges they encounter in school-related occupations. This gap is particularly relevant for OT, which emphasizes person-centred practice and the importance of understanding the individual's lived experience within their everyday

roles and contexts. Participation-focused assessments that capture adolescents' perspectives are therefore essential for identifying barriers that are meaningful, modifiable, and directly relevant to intervention planning.

Pre-intervention assessment is recognised as an essential and integral component of OT practice, even when it falls outside the direct scope of investigation. In this broader assessment context, self-report measures that explore adolescents' perspectives can complement traditional symptom-based or performance-based assessments and support the development of individualised, participation-focused intervention plans.

Within this broader participation-focused evidence gap, one area of growing relevance for OT is the role of EF (Akyurek et al., 2024; Cramm et al., 2016). EF difficulties are not present in all individuals with ADHD, yet they become especially consequential during adolescence, when academic, social, and self-management demands intensify and external supports decrease (Budman et al., 2025; Jaworska & MacQueen, 2015; Mastorci et al., 2024). Research consistently shows that adolescence is a period in which organisational demands, task complexity, and expectations for autonomous self-regulation increase, making EF difficulties more visible and more impactful on everyday functioning (Budman et al., 2025; De Rossi et al., 2023; Levanon-Erez et al., 2017). Despite this, most intervention studies continue to focus either on younger children or on adults, leaving adolescents under-represented in both general ADHD research and OT-specific evidence.

Research on pharmacological and behavioural treatments indicates that, while providing short-term benefits, their long-term impact remains uncertain (Coghill et al., 2023; Peterson, Trampush, Brown, et al., 2024; Peterson, Trampush, Maglione, et al., 2024; Sibley et al., 2025). Evidence suggests that medication alone does not reliably improve skills such as planning, organisation, task initiation, or academic participation (Ogundele & Ayyash, 2023; Watson et al., 2015). Yet these are precisely the areas adolescents identify as central to their daily challenges(Andersson Frondelius et al., 2019; Eccleston et al., 2019; Jones & Hesse, 2018; K. M. Kent et al., 2011; van Lier & Deater-Deckard, 2016; Wiener & Daniels, 2016; Zetterqvist et al., 2025). These limitations highlight the need for comprehensive, evidence-based interventions that address both cognitive challenges and real-world occupational demands.

OT is well positioned to meet this need, as interventions commonly target EF, daily routines, school and social participation, self-regulation, and environmental supports rather than focusing solely on symptom reduction (Cabelguen et al., 2026; Hahn-Markowitz et al., 2011; Sibley et al., 2016). However, evidence-based interventions—particularly those tailored to adolescents—remain sparse (Clarkson et al., 2021; Kelsch et al., 2016; Levanon-Erez et al., 2019; Nielsen et al., 2017; Rodrigues & Sposito, 2026). Existing studies tend to examine single-component approaches, such as isolated cognitive training or school-based strategies, with few investigations evaluating multicomponent, occupation-centred interventions that integrate cognitive, functional, and contextual elements (Andersen et al., 2024; Kılıç et al., 2026). Consequently, clinicians lack robust, age-appropriate guidance for supporting adolescents with ADHD in ways that reflect their lived experiences and everyday occupational challenges.

The present study addresses this gap by evaluating a multicomponent OT intervention designed specifically for adolescents with ADHD. By combining computerised cognitive training, academic-skills development, and optional parental psychoeducation, the intervention aims to strengthen executive functioning while enhancing participation in meaningful daily activities through context-sensitive and individualised strategies. Unlike decontextualised cognitive drills, the programme embeds executive-function training within occupation-based academic tasks, reflecting current recommendations for ecologically valid and functionally relevant intervention design.

OT extends beyond intervention delivery alone to include a broader assessment and planning process (see above). In this context, the Strengths and Difficulties Self-Perception Scale for Adolescent Students (STReDI-SPeS) was developed to provide adolescents with an opportunity to describe their own perceived strengths and difficulties in academic participation (Papagianni & Theodorou, 2026). The development of the scale identified four domains that appear particularly relevant to successful participation in the student role: academic disorganisation and temporal mismanagement, cognitive-attentional barriers, attributional distress and academic fatigue, and self-regulated academic engagement. These domains represent areas that are both meaningful to adolescents and amenable to occupational therapy intervention. The present study focuses specifically on the intervention component of this broader occupational therapy framework. Nevertheless, the intervention protocol and the

STReDI-SPeS should be understood as complementary developments: while the first was designed to identify participation-related strengths and barriers from the adolescents' perspective, the intervention protocol was designed to address many of the modifiable factors reflected within these domains. Together, they contribute to a participation-focused occupational therapy approach aimed at enhancing engagement and performance in the student role.

To our knowledge, this is the first study in Cyprus—and one of few internationally—to examine a hybrid, multicomponent OT intervention for adolescents with ADHD and to explore its impact on both cognitive and psycho-emotional outcomes. In doing so, the study addresses a previously unmet need for age-appropriate, occupation-centred, evidence-based intervention and advances occupational therapy practice by demonstrating how EF training can be delivered within a meaningful, participation-focused framework.

1.8 Aims and Objectives of the Study

The primary aim of this study is to evaluate the effectiveness of a multicomponent OT intervention (MOTI) in enhancing EF in adolescents with ADHD, while also examining its potential psycho-emotional benefits, including improvements in self-esteem, emotional regulation, and broader socio-emotional difficulties, as well as possible reductions in core ADHD symptoms.

Within this overarching aim, the study focuses on how MOTI may strengthen key person-level capacities that support adolescents' participation in academic occupations. These include executive, cognitive, emotional, and behavioural abilities that interact with everyday school demands. In this context, the study examines changes in WM, IC, CF, processing speed, reaction time, planning and organisation, sustained attention, psycho-emotional functioning, and ADHD symptomatology.

Collectively, these objectives capture the range of skills that support adolescents' participation, engagement and performance in academic contexts, reflecting the person-level determinants of occupational participation and academic performance.

1.9 Structure of the Dissertation

The present dissertation is organised into a series of chapters that systematically examine ADHD, its impact during adolescence, and the effectiveness of a multicomponent OT intervention targeting EF.

Chapter 1 introduces the research topic by providing a comprehensive background on ADHD, EF, and adolescence. It establishes the theoretical foundation of the study, outlines the rationale and significance of the research, and defines the aims and objectives that guide the investigation.

Chapter 2 presents a detailed review of the literature. It begins with an overview of ADHD, including its definition, diagnostic criteria, theoretical models, prevalence, and developmental trajectory. The chapter then explores the broader impact of ADHD on QoL and daily functioning, with particular emphasis on academic performance across developmental stages. A distinct section is dedicated to ADHD in adolescence, highlighting age-specific characteristics and challenges. The chapter further examines EF and their relationship with ADHD, before concluding with a review of current treatment approaches, including OT interventions.

Chapter 3 outlines the research methodology employed in the present study, including the research design, participant characteristics, procedures, intervention protocol, assessment tools, and statistical analyses.

Chapter 4 presents the results of the study in a clear and structured manner, reporting the main findings related to EF and cognitive outcomes following the intervention.

Chapter 5 discusses the findings in relation to the existing literature, interpreting the results and examining their implications for theory, research, and clinical practice.

Finally, Chapter 6 provides the conclusions of the study, summarising the key findings, outlining limitations, and offering recommendations for future research and professional practice.

2 Literature Review

2.1 ADHD: Overview

ADHD is a complex neurodevelopmental disorder, with prime characteristics of a persistent pattern of inattention and/or hyperactivity-impulsivity which is age-inappropriate and has a direct adverse effect on academic, occupational and/or social functioning (American Psychiatric Association, 2022; World Health Organisation, 2019). Over the years, multiple theoretical models have been proposed to explain its aetiology, symptom manifestation and underlying mechanisms, ranging from neurobiological and cognitive-energetic models to dimensional frameworks and computational approaches.

ADHD is closely associated with differences in EF which contribute to the manifestation of its core symptoms and to broader functional difficulties. These, along with the high rates of comorbidities and concomitant contribute to the complexity and heterogeneity of the condition. It is estimated that 50-75% of children or adolescents with ADHD have at least one additional psychiatric condition – most often another neurodevelopmental disorder, ODD, Anxiety and Mood disorders being among the most common (Cuffe et al., 2020; Reale et al., 2017).

Clinical characteristics of ADHD must be delineated across distinct life stages, as the disorder's core symptoms and associated difficulties are not static but evolve in response to changing environmental and functional demands (De Rossi et al., 2023; Martin et al., 2018). Symptoms typically are visible early in life, with hyperactivity and/or impulsivity most prominent in childhood (De Rossi et al., 2023; Franke et al., 2018). Later, in adolescence, inattention and EF difficulties are most prominent and persisting into adulthood (De Rossi et al., 2023; Slobodin et al., 2015). Adolescence—marked by the shift from primary to secondary education—introduces both qualitative and quantitative challenges that reshape clinical presentation. De Rossi et al (2023), report that in their sample, typical ADHD symptoms (inattention, hyperactivity, impulsivity) were significantly more severe in childhood than in adolescence; yet adolescents demonstrated poorer overall functioning, reduced adaptive skills, and heightened levels of anxiety, depressive symptoms, somatic complaints, emotional

dysregulation, social difficulties, and aggression. Similarly, other studies, e.g.(Asherson, 2016; Franke et al., 2018; Gilbert et al., 2025), support this view.

This profile indicates a developmental trajectory where ADHD-specific symptom severity decreases, while global impairment and overall psychopathology increase during the transition from childhood to adolescence. Adolescent ADHD is highly impairing and at the same time is under-served, reflecting the notion that the persistence (and severity) of ADHD in adolescence is not matched by persistence of services and support (Buitelaar, 2017; Türk et al., 2023).

2.2 Clinical features and diagnostic criteria

It is frequently noted that, in the absence of definitive biomarkers, the diagnosis of ADHD depends largely on clinical judgment and subjective assessment (Baroni & Castellanos, 2014). Nonetheless, ADHD is recognised as a valid clinical condition, and leading professional organisations have developed diagnostic guidelines grounded in widely accepted criteria (Faraone et al., 2021). These criteria are outlined in two principal diagnostic manuals used globally for the classification and assessment of disorders: the Diagnostic and Statistical Manual of Mental Disorders (DSM) (American Psychiatric Association, 2013), which focuses exclusively on mental health conditions, and the ICD (World Health Organisation, 2019) which encompasses a broad spectrum of diseases and disorders across medical disciplines. DSM, published by the American Psychiatric Association, is currently in its fifth edition with a text revision (DSM-5-TR) released in 2022. The ICD, published by the World Health Organization, is now in its eleventh edition (ICD-11), released in 2025.

Both DSM-5 and ICD-11, require a persistent pattern of inattention and/or hyperactivity-impulsivity, that interfere with functioning, to diagnose ADHD. Symptoms, according to both manuals, should be present across multiple contexts, cause clinically significant impairment and to reflect a developmentally inappropriate pattern of behaviour. Both taxonomic systems describe three presentations of the disorder: (a) inattentive, (b) hyperactive-impulsive and (c) combined, reflecting a shared conceptual foundation (Gomez et al., 2023).

While both systems share common diagnostic features, they also present key differences in the diagnostic approach they follow. The first difference is related to symptom

enumeration. While DSM-5 proposes fixed symptom lists and explicit thresholds, ICD-11 allows a greater degree of clinical judgement expanding symptoms descriptions and avoiding numerical cutoffs for diagnosis. ICD-11 emphasizes developmental context with a more flexible developmental framing, as shown by the age-of-onset criterion of "early to mid-childhood" as opposed to DSM-5 which explicitly requires the age of onset to be before the age of 12 years. Finally, while DSM-5 focuses on the frequency of symptoms and categorical criteria, ICD-11 emphasizes more on executive control deficits (and consequent impairments) ("Differences between ICD-11 and DSM-5 TR Criteria for ADHD," 2024; Gomez et al., 2023).

Symptoms of the disorder are summarised in Table 1.1, both according to DSM-5 and to ICD-11.

Table 1: DSM-5 symptoms for Inattention and Hyperactivity - Impulsivity

Inattention: Six or more of the following should be present
i. Failure to give close attention to details or often careless mistakes in schoolwork, work or other circumstances. ii. Difficulty sustaining attention in tasks. iii. Often does not seem to listen when spoken to directly. iv. Failure to follow through on instructions and/or failure to complete chores or tasks such as schoolwork, projects, etc. v. Difficulty in organising tasks and activities. vi. Avoidance or reluctance to take on tasks that require mental effort. vii. Often loses things important or necessary for tasks or activities. viii. Easy distraction by extraneous stimuli and/or unrelated thoughts. ix. Forgetful in daily activities.
Hyperactivity – Impulsivity: Six or more of the following should be present
i. Fidgeting, taping hands or feet, squirms in seat

ii.	Leave their seat without permission and/or in inappropriate moments, e.g., when in class or a work setting
iii.	Running, jumping, climbing excessively and in inappropriate places/timing
iv.	Difficulties in engaging in quiet activities
v.	Unable to stay still for an extended time - an urge to constantly moving
vi.	Excessive talking
vii.	Cannot wait for turn in conversations, blurs out answers or comments
viii.	Difficulty in waiting for one's turn, e.g., in lines
ix.	Frequently interrupt or intrude into other conversations

Table 2: ICD-11 symptoms for Inattention and Hyperactivity – Impulsivity.

ICD-11 symptoms for Inattention and Hyperactivity – Impulsivity.	
Inattention: Several symptoms of inattention that are persistent and sufficiently severe that have a direct negative impact on academic, occupational or social functioning are among the essential components. Symptoms are typically from the following clusters:	
i.	Having difficulty sustaining attention on tasks that do not provide a high level of stimulation or reward or require sustained mental effort; lacking attention to detail; making careless mistakes in school or work assignments; not completing tasks.
ii.	Being easily distracted by extraneous stimuli or thoughts not related to the task at hand; often seeming not to listen when spoken to directly; frequently appearing to be daydreaming or to have their mind elsewhere.
iii.	Losing things; being forgetful in daily activities; having difficulty remembering to complete upcoming daily tasks or activities; having difficulty planning, managing and organizing schoolwork, tasks and other activities.

Hyperactivity-impulsivity
Several symptoms of hyperactivity-impulsivity that are persistent and sufficiently severe that have a direct negative impact on academic, occupational or social functioning are among the essential components. These tend to be most evident in structured situations that require behavioral self-control. Symptoms are typically from the following clusters:
i. Showing excessive motor activity; leaving their seat when expected to sit still; often running about; having difficulty sitting still without fidgeting (younger children); displaying feelings of physical restlessness and a sense of discomfort with being quiet or sitting still (adolescents and adults). ii. Having difficulty engaging in activities quietly; talking too much. iii. Blurting out answers in school or comments at work; having difficulty waiting for their turn in conversation, games or activities; interrupting or intruding on others' conversations or games. iv. Having a tendency to act in response to immediate stimuli without deliberation or consideration of risks and consequences (e.g. engaging in behaviors with potential for physical injury; impulsive decisions; reckless driving).

Three presentations (formerly characterised as "types") of the disorder, are described on the basis of the intensity of the symptoms: (a) Predominantly inattentive – when symptoms of inattention are met but not those of hyperactivity-impulsivity, (b) predominantly hyperactive-impulsive – when symptoms of hyperactivity – impulsivity are met but not those of inattention and (c) Combined if both criteria of Inattention and Hyperactivity-Impulsivity are met (American Psychiatric Association, 2022; World Health Organisation, 2022).

Network and longitudinal analyses in large samples identify "being easily distracted", "having difficulty sustaining attention", "fidgeting" and "intrudes / interrupts" as central, highly connected symptoms across ages, genders, and ADHD presentations (Liu et al., 2022; Martel et al., 2021; Silk et al., 2019). Because of this substantial individual

variation in both the age of onset and the developmental course of ADHD (Franke et al., 2018; Martel et al., 2021), clinical characteristics must be defined with precision at different stages of life. It is reported that even in the same sub-type or ADHD presentation, the condition might present with great heterogeneity and variability which in addition might change over time (Janzen et al., 2024). Especially in adolescence, it should be kept in mind that while overall ADHD tend to be lower, functioning tends to be more impaired as concomitant difficulties like anxiety, aggression, and social and academic problems tend to surface (De Rossi et al., 2023; Sibley et al., 2010). Functional impairment, in all ages, varies across individuals with the diagnosis, adding to the highly heterogeneous nature of ADHD (Krieger et al., 2019; Luo et al., 2019; Núñez-Jaramillo et al., 2021).

The heterogeneous nature of ADHD is also evident in gender differences of clinical manifestations of the disorder, starting from the finding that the prevalence of ADHD in boys is higher than in girls (De Rossi et al., 2022). Boys tend to present more often with externalising symptoms – e.g. running and impulsivity, while girls more often present with internalising symptoms, such as inattentiveness and low self-esteem (Salari et al., 2023). These very differences might account for the increased likelihood of boys being referred more often for diagnosis and treatment compared to girls (De Rossi et al., 2022). Comorbidity and comorbid disorders are factors adding to the heterogeneity of ADHD and to the complexity of diagnosis and treatment (Luo et al., 2019). In children and adolescents, ODD and Conduct Disorder are among the most common comorbid conditions along with Learning Disorders and ASD (American Psychiatric Association, 2022; Medrano Nava et al., 2024; Tam et al., 2024).

2.3 ADHD in ICF

The ICF, developed by the WHO, is a biopsychosocial framework that provides a standardized way of understanding health, functioning, and disability. It considers the interaction between body functions and structures, activities, participation, and environmental and personal factors to provide a holistic view of an individual's functioning (World Health Organization, 2007). In OT, the ICF guides assessment and intervention by helping therapists understand how these factors influence a person's

ability to engage in meaningful daily activities and participate in society, supporting a client-centred approach to care.

In terms of the ICF, ADHD is described to present with a multidimensional functioning profile spanning body functions, activities and participation and contextual / environmental factors rather than as symptoms alone. The ICF core sets for ADHD were developed precisely to standardize this broader assessment across clinical, educational and research settings (Bölte et al., 2013, 2018b). Importantly, in ICF terms, an assessment of ADHD should not only recognise impairments, barriers and limitations but should also recognise and document strengths and supports that influence real-life functioning either as constraints or as facilitators of activities and occupations.

Table 3 below, summarises presents an overview of how ADHD-related characteristics align with ICF functioning domains, illustrating the multidimensional nature of ADHD across body functions, activity and participation, environmental influences and personal contextual factors.

Table 3: ADHD-related impairments according to ICF

ICF functioning domain	ADHD-related characteristics / difficulties / impairments
Body structures and functions	Impairments in attention, energy and drive. Impaired psychomotor, emotional, temperament / personality and sensory factors. Often reported alterations in brain structures. Cognitive – behavioural functioning difficulties.
Activities and participation	Commonly affected areas include school learning, communication, daily routines, self-care, community life, education, work/occupation, and leisure; ADHD is also associated with social, educational, and occupational difficulties
Environmental Factors	Family support, school context, social attitudes, accessibility, services, and other facilitators/barriers are repeatedly emphasized as shaping functioning

Personal factors	Personal factors are treated as important contextual influences, but the ICF does not provide a formal taxonomy for them; ADHD studies describe strengths and individual differences such as energy, creativity, hyper-focus, flexibility, resiliency, self-confidence, routines, and beliefs as relevant to functioning (Bölte et al., 2013; Simeonsson et al., 2014; World Health Organization, n.d.).

The ICF provides an internationally recognized structure for describing functioning – a description beyond symptoms – framing how ADHD affects an individual's participation and functioning in real-world.

2.4 Theoretical Models of ADHD

The aetiology and symptom profile of ADHD have been approached through multiple theoretical frameworks, each emphasising different cognitive, motivational, and neurobiological mechanisms. Rather than competing explanations, these models are best understood as complementary perspectives that together account for the heterogeneity observed in ADHD presentations. Early models focused on the core deficits of ADHD - executive dysfunction (ED) and behavioural inhibition (BI) difficulties – while more recent ones emphasize the interplay of genetic, environmental, neurocognitive and motivational factors (Killeen, 2019; Luo et al., 2019; E. J. S. Sonuga-Barke, 2005; Wang et al., 2025) This lack of a single, comprehensive model fuels the ongoing debates about classification of ADHD (categorical vs dimensional), core deficits and best practices for diagnosis and treatment (Sonuga-Barke et al., 2023).

To situate these debates, the following paragraphs review the main theoretical models of ADHD, illustrating how each one captures distinct – but partial - aspects of the disorder.

2.4.1 Executive Dysfunction and Behavioural Inhibition Models

Models focusing on ED and BI are closely linked to Russel Barkley's "unifying theory of ADHD", which conceptualises the disorder as a fundamental impairment in BI that disrupts higher-order self-regulatory and executive processes (Antshel, Hier, et al.,

2014; R. Barkley, 1997) Within this framework, ADHD arises from difficulties inhibiting prepotent responses, stopping ongoing behaviour and sustaining IC during delay periods – particularly in distracting contexts. These deficits in behavioural inhibition are understood to cascade into broader challenges in EF including WM, self-regulation and goal-directed behaviour (Isaac et al., 2024; Martella et al., 2020).

Deficits in IC are theorised to provoke secondary impairments in core EF components – WM, Internalisation of speech, self-regulation of affect, motivation and arousal as well as behavioural reconstitution (maintain goal-directed behaviour). Consequently, these deficits give rise to the characteristic symptoms of ADHD and to a pronounced difficulty in temporal processing, often found as "time blindness"(R. Barkley, 1997). Over time, updates to Barkley's model have positioned WM as a primary factor in the same hierarchical position as IC, giving the model greater power to predict ADHD symptoms through the motor control capacity variable (Panah et al., 2025).

In summary, Barkley's theory, as one of the most influential in ADHD, provides a mechanistic, cognitive-neurobiological account of ADHD, in which observable symptoms are interpreted as the downstream consequences of deficits in inhibition and EF. While highly influential, the model reflects a deficit-oriented conceptualisation of ADHD, a framing that has been critically reconsidered within neurodiversity-informed perspectives, which are going to be described in following sections.

2.4.2 The Cognitive-Energetic Model (CEM) of ADHD

Proposed by Sergeant (2000), the CEM framework explains ADHD as a disorder of state regulation arising from interactions among basic information-processing mechanisms, energetic or arousal systems, and top-down executive control (Isaac et al., 2024; Martella et al., 2020). ADHD is not attributed to a single, fixed cognitive deficit but its symptoms are believed to emerge from inefficient regulation of arousal, effort and activation across tasks and contexts. (J. Sergeant, 2000; E. Sonuga-Barke, Wiersema, et al., 2010). Children (and older individuals) struggle to regulate arousal/activation and effort to match demands, especially within contexts that are perceived as boring, slow or overly demanding (E. Sonuga-Barke, Wiersema, et al., 2010).

Core symptoms of ADHD – inattention and hyperactivity/impulsivity – are attributed to under–arousal and low activation and attempts to self-stimulate to cope with over – or under- arousal (Isaac et al., 2024; Martella et al., 2020; E. J. S. Sonuga-Barke et al., 2009). Dysregulation can "produce" both inattention (under-arousal, low activation) and hyperactivity/impulsivity (attempts to self-stimulate or cope with over- or under-arousal) (Bozhilova et al., 2018; Sergeant,2000).

The model proposes that behavioural performance is determined by the interaction of three hierarchical levels: (a) computational cognitive processes (including encoding, central processing and response organisation), (b) energetic factors comprising arousal, activation and effort and (c) a management or executive control system responsible for top-down regulation (J. Sergeant, 2000; J. A. Sergeant et al., 2003)..

Critically, the model emphasises that performance deficits emerge when there is a mismatch between an individual's energetic state and the demands of the task. This provides a possible explanation for the marked variability often observed in ADHD, whereby individuals may perform adequately or even exceptionally under conditions of high stimulation or immediate reward yet show significant impairment in low-arousal or sustained attention contexts (Bozhilova et al., 2018; Isaac et al., 2024; Martella et al., 2020).

Although the CEM retains a role for executive processes, it suggests that such impairments may be secondary to underlying energetic dysregulation, thereby offering a complementary perspective to ED models such as Barkley's. While the model has been influential in integrating cognitive and motivational accounts of ADHD, its empirical application has been limited by the difficulty of directly measuring energetic constructs such as effort and activation (J. A. Sergeant, 2005; Whitner, 2025).

2.4.3 Dual Pathway & Delay Aversion Models

The Dual Pathway Model proposed by Sonuga-Barke (2003) provides a theoretically integrative framework for explaining the heterogeneity of ADHD by identifying two partially dissociable developmental pathways that give rise to similar behavioural outcomes (Sonuga-Barke, 2003). Central to this model is the distinction between a cognitive/executive route and a motivational/reward-based route. The ED pathway conceptualises ADHD as primarily driven by deficits in IC and broader EF, including

WM and CF (E. J. S. Sonuga-Barke, 2003). These impairments are associated with dysfunction in fronto-dorsal striatal circuits and the mesocortical dopamine system, which are implicated in the regulation of goal-directed behaviour and top-down cognitive control (Nigg, 2005; Sonuga-Barke,2005). From this perspective, symptoms such as impulsivity, inattention, and disorganisation are understood as consequences of impaired self-regulation and deficient control over thoughts and actions.

In contrast, the delay aversion pathway emphasises motivational processes, conceptualising ADHD as a disorder partly characterised by an altered sensitivity to reinforcement contingencies (Nigg, 2005). Specifically, individuals according to this pathway exhibit a steeper delay-of-reward gradient, meaning that the subjective value of rewards decreases more rapidly as the delay to their receipt increases (Dalen et al., 2004; Sjöwall et al., 2013; Wilbertz et al., 2013). This motivational style is linked to fronto-ventral striatal regions, particularly the nucleus accumbens, and the mesolimbic dopamine system, which underpin reward processing and affective evaluation (Dalen et al., 2004; Fernández-Martín et al., 2025; Sjöwall et al., 2013). Importantly, delay aversion is not simply a preference for immediate rewards; rather, it reflects an active tendency to avoid or escape the negative emotional states—such as frustration or boredom—associated with waiting (Van Dessel et al., 2019). Behaviourally, this is manifested in a consistent choice of smaller, immediate rewards over larger, delayed alternatives, as well as deterioration in task performance under conditions involving delay and heightened emotional reactivity when delays are imposed (Wilbertz et al., 2013).

A key contribution of the Dual Pathway Model is its proposition that both pathways represent distinct, though not mutually exclusive, developmental routes within ADHD, potentially corresponding to different subtypes or profiles of the disorder (Nigg, 2005). These pathways may be associated with differing symptom patterns, neurocognitive deficits, and motivational characteristics, as well as distinct genetic and environmental influences. Empirical research provides support for this differentiation, including neuroimaging findings demonstrating atypical activation in regions such as the amygdala and prefrontal cortex in response to delay-related cues in individuals with ADHD, alongside structural variations (e.g., reduced amygdala volumes) that may mediate delay-related behaviours (Jiang et al., 2018; J. A. Sergeant, 2005; E. Sonuga-

Barke, Bitsakou, et al., 2010). By integrating cognitive and motivational perspectives, the model advances a more nuanced understanding of ADHD, highlighting the need for multidimensional assessment and suggesting that interventions may need to be tailored to target specific underlying mechanisms rather than adopting a one-size-fits-all approach.

2.4.4 Neurobiological Models

Neurobiological models conceptualise ADHD as a neurodevelopmental disorder arising from atypical brain maturation, altered neurotransmission, and dysfunction across distributed neural systems involved in attention, behavioural regulation, and reward processing (González-Madruga et al., 2022). Earlier biological accounts placed particular emphasis on fronto-striatal dysfunction and catecholaminergic abnormalities, especially in dopaminergic pathways, because these systems are centrally involved in executive control, motor regulation, and reinforcement processing (MacDonald et al., 2024). However, contemporary neurobiological models have moved beyond single-region and single-neurotransmitter explanations, increasingly framing ADHD as a condition involving multiple interacting brain circuits and network-level dysfunction, rather than a deficit localised to one discrete structure or transmitter system (Coastal, 2025; da Silva et al., 2023; The Neurobiology of ADHD, 2020). This shift is important because it better reflects the heterogeneity of ADHD and helps explain why individuals with the disorder may present with different constellations of cognitive, behavioural, and emotional difficulties.

One influential line of research within neurobiological models concerns the idea that ADHD is associated with delayed brain maturation rather than simply a fixed lesion or static abnormality (Gallo & Posner, 2016; Gehricke et al., 2017). In a well-known longitudinal neuroimaging study, cortical maturation in children with ADHD was found to follow a similar regional sequence to typical development, but with a marked delay in the attainment of peak cortical thickness across much of the cerebrum; this delay was especially pronounced in prefrontal regions implicated in attention, cognitive control, and motor planning (Norman et al., 2023; Shaw et al., 2007, 2013). Specifically, the median age at which 50% of cortical points reached peak thickness was reported as 10.5 years in the ADHD group compared with 7.5 years in controls (Shaw et al., 2007). This

maturational-delay account has been extended by large-scale structural imaging work showing that individuals with ADHD, particularly children, may also exhibit smaller subcortical volumes in regions such as the accumbens, amygdala, caudate, hippocampus, and putamen, with effect sizes tending to be stronger in childhood than adulthood (Norman et al., 2023; Shaw et al., 2007). Together, these findings support the view that ADHD is associated with altered developmental trajectories of both cortical and subcortical brain structures.

Functional neurobiological models further propose that ADHD involves abnormalities in the neural systems support EF, attention, timing, WM, emotion regulation, and reward-based decision-making (Rubia, 2018; Rueda et al., 2015). A major review of fMRI research reported that ADHD is associated with dissociable impairments across fronto-cingulo-striato-thalamic and fronto-parieto-cerebellar networks, including under-activation in regions involved in response inhibition, sustained attention, and WM (Rubia, 2018). The same review also noted abnormalities in orbital and ventromedial prefrontal as well as limbic regions, suggesting that neurobiological models must account not only for "cool" EF, but also for "hot" processes related to motivation and emotion control. In this sense, contemporary neurobiological models overlap with dual-pathway and motivational accounts of ADHD, because they indicate that the disorder cannot be reduced to ED alone (Rubia, 2018)

A further development in the field is the emergence of connectivity-based and large-scale network models of ADHD. These models argue that the disorder is increasingly best understood as a disorder of brain connectivity, particularly involving interactions between the default mode network and task-positive networks such as the fronto-parietal control, salience/ventral attention, and dorsal attention networks (Castellanos & Proal, 2012). Reviews of structural and functional connectivity studies indicate that one of the most replicable diffusion imaging findings is lower fractional anisotropy in the corpus callosum, while resting-state studies have reported altered connectivity within the DMN and between the DMN and fronto-parietal and salience systems (Castellanos et al., 2009; Gao et al., 2019; González-Madruga et al., 2022). A large meta-analysis of resting-state data further found that ADHD diagnosis was associated with less anticorrelation between the DMN and salience/ventral attention, somatomotor, and dorsal attention networks, findings that the authors interpreted as consistent with default

mode interference models of ADHD (Cortese et al., 2021). Importantly, that same study noted that effect sizes were small, which suggests that these neural differences are subtle and that no single connectivity signature can fully explain the disorder (Cortese et al., 2021).

Neurochemical models, especially those focusing on dopamine, remain highly influential within neurobiological accounts of ADHD, partly because first-line stimulant medications act on catecholaminergic systems. Yet recent reviews caution against equating ADHD with a simple or global hypodopaminergic state (MacDonald et al., 2024). A 2024 review concluded that there is evidence for the involvement of dopamine in ADHD, but only limited evidence that a hypo-dopaminergic state per se is a key explanatory mechanism (MacDonald et al., 2024) . That same review also notes that stimulant medications act on both dopamine and norepinephrine transporters, and that earlier critiques of dopamine-only models highlighted evidence favouring the noradrenergic system as well (MacDonald et al., 2024). Accordingly, current neurobiological models are better described as catecholaminergic and network-based, rather than purely dopaminergic, and they increasingly emphasise developmental stage, subgroup differences, and interactions with other neurotransmitter systems.

Overall, neurobiological models have made a major contribution to the understanding of ADHD by demonstrating that the disorder is associated with measurable differences in brain maturation, structure, function, and connectivity. At the same time, the literature also highlights important limitations: findings are often characterised by small effect sizes, methodological heterogeneity, under-representation of some subgroups (for example, females and unmedicated individuals), and a need for more longitudinal work to clarify developmental trajectories. For this reason, neurobiological models are perhaps most useful when integrated with cognitive, motivational, dimensional, and environmental accounts, rather than treated as stand-alone explanations. Such an integrative approach is more consistent with the current view of ADHD as a heterogeneous, multifactorial neurodevelopmental condition.

2.4.5 The Neurodiversity Paradigm

Models under the neurodiversity paradigm, treat ADHD and other conditions e.g. ASD and Specific Learning Disorders, as natural variations in human cognition and not

inherently as disorders (Kent, 2024; Vanderburg et al., 2024). Differences in attention, impulsivity and energy are seen as part of normal human diversity, and are compared to variations in personality or physical traits between individuals (Kent, 2024; Vanderburg et al., 2024). Within this view, challenges arise particularly in contexts that impose high demands on sustained attention, organisation, and delayed reward processing, highlighting the interaction between the individual and their environment.

Aligning with the Social Model of Disability (for an overview: (C. Barnes, 2019; Goering, 2015; Haegele & Hodge, 2016)), models within the Neurodiversity paradigm, argue that ADHD-related difficulties arise from a mismatch between the person and their environment (Filipe & Holroyd, 2026; J. Kent, 2024). The argument contrasts the medical-oriented approach which sees ADHD as a disorder located in the individual (due to brain dysfunctions). The neurodiversity assumption does not reject the aetiology or the biological causes of the disorder but rather the emphasis is on the emerging disabilities which are believed to be created from social contexts (Neurodivergent Test, 2025) . For example, difficulties with sustained attention or delayed reward processing become particularly salient in structured systems e.g. school-class or strict conventional work environments, which prioritise prolonged focus, temporal organisation and delayed outcomes (Helmold & Martensen, 2025; Neurodiversity: Understanding ADHD, Autism, Dyslexia & Brain Differences | IPsychology, n.d.). On the other hand, within more dynamic or stimulus-rich context, the same traits might be of minor importance or might even be adaptive or advantageous (Fung, 2024; Kent, 2024).

Neurodiversity models emphasise a strengths-based understanding of ADHD (Fung, 2024; Kent, 2024). While acknowledging the presence of genuine challenges in areas such as EF, emotional regulation and organisation these models also highlight associated cognitive and behavioural strengths (Fung, 2024; Vanderburg et al., 2024). Individuals with ADHD are frequently described as demonstrating heightened creativity, rapid idea generation, responsiveness to novel stimuli, and the capacity for intense task engagement under conditions of interest or urgency (Kornblau & Robertson, 2021). Such characteristics are conceptualised not as compensatory anomalies, but as integral aspects of an alternative cognitive style. Consequently, the goal of intervention shifts from normalisation towards the optimisation of functioning

through the alignment of tasks, environments, and individual strengths (Kornblau & Robertson, 2021).

Importantly, neurodiversity models do not reject the existence of difficulty or impairment in ADHD (Helmold & Martensen, 2025; Nicolaidis, 2012) but rather reframe their interpretation and implications. The paradigm supports the provision of support and intervention where necessary, particularly when individuals experience distress or reduced quality of life (Helmold & Martensen, 2025). However, such interventions are understood as facilitating adaptation and well-being, rather than correcting a fundamentally "defective" cognitive system (Filipe & Holroyd, 2026; Nicolaidis, 2012; Sedgwick-Müller & Müller-Sedgwick, 2025). In this sense, neurodiversity approaches complement rather than entirely replace cognitive–neurobiological models, offering an additional interpretive layer that situates ADHD within broader social, ethical, and contextual frameworks (Filipe & Holroyd, 2026; Kornblau & Robertson, 2021; Sedgwick-Müller & Müller-Sedgwick, 2025). This shift has important implications for how ADHD is theorised, researched, and supported, particularly in moving towards more inclusive and person-centred models of care.

The following section integrates major theoretical models of ADHD, highlighting both their shared assumptions and their conceptual divergences across levels of explanation.

2.5 Models of ADHD: critical discussion

As demonstrated above, research offers several ways of modelling ADHD, spanning biology, cognition, development and context. The theoretical landscape reflects a progression from unitary, deficit-based explanations towards increasingly integrative and multidimensional approaches.

Early models, particularly those grounded in ED and behavioural regulation, such as Barkley's framework, have been highly influential in conceptualising ADHD as a disorder of impaired IC (R. Barkley, 1997). This model offers a coherent mechanistic account linking behavioural symptoms to disruptions in EF, including WM and self-regulation (R. Barkley, 2010; Panah et al., 2025). However, a key limitation lies in its relative inability to account for the variability of ADHD presentation across contexts and individuals. Not all individuals with ADHD exhibit consistent executive

impairments, and performance often improves under conditions of high motivation or stimulation, suggesting that ED alone cannot fully explain the disorder.

The Cognitive–Energetic Model CEM addresses some of these limitations by reconceptualising ADHD as a problem of state regulation rather than cognitive capacity (J. Sergeant, 2000; J. A. Sergeant, 2005). By introducing the constructs of arousal, activation, and effort, the model provides a plausible explanation for intra-individual variability in performance and emphasises the role of task demands in eliciting impairment (J. A. Sergeant, 2005). Nevertheless, the explanatory strength of the CEM is tempered by methodological challenges, particularly the difficulty of operationalising and measuring energetic constructs such as "effort." Additionally, while the model successfully explains variability, it remains less precise in identifying the proximal cognitive mechanisms through which energetic dysregulation translates into specific behavioural outcomes, leading to concerns about its empirical specificity.

The dual pathway and delay aversion models further extend theoretical understanding by incorporating motivational processes into the explanation of ADHD. These models represent a critical shift away from purely cognitive interpretations, proposing that alterations in reward processing and intolerance of delay constitute a distinct pathway contributing to ADHD symptomatology (E. J. S. Sonuga-Barke, 2002, 2003). This perspective provides a compelling account of behaviours such as impulsivity and preference for immediate rewards, and is supported by evidence linking these patterns to mesolimbic dopaminergic systems (Ikegami et al., 2026). However, the dual pathway model has also been critiqued for potentially oversimplifying ADHD into discrete subtypes and for not fully accounting for the overlap between cognitive and motivational impairments. Subsequent extensions proposing additional pathways (e.g. temporal processing deficits) highlight the growing recognition of ADHD as a heterogeneous condition rather than a singular syndrome.

Neurobiological models offer an essential explanatory foundation by identifying structural and functional differences in neural systems implicated in attention, executive control, and reward processing (Coastal, 2025). Research consistently implicates fronto-striatal and fronto-cerebellar networks, as well as dysregulation in dopaminergic and noradrenergic neurotransmission, in the manifestation of ADHD symptoms (Coastal, 2025; Curatolo et al., 2010; da Silva et al., 2023; MacDonald et al., 2024). These

models strengthen the scientific validity of ADHD by situating behavioural differences within measurable neurodevelopmental processes. However, their explanatory scope is limited by the complexity and variability of findings; no single neural abnormality has been identified as both necessary and sufficient for ADHD, reinforcing the notion that the disorder reflects distributed network differences rather than discrete lesions. Furthermore, neurobiological accounts often struggle to explain why similar neural profiles can produce markedly different behavioural outcomes across individuals and contexts.

In contrast to these models, the neurodiversity paradigm introduces a critical conceptual shift by challenging the assumption that ADHD necessarily constitutes a disorder. Instead, it frames ADHD as a variation in cognitive functioning, with both strengths and challenges emerging depending on environmental context (Vanderburg et al., 2024). This perspective contributes significantly to the ethical and social understanding of ADHD by reducing stigma and emphasising the role of societal structures in shaping disability. However, it has also been criticised for potentially underemphasising the severity of impairment experienced by some individuals, particularly those with significant functional difficulties. As such, while neurodiversity offers an important corrective to deficit-based models, it does not fully replace the need for mechanistic explanations of cognitive and neurobiological differences.

Taken together, these models illustrate that ADHD cannot be adequately captured by any single explanatory framework. Rather, it is best understood as a multidimensional construct involving interacting cognitive, motivational, energetic, and neurobiological processes, whose functional implications are shaped by environmental and social factors. The continued development of integrative models, which combine mechanistic precision with contextual sensitivity, represents a key direction for future research. Such an approach allows for a more nuanced understanding of ADHD that accommodates both its biological basis and its variability across individuals and contexts, bridging the gap between clinical, cognitive, and neurodiversity perspectives.

2.5.1 Adherence to a model: Implications for practice

The theoretical framing of ADHD—whether grounded in a biomedical or neurodiversity paradigm—has direct implications for the design and implementation of interventions

for adolescents. As highlighted in the literature, e.g. by (Dallman et al., 2022; Nicholson & Lee, 2026; E. Sonuga-Barke & Thapar, 2021) the paradigm adopted by practitioners and researchers shapes not only the understanding of ADHD, but also the methodological and practical approaches considered appropriate. This includes the selection of methodologies, treatment approaches and importantly the beneficiaries of such work. In clinical and applied contexts, this becomes particularly consequential. Biomedical perspectives tend to prioritise symptom reduction and impairment-based interventions, enabling allocation of healthcare resources and support based on diagnosis (Nicholson & Lee, 2026). On the other hand, neurodiversity approaches shift attention towards lived experience, highlight strengths of the condition and interventions are turned towards changes in social context, and removing structural barriers influencing functioning (Nicholson & Lee, 2026).

In practice, these differing assumptions lead to contrasting but increasingly complementary approaches to intervention. A predominantly medical framework emphasises evidence-based treatments, including pharmacological interventions and structured behavioural strategies, aimed at reducing impairment and improving functional outcomes (Cortese et al., 2022). In contrast, neurodiversity-informed approaches advocate for a broader, contextual form of support, highlighting the importance of reducing stigma, addressing exclusionary environments, and implementing adaptations within educational, occupational, and social systems(Filipe & Holroyd, 2026; Friedel et al., 2025; van der Oord et al., 2026). Rather than focusing solely on altering the individual, these approaches prioritise adjustments to the surrounding environment and promote strengths-based perspectives that can improve self-concept and quality of life (Filipe & Holroyd, 2026; Fung, 2024). Importantly, emerging literature suggests that these perspectives need not be mutually exclusive, as combining symptom-focused interventions with environmental adaptation may provide the most effective support (Goering, 2015).

However, the coexistence of these frameworks also introduces important tensions and challenges for practice. The biomedical construction of ADHD may facilitate access to diagnosis, treatment, and resources, but may simultaneously reinforce deficit-focused narratives and negative language associated with dysfunction and disorder (Cortese et al., 2022). Conversely, neurodiversity perspectives, while promoting acceptance and

identity, may risk underestimating the severity of impairment experienced by some individuals or restricting access to evidence-based treatment if ADHD is no longer framed as a medical condition (Nicholson & Lee, 2026; E. Sonuga-Barke & Thapar, 2021). This creates a practical dilemma, particularly in cases of more severe ADHD presentations, where significant risks and functional impairments persist regardless of environmental modification. As such, a balanced approach is required, one that acknowledges both the biological underpinnings of ADHD and the role of social context in shaping its expression and impact.

From a research perspective, there seems to be a growing need to move beyond reductionist, disorder-focused models towards more integrative and contextually sensitive approaches (Cortese et al., 2022; Shah & Holmes, 2023). Current research has been dominated by neurobiological and clinical frameworks, with comparatively limited focus on social factors, stigma, and lived experience (Cortese et al., 2022). Emerging directions emphasise the importance of incorporating neurodiversity-informed perspectives, including participatory research designs, transdiagnostic approaches, and the study of ADHD within broader neurodivergence spectra. Future research priorities therefore include capturing the heterogeneity of ADHD, better understanding individual variation, and evaluating how different frameworks influence both outcomes and access to support (Shah & Holmes, 2023; E. Sonuga-Barke & Thapar, 2021). Overall, the integration of medical and neurodiversity perspectives presents an opportunity to develop more comprehensive theories and practices that reflect both the biological and socio-contextual realities of ADHD (Sonuga-Barke et al., 2023).

2.6 Prevalence and developmental trajectory

The International Consensus Statement of the World Federation of ADHD declares that "ADHD occurs throughout the developed and developing world", and while it is more often diagnosed today than a few decades ago, it has not actually become more common (Faraone et al., 2021). Global prevalence is estimated at 8% in children and adolescents, with boys being twice as affected as girls (Ayano et al., 2023; Salari et al., 2023).

Notably, this prevalence is not evenly distributed across genders, with available research consistently documenting a significant disparity between boys and girls, both

in overall rates and across ADHD presentations. A large umbrella review of meta-analyses (Ayano et al., 2023), encompassing thirteen reviews with a total of 3,277,590 participants, found an overall prevalence of 10% for boys and 5% for girls — a 2:1 ratio that remained consistent across all ADHD subtypes. Specifically, for the predominantly inattentive presentation, prevalence was 4.05% for boys versus 2.21% for girls; for the hyperactive-impulsive presentation, 3.61% versus 1.5%; and for the combined presentation, 3.63% versus 1.52% (Ayano et al., 2023).

Regarding age-related trends, prevalence appears to decline across development. Estimates indicate a rate of 7.6% among children aged 3–12 years and 5.6% among adolescents aged 12–18 years (Salari et al., 2023), while for adults, prevalence drops further to approximately 2–3% (Popit et al., 2024; Song et al., 2021) - a figure corroborated by the World Federation of ADHD, which reports 2.5% for adults and 5.9% for youth (Faraone et al., 2021). Longitudinal evidence further clarifies this trajectory: only 15–20% of individuals diagnosed in childhood continue to meet full diagnostic criteria in adulthood, while an additional 50% present with subthreshold yet impairing symptoms (Franke et al., 2018; Norman et al., 2023).

While earlier conceptualisations regarded ADHD as a condition confined to childhood, contemporary research recognises it as a lifelong neurodevelopmental disorder that emerges in early childhood and often persists into adulthood and older age, albeit in evolving forms. Over time, both symptom presentation and patterns of comorbidity tend to change, leading to corresponding shifts in functional impairment. Longitudinal evidence indicates high rates of symptomatic persistence, ranging from approximately 60% to 86%, although the persistence of the full diagnostic syndrome is observed in a smaller proportion of individuals (Cherkasova et al., 2022; R. Di Lorenzo et al., 2021; Jiménez-Muñoz et al., 2025).

Importantly, the developmental course of ADHD is not characterised by a single, uniform trajectory but rather by heterogeneous longitudinal pathways that differ across individuals. Research has demonstrated substantial variability, with some individuals exhibiting stable symptom levels, others showing a reduction in symptoms over time, and some even demonstrating increasing symptom severity (Vos et al., 2022). More specifically, distinct developmental trajectories—such as ascending-high, stable-low, and descending-medium patterns—have been identified in children and adolescents,

with neural mechanisms, particularly those involving attention-related brain networks, playing a key role in shaping these trajectories (Wang et al., 2024). Beyond early symptom severity, a range of factors including genetic predispositions, demographic characteristics, and clinical features further contribute to the differentiation of these developmental pathways (Cherkasova et al., 2022; Vos et al., 2022).

2.7 Executive Functions in ADHD

2.7.1 Definition and overview

Contemporary theoretical models of ADHD increasingly emphasise underlying cognitive mechanisms as central to understanding the disorder's aetiology and expression. Among these, EF—a set of higher-order cognitive processes that support goal-directed behaviour, self-regulation, and adaptive functioning (Friedman & Miyake, 2016; Miyake & Friedman P, 2012)—have emerged as a key explanatory framework. These processes are primarily mediated by the prefrontal cortex and related descending brain systems (Berenguer et al., 2018). According to Miyake et al. (2000), EF can be understood as comprising three core constructs: (a) shifting between tasks, (b) updating and monitoring WM representations, and (c) inhibition of dominant or prepotent responses.

Diamond (2013) suggests that these three core abilities— WM, IC and CF —form the basis for higher-level EF, such as planning, decision making, and complex problem solving. Additionally, some researchers advocate for a broader definition of EF, including additional cognitive skills such as planning, impulse control, attention, judgement, and decision making (Logue & Gould, 2014). Within this context, "updating and monitoring of WM" is often referred to simply as "WM," while "shifting" is also known as "mental flexibility" or "CF." These terms are used interchangeably in the literature.

Seminal work by Miyake and colleagues (Friedman & Miyake, 2016) has been instrumental in shaping the understanding of EF as core cognitive processes underpinning self-control and self-regulation. These processes are crucial not only for everyday adaptability but also for understanding cognitive dysfunctions (Miyake & Friedman P, 2012). A key theoretical proposition from Miyake and Friedman (2012) is

the "unity and diversity" framework, which posits that EF components share a common underlying capacity (unity) while also maintaining distinct functional characteristics (diversity). This framework has informed the development of nuanced assessment tools and targeted interventions.

From a functional perspective, EF comprises partially separable but interacting components— especially IC, WM and CF —that support learning, planning, decision making and participation in social interactions and playing (Josman & Meyer, 2019). Together, they underlie self-regulation, adaptation, and independence in virtually all aspects of everyday life. They are essential for managing activities of daily living and goal-directed behaviour (Verreckt et al., 2021). Disruptions in these processes can therefore have pervasive effects across multiple domains of functioning (Fogel et al., 2020).

Within the field of OT, EF is conceptualised not only as a set of cognitive processes but as these processes being foundational in enabling effective occupational performance, participation and self-management (Fogel, 2022; Josman & Meyer, 2019). EF support the organisation of daily routines, the engagement in academic tasks, regulation of social behaviour and adaptation to changing environmental demands (Fogel, 2022; Verreckt et al., 2021). From an OT perspective, EF difficulties are understood as barriers that disrupt the smooth execution of occupations, limit independence and reduce participation in meaningful and age-appropriate activities (Akyurek et al., 2024; Andersen et al., 2024; Lyhne et al., 2021).

Many influential models, including those focusing on IC, delay aversion, and cognitive regulation, converge in highlighting deficits in EF as core contributors to the behavioural and functional manifestations of ADHD. Consequently, examining EF provides a critical bridge between theoretical conceptualisations and the observable difficulties experienced by individuals with ADHD in everyday life. This section therefore reviews the nature, development, and impairment of EF in ADHD, with particular emphasis on their role in shaping developmental outcomes and functional performance.

2.7.2 Core components of EF

The three primary EF components as proposed by Friedman & Miyake (2016) can be described as follows:

Inhibitory Control refers to the ability to suppress automatic or dominant responses and distractions, including emotional impulses that interfere with goal-directed behaviour (Rodríguez-Nieto et al., 2022; Verreckt et al., 2021). Dominant responses reflect habitual or well-learned behavioural tendencies (eg, actions that a person typically performs in familiar situations) (Colautti et al., 2025; Urben et al., 2014). On the other hand, prepotent responses are actions strongly triggered by immediate environmental stimuli and are therefore highly likely to occur unless actively inhibited (Colautti et al., 2025; Urben et al., 2014). Effective IC requires suppressing both types of responses, enabling individuals to pause, modulate, or redirect behaviour rather than react impulsively (Urben et al., 2014).

As a core EF, IC has a crucial role in self-control or self-regulation. It supports resisting temptations and managing distractions, preventing engagement in risky and dangerous actions. Further, IC is essential for maintaining focus during tasks that demand sustained attention, such as learning in class, driving or operating machinery (R. Barkley, 1997; Gestsdottir et al., 2022; Hyland-Monks et al., 2018; Toharudin et al., 2019). Beyond behavioural restraint, IC enables individuals to delay gratification and preserve task goals over time, prioritising long-term outcomes over immediate impulses (R. Barkley, 1997; Gestsdottir et al., 2022). In this way, IC contributes to the broader system of self-regulation that supports adaptive functioning across academic, social and everyday contexts.

Working memory is the ability to hold and manipulate information for a limited time and as long as this is useful for the task-in-hand (e.g. following directions or keeping in mind the data a teacher gives for the solution of a maths problem) (S. F. Ahmed et al., 2022; Friedman & Miyake, 2016). It enables individuals not only to retain information temporarily but also to transform it, integrate it with prior knowledge and use it to guide behaviour (Baddeley, 2012). This dual function of maintaining and manipulating information allows a student to follow multi-step instructions, keep numerical or verbal

information in mind while solving problems, and mentally track the steps required to complete academic tasks and homework (Bergman-Nutley & Klingberg, 2014).

WM is considered a central EF and, as such, supports a wide range of higher-order cognitive processes, including learning, reasoning, problem solving, planning and organisation, and self-regulation (S. F. Ahmed et al., 2022; Matotek, 2025; Skalaban et al., 2022). It can be seen as the mental workspace needed to coordinate complex tasks, shift between tasks, and maintain goal-relevant information in the face of distractions. WM also contributes to self-regulation by enabling individuals to hold rules, strategies and behavioural expectations in mind, supporting adaptive decision-making and the inhibition of irrelevant or impulsive responses (Baniqued et al., 2015; Cybele Raver & Blair, 2016; Maraver et al., 2016; Matotek, 2025; Whitney et al., 2004).

Cognitive flexibility (shifting) is the ability to shift focus or thoughts and to adapt behaviour when situations change (Miyake & Friedman P, 2012; Rodríguez-Nieto et al., 2022; Theodoraki et al., 2020). It enables individuals to disengage from a previously relevant mental set and adopt a new one, supporting adaptive responses when routines are disrupted, tasks require transitions, or alternative strategies become necessary (L. Y. Lee et al., 2024). CF is central to navigating dynamic environments, as it allows individuals to reinterpret information, adjust plans and shift perspectives when circumstances change unexpectedly (ScienceDirect, n.d.). In academic life, it supports reading and maths and leads to better academic performance (Dajani & Uddin, 2015; L. Y. Lee et al., 2024; Rodríguez-Nieto et al., 2022; ScienceDirect, n.d.).

Conversely, difficulties in CF can lead to rigid thinking, perseveration and challenges in adapting to new academic demands, highlighting its importance as a core determinant of successful participation in school occupations (Indira et al., 2026; L. Y. Lee et al., 2024; Wixted et al., 2016).

2.7.3 EF in developmental, clinical and OT contexts

EF develop progressively across childhood and adolescence, paralleling the maturation of prefrontal brain networks (van Rooij et al., 2015). This developmental trajectory renders adolescence a critical period for the consolidation of executive skills, particularly in relation to increasing academic demands, autonomy, and social complexity (Bian et al., 2025; Gordon & Hinshaw, 2020; Serpell & Esposito, 2016)

Early executive abilities, such as basic IC and attentional regulation, begin to appear in the preschool years; however, more complex functions—including planning, organisation, and abstract reasoning—develop progressively throughout the school years and into adolescence (Best & Miller, 2010; Thompson & Steinbeis, 2020).

Adolescence represents a particularly critical developmental period for EF, as these higher-order cognitive processes continue to mature well into late adolescence and early adulthood (Friedman et al., 2016). During this stage, individuals are required to manage increasingly complex academic demands, navigate evolving social relationships, and exercise greater autonomy in daily life, all of which rely heavily on executive capacities such as planning, organisation, and self-regulation (Ahmed et al., 2019; Diamond, 2013). These escalating demands place significant pressure on executive systems, particularly in domains such as time management, emotional regulation, and decision-making (Diamond, 2013).

At the same time, ongoing neurodevelopmental changes—characterised by continued maturation of prefrontal cortical regions alongside heightened sensitivity of reward-related socioemotional systems—may contribute to increased variability in self-regulation and a greater propensity for risk-taking behaviour (Hofmann et al., 2012; Ogilvie et al., 2020; Pas et al., 2021). This developmental imbalance, often described within dual-systems models, reflects the asynchronous maturation of cognitive control and reward-processing systems (Shroff et al., 2023; Shulman et al., 2016; Steinberg & Chein, 2015).

Consequently, even typically developing adolescents may exhibit inconsistencies in executive performance, while those with vulnerabilities in EF, such as individuals with ADHD, may experience more pronounced and persistent difficulties (Shroff et al., 2023; Shulman et al., 2016; Steinberg & Chein, 2015).

From a clinical perspective, ED is a transdiagnostic feature observed across a range of neurodevelopmental and psychiatric conditions (Bloemen et al., 2018; Carvalho, 2026; Harden et al., 2020; L. M. McGrath et al., 2016). In neurodevelopmental disorders such as ADHD and ASD, impairments in executive processes are commonly reported and are associated with significant functional limitations (M. A. Barnes, 2023; Gestsdottir et al., 2022).

Beyond neurodevelopmental conditions, EF impairments are also implicated in a range of emotional and behavioural difficulties. Reduced executive control has been associated with internalising disorders, such as anxiety and depression, particularly during adolescence—a developmental period marked by increased emotional sensitivity and regulatory demands (Han et al., 2016). Moreover, in ADHD, co-occurring conditions such as ODD and conduct disorder have been linked to specific EDs, particularly in IC and decision-making processes (Lawson et al., 2015). These findings underscore the role of EF not only in cognitive performance but also in emotional and behavioural regulation.

Importantly, EF are closely tied to functional outcomes in everyday life (O. Fisher et al., 2022; Mousavi et al., 2025). They underpin the ability to initiate, organise, and complete tasks; manage time effectively; regulate emotions; and engage in socially appropriate behaviour (Diamond, 2013; Josman & Meyer, 2019). In educational contexts, executive processes are essential for sustaining attention, following instructions, completing assignments, and adapting to changing task demands. In social contexts, they support perspective-taking, impulse control, and adaptive communication (Best & Miller, 2010; David et al., 2017; Diamond, 2013; Prencipe et al., 2011; Turgay et al., 2012). Consequently, impairments in EF are strongly associated with difficulties in academic achievement, social participation, and independent living (David et al., 2017; Prencipe et al., 2011).

From an applied perspective, these developmental and clinical considerations reinforce the importance of targeting EF during adolescence, particularly for individuals with ADHD. Given the interaction between ongoing brain maturation, increasing environmental demands, and functional expectations, adolescence represents a critical window for intervention (Lambez et al., 2020; Shaw et al., 2013; Sibley et al., 2025). Interventions that support the development of executive skills, while simultaneously addressing their application in real-world contexts, have the potential to produce meaningful improvements in participation, autonomy, and overall QoL (Ramos-Galarza et al., 2024; Ramos-Galarza & Pérez-Salas, 2021; Rueda et al., 2021; Veloso et al., 2020).

While EF impairments may not be universally present in all individuals with ADHD (Miller et al., 2012), ADHD symptoms—such as distractibility, impulsivity, difficulty

sustaining attention, and challenges in planning and organisation— seem to map directly onto executive domains including WM, IC, CF, and goal-directed planning (Andersen et al., 2025; R. A. Barkley, 2022; Knapp & Morton, 2017). This perspective underscores the ecological validity of interventions targeting EF, as improvements in these cognitive structures are likely to translate into meaningful reductions in ADHD-related difficulties in everyday life (Rapport et al., 2013).

Several authors, therefore, recognise the need to treat difficulties in EF, as a crucial aspect of the management of ADHD (Gunzenhauser & Nückles, 2021; Ramos-Galarza & Pérez-Salas, 2021; Rueda et al., 2021; Veloso et al., 2020). Training of EF aims in the improvement of real-life goal attainment, like the enhancement of academic participation and learning (Gunzenhauser & Nückles, 2021). This is supported by the notion that focusing on neuropsychological processes (e.g. EF) when treating ADHD, is of crucial importance due to the combination of these being associated both with symptoms of ADHD and with other functional impairments in their own right (even when ADHD is not present) (Cortese et al., 2015; Sibley et al., 2025).

From an OT perspective, when EF are impaired, adolescents may struggle with task initiation, time management, emotional and behavioural regulation and independent living (David et al., 2017; Fogel, 2025; Fogel et al., 2020; Prencipe et al., 2011). These occupational consequences highlight the need for interventions that not only strengthen EF but also embed cognitive training within a meaningful, real-world context. This rehabilitation-oriented view directly informs the development of the MOTI, which integrates EF training with occupation-based academic tasks and contextual supports, ensuring that cognitive gains translate into improved participation, functional independence and everyday performance.

Within the combined PEOP–MOHO–ICF conceptualization adopted in this study, EF is understood as a set of person-level cognitive capacities that interact dynamically with environmental demands and occupational contexts to shape adolescents' participation in everyday activities. The unity-and-diversity model proposed by Friedman and Miyake (2016) identifies three core EF components outlined above.which together support goal-directed behaviour and adaptive engagement in meaningful occupations.

From a MOHO perspective, IC contributes to volitional regulation and the capacity to sustain engagement in chosen activities, while within the ICF it aligns with mental

functions that support self-regulation. In everyday occupational contexts, IC enables adolescents to resist distractions, delay gratification, and maintain focus during academic tasks or other goal-directed activities (R. A. Barkley, 1997, 2010; Hyland-Monks et al., 2018; Toharudin et al., 2019). Within PEOP, difficulties in IC can disrupt the alignment between person factors and environmental expectations, particularly in settings with high cognitive or behavioural demands.

WMin MOHO terms, supports performance capacity, enabling adolescents to manage the cognitive load required for learning, problem-solving, planning, and organisation. Within the ICF, it corresponds to higher-level cognitive functions essential for academic participation. In the PEOP model, WM is central to meeting occupational demands such as following multi-step instructions, completing assignments, and managing school materials. Difficulties in WM can therefore directly affect participation in academic, social, and self-management occupations (Ahmed et al., 2022; Matotek, 2025; Skalaban et al., 2022).

Finally, within MOHO, CF supports adaptive patterns of habituation and the ability to modify routines when faced with unexpected demands. In the ICF, it aligns with mental adaptability functions, while in PEOP it facilitates the negotiation of changing occupational demands and environmental conditions. CF contributes to perspective-taking, switching between subjects or tasks, adjusting plans, and managing transitions in academic contexts, all of which support successful participation and academic performance (Dajani & Uddin, 2015; Lee et al., 2024; Rodríguez-Nieto et al., 2022).

Together, these EF components illustrate how person-level cognitive capacities (MOHO, ICF) interact with environmental expectations and occupational demands (PEOP) to influence adolescents' participation in meaningful, age-appropriate activities. Their relevance intensifies during adolescence, when academic complexity increases and expectations for autonomous regulation expand. This makes EF a critical construct for understanding participation challenges and for designing interventions that are ecologically valid, developmentally appropriate, and grounded in the integrated PEOP–MOHO–ICF framework.

2.8 Impact on Quality of Life (QoL)

Beyond the core symptoms of inattention and hyperactivity, ADHD is associated with a significantly elevated risk in social functioning and interpersonal relationships, elevated risks to physical health, educational and occupational underachievement, behavioural difficulties and a substantially increase likelihood of psychiatric comorbidities across the lifespan (French et al., 2024; Wehmeier et al., 2010). The disorder is therefore linked to wide-ranging consequences for individuals' overall functioning and well-being, ultimately compromising overall QoL (Wanni Arachchige Dona et al., 2023).

The impact of ADHD on QoL can be observed throughout the lifespan; however, the extent of impairment may vary depending on factors such as access to treatment, symptom severity, age, and perspective (e.g. parent versus self-report) (Wanni Arachchige Dona et al., 2023; Yang et al., 2013). Furthermore, emerging evidence suggests that treatment, targeted interventions, and supportive environments may mitigate some of these adverse outcomes (D. R. Coghill et al., 2017; J et al., 2015; Mikami et al., 2022; Pehlivanidis, A.; Spyropoulou, A.; Galanopoulos, A.;Papachristou, C.A. & Papadimitriou, 2012; Senior et al., 2020).

Social functioning and interpersonal relationships are frequently impaired. ADHD can significantly affect communication and relationship quality, as core symptoms—such as inattention, impulsivity, and emotional dysregulation—often lead to misunderstandings, conflict, and social rejection (Becker et al., 2012; Mikami et al., 2022). These challenges may result in patterns of social withdrawal and emotional distress, thereby increasing the risk of anxiety and depression (Becker et al., 2012). From childhood, where peer rejection and bullying are common, through adolescence and adulthood, individuals with ADHD often experience persistent difficulties in establishing and maintaining stable friendships and romantic relationships (Simmons & Antshel, 2021; Wiener, 2023).

Emotional dysregulation constitutes another important area of concern. Often manifested as disproportionate emotional responses, frequent and unpredictable mood shifts, and heightened impulsivity, emotional dysregulation represents a persistent impairment from childhood through adulthood. These difficulties can adversely affect the ability to maintain stable relationships in both social and vocational contexts,

thereby reducing QoL (Ben-Dor Cohen et al., 2021; Biele et al., 2022; Serey et al., 2025; van Stralen, 2016).

In addition, risks to general physical health are elevated among individuals with ADHD. Evidence indicates higher prevalence rates of conditions such as obesity, sleep disorders, poor oral health, cardiovascular and respiratory diseases, and diabetes (Cortese et al., 2016; Garcia-Argibay et al., 2023; Laugesen et al., 2017; Nigg, 2013; Wanni Arachchige Dona et al., 2023). ADHD is also associated with an increased risk of mortality due to unnatural causes, including driving-related incidents, accidental injuries, and criminal activities (Barbaresi et al., 2013; Dalsgaard et al., 2015; French et al., 2024).

Unmanaged ADHD symptoms may hinder socio-economic attainment in adulthood, contributing to lower educational achievement, increased job instability, and broader systemic barriers (Jennum et al., 2025; Mohan et al., 2026; Russell et al., 2014). Furthermore, individuals with ADHD may be more prone to engaging in antisocial or risky behaviours, often driven by impulsivity, emotional instability, and difficulties in planning and decision-making (Retz et al., 2021; Yu et al., 2024). Although most individuals with ADHD do not engage in criminal activity, the condition is disproportionately represented within prison populations (Baggio et al., 2018). This risk is further exacerbated when ADHD co-occurs with conditions such as conduct disorder, ODD, and substance misuse, which can intensify behavioural challenges (Fischer et al., 2005; Fletcher & Wolfe, 2009; Retz et al., 2021; Yu et al., 2024).

Psychiatric comorbidities represent a major implication for affected individuals. There is a well-established correlation between ADHD and substance use disorders, mood and anxiety disorders, as well as other neurodevelopmental conditions (American Psychiatric Association, 2022; Wanni Arachchige Dona et al., 2023). These comorbidities substantially reduce QoL and often lead to significant functional, psychosocial, and economic impairments (Cuffe et al., 2020; Katzman et al., 2017; Sultan et al., 2021; Yang et al., 2013). The presence of multiple conditions increases the overall burden of disease, complicates treatment, and adversely affects all domains of daily functioning, including academic and/or vocational performance, emotional regulation, and social participation (Anker et al., 2018; European Network Adult ADHD – Impact of Psychiatric Comorbidities on Adults with ADHD, n.d.).

There is also evidence suggesting that individuals with ADHD exhibit higher rates of non-suicidal self-injury and suicidal behaviour. Traits such as impulsivity and emotional instability further increase vulnerability to unplanned self-harm, highlighting the substantial burden of the disorder on overall well-being (French et al., 2024; Garas & Balazs, 2020; Levy et al., 2020; Mayes et al., 2015; Swanson et al., 2014).

In summary, ADHD is a condition that exerts a pervasive and multifaceted impact on QoL across all stages of development, impairing critical aspects of daily functioning and well-being. The burden is further intensified by the presence of comorbidities and increasing social demands. These findings highlight the importance of adopting a holistic, lifespan-oriented approach to management—one that extends beyond the reduction of core symptoms to address broader functional outcomes and the challenges of everyday living.

2.9 Impact on daily living functionality

Participation in meaningful occupations - everyday activities with meaning and purpose, that people need, want and are expected to do- is fundamental to human health, well-being and identity (Hinojosa et al., 1997; WFOT, 2012). Even more, an occupation is any activity that people do to fill their time and give meaning to their lives (Hinojosa et al., 1997b; Ishikawa et al., 2024). They are essential for giving life structure, purpose and a sense of belonging (WFOT, 2012), while meaning attached to any occupation is considered to be personalized and subjective (Rosenberg & Cohen Erez, 2023; WFOT, 2012). Engagement in meaningful, age-appropriate occupations promotes grow, development, provides a context for learning and acquiring new skills and contributes to health and well-being (Rosenberg & Cohen Erez, 2023; WFOT, 2012).

ADHD significantly impairs daily-living (occupation) participation and functioning through deficits in EF (Biele et al., 2022; Christoforou et al., 2023) – which are critical for self-regulation and goal-directed behaviour. Findings from literature suggest that the manifestation of functional impairments in ADHD is neither static nor uniform across development. Instead, difficulties shift in form and severity, and persons are confronted with evolving environmental demands (De Rossi et al., 2023; Overgaard et al., 2025; Slobodin et al., 2015).

It is found that children with neurodevelopmental disorders (NDD) perceive participation in daily-activities as more challenging compared to their peers without a NDD while at the same time they tend to attach less meaning – considering them as less important (Rosenberg & Cohen Erez, 2023). Among "daily activities" are included: self-care, organizing one's room, homework, school participation, playing and socializing (Hinojosa et al., 1997b; Rosenberg & Cohen Erez, 2023).

Core areas of impairment that directly challenge participation in occupations and daily living can be understood across several interrelated domains, including time management, task initiation, and sustained attention.

Time management is a key skill for performing everyday activities and achieving autonomy and independence (Wennberg et al., 2019). It is closely connected to time perception, a multidimensional construct involving cognitive and neuropsychological processes that may be impaired in ADHD (Mette, 2023). Effective time management relies on interconnected abilities, including the development of a sense of time, time orientation and the capacity to sequence events and allocate appropriate durations to activities (Mette, 2023; Pérez-Rodríguez et al., 2026; Wennberg et al., 2019).

Individuals with ADHD often demonstrate altered time perception, including difficulty accurately estimating and valuing time in relation to task demands (Weissenberger et al., 2019; Wennberg et al., 2019). These impairments affect both the subjective experience of time and the planning and organization of daily activities across settings such as home and school (Wennberg et al., 2019). Time perception may be inconsistent, with time experienced either accelerating or slowing, partly due to attentional dysregulation. This can contribute to "time blindness", characterised by difficulties in monitoring time and anticipating deadlines, as well as distortions associated with hyperfocus or low task engagement (Weissenberger et al., 2019). Consequently, individuals may struggle to maintain routines, adhere to schedules, and fulfil daily responsibilities.

A further area of difficulty relates to task initiation and sustained attention (Kreider et al., 2019). Individuals with ADHD often have difficulties in initiating or sustaining focus on non-stimulating, routine tasks including household chores, administrative work or studying is a common difficulty for individuals with ADHD (Babajanyan et al., 2023; E. Sonuga-Barke et al., 2010). This is closely linked to patterns of procrastination,

where tasks are delayed despite awareness of their importance (Niermann & Scheres, 2014). In contrast, there may be a tendency to enter periods of intense "hyperfocus," particularly when tasks become urgent or deadlines are imminent (Oroian et al., 2025). Although hyperfocus can sometimes enhance productivity in the short term, it is typically inconsistent and difficult to regulate, contributing to uneven task engagement and challenges in maintaining balanced and predictable routines (Oroian et al., 2025).

WM difficulties include impaired ability to hold, process and manipulate information causing difficulties in daily functioning such as completing multi-step tasks, organizing schedules, maintaining focus and remember basic instructions (Kofler et al., 2018). Individuals with ADHD often find themselves losing track of tasks mid-action, making daily activities such as cooking, shopping etc. extremely difficult and often unsuccessful.

Summarizing, it is important to stress that an overall consequence of ADHD impact of daily functioning is the constant struggle of individuals to initiate tasks, regulate attention, organize these tasks and manage time in a way that the outcome is successful, leading to a profound emotional and mental exhaustion and to significantly reduced overall QoL compared to neurotypical peers (Pawaskar et al., 2019).

2.9.1 Impact on academic participation and performance

So far, it is clear that ADHD is widely conceptualised as a neurodevelopmental disorder characterised by persistent pattern of inattention, hyperactivity and impulsivity. These characteristics interfere with functioning across contexts of every-day living and participation. Importantly, while ADHD symptoms originate in childhood, their impact on functionality, particularly in the academic domain, evolves over time in response to developmental and environmental demands and expectations (Banaschewski et al., 2023). Academic impairment in ADHD should be examined not as a static deficit, but as a dynamic construct shaped by the interaction between individual difficulties and the increasing complexity of academic participation across adolescence.

Academic impairments and underperformance are common problems of students with ADHD, present even from early school placement (DuPaul & Jimerson, 2014; Jangmo et al., 2019; Langberg et al., 2011; McDougal et al., 2023), compromising successful academic participation and performance. Compared with their typically developing

peers, students with ADHD tend to achieve lower grades, perform lower on standardised achievement tests, have an increased likelihood of grade retention and school-failure risk and higher rates of special education placement (Langberg, Epstein, et al., 2011; Zendarski et al., 2016). Research findings demonstrate that these impairments are not attributable to differences in intellectual abilities between ADHD and non-ADHD students, but they reflect disruptions in attention regulation, task persistence and classroom behaviour (Langberg, Molina, et al., 2011; Rogers & Tannock, 2018). Students with ADHD and EF impairments have been found to be most likely to receive special educational support (Samuels et al., 2016).

For the current study, the term "academic performance" does not refer to grades or to grade-measured achievements on tests. Rather we adopt an OT informed perspective, seeing "performance" as successful participation in meaningful, age-appropriate occupations – here occupation being learning. Successful participation in learning (or schooling) and fulfilment of the role of student has certain conditions: a student should be able to use task-specific and general self-regulated strategies, including planning, organizing and time management, regulate their academic-related emotions, have stable motivational beliefs (Horanicova et al., 2024; Katsantonis & McLellan, 2023) and "appropriate" school behaviour – regular attendance, following school and classroom rules and routines (Horanicova et al., 2024). Other important factors include effective time management and study routines – importantly being able to balance study hours with other activities, regulate study-time to include adequate breaks (Suleiman et al., 2024), while during class a student should have a functional response time, to be able to remain seated for prolonged periods, be able to work both independent and with peers, engage and contribute in classroom activities, sustain attention, focus on important stimuli etc (Grajo et al., 2020).

Academic functioning is often a primary target of treatment (Rios-Davis et al., 2023), as it is regarded as the most critically impaired domain for adolescents with ADHD (Sibley et al., 2014). Academic outcomes, regardless a diagnosis or no, relate to better socioeconomic position of an individual (Horanicova et al., 2024), while positive academic experiences are connected higher overall life satisfaction, lower risk of substance use and better mental health (Inchley et al., 2018), and have implications for

future success and societal well-being (Suleiman et al., 2024). Academic functioning and performance is discussed in detail in following section.

Heavy schoolwork pressure, expectations to adapt effectively to physical and psychological changes (Zhao et al., 2021), along with changes within the academic setting (multiple classes daily, less availability of teachers' support and resources, increased expectations for academic independence and reduced academic support) might pile up resulting in stress, anxiety and consequently lower academic performance ins secondary education as compared to primary school (Sibley et al., 2014). In addition to these key factors, which characterize the transition from primary to secondary education for all adolescents, students with an ADHD diagnosis often face further aggravating challenges. Their established difficulties in attention, EF, and behavioural regulation compound the demands of this developmental period, increasing their vulnerability to academic and social failure (Dvorsky & Langberg, 2019; Sibley et al., 2014).

Sibley et al, (2014) state that academic problems for adolescents with ADHD, are behavioural manifestations of core symptoms that lead to impairments in a developmentally specific academic environment. According to their findings, academically impaired students with ADHD display difficulties at multiple levels and points in academic process, including taking class notes, poorly organized and careless classwork, failure to record homework in daily agendas, poor material organisation etc with most prominent difficulties in time management and planning (Sibley et al., 2014). Concluding, they suggest that a detailed assessment is necessary for every student with ADHD, while treatments targeting time management and planning deficits have the potential to be most effective for these students.

In summary, ADHD is a condition that exerts a pervasive and multifaceted impact on quality of life across all stages of development, impairing critical aspects of daily functioning and well-being. The burden is further intensified by the presence of comorbidities and increasing social demands. These findings highlight the importance of adopting a holistic, lifespan-oriented approach to management—one that extends beyond the reduction of core symptoms to address broader functional outcomes and the challenges of everyday living.

2.10 ADHD in adolescence

While ADHD is a lifetime condition, we limit our focus on adolescence as we recognise the need for a more specialised approach to the disorder and its impact on this developmental stage. Further, we specifically focus on ages 13 to 18 years as in Cyprus these two edges mark, for most individuals, important transitions in academic and social status. Transition from primary to secondary education is done at the age of 13 while the age of 18 years marks the "end of childhood" and the transition either to work training or higher education.

While WHO defines adolescence more broadly as 10–19 years, this study narrows its focus to 13–18 years to align with Cyprus's educational transition points.WHO recognises that despite adolescence being perceived as a *healthy stage of life*, the risk of death, illness and injury is elevated and these risks can in an important extent be preventable or treatable (World Health Organisation, n.d.) Adolescence is a developmental stage characterized by major changes in all aspects of life – physical, emotional, cognitive and social (Mastorci et al., 2024). As Mastorci et al (2024) stress, if transitions from childhood to adolescence are not positively experienced, then vulnerability develops at the expense of coping mechanisms, leading to increased risks for the development of adverse outcomes such as psycho-social problems or difficulties, including psychiatric disorders (anxiety, depression, eating disorders). It is reported that around half of all life-time mental disorders start at mid-teens with the risk peaking at the age of 15 years (J. J. McGrath et al., 2023; Solmi et al., 2021).

ADHD and other neurodevelopmental conditions manifest in impaired developmental milestones, including deficits in aspects like cognitive, motor, emotional and social functioning (Tal-Saban et al., 2025). While in adolescence is expected that the individual will develop a maturation and growth of cognitive abilities, social cognition and will develop new skills, engage in new activities and focus on education, social and leisure activities (Budman et al., 2025; Jaworska & MacQueen, 2015; Mastorci et al., 2024), the presence of ADHD might result in reduced independence, difficulties in various daily occupations such as learning and academic participation, social interactions, learning to drive etc (French et al., 2024; Tal-Saban et al., 2025).

During adolescence, comorbidities tend to emerge or comorbid profiles to shift – in childhood tics and learning problems are the most common while oppositional and conduct problems increase in adolescence (De Rossi et al., 2023). Mood and anxiety disorders along with aggression and social problems are among the most common comorbidities among adolescents with ADHD (De Rossi et al., 2023; Franke et al., 2018; Sasser et al., 2016).Comorbidity of ADHD with other psychiatric disorders, make the condition more complex (Cuffe et al., 2020; Reale et al., 2017).

Additionally, ADHD in adolescent years acts as a risk factor for substance use as it doubles the risk of nicotine dependence and has an established, though weaker, association with alcohol misuse (Agnew-Blais et al., 2018; Shaw & Sudre, 2020). Mortality rates are elevated for ADHD adolescents comparing to their non-ADHD peers and this seems to be a consequence of increased risky behaviour, including risky road / driving behaviour, leading to increased rates of accidents (Chang et al., 2017; Dalsgaard et al., 2015).

In adolescence, the role of student seems to be more challenging than any other period. Significant social, emotional, physical and cognitive changes are taking place during adolescence. Performance in roles such as the role of student and occupational performance (e.g. learning) influence how one sees their self and thus influence identity formation (Mann et al., 2015)

2.11 Treatment Approaches

2.11.1 Overview of Treatment Approaches

The efficacy of treatment methods for ADHD and associated executive functioning (EF) difficulties has been a central focus of clinical and educational research. Given the multidimensional nature of ADHD—encompassing attentional regulation, WM, and self-regulation—intervention typically requires a multimodal approach integrating pharmacological, behavioural, and cognitive strategies (Feldman et al., 2018; Qian et al., 2020).

Current literature broadly categorises treatment approaches into three main types: (a) pharmacological, (b) non-pharmacological (psychological, behavioural, or psychosocial), and (c) combined interventions (National Institute of Mental Health,

2013; Nazarova et al., 2022). Despite extensive research, there is no clear consensus regarding a single optimal treatment, as each approach demonstrates benefits alongside important limitations, particularly in terms of long-term effectiveness (Ramos-Galarza et al., 2024).

This section examines the current evidence base, comparing outcomes across studies investigating pharmacological, psychosocial interventions, and targeted EF training, with an emphasis on how these methods translate into measurable improvements in daily functioning and long-term prognosis.

2.11.2 Pharmacological Treatments

Pharmacological treatment, particularly stimulant medication, is widely recognised as an effective first-line intervention for reducing core ADHD symptoms, especially inattention and hyperactivity–impulsivity (K. A. Brown et al., 2018; Catalá-López et al., 2017; D. Coghill et al., 2023). Across the literature, medications—particularly stimulants and selected non-stimulants—demonstrate the most consistent and replicable benefits compared to other intervention modalities, including psychological and neurobiological approaches (Wilens et al., 2024).

Psychostimulants, primarily methylphenidate and amphetamine-based medications, are recommended as first-line treatments for adolescents with ADHD due to their robust efficacy (Mechler et al., 2022; Türk et al., 2023). These agents act by enhancing dopaminergic and noradrenergic neurotransmission in the prefrontal cortex, thereby improving attention, IC, and EF (Mechler et al., 2022; Türk et al., 2023) . Evidence from large meta-analyses demonstrates that stimulants produce large effect sizes in reducing core ADHD symptoms in children and adolescents, alongside improvements in QoL and functional outcomes (Catalá-López et al., 2017; Pelham et al., 2017). Long-acting formulations are particularly advantageous in adolescence, as they promote better adherence and reduce the likelihood of rebound symptoms during the school day (Pelham et al., 2017; Sibley et al., 2025). Furthermore, stimulant treatment has been associated with measurable improvements in EF, a key area of impairment in adolescents with ADHD that affects academic performance, behavioral regulation, and social functioning (Wilens et al., 2024).

Non-stimulant medications provide important alternatives or adjuncts to stimulant therapy. Atomoxetine, a selective norepinephrine reuptake inhibitor, is one of the most widely studied non-stimulants (Peterson, Trampush, Maglione, Bolshakova, et al., 2024; Qiu et al., 2023). Evidence from randomized controlled trials suggests that atomoxetine is effective in improving EF and reducing ADHD symptoms compared to placebo, although its effects are generally smaller than those of stimulants (Mechler et al., 2022; Sibley et al., 2025). Comparative studies indicate that while both atomoxetine and stimulants can improve EF, stimulant medications tend to produce greater magnitude of change, particularly in domains such as WM and response inhibition (Cortese et al., 2018; Wilens et al., 2024). Additionally, atomoxetine may be beneficial in adolescents with comorbid anxiety, with some studies reporting reductions in anxiety symptoms alongside improvements in ADHD-related impairments (Cortese et al., 2018; Mechler et al., 2022; Türk et al., 2023).

Adverse effects and treatment non-adherence represent key challenges in the pharmacological management o(Caye et al., 2019; C. P. Martin & Hoza, 2020; Mechler et al., 2022). Across medication classes, both stimulants and non-stimulants are generally considered well tolerated, but they are associated with a range of side effects that may influence continuation of treatment (Caye et al., 2019; C. P. Martin & Hoza, 2020; Mechler et al., 2022) . For stimulant medications, commonly reported adverse effects include decreased appetite, sleep disturbances, headaches, and increases in blood pressure and heart rate, which may be particularly relevant during adolescence due to ongoing physical development (Emilsson et al., 2017). Evidence also highlights concerns regarding reduced growth velocity in some individuals, necessitating regular monitoring (Bai et al., 2015; Caye et al., 2019; Charach et al., 2004; Emilsson et al., 2017). Non-stimulant medications such as atomoxetine are associated with side effects including gastrointestinal symptoms, fatigue, and somnolence, and carry specific warnings about the potential for suicidal ideation and behavioural changes, particularly during treatment initiation (Caye et al., 2019; Cortese et al., 2018; Nourredine et al., 2024). Although serious adverse events are relatively uncommon and most side effects are mild or transient, variability in tolerability remains an important clinical issue.

Side effects contribute directly to non-adherence, which is frequently observed during adolescence (Emilsson et al., 2017). Emerging evidence indicates that some

pharmacological treatments, particularly atomoxetine and guanfacine, may have lower acceptability compared to placebo, reflected in higher discontinuation rates in clinical trials (Cortese et al., 2018). Beyond tolerability, developmental and psychosocial factors play a critical role in adherence behaviours (Caye et al., 2019; Sibley et al., 2025; Watson et al., 2015). Adolescents demonstrate greater autonomy in treatment decisions and may be less willing to maintain long-term medication use, especially when benefits are perceived as modest or when side effects interfere with daily functioning (Parkin et al., 2022; Watson et al., 2015). Additionally, while pharmacological treatments show clear efficacy for core ADHD symptoms, their effects on broader outcomes such as QoL are less consistent, which may further reduce motivation to continue treatment (G. A. Fabiano et al., 2015). These factors highlight the importance of regular monitoring, patient engagement, and shared decision-making to optimise adherence and ensure sustained therapeutic benefit (G. A. Fabiano et al., 2015; Sibley et al., 2025; Watson et al., 2015).

In light of these considerations, contemporary ADHD management increasingly emphasises multimodal intervention frameworks that extend beyond medication alone. These integrated approaches seek to combine pharmacological treatment with behavioural, cognitive, and systemic supports, providing a more comprehensive response to the diverse needs of adolescents with ADHD. The following section explores the rationale and evidence base for such multimodal interventions, with particular attention to how combined approaches may optimise outcomes across clinical, academic, and psychosocial domains.

2.11.3 Non-pharmacological treatments

Non-pharmacological approaches to ADHD encompass a broad and heterogeneous range of interventions aiming to improve behavioural regulation, cognitive functioning, and everyday participation without relying solely on pharmacological mechanisms (Nazarova et al., 2022). These approaches include behavioural therapy, parent training, social skills interventions, cognitive and EF training, psychoeducation, and lifestyle-based interventions such as sleep and physical activity programmes (Nazarova et al., 2022; Sibley et al., 2025). The diversity of these methodologies reflects the complex and multidimensional nature of ADHD, but also introduces variability in outcomes,

requiring careful interpretation of evidence across studies (Chacko et al., 2024; G. A. Fabiano et al., 2021; Nazarova et al., 2022).

Behavioural therapy is among the most extensively studied and well-supported psychosocial interventions, particularly in childhood and adolescence (Caye et al., 2019; Nazarova et al., 2022). Evidence-based behavioural programmes typically focus on modifying environmental contingencies, reinforcing adaptive behaviours, and supporting the development of self-regulation skills (Rios-Davis et al., 2023). A review of adolescent treatment approaches identifies behavioural therapy as a core evidence-based intervention, although considerable variability exists across treatment packages in terms of content and delivery (Rios-Davis et al., 2023). This variability reflects the broader heterogeneity of ADHD, where individuals may demonstrate different profiles of strengths and difficulties across contexts (Rios-Davis et al., 2023; Sibley et al., 2025). As a result, behavioural interventions are often most effective when tailored to specific environmental demands, such as classroom expectations or family routines (Caye et al., 2019; Rios-Davis et al., 2023; Watson et al., 2015)

Parent training and family-based interventions represent another central component of non-pharmacological treatment (G. Fabiano, 2008; Ogundele & Ayyash, 2023). These approaches aim to enhance caregivers' ability to support the child or adolescent's behaviour through consistent structure, reinforcement strategies, and improved communication (G. Fabiano, 2008; Foubister et al., 2020; Nazarova et al., 2022; Sibley et al., 2016). Extensive research has demonstrated that psychosocial interventions, including parent training, constitute a well-established evidence base, although challenges remain regarding long-term effectiveness and implementation in real-world settings (Doffer et al., 2023; Loren et al., 2015; Phillips et al., 2024; Sibley et al., 2016). Importantly, these interventions extend the focus from the individual to the broader relational and environmental context, acknowledging that behavioural outcomes are shaped through ongoing interactions between the individual and their surroundings (Chacko et al., 2024; Doffer et al., 2023).

Cognitive and EF training programmes have gained increasing attention as a means of targeting underlying cognitive processes associated with ADHD (G. A. Fabiano et al., 2021; Nazarova et al., 2022; Sibley et al., 2025). These interventions often involve structured, computer-based tasks or strategy-focused training designed to improve WM,

attention, and IC (Alabdulakareem & Jamjoom, 2020; Oldrati et al., 2020; Westwood et al., 2000). A comprehensive meta-analysis of psychosocial treatments highlights the growing interest in combining multiple intervention components, including cognitive training and behavioural strategies, to enhance generalisation to everyday functioning (G. A. Fabiano et al., 2021). While findings suggest potential improvements in targeted cognitive domains, evidence for transfer to real-life functioning remains mixed, indicating that cognitive gains alone may not be sufficient to support meaningful behavioural change (D. Coghill et al., 2023; G. A. Fabiano et al., 2021).

More recent approaches have emphasised the importance of integrating multiple components within intervention design (Caye et al., 2019; Gałuszka et al., 2025). Multi-component psychosocial programmes combine behavioural, cognitive, and contextual strategies to address the complex interplay between cognitive processes and environmental demands (Caye et al., 2019; Gałuszka et al., 2025). This is particularly relevant in adolescence, where increasing expectations for independence and self-management highlight the need for interventions that extend beyond symptom reduction (Buitelaar, 2017; Levanon-Erez et al., 2019; Sibley et al., 2025). Research suggests that combining different intervention elements may enhance executive functioning and facilitate the application of cognitive skills within real-life contexts, reflecting a more ecologically valid approach to treatment (Blair, 2017; Rueda et al., 2021).

Across non-pharmacological interventions, a consistent theme is the recognition that ADHD-related challenges do not occur in isolation but emerge within specific environmental contexts (Banaschewski et al., 2023; DuPaul & Jimerson, 2014; Gonda et al., 2024; Rapport et al., 2013). From this perspective, difficulties in attention, organisation, or task engagement may reflect a mismatch between individual cognitive profiles and contextual demands, rather than solely intrinsic deficits (Filipe & Holroyd, 2026; J. Kent, 2024). Consequently, effective interventions increasingly aim not only to modify behaviour or improve cognitive performance but also to support individuals in navigating and adapting to everyday environments (Gonda et al., 2024; Graham et al., 2024). This includes the development of compensatory strategies, the modification of task demands, and the creation of supportive structures that facilitate engagement and participation (Bahr, 2023; Graham et al., 2024; Kornblau & Robertson, 2021).

Overall, non-pharmacological approaches play a critical role in addressing the functional impact of ADHD, particularly in domains such as academic participation, daily routines, and social functioning (Grajo et al., 2020; Gunzenhauser & Nückles, 2021; Ianni et al., 2021). While evidence supports the effectiveness of several individual interventions, current literature highlights the importance of integrated, context-sensitive approaches that combine multiple strategies and align with the individual's developmental stage and environmental context (Chacko et al., 2014; Gunzenhauser & Nückles, 2021). This shift towards more comprehensive and personalised intervention models underscores the need to move beyond symptom-focused outcomes and toward meaningful improvements in participation and long-term adaptation.

2.11.4 Combined Approaches (Multimodal Treatments)

Contemporary clinical guidelines emphasise that the management of ADHD should be comprehensive, individualised, and grounded in a combination of pharmacological and non-pharmacological strategies. Both the World Health Organization (WHO) and the Centres for Disease Control and Prevention (CDC) highlight that ADHD is a complex condition affecting multiple domains of functioning, and therefore requires an integrated, multimodal approach to care (Centers for Disease Control and Prevention, 2024; WHO, 2016) .

According to WHO recommendations (WHO, 2016) , the initial management of ADHD should prioritise psychosocial and behavioural interventions, particularly in settings where specialist resources may be limited. Non-specialised healthcare providers are encouraged to initiate parent education and training programmes as a first step following diagnosis. These interventions may be complemented by structured therapeutic approaches such as cognitive behavioural therapy and social skills training when feasible, reflecting the importance of addressing behavioural, emotional, and social impairments alongside core symptoms. Pharmacological treatment, specifically methylphenidate, may be considered for children aged six years and older only when significant impairment persists despite environmental and behavioural interventions. Such treatment should follow a comprehensive clinical assessment, involve informed decision-making with caregivers, and be prescribed under specialist supervision.

Similarly, CDC guidance, NICE guidelines and other national and international guidelines —emphasise that treatment approaches for ADHD should be age-specific and involve a combination of interventions. For school-age children and adolescents (aged six years and older), medication is recommended in conjunction with behaviour therapy, rather than as a standalone treatment (Centers for Disease Control and Prevention, 2024; National Institute for Health and Care Excellence NICE, 2019). Behavioural therapies with demonstrated effectiveness include parent training in behaviour management, classroom-based interventions, peer-focused programmes, and organisational skills training. Importantly, the CDC underscores the value of collaboration among parents, healthcare providers, and educational professionals in developing an individualised treatment plan tailored to the child's needs (Centers for Disease Control and Prevention, 2024; National Institute for Health and Care Excellence NICE, 2019).

Behavioural and environmental modifications are considered foundational components of treatment, particularly in younger children, while pharmacotherapy is introduced when necessary to address persistent and impairing symptoms (National Institute for Health and Care Excellence NICE, 2019; Özgen et al., 2020; WHO, 2016). However, findings must be interpreted cautiously, as benefits appear to diminish over time and may not consistently translate into functional improvements. This limitation is particularly relevant for adolescents, whose needs differ from those of younger children. Evidence suggests that interventions for this age group must address not only symptom reduction but also broader functional difficulties, including academic performance, emotional regulation, and daily living skills (Buitelaar, 2017; Rios-Davis et al., 2023).

Furthermore, literature highlight the necessity of ongoing monitoring and adjustment of treatment strategies to evaluate effectiveness, manage potential side effects, and respond to changes in the individual's developmental and functional needs (Caye et al., 2019). The Multimodal Treatment study for ADHD (MTA), which is one of the most influential and comprehensive studies in the field of ADHD treatment and management concluded that the combination of medication with behavioural therapy (not detailed described) is the most effective treatment for children with ADHD (Duric et al., 2017; Martinez-Nunez & Quintero, 2019; National Institute of Mental Health, 2013). Despite the choice of the treatment method, when considering adolescents with ADHD there is a

need that treatments should be targeting a great range of aspects (core symptoms and concomitant difficulties and impairments) focusing on what makes them vulnerable (Buitelaar, 2017; Rios-Davis et al., 2023). Literature concludes that, especially for adolescents, there is a great need for individualised, age-appropriate interventions, taggling the characteristic needs of the developmental period (Sibley et al., 2025; Watson et al., 2015) The notion that there is an increased need to target adolescence is supported by findings indicating that adolescence presents a unique period for reducing negative adult outcomes (Sibley et al., 2025).

These recommendations support a multimodal framework in which pharmacological treatment is combined with behavioural, psychological, and educational interventions. This integrated approach aims not only to reduce core ADHD symptoms but also to improve broader outcomes, including academic performance, social relationships, and overall quality of life.

2.11.5 Theoretical Foundations of Treatment Approaches

Building on these guideline-driven recommendations, it is important to consider the theoretical foundations that underpin multimodal treatment approaches to ADHD. The integration of pharmacological, behavioural, and psychosocial interventions reflects a broader understanding of ADHD as a disorder influenced by neurobiological, cognitive, and environmental factors. Consequently, effective treatment models are informed by theories of brain function, learning, and behaviour, which explain how different interventions target specific aspects of the disorder. The following section therefore explores the key theoretical perspectives that support and justify the use of multimodal strategies in ADHD management. These are presented below.

2.11.5.1 Cognitive-behavioural and EF Models

Cognitive–behavioural and EF models conceptualise ADHD as a disorder characterised by deficits in self-regulation and executive control, with underlying neurobiological impairments affecting both behavioural and emotional regulation. Within this framework, difficulties in core EF components—such as WM, planning and organisation, and IC—are considered central to the manifestation of ADHD symptoms (Alderson et al., 2017; R. Barkley, 1997; Champ et al., 2021; Raiker et al., 2012). These

models have informed the development of a range of interventions aimed at improving both cognitive processes and self-management capacities.

Interventions derived from cognitive–behavioural and EF approaches focus on enhancing attention, EF, and adaptive skills through structured skill training, behavioural strategies, and coping mechanisms (Antshel et al., 2014; Lopez et al., 2018; Toplak, Connors, et al., 2008). Cognitive training programmes, often delivered through computer-based or game-like formats, are designed to strengthen specific cognitive domains such as attention, IC and WM, thereby contributing to the reduction of ADHD symptoms (Caye et al., 2019).

Importantly, these approaches extend beyond individual-level interventions to support generalisation of skills across different contexts. As such, they frequently incorporate behavioural parent training and classroom-based management strategies, which reinforce the application of learned skills in everyday environments and promote consistency in behavioural expectations (Anastopoulos et al., 2021; Chacko et al., 2016; Langberg, Epstein, et al., 2011) Together, these components illustrate how cognitive–behavioural and EF models underpin a comprehensive and context-sensitive approach to ADHD treatment.

2.11.5.2 Neurobiological Perspectives on Treatment

In contrast, neurobiological models conceptualise ADHD primarily as a brain-based condition associated with atypical development and functioning of neural systems that regulate cognition, attention, emotion, reward, and sensorimotor processes (Baroni & Castellanos, 2014; da Silva et al., 2023; De La Fuente et al., 2013; Martel et al., 2021). Central to this perspective is the role of dysfunctions in dopaminergic and other neurotransmitter systems, which are believed to underpin the core symptoms and behavioural manifestations of ADHD (Drechsler et al., 2020; Núñez-Jaramillo et al., 2021).

Treatment approaches derived from neurobiological and substrate-based theories focus predominantly on pharmacological interventions aimed at modulating these neural pathways. These include both stimulant and non-stimulant medications, which are used to improve attention, EF, and behavioural regulation (K. A. Brown et al., 2018; Sibley et al., 2025) While these approaches form a central component of ADHD management,

detailed evaluation of specific pharmacological strategies falls beyond the scope of the present discussion.

2.11.5.3 Multifactorial and transactional models

More recent multifactorial and transactional models offer a broader conceptualisation of ADHD by emphasising the dynamic interaction between biological, psychological, and environmental influences. Within this perspective, ADHD is understood as the product of complex and ongoing interplay among genetic predispositions, developmental processes, and contextual factors such as family, school, and broader cultural environments (Banaschewski et al., 2023; Luo et al., 2019). These models also highlight the importance of arousal regulation, diverse developmental pathways, and the psychosocial context of the individual, recognising that ADHD does not present in a uniform manner across individuals (Banaschewski et al., 2023; Wang et al., 2025).

At the core of this approach is the understanding that individuals with ADHD may experience different patterns of impairments across domains such as family life, educational or occupational functioning, peer relationships, and cultural systems (Gallo & Posner, 2016; Luo et al., 2019). As a result of this heterogeneity, no single risk factor or treatment modality is considered sufficient for all individuals (Gonda et al., 2024; Luo et al., 2019). Instead, these models advocate for individualised, flexible treatment plans that integrate pharmacological and psychosocial interventions, moving beyond a sole focus on symptom reduction towards enhancing overall functioning and competency (Boland et al., 2020; Faraone et al., 2015; Stein et al., 2012).

Treatment approaches grounded in multifactorial models prioritise long-term adaptation and functional outcomes through highly personalised interventions that are responsive to each individual's profile and social context (Banaschewski et al., 2023; Luo et al., 2019). These approaches support the selective use of medication based on individual needs, alongside multisystemic interventions involving the family, school, and community (Lv et al., 2023). In addition, treatment may include skills training targeting neurocognitive deficits, psychotherapy addressing emotional dysregulation and comorbid conditions such as anxiety and depression, and interventions for associated difficulties such as sleep problems, applied across the lifespan (Drechsler et al., 2020; Gałuszka et al., 2025).

Neurodiversity perspectives further extend these multifactorial models by reframing ADHD not solely as a disorder but as a natural variation in neurodevelopment, associated with both challenges and strengths. From this viewpoint, difficulties in attention, impulse control, and EF are understood in relation to environmental demands rather than as purely intrinsic deficits. Consequently, neurodiversity-informed approaches emphasise strengths-based, person-centred interventions that prioritise autonomy, self-acceptance, and functional adaptation. Rather than focusing exclusively on symptom reduction, they advocate for environmental modifications, inclusive educational practices, and supports that enhance participation and quality of life across contexts. Importantly, these perspectives do not reject pharmacological or behavioural treatments but encourage their use in a collaborative, individualised manner that respects the preferences, identity, and lived experience of the person

2.12 OT for ADHD

OT offers a distinct perspective on ADHD by focusing on how symptoms influence participation in everyday occupations and the ability to fulfil meaningful life roles. Drawing on participation-focused and occupational models of practice, OT seeks to understand the interaction between individual characteristics, environmental demands, and occupational performance. The following sections outline the role of OT in ADHD, the theoretical foundations underpinning OT practice, approaches to assessment and intervention, and the evidence supporting OT interventions for adolescents with ADHD.

2.12.1 OT in ADHD

The theoretical perspectives underpin the rationale for a multimodal understanding of ADHD and highlight the need for interventions that address not only symptoms but also functional participation across everyday contexts. Contemporary perspectives conceptualise ADHD not only as a neurodevelopmental condition characterized by attentional and behavioural symptoms, but also as a source of functional difficulties that influence participation in academic, social and daily living occupations (Banaschewski et al., 2017; Jones & Hesse, 2018; Zetterqvist et al., 2025). Although increasing recognition has been given to the heterogeneous and context-sensitive nature of ADHD, much of the existing literature continues to prioritise symptom reduction over functional

and participation-based outcomes (D. Coghill et al., 2023; Hotte-Meunier et al., 2024; Peterson, Trampush, Maglione, et al., 2024). This tendency creates a notable gap in rehabilitation-oriented evidence, which is particularly This creates a notable gap in rehabilitation-oriented evidence, particularly for adolescents whose occupational roles, routines, and environmental demands differ substantially from those of younger children (Budman et al., 2025; De Rossi et al., 2023; Levanon-Erez et al., 2017).

Within this context, OT interventions offer a distinct contribution by focusing on meaningful engagement in everyday occupations. According to the WFOT, OT promotes health and wellbeing through participation in activities that individuals want, need, or are expected to do (WFOT, 2012). Within OT, the term *occupation* refers to everyday activities that provide purpose and meaning, and that occupy an individual's time. These may include necessary occupations such as self-care, desired occupations such as leisure and hobbies, and socially expected occupations such as education and employment (Boop et al., 2020; Hinojosa et al., 1997).

This occupation-centred perspective aligns closely with contemporary conceptualisations of ADHD that emphasise participation, functioning, and QoL as important outcomes. Rather than focusing exclusively on symptom reduction, OT seeks to understand how ADHD affects engagement in everyday occupations and how participation can be supported across different contexts.

2.12.2 Theoretical foundations for OT practice in ADHD

OT is guided by theoretical models that help explain how individuals engage in meaningful occupations and how participation is influenced by personal and environmental factors. Within ADHD, these frameworks support an understanding of occupational performance that extends beyond symptom-based perspectives. Two models that are particularly relevant to the present study are the PEOP model and the MOHO.

2.12.2.1 The PEOP Model

OT practice is informed by several theoretical models, among which PEOP model is particularly influential (Wong & Fisher, 2015). The PEOP model conceptualises

occupational performance as the result of a dynamic interaction between personal characteristics, environmental conditions, and occupational demands (Bass et al., 2024; Baum et al., 2021).

The model recognises that impairments may influence participation but do not solely determine it. Rather, occupational performance emerges from the degree of fit between personal capacities, environmental supports and barriers, and the characteristics of occupations (Bass, de Sam Lazaro, et al., 2024; Baum et al., 2021). Individuals are therefore understood within their broader contexts, with attention given to both strengths and challenges that influence engagement in meaningful occupations (Baum et al., 2021).

Within the PEOP framework, personal factors relevant to occupational performance include physiological characteristics, such as health status and physical capacity, as well as cognitive functions including reasoning, attention, EF, and self-regulation (Baum et al., 2021).

2.12.2.2 Model of Human Occupation (MOHO)

The MOHO complements the PEOP perspective by emphasising the subjective and experiential dimensions of occupational participation. MOHO conceptualises occupational engagement through three primary constructs: volition, habituation, and performance capacity (R. R. Taylor et al., 2024; Wong & Fisher, 2015).

Volition refers to a person's interests, values, and sense of personal effectiveness. Habituation relates to the development and maintenance of routines and roles, while performance capacity encompasses the physical and mental abilities that support occupational participation. According to MOHO, engagement in occupations is influenced not only by the abilities of a person but also by their motivation, identity, routines, and perceptions of competence (Taylor et al., 2024).

These concepts are particularly relevant in ADHD, where disrupted routines, difficulties establishing effective habits, inconsistent performance patterns, and reduced perceptions of competence are commonly reported (Cheung & Fung, 2020; Karamali-Esmaili, 2019).

2.12.2.3 Application of the MOHO and PEOP model to ADHD

Together, PEOP and MOHO provide a comprehensive framework for understanding occupational performance in ADHD. PEOP emphasises the interaction between the individual and their environment, whereas MOHO highlights the person's subjective experiences, motivations, and occupational identity.

From this perspective, occupational difficulties associated with ADHD are understood not solely as impairments residing within the individual but also as mismatches between personal abilities and environmental demands (Baum et al., 2021). Consequently, OT interventions extend beyond remediation of individual deficits to include environmental adaptations, task modifications, and strategies that promote successful participation. This holistic perspective provides the theoretical foundation for assessment and intervention approaches that seek to optimise occupational performance by reducing barriers and leveraging individual strengths across everyday contexts.

2.12.3 Assessment and Identification of occupational challenges

Assessment is a fundamental component of OT practice. Assessment provides the basis for understanding how ADHD influences participation in everyday occupations and occupational roles. Consistent with occupation-centred and participation-focused perspectives, assessment extends beyond the identification of symptoms to examine the ways in which personal characteristics, environmental influences, and occupational demands interact to facilitate or restrict engagement in meaningful activities. The following sections outline OT assessment approaches and describe the participation-focused assessment framework adopted in the present study.

2.12.3.1 OT Assessment

Assessment as a central component of OT practice typically involves a combination of standardised and non-standardised measures alongside observational and context-based evaluations. Within the PEOP framework, assessment is used to examine the interaction between occupational performance, personal characteristics, and environmental factors, conceptualised along a continuum of barriers and facilitators (Bass, Marchant, et al., 2024).

This perspective is particularly relevant in ADHD, where symptoms and associated difficulties are often influenced by contextual demands and environmental supports (De Rossi et al., 2023). OT assessment therefore aims to identify cognitive, behavioural, emotional, and environmental factors that affect participation in daily occupations. Such factors commonly include difficulties with EF, attention regulation, planning, organisation, and time management, as well as contextual influences that either facilitate or impede successful occupational engagement (Manee et al., 2020).

Assessments are selected to provide insight into an individual's ability to perform activities, tasks, and occupations that are important for fulfilling valued roles and responsibilities, including educational participation, social engagement, work, and independent living (Bass, Marchant, et al., 2024; Manee et al., 2020). Through this process, OTs obtain a comprehensive understanding of participation-related challenges and identify areas for intervention.

The information gathered through assessment guides the development of individualised, goal-oriented intervention plans that address not only the needs of the individual but also the influence of family, school, and broader environmental contexts. Consistent with the PEOP perspective, intervention planning therefore aims to optimise occupational fit through both personal and environmental change.

The development of the STReDI-SPeS contributed to the assessment of participation-related challenges by identifying domains of academic participation that adolescents themselves considered important. Four domains emerged through the development of the instrument: academic disorganisation and temporal mismanagement, cognitive-attentional barriers, attributional distress and academic fatigue, and self-regulated academic engagement.

These domains provide an occupationally relevant framework for understanding participation difficulties experienced by adolescents within educational settings. Furthermore, they informed the selection of intervention activities targeting planning, organisation, time management, attention management, study skills, and self-regulated engagement.

Although the STReDI-SPeS was not originally developed as an intervention outcome measure, it was utilised in the present study as both a participation-focused assessment and an outcome measure due to its demonstrated sensitivity to ADHD-related participation difficulties. The intervention protocol was developed to address the participation barriers reflected in the STReDI-SPeS domains, with intervention activities specifically targeting difficulties that adolescents commonly report in relation to academic occupations.

Previous psychometric investigation of the STReDI-SPeS (Papagianni & Theodorou, 2026) demonstrated that the total score, particularly the domains of academic disorganisation and cognitive-attentional barriers, differentiated adolescents with ADHD from their typically developing peers. Nevertheless, findings suggested that the instrument is more suitable for profiling participation-related needs than for identifying ADHD at a population level. Consequently, within the present study, the STReDI-SPeS was employed as a participation-focused assessment and outcome measure rather than as a screening or diagnostic tool.

2.12.4 OT Interventions for ADHD

Within OT, intervention is guided by the understanding that occupational performance emerges from the interaction between personal capacities, environmental conditions, and occupational demands. Consequently, interventions for individuals with ADHD extend beyond symptom management to address participation restrictions, contextual barriers, and the development of skills required for successful engagement in everyday occupations. This holistic approach underpins the range of OT interventions used in ADHD.

2.12.4.1 Scope of OT Intervention

OT has the potential to address numerous areas affected by ADHD, including school participation, learning, daily routines, social engagement, emotional regulation, behavioural regulation, and broader aspects of occupational functioning (Chu & Reynolds, 2007; Kornblau & Robertson, 2021; Nielsen et al., 2017; Reitz & Scaffa, 2020; Senior et al., 2020). Through specifically designed interventions and meaningful therapeutic activities, OT also targets EF and cognitive skills such as planning,

organisation, time management, WM, attention, and concentration (Hahn-Markowitz et al., 2020; Levanon-Erez et al., 2019; Wennberg et al., 2021).

OT interventions for ADHD can be broadly understood within the PEOP framework, which emphasises the interaction among personal capacities, environmental contexts, and occupational demands (Bass, Marchant, et al., 2024; Baum et al., 2021). Interventions are commonly categorised as either component-based or occupation-based according to whether they primarily target personal factors or the broader person-environment-occupation relationship (Laverdure & Beisbier, 2021).

2.12.4.2 Component-Based Interventions

Within the PEOP framework, component-based interventions primarily target underlying personal factors that influence occupational performance. These interventions focus on enhancing cognitive, behavioural, and sensory processes that support successful engagement in everyday occupations. In ADHD, component-based approaches commonly address EF, attention regulation, WM, IC and sensory processing difficulties (Laverdure & Beisbier, 2021).

Cognitive training interventions are among the most widely investigated component-based approaches. These interventions are frequently delivered through computerised or gamified programmes and aim to improve cognitive processes such as WM, IC, and sustained attention. Improvements in these domains are expected to facilitate occupational performance across academic, social, and daily living contexts (Caye et al., 2019). Similarly, sensory-based interventions seek to address sensory processing difficulties that may interfere with participation. By supporting sensory modulation and regulation, these approaches aim to reduce behavioural and emotional barriers to occupational engagement (Faramarzi et al., 2016).

Although component-based interventions may improve specific cognitive or sensory functions, OT recognises that enhanced underlying abilities do not automatically translate into improved participation. Consequently, component-based approaches are often combined with occupation-focused strategies that facilitate the application of newly acquired skills within meaningful real-world contexts.

2.12.4.3 Occupation-Based Interventions

Occupation-based interventions extend beyond the remediation of underlying impairments by focusing directly on participation in meaningful occupations. Within the PEOP framework, these interventions target the dynamic interaction between person, environment, and occupation to support performance and participation in everyday life (Bass, Marchant, et al., 2024; Baum et al., 2021).

Occupation-based interventions frequently focus on the development of structured routines, effective organisation strategies, time management skills, and task completion within authentic contexts such as school, work, home, and community environments (Christiansen & Townsend, 2004). These areas are particularly relevant for individuals with ADHD, who often experience difficulties managing the executive demands associated with everyday occupations (Evans et al., 2014; Langberg et al., 2013).

Environmental modification also constitutes a core aspect of occupation-based practice. From a PEOP perspective, environmental factors can act either as barriers or as facilitators to participation. Accordingly, OTs may implement strategies such as reducing distractions, introducing visual supports, restructuring workspaces, modifying task demands, or using assistive technologies such as planners, schedules, timers, and reminder systems (Caye et al., 2019; Kılıç et al., 2026). These adaptations seek to improve the fit between individual abilities and environmental demands, thereby supporting successful occupational performance.

This integrated approach is particularly relevant in ADHD, where occupational engagement is highly influenced by contextual factors and environmental supports. By addressing both personal capacities and environmental demands, occupation-based interventions aim to promote sustainable participation in meaningful life roles and occupations.

2.12.4.4 Family-Centred and Collaborative Practice

A key strength of OT is its collaborative and family-centred approach. Given the pervasive nature of ADHD across home, school, and community settings, effective intervention frequently involves collaboration with parents, teachers, caregivers, and

other professionals. Such collaboration facilitates consistency across environments and supports the generalisation of skills learned during intervention.

Family-centred practice recognises the importance of understanding the perspectives, priorities, and goals of both adolescents and their families. Involving families in intervention planning and implementation can increase relevance, engagement, and long-term sustainability of outcomes (Lage et al., 2024; Shahbazi et al., 2026). Similarly, collaboration with educational professionals allows intervention strategies to be implemented within classroom contexts where many occupational challenges are experienced.

This multidisciplinary approach is consistent with broader recommendations for multimodal ADHD management and reinforces the role of OT as an important contributor to comprehensive and coordinated care.

2.12.5 OT and Educational Participation

Educational participation represents a central occupational domain during adolescence and is often one of the areas most significantly affected by ADHD. Beyond academic achievement, successful participation in education involves engagement in the student role, the development of effective learning habits and routines, and the ability to meet the cognitive, behavioural, and social demands of the school environment. From an OT perspective, educational participation is understood as a complex interaction between individual abilities, environmental contexts, and occupational demands. Consequently, understanding the challenges adolescents with ADHD experience within educational settings is essential for developing interventions that support meaningful participation and success in the student role.

2.12.5.1 Occupational Challenges in the Student Role

The PEOP-informed approach to intervention highlights the importance of addressing both individual capacities and contextual influences on occupational performance, treating person and environment factors as as unity rather than separately (Bass et al., 2025) . Despite the availability of evidence-based intervention approaches, adolescents

with ADHD continue to experience significant challenges in everyday functioning, particularly within educational environments where demands for sustained attention, organisation, planning, and self-regulation are high.

As adolescents progress through secondary education, academic expectations become increasingly complex and independent. Consequently, individuals with ADHD are at heightened risk for poorer occupational outcomes, academic underachievement, psychiatric comorbidities, and engagement in rule-breaking or risk-taking behaviours (Barkley et al., 2006; Levanon-Erez et al., 2017; Sibley et al., 2010). Repeated exposure to academic difficulties, failure experiences, and negative feedback may contribute to reduced self-efficacy, diminished self-perception, and challenges in identity formation, particularly in relation to the student role (Budman et al., 2025).

From an OT perspective, addressing these challenges requires more than the development of functional skills alone. Intervention must also support positive occupational identity, self-efficacy, and meaningful engagement in valued roles and occupations.

2.12.5.2 Self-regulated Learning and Academic Participation

The PEOP-informed approach to intervention highlights the importance of addressing both individual capacities and contextual influences on occupational performance. Despite the availability of evidence-based intervention approaches, adolescents with ADHD continue to experience significant challenges in everyday functioning, particularly within educational environments where demands for sustained attention, organisation, planning, and self-regulation are high.

As adolescents progress through secondary education, academic expectations become increasingly complex and demanding. Consequently, individuals with ADHD are at heightened risk for poorer occupational outcomes, academic underachievement, psychiatric comorbidities, and engagement in rule-breaking or risk-taking behaviours (Barkley et al., 2006; Levanon-Erez et al., 2017; Sibley et al., 2010). Repeated exposure to academic difficulties, failure experiences, and negative feedback may contribute to

reduced self-efficacy, diminished self-perception, and challenges in identity formation, particularly in relation to the student role (Budman et al., 2025).

From an OT perspective, addressing these challenges requires more than the development of functional skills alone. Intervention must also support positive occupational identity, self-efficacy, and meaningful engagement in valued roles and occupations.

2.12.6 Evidence for OT Interventions in ADHD

As the role of OT in ADHD has expanded, a growing body of research has examined the effectiveness of interventions aimed at improving occupational performance, participation, and related functional outcomes. The evidence base encompasses both component-based approaches, which target underlying cognitive and behavioural processes, and occupation-based approaches, which focus directly on participation in meaningful activities and everyday contexts. The following sections review the current evidence supporting these intervention approaches in adolescents with ADHD.

2.12.6.1 Evidence for component-based interventions

Current evidence suggests that OT interventions demonstrate moderate efficacy for adolescents with ADHD, particularly in improving EF, cognitive strategy use, occupational performance, and participation (Grajo et al., 2020; Levanon-Erez et al., 2019).

Emerging interventions targeting specific EF components have shown promising outcomes. Cognitive approaches such as Central Executive Training (CET) and IC training have demonstrated improvements in WM,, impulsivity, IC, and aspects of academic performance (Kofler et al., 2020; Maraver et al., 2016; Singh et al., 2022). These approaches may produce both near-transfer effects within trained cognitive domains and, in some cases, broader benefits for functional performance. However, evidence for consistent generalisation to everyday occupations remains mixed.

Digital cognitive training programmes have also received considerable attention. Interventions such as Cogmed™ have shown positive effects on WM performance (Stevens et al., 2016), although findings across the broader literature remain inconsistent, with variability in the extent to which cognitive gains translate into meaningful participation outcomes (Bikic et al., 2018).

Sensory-based interventions have likewise been investigated within ADHD populations. While some studies report improvements in attention, regulation, and engagement, overall findings remain inconsistent and further research is required to determine their effectiveness and applicability (Faramarzi et al., 2016; Kılıç et al., 2026).

2.12.6.2 Evidence for Occupation-Based Interventions

Occupation-based and metacognitive approaches have demonstrated particularly promising outcomes for adolescents with ADHD. The Cognitive-Functional (Cog-Fun) and Teen Cog-Fun programmes represent notable examples of occupation-focused interventions that integrate cognitive strategy training within meaningful daily activities (Hahn-Markowitz et al., 2011, 2020; Levanon-Erez et al., 2019).

These interventions emphasise self-awareness, strategy development, personalised goal setting, and participation in everyday occupations (Hahn-Markowitz et al., 2011). Evidence indicates significant improvements in EF, occupational performance, and strategy use, with particularly strong outcomes reported for goal attainment and participation-focused measures (Levanon-Erez et al., 2019).

Participation-focused interventions, including structured routines, yoga-based programmes, and creative engagement activities, have also demonstrated moderate evidence for improving attention, social participation, and engagement within educational settings (Grajo et al., 2020; Gurlek & Bumin, 2026). Importantly, these interventions align closely with the OT focus on meaningful participation and QoL rather than solely on symptom reduction.

2.12.6.3 Intervention outcomes and acceptability

Across diverse OT models and intervention approaches, studies consistently report improvements in participation, daily routines, EF, occupational performance, and social engagement among adolescents with ADHD (Ambrose, 2021; Levanon-Erez et al., 2019; Watroba et al., 2024).

Positive outcomes have been reported across both individual and group-based interventions, with metacognitive and occupation-focused approaches often demonstrating the strongest effects (Ambrose, 2021; Levanon-Erez et al., 2019; Nasri et al., 2017; Senior et al., 2020). In addition to measurable improvements in performance, adolescents and their families generally report high levels of satisfaction, acceptability, and perceived usefulness of OT interventions (D'Arrigo et al., 2020; Revue Canadienne D'Ergothérapie et al., 1999; Senior et al., 2020).

These findings suggest that OT interventions are not only effective in supporting participation and occupational performance but are also feasible and well aligned with the priorities and needs of adolescents with ADHD and their families.

2.12.6.4 Limitations for the Evidence Base

Despite promising findings, several limitations remain within the current evidence base. Considerable variability exists across intervention approaches, outcome measures, and study methodologies, making direct comparison between studies challenging. Furthermore, many interventions continue to focus on isolated cognitive components rather than adopting comprehensive approaches that address both participation and contextual influences.

The relative scarcity of standardised, occupation-focused programmes for adolescents highlights the need for further research within this age group. Future intervention development should seek to integrate component-based and occupation-based approaches within holistic frameworks that address individual capacities, environmental demands, and meaningful participation outcomes simultaneously.

2.12.7 Summary

OT offers a distinct and valuable contribution to ADHD management by focusing on participation, occupational performance, and QoL. Grounded in theoretical frameworks such as PEOP and MOHO, OT conceptualises ADHD-related difficulties as the result of complex interactions among personal characteristics, environmental influences, and occupational demands. This perspective informs both assessment and intervention by emphasising participation within meaningful occupations rather than symptom reduction alone.

Assessment approaches, including participation-focused measures such as the STReDI-SPeS, facilitate the identification of occupational challenges experienced by adolescents across educational and everyday contexts. Building upon these assessments, OT interventions incorporate both component-based and occupation-based approaches that target EF, environmental adaptation, self-regulation, and participation in valued roles.

Educational participation represents a particularly important area of focus during adolescence, as difficulties in EF can significantly affect engagement in the student role. Evidence suggests that OT interventions can improve EF, occupational performance, participation, and strategy use, with occupation-based and metacognitive approaches demonstrating particularly promising outcomes (Hahn-Markowitz et al., 2011; Kim et al., 2020; Levanon-Erez et al., 2019). However, further research is required to develop and evaluate comprehensive adolescent-focused interventions that integrate individual, environmental, and occupational factors.

Overall, by bridging theoretical understanding with real-world application, OT supports adolescents with ADHD in developing the skills, strategies, and environmental support necessary for meaningful participation and successful engagement in everyday life.

2.13 Recommendations drawn from research literature

The development of recommendations for the management of ADHD within this dissertation is informed not only by national and international clinical guidelines but also by a critical synthesis of the research literature. This approach is grounded in the principles of Evidence-Based Practice (EBP), which emphasise the integration of the

best available research evidence with clinical expertise and the needs and values of individuals (American Psychological Association, 2021; Seegan et al., 2023).

Within OT, EBP further requires that interventions are occupation-centred, developmentally appropriate, and responsive to environmental and contextual factors influencing participation (Serwe et al., 2021; World Federation of Occupational Therapists, 2021). In parallel, contemporary perspectives highlight that ADHD should not be conceptualised solely as a deficit-based condition, but rather as a form of cognitive diversity shaped by the dynamic interaction between indi(*Neurodiversity: Understanding ADHD, Autism, Dyslexia & Brain Differences | IPsychology*, n.d.)*Differences | IPsychology, n.d.)*. From this perspective, evidence-based interventions should aim not only to remediate impairments but also to support meaningful participation, promote self-determination, and adapt environments to accommodate neurodivergent profiles. Accordingly, the following recommendations are derived from a synthesis of the research literature examining ADHD management and associated EF and cognitive impairments, with particular emphasis on adolescence and occupational outcomes.

A central theme across the literature is that the effectiveness of cognitive and neuropsychological interventions depends on their grounding in established scientific and developmental principles. Training programmes achieve greater effectiveness when they are aligned with well-documented processes of cognitive development and learning (Rueda et al., 2021). Conversely, a key limitation of many existing ADHD interventions is their insufficient theoretical grounding, which contributes to difficulties in achieving sustained and generalisable improvements in functioning (Rapport et al., 2013). From an OT perspective, this highlights the importance of integrating theoretical knowledge of EF with occupation-based frameworks that consider how cognitive impairments translate into everyday activity performance and participation (Chacko et al., 2024; Rubia, 2018).

In addition to theoretical alignment, the structural characteristics of training interventions play a critical role in their effectiveness. Evidence suggests that cognitive training is optimally efficient when it incorporates short, structured sessions, combines repetitive practice with top-down strategy application, and adapts task difficulty

progressively to reflect the individual's abilities and developmental trajectory (Cochrane & Green, 2021; Cortese et al., 2015; Drechsler et al., 2020b, 2020a). These design features support sustained engagement and facilitate skill acquisition, particularly when embedded within meaningful occupational contexts. OT literature similarly emphasises that interventions are more effective when they are activity-based and integrated into real-life routines, rather than delivered as abstract or decontextualised cognitive exercises (Grajo et al., 2020).

A further key principle in intervention design is the promotion of far transfer, defined as the generalisation of trained cognitive (Bombonato et al., 2024; Gunzenhauser & Nückles, 2021)4; Gunzenhauser & Nückles, 2021). The literature consistently highlights that far transfer should be an explicit goal of any intervention; however, it is rarely achieved unless specifically supported through ecologically valid training approaches (Blair, 2017; Gunzenhauser & Nückles, 2021). Evidence indicates that practising cognitive skills within authentic, real-world contexts significantly enhances transfer to academic, social, and daily life outcomes (Blair, 2017; Gunzenhauser & Nückles, 2021). This principle aligns strongly with OT frameworks, which prioritise participation in meaningful occupations and emphasise the interaction between the individual, the activity, and the environment as key determinants of functional outcomes (Grajo et al., 2020; Laverdure & Beisbier, 2021).

The complexity of ADHD further necessitates intervention approaches that target multiple neuropsychological processes simultaneously (Cortese et al., 2015; Rapport et al., 2013). ADHD is associated with interacting difficulties in WM, IC, CF, and self-regulation; therefore, interventions addressing multiple domains are more likely to facilitate meaningful and generalisable improvements (Cortese et al., 2015; Rapport et al., 2013). Evidence suggests that such multi-component approaches optimise the transfer of gains from cognitive processes to behavioural and functional outcomes (Bryck & Fisher, 2012; Cortese et al., 2015; Moreau & Conway, 2014; Rapport et al., 2013; Sibley et al., 2025). OT evidence similarly highlights the value of integrated approaches that support participation across academic, social, and daily activities, rather than focusing on isolated skills (Gurlek & Bumin, 2026; Kelsch et al., 2016).

Importantly, neurocognitive interventions should not be limited exclusively to ADHD-specific deficits (Cortese et al., 2015; Gunzenhauser & Nückles, 2021; Ramos-Galarza et al., 2024; Rapport et al., 2013). A growing body of research suggests that targeting broader EDs, which may be shared across neurodevelopmental and mental health conditions, can enhance both the effectiveness and generalisability of interventions (Cortese et al., 2015; Gunzenhauser & Nückles, 2021; Ramos-Galarza et al., 2024; Rapport et al., 2013). From a neurodiversity-informed perspective, this approach is particularly relevant, as it shifts the focus from "normalising" behaviour to supporting adaptive functioning across diverse cognitive profiles (Filipe & Holroyd, 2026; Kent, 2024; Nicholson & Lee, 2026).

The centrality of EF impairments in ADHD further reinforces their importance as a primary target for intervention (T. E. Brown, 2013; Ramos-Galarza et al., 2024; Ramos-Galarza & Pérez-Salas, 2021; Veloso et al., 2020). ED is closely associated with difficulties in academic performance, daily organisation, and self-regulation, and therefore represents a key mechanism underlying functional impairment (Ramos-Galarza et al., 2020; Ramos-Galarza & Pérez-Salas, 2021; Rueda et al., 2021; Sibley et al., 2014; Titz & Karbach, 2014). However, in line with neurodiversity principles, the aim of targeting EF should not be viewed solely as remediation of deficits but as enhancing the individual's capacity to engage in meaningful occupations, achieve personally relevant goals, and improve overall participation within their environments (Filipe & Holroyd, 2026; Kent, 2024; Nicholson & Lee, 2026)..

Adolescence represents a critical developmental period requiring targeted intervention approaches (Coxe et al., 2021; Lambez et al., 2020; Sibley et al., 2025) . Adolescents with ADHD face increasing academic, social, and organisational demands, alongside expectations for greater independence and self-management (Coxe et al., 2021; Rusca-Jordán & Cortez-Vergara, 2020; Sibley et al., 2025). These challenges highlight the need for developmentally sensitive interventions that address both cognitive impairments and the contextual demands of the transition to adulthood (Buitelaar, 2017; D. Coghill et al., 2023; Feldman et al., 2018; Rios-Davis et al., 2023; Sibley et al., 2025). OT approaches are particularly relevant in this context, as they explicitly address the interaction between cognitive abilities and participation in real-life roles,

including education, self-care, and social engagement (Drechsler et al., 2020a; Kelsch et al., 2016).

Finally, the literature highlights the importance of psychoeducation as a core component of ADHD management (Coghill et al., 2023; Feldman et al., 2018). Providing psychoeducation to adolescents and their families enhances understanding of the condition, supports the development of adaptive strategies, and promotes engagement in intervention processes (D. Coghill et al., 2023; Dahl et al., 2020; Feldman et al., 2018). From both an EBP and neurodiversity perspective, psychoeducation also plays a key role in fostering self-awareness, reducing stigma, and empowering individuals to advocate for their needs and preferences within educational and social contexts (Bai et al., 2015; Dahl et al., 2020).

Across most ADHD guidelines, parent involvement in treating children and adolescents with ADHD is explicitly recommended. Parents are encouraged to actively participate in decision-making, receive psychoeducation or training, and be involved in the coordination with school-based services; these are some of the common features across the majority of guidelines (Guideline Overview – CADDRA, n.d.; Klassen et al., 2000; May et al., 2023; National Institute for Health and Care Excellence NICE, 2019; Taylor et al., 2004; WHO, 2016). Nevertheless, parent involvement in research studies remains scarce and inconclusive; in addition, the diversity between studies does not permit generalisations of the findings, leaving another gap in the literature.

In summary, the evidence suggests that effective ADHD management requires a comprehensive, theoretically grounded, and contextually embedded approach. Interventions should integrate cognitive training with occupation-based strategies, target multiple executive function processes, promote far transfer through ecologically valid activities, and be tailored to the developmental needs of adolescents. At the same time, incorporating insights from the neurodiversity paradigm ensures that such interventions move beyond deficit reduction towards supporting meaningful participation, autonomy, and inclusion in everyday life.

2.14 ADHD management and current situation in Cyprus

ADHD management in Cyprus is shaped by significant structural gaps in national policy, data infrastructure, and service organization. The country currently lacks national clinical guidelines for ADHD, resulting in considerable variability in diagnostic practices and treatment pathways across clinicians, schools, and mental-health services. Within OT, there is a notable absence of structured, adolescent-focused interventions that are both evidence-based and culturally adapted. This gap underscores the need for interventions that align with adolescents' developmental profiles while also integrating the sociocultural realities of Cypriot families and schools.

Importantly, ADHD is not recognised as a disability in Cyprus. This policy position has significant implications for national data collection: ADHD is excluded from the Disability Assessment System, not monitored by the Department of Social Inclusion, and not included in national disability statistics. Consequently, the Ministry of Education remains the only governmental body that reports ADHD-related figures, and even these are limited to students who received services rather than all students with the diagnosis.

1. Lack of National Guidelines and Surveillance Systems

Cyprus does not maintain a national ADHD registry, nor does it operate a centralized surveillance system capable of tracking diagnoses, treatment patterns, or long-term outcomes. ADHD is not classified as a disability within national legislation, which means it is excluded from the Disability Assessment System and from national disability statistics. As a result, ADHD data remain fragmented across independent bodies such as the Ministry of Education, the Health Insurance Organization (GESY), and the Department of Social Inclusion. None of these bodies publishes aggregated ADHD-specific statistics, and no national prevalence study has been conducted to date. This places Cyprus among the European countries with the least developed ADHD data infrastructure, in contrast to countries with registry-based systems such as Sweden, Finland, and Denmark, where diagnoses and prescriptions are systematically monitored.

2. Educational System Data: The Only Available Figures

The only formal estimation of ADHD prevalence in Cyprus originates from the Annual Report of the Ministry of Education, Culture, Sports and Youth. These reports do not

provide epidemiological prevalence; instead, they list the number of students who received services from the Educational Psychology Services during a given school year. The last report containing ADHD-specific data was published in 2017 (Ministry of Education, Culture, 2018) and documented 742 students with ADHD during the 2016–2017 school year. Of these, 226 were secondary-education students (Gymnasion, Lykeion, Technical Schools). However, these figures represent only students who received services, not all students with ADHD. The report provides no demographic information (e.g., sex, comorbidities, socioeconomic background), and the proportion of students from special education schools is not specified. After 2017, the reporting structure changed: ADHD is now grouped under "Other neurodevelopmental disorders", a category that includes ADHD, ASD, and Movement Disorders. The 2024 report lists 1126 students with "other neurodevelopmental disorders" out of 10,598 students with any diagnosis, spanning all grades from primary to upper secondary education. This shift in reporting further obscures ADHD-specific data and makes longitudinal tracking impossible.

3. Absence of National Prevalence Studies and Research Output

To date, no published research has investigated ADHD prevalence in Cyprus, the demographic profile of individuals with ADHD, or treatment outcomes. There are no longitudinal studies, no national surveys, and no academic publications examining ADHD within Cypriot populations. This stands in contrast to countries such as Greece, where universities in Athens, Thessaloniki, and Crete have conducted regional prevalence studies estimating ADHD at 5–7%, (Koumoula et al., 2024; Skounti et al., 2010) consistent with European norms. To be noted that even for Greece, most of the finding are outdated or do not constitute formal national results. Cyprus's lack of research infrastructure contributes to national under-identification and limits the development of evidence-based interventions.

4. Role of ADHD-Cyprus Association

In the absence of national data systems and research networks, much of the publicly accessible information comes from ADHD-Cyprus, a non-profit, voluntary organization dedicated to supporting individuals with ADHD and their families. The organization provides psychoeducation, support groups, advocacy, and community engagement. While its role is valuable, it does not maintain clinical registry or publish

epidemiological data. Its contributions highlight the need for coordinated national systems that move beyond voluntary support and toward structured, evidence-based policy.

5. Cross-Country Context

Compared with other European countries, Cyprus exhibits substantial ADHD data gaps. Greece, although also lacking a national registry, benefits from official clinical guidelines, structured educational identification through ΚΕΔΑΣΥ, and active academic research networks. Northern European countries maintain integrated health-information systems that allow researchers to track ADHD diagnoses, prescriptions, and outcomes across the lifespan. Cyprus's absence of guidelines, prevalence studies, treatment statistics, and integrated data systems places it at the lowest end of the European ADHD surveillance spectrum. Addressing these gaps is essential for developing effective, culturally responsive interventions and for aligning national practice with European standards.

2.15 Clinical Practice Guidelines for ADHD: International perspectives and the situation in Cyprus

Clinical practice guidelines play an important role in promoting evidence-based assessment and intervention for ADHD. Developed by professional organisations, governmental agencies, and expert panels, these guidelines synthesise current research evidence and provide recommendations intended to improve consistency and quality of care. Although healthcare systems differ across countries, there is increasing international agreement regarding the principles that should guide ADHD assessment and management. Examining these recommendations provides an important framework for understanding current practice in Cyprus and identifying gaps relevant to the present study.

2.15.1 Overview of major guidelines

Over the past two decades, several national and international organisations have published clinical practice guidelines for ADHD. Among the most influential are the guidelines developed by the National Institute for Health and Care Excellence (NICE)

in the United Kingdom, the American Academy of Paediatrics (AAP) in the United States, the Canadian ADHD Resource Alliance (CADDRA), and the Australian ADHD Professionals Association (AADPA). Although these guidelines have been developed within different healthcare systems, they demonstrate considerable consistency regarding the assessment, diagnosis, and treatment of ADHD.

Collectively, these guidelines conceptualise ADHD as a chronic neurodevelopmental condition requiring comprehensive assessment and multimodal intervention. They emphasise the importance of evidence-based practice, multidisciplinary collaboration, and ongoing monitoring across development, recognising that ADHD symptoms and associated functional difficulties often persist into adolescence and adulthood.

2.15.2 Common recommendations across guidelines

2.15.2.1 Assessment and Diagnosis

A consistent recommendation across guidelines is that ADHD assessment should be comprehensive, systematic, and multidisciplinary. Assessment typically involves the collection of information from multiple informants, including parents, teachers, and the young person themselves, alongside clinical interviews, developmental histories, behavioural observations, and the use of standardised rating scales.

Guidelines also emphasise the need to evaluate functional impairment across multiple settings rather than relying solely on symptom presence. Furthermore, consideration of differential diagnoses and co-occurring conditions is strongly recommended, given the high rates of psychiatric, developmental, and learning-related comorbidities associated with ADHD.

2.15.2.2 Pharmacological Interventions

Pharmacological treatment remains a central component of ADHD management within most international guidelines. Stimulant medications are commonly recommended when symptoms result in significant impairment, with non-stimulant medications considered when stimulants are contraindicated, poorly tolerated, or ineffective.

Guidelines consistently emphasise the importance of monitoring treatment response, adverse effects, and long-term outcomes. Medication is generally presented as one component of a broader treatment plan rather than a stand-alone solution.

2.15.2.3 Non-pharmacological interventions

Alongside medication, international guidelines recommend a range of non-pharmacological interventions. These commonly include psychoeducation, behavioural interventions, parent training programmes, educational supports, and psychological therapies. Such interventions aim to improve functioning, support self-management, and address difficulties that may not be sufficiently managed through medication alone.

Increasing attention has also been given to interventions targeting EF, self-regulation, organisation, and school participation, particularly during adolescence when academic demands become more complex, and independence is expected.

2.15.2.4 Multimodal Treatment Approaches

Perhaps the strongest area of agreement across guidelines is the recommendation for multimodal treatment. ADHD is increasingly recognised as a multifaceted condition affecting multiple domains of functioning, and therefore intervention is encouraged across home, school, healthcare, and community settings.

Multimodal approaches typically combine pharmacological treatment with educational, behavioural, psychosocial, and environmental interventions. This reflects a broader shift away from symptom-focused management towards approaches that prioritise functional outcomes, participation, and QoL.

2.15.3 OT within International Guidelines

Although OT is not always explicitly highlighted within guideline recommendations, many of the interventions advocated by international guidance align closely with OT principles and practice. Recommendations relating to EF, self-regulation, environmental adaptation, educational participation, routine development, and collaborative working are consistent with occupation-centred approaches to intervention.

From an OT perspective, ADHD-related difficulties are understood not solely as impairments within the individual but as disruptions in occupational performance and participation. Consequently, OTs contribute to ADHD management by addressing the interaction between personal capabilities, environmental demands, and occupational requirements. This includes interventions targeting organisation, planning, time management, attention management, self-regulation, and participation within important life roles such as that of the student.

The emphasis placed by international guidelines on functional outcomes, participation, and multidisciplinary intervention therefore provides indirect support for OT as a valuable component of comprehensive ADHD management. Furthermore, guideline recommendations concerning educational supports and EF interventions align closely with the occupational challenges commonly experienced by adolescents with ADHD.

2.15.4 The Situation in Cyprus

Despite increasing international consensus regarding evidence-based ADHD management, implementation of recommended practices varies across countries and healthcare systems. In Cyprus, ADHD assessment and intervention services have expanded in recent years; however, challenges remain in relation to service availability, accessibility, and the provision of specialised non-pharmacological interventions.

Management of ADHD typically involves collaboration among healthcare professionals, educational services, and families. Nevertheless, the availability of structured intervention programmes specifically targeting participation, EF, and school-related occupational performance remains relatively limited compared with recommendations contained within international guidelines.

Educational difficulties are frequently among the most prominent concerns reported by adolescents with ADHD and their families. However, interventions are often directed towards symptom management rather than participation-focused outcomes such as organisation, time management, academic engagement, and successful participation in the student role. This represents a potential gap between international recommendations

emphasising functional outcomes and existing intervention options available within the local context.

Furthermore, limited research has examined participation-focused OT interventions for adolescents with ADHD within Cyprus. Consequently, there remains a need for interventions that address the everyday occupational challenges encountered by adolescents while also being feasible for implementation within educational and community settings.

2.15.5 Implications for the present study

Review of international clinical practice guidelines demonstrates broad agreement regarding the importance of multimodal, multidisciplinary, and functionally oriented approaches to ADHD management. While symptom reduction remains an important treatment objective, increasing emphasis is placed on improving participation, daily functioning, educational engagement, and QoL.

These priorities align closely with the theoretical foundations of OT and the PEOP framework adopted in the present study. In particular, guideline recommendations relating to EF, self-regulation, environmental supports, and educational participation highlight the need for interventions that address both individual capacities and contextual influences on performance.

The present study responds to these recommendations by evaluating an occupation-focused intervention designed to support adolescents with ADHD in the student role. By targeting areas such as planning, organisation, time management, attention management, study strategies, and self-regulated academic engagement, the intervention addresses participation challenges consistently identified in both the international literature and contemporary clinical guidelines. Furthermore, the use of the STReDI-SPeS as a participation-focused outcome measure reflects the growing emphasis on functional outcomes and meaningful participation rather than symptom reduction alone. Although international clinical practice guidelines provide broad consensus regarding the principles of ADHD assessment and management, they also highlight several areas where the evidence base remains limited. Questions remain regarding the effectiveness of non-pharmacological interventions, the most appropriate approaches for adolescents,

the transfer of intervention gains to everyday functioning, and the role of participation-focused interventions within routine practice. These unresolved issues are reflected in the current research literature and provide the basis for the present study.

2.16 Gaps in Research

Despite substantial advances in ADHD research and the growing consensus reflected in international clinical practice guidelines, important gaps remain regarding what works, for whom, and under what conditions, particularly during adolescence.

Recent high-level reviews (Nazarova et al., 2022; Peterson et al., 2024; Qiu et al., 2023; Sibley et al., 2025; Türk et al., 2023) conclude that although non-pharmacological treatment options have expanded considerably, their evidence base remains inconsistent, heterogeneous, and generally weaker than that for medication, especially when long-term and functional outcomes are considered. In addition, major evidence syntheses report limited direct comparisons between alternative treatment approaches (Nazarova et al., 2022; Peterson et al., 2024; Rios-Davis et al., 2023; Watson et al., 2015) making it difficult to determine the relative contribution of specific intervention components or to identify which non-pharmacological strategies are most appropriate for particular developmental stages.

This limitation is especially important in adolescence (Janzen et al., 2024). The literature increasingly recognises adolescence as a developmentally distinct period in ADHD, characterised by rising academic demands, increasing expectations for independence, and greater social and organisational complexity (Caye et al., 2016; Janzen et al., 2024; Sibley, 2021; Sibley et al., 2025). At the same time, intervention research remains disproportionately based on children or on mixed samples spanning childhood and adolescence, which weakens the specificity of conclusions for the 13–18 age group (Rajeh et al., 2017; Sibley et al., 2025). Recent reviews continue to identify adolescents and young people as a population with unique treatment needs, but with insufficient targeted evidence to guide practice. This gap is highly relevant to the present study, which focuses specifically on adolescent students aged 13–18 years, a period the literature also identifies as crucial because it coincides with major transitions in academic participation and everyday self-management.

A further gap concerns the nature and delivery mode of cognitive intervention (G. A. Fabiano et al., 2015; Nazarova et al., 2022; Rios-Davis et al., 2023; Sibley et al., 2025). Current literature does not adequately distinguish between different ways of training EF, nor does it sufficiently clarify whether benefits arise from computer-based, process-specific cognitive training, from skills-based OT approaches embedded in everyday tasks**,** or from a **c**ombination of the two (G. A. Fabiano et al., 2015; Nazarova et al., 2022; Rios-Davis et al., 2023; Sibley et al., 2025). This matters because available reviews note both the heterogeneity of psychosocial and cognitive interventions and the limited number of studies directly comparing different active approaches. As a result, there is still inadequate evidence regarding whether targeted computer-based training of specific EF components offers added value over skills training that resembles treatment as usual within OT practice, and whether a multicomponent model combining these strategies may be more effective than either element in isolation (Chaulagain et al., 2023; Peterson et al., 2024). This unresolved issue maps directly onto the first two aims of the present study, namely, to advance knowledge about the effectiveness of these two training modes and to investigate the effectiveness of their combination.

The literature also continues to highlight a major problem of ecological validity. Cognitive training studies often demonstrate improvements on trained tasks or closely related neuropsychological measures, but evidence for broader transfer to everyday functioning remains weak (Coghill et al., 2023; Peterson et al., 2024; Sibley et al., 2025). A 2023 meta-analysis of randomised controlled trials found that computerised cognitive training improved WM outcomes but did not show robust effects across other neuropsychological or academic outcomes, and clinical benefits were limited and often setting-specific (Westwood et al., 2023). Likewise, recent reviews state that cognitive training generally does not generalise well beyond the trained tasks, while broader psychosocial effects are often shaped by context and informant (Ogundele & Ayyash, 2023; Sibley et al., 2025; Westwood et al., 2023). This gap provides a strong rationale for a neurocognitive-informed OT intervention that does not rely solely on decontextualised computer exercises but instead combines targeted cognitive work with real-life academic and functional skill training. It also justifies why the present study examines not only objective EF outcomes, but also whether there are measurable changes in core ADHD-related symptoms**,** as reported by parents and/or participants.

Within OT, the gap is even more specific. Although OT is well positioned to address participation, daily functioning, and executive strategies in meaningful contexts, there are still very few structured, evidence-based OT interventions designed specifically for adolescents with ADHD. The available evidence for adolescent-focused OT approaches, such as Teen Cog-Fun (Levanon-Erez et al., 2019), remains promising but preliminary, and is still described in terms of feasibility rather than a mature and extensive evidence base. This leaves an important practice and research gap: OTs need interventions that are sufficiently structured to function as reproducible therapeutic tools, yet flexible enough to be adapted to the heterogeneous profiles and needs of adolescents with ADHD. That gap aligns directly with the third aim of the present study, which is to develop an evidence-based, neurocognitive-informed OT intervention that is both structured and adaptable**.**

Another unresolved issue concerns which EF should be prioritised as primary targets of intervention. The literature consistently associates ADHD with deficits in EF; however, findings remain inconsistent regarding which components are most responsive to intervention and which improvements are most meaningful for functional outcomes in adolescence (Ramos-Galarza et al., 2024; Rapport et al., 2013). While a substantial proportion of research has focused on WM and inhibitory processes, these domains are more frequently examined due to their suitability for controlled cognitive training paradigms. In contrast, EF components such as planning, organisation, and sustained attention—although highly relevant to everyday functioning and academic participation—remain less clearly understood in terms of their responsiveness to intervention and their transfer to real-life contexts.

This gap suggests a need to examine multiple, interrelated components of EF within a single intervention framework, rather than focusing exclusively on isolated cognitive processes (Gunzenhauser & Nückles, 2021). Consequently, the present study adopts a comprehensive approach to EF, investigating changes across memory, CF, IC, planning and organisation, and sustained attention. This approach enables the evaluation of both targeted cognitive improvements and broader functional outcomes, thereby addressing the current limitations in the literature regarding the prioritisation and measurement of EF domains in adolescents with ADHD.

Finally, the literature reveals an important gap regarding feasibility and implementation in routine practice**.** Even when interventions appear promising under research conditions, there is insufficient evidence concerning whether they are workable, acceptable, and adaptable within real OT settings (Sibley et al., 2022; Taun et al., 2026). This issue is reinforced by evidence from routine non-pharmacological care for adolescents with ADHD, where core evidence-based elements were delivered inconsistently, and parent involvement was uncommon; notably, 53.9% of sessions in one study had no parental presence (Sibley et al., 2022; Taun et al., 2026). This finding is especially relevant because clinical guidelines frequently recommend parent involvement, yet research implementation remains inconsistent. Although the present study does not include a formal feasibility evaluation, it contributes to this gap by examining how a structured, multicomponent OT protocol can be delivered within a real clinical setting and by documenting factors related to its practical application.

Summarising, the literature highlights several interrelated gaps that constrain the development of effective, occupation-centred interventions for adolescents with ADHD. Firs, adolescents aged 13-18 remain under-represented in both ADHD and OT research, despite facing unique academic, cognitive and self-management demands and challenges. Second, limited clarity exists regarding the contribution of computer-based cognitive training, functional skills training and their combination, as most studies examine isolated components rather than integrated approaches. Third, although cognitive training can improve performance on trained tasks, evidence for far-transfer to ADHD symptoms, academic functioning, and everyday participation remains weak. Fourth, few structured yet flexible OT protocols have been developed specifically for adolescents, resulting in fragmented evidence across single-component interventions. Finally, current assessment practices rely predominantly on parent or teacher reports, with a notable absence of student-informed tools that capture adolescents' lived experience of their academic participation and the student role.

These gaps provide the rationale for the present quasi-experimental study, which evaluates a multicomponent OT intervention protocol (MOTI) designed for adolescent students with ADHD and examines whether participation leads to measurable improvements in EF, ADHD-related symptoms, and student-reported academic

participation. This rationale leads directly to the methodology, which presents the study design, intervention components, outcome measures—including the STReDI-SPeS—and hypotheses.

2.17 The Current Research

2.18 The Current Research

The present study builds directly on the gaps identified in the preceding section by operationalizing them into a focused, adolescent-specific OT intervention. While existing research highlights the importance of executive functioning, cognitive training, and occupation-centered approaches for individuals with ADHD, evidence remains fragmented, particularly for adolescents aged 13–18. The MOTI protocol was therefore developed to integrate computer-based cognitive training, EF strategy instruction, and occupation-focused routines targeting school participation. In addition, the study incorporates a student-reported measure of academic participation (STReDI-SPeS) to address the lack of tools capturing adolescents' lived experience of the student role. Through this design, the study examines whether participation in the MOTI is associated with measurable improvements in EF, ADHD-related symptoms, and psycho-emotional wellbeing.

As outlined in Chapter 1, the study is guided by eight research questions addressing WM, CF, IC, general cognitive abilities (processing speed and reaction time), planning and organisation, sustained attention, and psycho-emotional functioning. These questions are operationalised through eight corresponding hypotheses, enabling a comprehensive examination of both cognitive and psycho-emotional outcomes. This structure allows the study to investigate not only whether the MOTI produces statistically significant pre–post cognitive gains, but also whether such gains extend to broader indicators of adolescent wellbeing—an increasingly important consideration within OT’s participation-focused, person-centred perspective.

To investigate the effectiveness of the MOTI we implemented a quasi-experimental design with a one-group pretest–posttest approach (see section 3.5 Research Design for details).

2.18.1 Aims and Objectives of the Study

The primary aim of this study is to evaluate the effectiveness of a multicomponent occupational therapy intervention in improving EF for adolescents with ADHD, while also exploring the intervention's potential psycho-emotional effects, including changes in self-esteem, emotional regulation, and related socio-emotional difficulties and its potential to positively affect core symptoms of ADHD.

The specific objectives are:

- To examine changes in WM following the intervention
- To assess improvements in CF
- To evaluate changes in IC
- To investigate changes in general cognitive abilities, including processing speed and reaction time
- To examine changes in planning and organisational abilities following the intervention
- To assess changes in sustained attention following the intervention
- To explore changes in adolescents' psycho-emotional state, including self-esteem, anxiety, mood-related difficulties (e.g., sadness, anger, boredom), and broader emotional and behavioural difficulties, following the intervention
- To evaluate changes in core symptoms of ADHD

2.18.2 Research Questions

In line with these objectives, the following research questions specify how the study examines the ways in which the MOTI may support adolescents' EF and broader participation in academic contexts.

- Does participation in the MOTI improve working memory in adolescents with ADHD?
- Does the intervention improve CF in this population?
- Does the intervention improve IC?
- Does the intervention improve general cognitive abilities, including processing speed and reaction time?
- Does the intervention improve planning and organisational abilities?
- Does the intervention improve sustained attention?
- Is participation in the intervention associated with changes in adolescents' psycho-emotional functioning, including self-esteem, anxiety, mood, and emotional/behavioural difficulties?
- Does the intervention have positive effects on core ADHD symptoms?

2.18.3 Hypotheses

Each research question is paired with a corresponding hypothesis, enabling a systematic examination of anticipated improvements associated with participation in the MOTI.

H1. Adolescents who participate in the MOTI will demonstrate significant improvements in WM.

H2. Adolescents who participate in the MOTI will demonstrate significant improvements in CF.

H3. Adolescents who participate in the MOTI will demonstrate significant improvements in IC.

H4. Adolescents who participate in the MOTI will demonstrate significant improvements in general cognitive abilities, including processing speed and reaction time.

H5. Adolescents who participate in the MOTI will demonstrate significant improvements in planning and organisational abilities.

H6. Adolescents who participate in the MOTI will demonstrate significant improvements in sustained attention.

H7. Adolescents who participate in the MOTI will demonstrate positive changes in psycho-emotional functioning, including self-esteem, anxiety, mood-related difficulties (sadness, anger, boredom), and broader emotional and behavioural symptoms.

H8. Adolescents who participate in the MOTI will demonstrate significant reductions in core ADHD symptoms.

The structure of the present study therefore enables a systematic examination of both proximal cognitive outcomes and broader psycho-emotional indicators associated with MOTI participation. By integrating performance-based measures, self-report scales, and a student-informed assessment of their perceived strengths and challenges in academic participation, the study is positioned to capture changes across multiple domains of adolescent functioning. This multidimensional approach reflects OT's emphasis on participation, context, and lived experience, and provides a coherent bridge between the theoretical foundations outlined in the literature review and the empirical procedures that follow.

The next chapter presents the methodological framework through which these research questions and hypotheses are examined, detailing the study design, participant characteristics, intervention components and outcome measures.

3 Research Methodology

Building on the gaps identified in the literature and the rationale for the present study, the following chapter outlines the methodological approach adopted to evaluate the proposed intervention. Central to this study is the development and implementation of a structured, multicomponent OT intervention designed to address the impact of ADHD on adolescents' occupational performance, particularly within academic and everyday life contexts.

Guided by the PEOP model (see Section 1.4) the intervention is designed to support the development of EF in relation to real-life occupational demands, while also considering contextual factors that influence participation.

This chapter details the research design, participant characteristics, intervention protocol, data collection procedures, and outcome measures, with particular emphasis on how executive functioning is operationalised as a component of occupational performance. By outlining these elements, the chapter establishes a structured framework for evaluating the intervention's effectiveness in enhancing adolescents' functional participation and engagement across meaningful roles and routines.

The description of the MOTI follows the TIDieR guidelines (Template for Intervention Description and Replication; Hoffmann et al., 2014), so that the intervention is presented clearly and can be replicated. The completed TIDieR checklist is provided in Appendix 5.

3.1 Participants and recruitment

Participants were adolescents aged 13 to 18 years with a formal diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD). Recruitment was conducted through an open call disseminated via social media, non-governmental organisations, parent associations, and school-affiliated networks across Cyprus. Parents of 92 adolescents initially expressed interest. Following screening and attrition across recruitment and intervention phases, the final analysed sample comprised 54 adolescents, including 36 males (66.7%) and 18 females (33.3%), with a mean age of 14.38 years (SD = 1.48). Most participants had not previously received treatment for ADHD. Detailed description is included in section 4.1 Results – Participant Characteristics.

3.1.1 Inclusion and Exclusion Criteria

Inclusion criteria required:

(a) a confirmed ADHD diagnosis by a child psychiatrist or the Educational Psychology Service;

(b) age between 13 and 18 years;

(c) enrolment in mainstream education;

(d) fluency in Greek or English.

Exclusion criteria included:

(a) intellectual disability or severe learning difficulties;

(b) enrolment in special education;

(c) use of medication known to alter cognitive performance at study entry;

(d) unstable medication status within the preceding three months.

3.2 Justification for Repeated-Measures Design

A repeated-measures design was selected because each adolescent was assessed on identical outcomes at two time points. Within-subjects designs are advantageous in developmental and intervention studies because each participant serves as their own comparison point, thereby reducing the impact of between-person variability such as baseline cognitive level, motivation, and family context (S. K. Ahmed, 2024; Steingrimsdottir & Arntzen, 2015). This improves sensitivity to change, which is especially valuable when working with modest sample sizes (S. K. Ahmed, 2024; Steingrimsdottir & Arntzen, 2015), often encountered in clinical and OT research.

3.3 Missing Data and Data Screening

Although 54 adolescents completed the intervention, not all participants completed every post-intervention assessment. In addition, some responses were excluded from specific analyses because they were incomplete or demonstrated response patterns

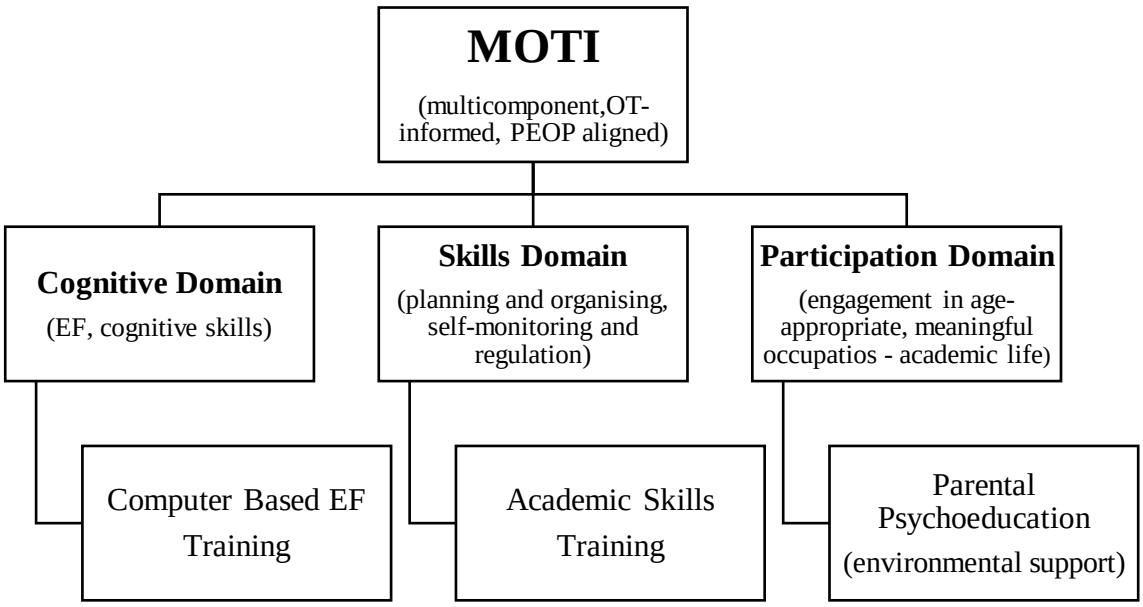
indicative of invalid responding (e.g., selecting the same response option across an entire questionnaire without evidence of item differentiation). Consequently, the number of participants included in each post-intervention analysis varied according to the availability and quality of valid data for each measure. All analyses were conducted using available-case data, and the sample size (N) is reported separately for each outcome measure.

3.4 Intervention Protocol

MOTI, the proposed intervention protocol, is grounded in current evidence regarding the treatment and management of ADHD and associated executive function difficulties (e.g., Ramos-Galarza et al., 2024; Rapport et al., 2013; Rueda et al., 2021; Veloso et al., 2020), while also responding to the developmental and contextual demands of adolescence. Drawing on an OT perspective and informed by the PEOP model (Bass et al., 2024), the intervention supports adolescents' occupational performance by targeting the development of cognitive and self-regulatory processes within meaningful, real-life contexts. The proposed intervention is multicomponent in that it targets multiple domains (cognitive, skills, participation) and uses multiple techniques (computer-based intervention, skills training, and parental psychoeducation). The next sections present the MOTI.

Figure 1 presents a visual representation of the MOTI, illustrating its three targeted domains (cognitive, skills, participation) and the techniques used (computer-based EF training, (academic) skills training, and parental psychoeducation).

Figure 1: Visual representation of the MOTI.



3.5 Intervention Protocol Components

To achieve these aims, the intervention is organised into three interrelated components that are designed to operate synergistically. These include Cognitive Training, targeting specific EF components; Academic Skills Training (AST), focusing on the application of strategies within school-related occupations; and Parents' Psychoeducation, supporting the environmental context and facilitating carryover of skills beyond the therapeutic setting. Each component contributes a distinct yet complementary role in supporting adolescents' engagement in meaningful occupations and enhancing overall functional outcomes. The structure and content of these three components are described in detail in the following sub-sections.

The protocol adopts a multicomponent structure that reflects the dynamic interaction between person factors, environmental influences, and occupational demands. Specifically, the intervention is organised around three complementary pillars. The Cognitive Training component targets person-related capacities by strengthening key EF components, including WM, IC, and CF. Participants completed 25-minute sessions, with tasks selected automatically and adapted to each participant's baseline profile and ongoing performance.

The second component, AST, consisted of six 45-minute sessions focusing on skills regarded as central to school participation and "learning how to learn", including planning, organising, prioritising, time management, sustained attention, and study strategies. Participants were trained to develop weekly planners, identify priorities, schedule study time, and apply techniques such as the Pomodoro method. This component was intended to support the application of executive skills in ecologically relevant academic contexts.

The third component involved optional psychoeducation sessions for parents or guardians. These weekly sessions addressed typical development, ADHD characteristics, family communication, behavioural regulation, and treatment options. In the current phase of programme development, this component was complementary rather than mandatory in order to preserve adolescent autonomy and avoid making participation contingent on parental involvement. The Parents' Psychoeducation component addresses environmental influences by enhancing caregivers' understanding of ADHD and equipping them with strategies to support skill generalisation and consistency across home and school contexts.

Through the integration of these three pillars, the intervention extends beyond isolated cognitive training to promote the functional application of skills and the transfer of learning to everyday situations. Improvements in EF are expected to enhance adolescents' capacity to manage task demands within key occupations, particularly those related to learning and academic participation. At the same time, the emphasis on ecologically relevant skills training supports applying strategies in real-world contexts, while parental involvement strengthens environmental supports and promotes continuity of intervention effects. Collectively, this coordinated approach is intended to enhance occupational performance, leading to improved participation in academic roles, greater

independence in daily routines, and increased confidence in managing everyday challenges. In this way, the intervention supports not only cognitive development, but also meaningful engagement in occupations that are central to adolescents' development and wellbeing.

3.5.1.1 Cognitive Training

The first component of the MOTI is Cognitive Training, which is designed to target core EF processes through a structured, computer-based format. This component responds directly to the identified limitations in the literature regarding the effectiveness, specificity, and transferability of cognitive interventions for adolescents with ADHD. In particular, it addresses the need for interventions that systematically target EF domains while incorporating adaptive and engaging formats suitable for this developmental stage.

The design of the Cognitive Training component is grounded in robust empirical evidence indicating that EF difficulties constitute a central feature of ADHD and are closely associated with patterns of inattention, behavioural dysregulation, and difficulties in planning and problem-solving (Faraone et al., 2021; Medrano Nava et al., 2024; Theodoraki et al., 2020). Research further demonstrates that adolescents with ADHD frequently present impairments in IC, CF, sustained attention, and WM, alongside difficulties in planning and organisation (Berenguer et al., 2018; Molitor et al., 2018). These cognitive challenges have been shown to impact academic performance, emotional regulation, social participation, and independence in DLA (Mousavi et al., 2025; Samuels et al., 2016). Consistent with these findings, the Cognitive Training component focuses on the systematic development of WM, CF, IC, and planning and organisation, with additional emphasis on attentional control. These domains are targeted due to their well-established relationship with functional outcomes and their relevance to the academic and everyday demands faced by adolescents. Importantly, this focus aligns with the broader rationale of the study, which emphasises the need to address EF as a mechanism for improving performance in meaningful occupations.

The intervention is delivered through computer-based, game-like activities using a specialised digital platform, the Cognifit™ (described below), enabling structured and

repeated practice of specific cognitive processes. The use of adaptive training tasks—where the level of difficulty adjusts dynamically to the participant's performance—reflects current recommendations for individualised and progressive intervention design. Such adaptive features aim to maintain engagement while ensuring that the training remains appropriately challenging, thereby supporting optimal cognitive development.

Cognitive training is conceptualised as a process of repeated and progressively demanding practice, designed to strengthen underlying neurocognitive mechanisms. Evidence from developmental and rehabilitation research suggests that EF demonstrate a degree of plasticity, allowing for improvement through structured training and guided practice (Mousavi et al., 2025; Siqueira & Gurge-Giannetti, 2011). Furthermore, theoretical frameworks of cognitive training propose that strengthening specific neural networks may lead to improvements in the cognitive processes they support (Cortese et al., 2015).

At the same time, the design of this component acknowledges the limitations identified in the literature, particularly regarding the restricted transfer of cognitive gains to real-life functioning. For this reason, Cognitive Training within the MOTI is not implemented as a standalone intervention but as part of a broader multicomponent framework. Its role is to establish foundational cognitive capacities that are subsequently reinforced and applied through the Academic Skills Training component and supported within the environmental context through Parents' Psychoeducation.

In summary, the Cognitive Training component provides a structured and evidence-informed approach to targeting executive function deficits in adolescents with ADHD. It contributes to the overall intervention by enhancing core cognitive capacities essential for effective engagement in academic tasks and daily activities, while its integration within the broader intervention framework supports the transfer of these skills to meaningful, real-life contexts.

3.5.1.2 Cognitive Training Delivery Tool

The Cognitive Training component of the MOTI represents the most intensive and structured element of the intervention and is delivered through a computer-based format using the Cognifit™ platform. Cognifit™ is a standardised cognitive training and

assessment tool designed to target a range of cognitive domains, including EF, attention, memory, and reasoning (CogniFit Scientific Validation, n.d.; Conesa & Duñabeitia, 2021). The platform incorporates adaptive algorithms that adjust task difficulty in response to individual performance, thereby enabling personalised and progressive training that aligns with principles of neuroplasticity and repeated, targeted cognitive engagement.

The selection of Cognifit™ as the primary delivery tool was informed by its evidence-based structure and its relevance to neurodevelopmental populations, including adolescents with ADHD (Conesa & Duñabeitia, 2021; Horowitz-Kraus, 2013). Its computerised, game-like interface is particularly suited to adolescent users, supporting engagement and sustained participation, while also allowing for consistent delivery of intervention content across participants. In addition, the platform provides objective, standardised metrics of performance, facilitating systematic monitoring of cognitive progress over time.

Importantly, the use of a structured and adaptive cognitive training tool aligns with the rationale of the present study, which seeks to examine the extent to which targeted improvements in EF may contribute to broader functional outcomes. In this context, Cognifit™ enables the repeated practice of key executive processes—such as WM, IC and CF—under controlled conditions. At the same time, the inclusion of this component within a broader multicomponent intervention reflects the recognition that cognitive training alone may produce limited transfer to everyday functioning, as highlighted in the literature.

Evidence from systematic reviews and meta-analyses indicates that computerised cognitive training interventions may lead to small to moderate improvements in trained cognitive domains; however, effects on untrained tasks and real-life outcomes, including academic performance and behavioural regulation, are often inconsistent or limited (Alabdulakareem & Jamjoom, 2020; Azami et al., 2016; Conesa & Duñabeitia, 2021; Elbe et al., 2023; Meyer et al., 2020; Westwood et al., 2023) These findings reinforce the need to embed cognitive training within a wider intervention framework that supports the application and generalisation of skills.

From this perspective, the role of Cognifit™ within the MOTI is to provide a structured foundation for the development of EF, which is subsequently strengthened and

transferred through the AST component and supported within the environmental context through Parents' Psychoeducation. Its design—characterised by adaptability, repeated practice, and engagement—supports the enhancement of targeted cognitive processes, while its integration within the MOTI protocol addresses the broader aim of promoting meaningful changes in adolescents' occupational performance and participation.

The selection of Cognifit™ as the primary delivery and assessment tool is closely aligned with the study's hypotheses and analytical framework. By providing standardised, quantitative indices of EF—particularly in domains such as WM, CF, IC, planning, and attention—the platform enables the direct operationalisation of the study's outcome variables in a manner consistent with Hypotheses 1–5. The use of pre- and post-intervention assessments derived from Cognifit™, complemented by additional neuropsychological measures, supports the evaluation of statistically significant changes in cognitive performance following participation in the MOTI. Accordingly, the study employs a within-subject, pre–post design, allowing for the application of inferential statistical analyses (e.g., paired-samples comparisons) to determine whether observed changes in EF domains are significant relative to baseline performance. In this way, Cognifit™ serves not only as a training medium, but also as a core component of the measurement strategy, ensuring coherence between the intervention, the hypotheses, and the analytical approach.

3.5.1.3 Academic Skills Training

The AST component was designed to facilitate the transfer of cognitive gains into meaningful academic participation, while also addressing the motivational and attributional processes that influence adolescents' engagement in school-related occupations. This aligns directly with the conceptual framework underpinning the StreDi-SPeS, which highlights that academic performance and participation are shaped not only by cognitive abilities, but also by students' causal beliefs, motivation, and patterns of self-regulated engagement (Papagianni & Theodorou, 2026).

The AST consisted of six structured sessions, each lasting approximately 45 minutes, delivered once or twice weekly based on participant preference and available either in person or online. The sessions targeted four key domains: planning and organisation, time management, management of sustained attention, and study strategies, all of which

correspond to domains identified within the StreDi-SPeS framework as central to academic functioning and participation.

The design of this component is informed by evidence indicating that academic engagement and performance decline during adolescence, influenced by a complex interaction of cognitive, emotional, and environmental factors, including motivation, behavioural regulation, and perceptions of competence. In this context, AST aims not only to develop practical skills but also to support more adaptive patterns of engagement and self-regulation, which are critical for sustained participation in academic occupations.

From the perspective of the StreDi-SPeS structure, the AST sessions directly target the domains reflected in its factor model. Skills related to planning, organisation, and time management correspond to challenges associated with academic disorganisation and temporal mismanagement, which are linked to reduced autonomy and inefficient engagement patterns. Similarly, training in attention management and study strategies addresses cognitive-attentional barriers and supports improvements in concentration, information processing, and learning efficiency. In addition, the sessions aim to mitigate attributional distress and academic fatigue by promoting structured routines, achievable goal-setting, and positive learning experiences, thereby fostering a more adaptive relationship with academic tasks. At the same time, the intervention supports the development of self-regulated academic engagement by encouraging students to adopt consistent routines, effective strategies, and a sense of personal agency in their learning.

Importantly, this component is grounded in the principle that skills are more likely to generalise when practised within authentic, ecologically valid contexts. Accordingly, all AST activities are directly linked to students' real academic demands, such as organising schoolwork, preparing for assessments, and managing homework tasks. This approach reflects the StreDi-SPeS emphasis on capturing and addressing lived experiences of academic participation, rather than isolated cognitive or behavioural constructs.

Furthermore, the AST component incorporates strategies to enhance motivation and engagement, recognising that these are critical determinants of participation in both educational and therapeutic contexts. Evidence suggests that motivation influences the initiation and persistence of goal-directed activity and is closely related to students'

beliefs about their ability to influence outcomes. By supporting students in setting achievable goals, developing effective routines, and experiencing success in academic tasks, the intervention aims to reinforce adaptive attribution patterns, particularly those emphasising effort, strategy use, and controllable factors as contributors to success.

Overall, the AST component serves as the primary mechanism through which cognitive gains are translated into functional, occupation-based outcomes. By targeting the organisational, cognitive, and motivational dimensions of academic participation in an integrated manner, it supports improvements not only in performance, but also in engagement, persistence, and self-efficacy within the student role, which are central to adolescents' development and wellbeing.

3.5.1.4 Components of AST

In line with the broader rationale of the intervention, AST addressed four domains:(a) planning, organising, and prioritising, (b) time management, (c) management of sustained attention and focus, and (d) study techniques training. The component was delivered in six sessions of approximately 45 minutes, once or twice weekly depending on student preference, and was available either face-to-face or online. The overall intention of AST was to strengthen self-regulated academic engagement, reduce academic disorganisation and temporal mismanagement, and support participation in the student role. These domains closely resemble the constructs captured in the StreDi-SPeS framework.

3.5.1.4.1 Planning, Organising, and Prioritising

Students first identified personal academic goals, including what level of performance they considered satisfactory for each school subject. They were then guided to identify priority subjects, based on difficulty, importance, or need for additional effort. In addition to school demands, students were asked to consider other occupations they wished to participate in during the week, including leisure, social, sport, or creative activities. This process was intended to support goal-directed behaviour and prioritisation within the student role.

Following this, each student constructed a weekly planner. The planner included all fixed obligations (school timetable, private tutoring, family duties, appointments); all

upcoming tests, exams, homework deadlines, and project deadlines; any planned but optional personal or social activities; and designated periods of free, unstructured time, particularly during the weekend. Students were explicitly encouraged to preserve some free time, as this was considered important for rest, perceived control over time, and balance within daily routines.

Once fixed demands and free time had been identified, students scheduled daily weekday study periods, each lasting at least 90 minutes. These study periods were intended for homework completion, revision, and "deepening knowledge" activities. Students then added specific preparation periods for forthcoming tests and exams. At the end of the exercise, students discussed anticipated barriers (e.g., fatigue, competing demands, low motivation, impractical timing), and the planner was collaboratively revised where necessary.

This set of procedures is most directly aligned with Hypothesis 4 (planning and organisation), because it systematically targets planning, sequencing, prioritisation, and organisational routines. It may also contribute indirectly to Hypothesis 6 (sustained attention) by structuring study time and reducing task overload. In terms of outcomes, the most relevant measures are the planning/organisation indices within CogniFit™, and potentially student-reported changes reflected in broader behavioural measures such as the Greek ADHD Scale and ASEBA, where better organisation may be reflected in reduced everyday difficulties.

3.5.1.4.2 Time Management

Time management was addressed at both a macro-level and a micro-level. The macro-level component was embedded in the weekly planning exercise described above. The micro-level component involved teaching students to use the Pomodoro Technique as a structured approach to short-term study management.

Students were instructed to implement the technique as follows:

Choose one task or subject: students gathered all homework or study demands in front of them, prioritised them, and selected the task considered most important to start with.

Set a timer: students set a timer for 25 minutes and were instructed to work continuously for the entire interval, without switching tasks or using social media.

Take a short break: after the work interval, students took a break of 2–5 minutes, during which they were encouraged to attend to basic needs (e.g., water, toilet) and engage in light movement or stretching.

Repeat the cycle: the sequence was repeated as needed. After three Pomodoro cycles, students were allowed a longer break of up to 20 minutes, and only then were they permitted to check social media or go back online.

The protocol was adapted for attentional capacity. Students with severely reduced attention span were instructed to start with 15-minute work intervals and gradually increase by 2–3 minutes per week until they reached 25 minutes. Students with stronger attention capacity could gradually extend intervals up to 40 minutes, but not beyond.

This domain aligns most directly with Hypothesis 6 (sustained attention) because it targets the ability to remain engaged in a task over a defined time interval, while also supporting Hypothesis 4 (planning and organisation) through time structuring and task sequencing. The most relevant measurement tools are the Continuous Attention Test (CAT) and the attention-related indices of CogniFit™ for Hypothesis 6, and the planning/organisation indices of CogniFit™ for Hypothesis 5. Because time management is also closely linked to reduced procrastination and improved self-regulated engagement, this domain also corresponds conceptually to the StreDi-SPeS dimensions of academic disorganisation and self-regulated academic engagement.

3.5.1.4.3 Management of Sustained Attention and Focus

Students were instructed to optimise their study environment in order to minimise distractions and increase the likelihood of remaining focused during academic tasks. The first step was to identify their own primary sources of distraction. For some students these were auditory (e.g., noise, conversations), whereas for others they were visual (e.g., movement, people passing, looking outside).

Once key distractions had been identified, students were encouraged to implement environmental adaptations such as using white-noise machines, background music, or noise-cancelling earbuds; arranging the desk or study chair so that windows, doors, or movement in the room were less visible; preparing all necessary materials in advance to reduce unnecessary interruptions; informing family members of the planned study period and requesting not to be interrupted during that interval.

The emphasis of this domain was not simply on "trying harder" to pay attention, but on creating a study context that reduced external interference and supported successful task persistence.

This domain aligns primarily with Hypothesis 6 (sustained attention) and secondarily with Hypothesis 3 (inhibitory control), because students are required both to sustain focus and to resist responding to competing distractors. The most relevant measures are the CAT, attention and inhibition indices within CogniFit™, and, where relevant, broader parent- or self-reported behavioural change reflected in the Greek ADHD Scale or ASEBA.

3.5.1.4.4 Study Techniques Training

Students were trained in a range of practical study strategies intended to improve comprehension, retention, organisation of material, and active engagement with school subjects. Training included instruction in how to study and take notes effectively; how to prepare flashcards for memorisation and retrieval practice; how to create timelines, relation charts, and other visual organisers suited to different subjects; how to select strategies appropriate to the content demands of particular school subjects.

Students were additionally instructed in how to "deepen knowledge", meaning how to move beyond minimal completion of homework and towards better understanding of academic material. They were encouraged to identify topics they did not understand, or topics they found interesting and wanted to explore further and then seek supplementary explanations using accessible resources. Examples included online channels or educational material that explained science, mathematics, chemistry, history, or other topics in more concrete, simplified, or engaging ways before returning to school textbooks and formal terminology.

Students were also trained in the selective use of AI tools for study purposes. This involved using AI to clarify concepts, generate explanations, and support revision, rather than replacing active studying or independent thinking. The aim was to use digital supports to strengthen understanding and academic participation.

This domain aligns most strongly with Hypothesis 1 (WM training) because notetaking, summarising, retrieval practice, and use of visual organisers all place demands on holding and manipulating information during learning. It may also support Hypothesis 2

(CF training) through shifting between representations and strategies, and Hypothesis 4 (planning and organisation training) through structured study methods. The most relevant measures are the Digit Span Test and working memory indices in CogniFit™ for Hypothesis 1, the Trail Making Test Part B and CF indices in CogniFit™ for Hypothesis 2, and the planning/organisation indices in CogniFit for Hypothesis 5. From the perspective of StreDi-SPeS, this component addresses cognitive-attentional barriers while promoting more adaptive, self-regulated academic engagement.

3.5.1.5 Parents' Psychoeducation

The Parents' Psychoeducation component constitutes the third pillar of the MOTI and is designed to address the environmental dimension of occupational performance, in alignment with the PEOP model. Within this framework, occupational performance emerges from the dynamic interaction between individual capacities, environmental contexts, and the demands of everyday occupations. Accordingly, this component aims to enhance adolescents' participation in academic and daily activities by supporting the development of enabling home environments and supportive relational contexts.

Parents (or guardians/caregivers) were invited to participate in a structured programme consisting of six weekly 90-minute sessions, delivered in person or online based on participant preference. The inclusion of parents was considered essential, as evidence indicates that family relationships, social support, and the quality of interactions within the home environment play a significant role in adolescents' academic engagement, performance, and overall development (Magnano et al., 2020). In addition, family functioning can be affected by the challenges associated with ADHD, including increased levels of parental stress and relational difficulties (Bauer et al., 2019; Schmengler et al., 2023). From a neurodiversity-informed perspective, these challenges are understood not solely as individual impairments, but as patterns emerging from the interaction between individual differences and environmental expectations, highlighting the importance of adapting contexts to better support participation.

The psychoeducation programme was therefore designed to provide parents with knowledge, practical strategies, and opportunities for reflection, enabling them to better support their adolescents' engagement in meaningful occupations. The programme emphasised strengths-based understanding, developmental awareness, and collaborative

problem-solving, rather than a deficit-focused view. Sessions were interactive and combined structured content delivery (using visual materials such as PowerPoint) with group discussion, allowing parents to share experiences, raise concerns, and apply concepts to their own family context.

3.5.1.5.1 Structure and Content of Sessions

Session 1: Introduction and Overview of ADHD

The initial session focused on building rapport and creating a supportive, collaborative group environment. Parents were invited to share general experiences of raising their adolescents, within comfortable boundaries. The programme's structure, goals, and expectations were introduced, and a brief overview of ADHD was provided, framed as a neurodevelopmental difference within a continuum of human variability.

Session 2: Developmental Perspectives – Childhood

This session explored ADHD within the context of childhood development, including common patterns of behaviour and variability across individuals. Attention was given to understanding differences in development without pathologising them, and to recognising how early experiences and environmental responses shape later participation.

Session 3: Developmental Perspectives – Adolescence and Early Adulthood

The third session focused on the transition to adolescence, a period characterised by increasing academic demands, autonomy, and social complexity. Parents were supported in understanding how these contextual changes interact with their adolescent's cognitive and behavioural profile, influencing participation in school and everyday life.

Session 4: Effective Communication in the Context of ADHD

This session addressed parent–adolescent communication, with emphasis on strategies that support understanding and engagement. Techniques included maintaining clear, respectful communication; allowing time to respond; reducing interruptions; and using positive, specific language. Parents were encouraged to reflect on their own communication patterns and to practise alternative approaches. Within a neurodiversity-

informed framework, communication differences were approached as variations in processing and expression, requiring mutual adaptation rather than correction.

Session 5: Supporting Behaviour Regulation and Setting Boundaries

This session focused on strategies to support behaviour in a consistent, structured way. Parents were introduced to natural and logical consequences, distinguishing them from punitive approaches. Emphasis was placed on setting clear, predictable boundaries while maintaining flexibility and respect for the adolescent's developing autonomy. Parents were encouraged to balance guidance with independence, supporting self-regulation in everyday contexts.

Session 6: Positive Parenting and Supporting Participation in Everyday Activities

The final session focused on practical strategies to support adolescents' participation in daily occupations, particularly academic tasks such as homework, planning, and organisation, as well as social engagement. Parents were introduced to specific strategies used in the intervention (e.g., structured study routines and time-management approaches such as the Pomodoro technique) and were encouraged to reinforce them at home. Importantly, the intervention emphasised recognising and building on adolescents' strengths, interests, and achievements to promote a positive sense of competence and self-efficacy.

Across sessions, the Parents' Psychoeducation component aimed to create a supportive and responsive environment that enables adolescents to apply the cognitive and academic skills targeted in the other components of the intervention. By enhancing parental understanding, communication, and support strategies, this component helps optimise environmental conditions that influence participation.

From a PEOP perspective, this component primarily targets the environmental domain, while also indirectly supporting person-level processes (e.g., motivation, self-regulation) and occupational performance (e.g., engagement in academic tasks and daily routines). Through a neurodiversity-informed approach, the intervention emphasises adapting environments and expectations to better align with adolescents' individual profiles, promoting meaningful participation, autonomy, and wellbeing rather than focusing solely on reducing difficulties.

The parent programme was delivered after completion of the cognitive training phase for adolescents, in order to minimise any potential interaction effects on initial outcome measures.

3.5.1.6 Integration of components

Taken together, the three components of the MOTI operate in a complementary and integrated manner, addressing the dynamic interaction between person, environment, and occupation as conceptualised within the PEOP model of OT. The Cognitive Training component targets person-level capacities by strengthening core EF components—WM, CF, IC, planning, and attention—which form the basis of Hypotheses 1–6. The AST component translates these cognitive processes into contextually meaningful strategies, supporting their application within real academic tasks and thereby facilitating the transfer of gains to occupational performance in the student role. In parallel, the Parents' Psychoeducation component addresses environmental factors by enhancing parental understanding, communication, and support, creating conditions that enable consistent practice and reinforcement of skills at home. Through this multilevel approach, the intervention is designed not only to produce measurable improvements in executive functioning, as assessed through the selected neuropsychological instruments, but also to support broader changes in engagement, organisation, and self-regulation in everyday academic activities. By integrating cognitive development, functional skill acquisition, and environmental support, the MOTI reflects a holistic, neurodiversity-informed approach to intervention, aligning theoretical constructs with measurable outcomes and promoting meaningful participation in occupations central to adolescent development and wellbeing.

3.5.2 Duration of Intervention, Frequency and Delivery

The MOTI was intentionally designed to be brief, flexible, and adaptable, to enhance accessibility, promote engagement, and reduce the risk of participant drop-out. These design characteristics are consistent with current recommendations suggesting that shorter, focused interventions with flexible delivery formats are more likely to sustain participation, particularly among adolescents (Cochrane & Green, 2021; Cohen & Schleider, 2022; Cortese et al., 2015).

For the purposes of the present study, the intervention was implemented over a period of approximately one month, representing a time-limited yet intensive approach. This relatively brief duration was selected to increase acceptability and engagement, as adolescents are more likely to commit to interventions they perceive as manageable and time-efficient. Brief intervention models have also been associated with improved feasibility and adherence, particularly when combined with active and structured training components (Cohen & Schleider, 2022).

The Cognitive Training component was delivered through a computer-based platform accessible from participants' home environments. Students were instructed to engage with the programme at least four times per week, with each session lasting approximately 25 minutes, amounting to a total potential training time of approximately 400 minutes. This format reflects recommendations that frequent, shorter sessions may be more effective than fewer, longer sessions, both in maintaining cognitive engagement and supporting sustained participation (Cochrane & Green, 2021). The platform included automated reminders and performance tracking, supporting consistency and monitoring of adherence.

The AST component had a total duration of 270 minutes, delivered in a concentrated format across multiple sessions. Although equivalent in total duration to a longer-term intervention (e.g., weekly sessions over some months), the condensed delivery was intended to maintain continuity, support rapid skill acquisition, and reduce attrition. This approach allows students to apply strategies close to learning, reinforcing retention and transfer.

A central feature of the MOTI is its flexibility of delivery, both in scheduling and format. Students were able to access the cognitive training component at times of their own choosing, within recommended guidelines to ensure effective engagement. Similarly, intervention sessions—including AST and Parents' Psychoeducation—could be delivered either face-to-face or online, based on participant preference and practical considerations. This flexibility reduces common barriers to participation, such as travel time and scheduling conflicts, and supports integration of the intervention within adolescents' existing routines.

In addition to enhancing accessibility, flexibility and adaptability support engagement and sustained participation. Adolescents vary in their cognitive profiles, motivation, and

daily demands; therefore, rigid intervention formats may limit adherence. Within the MOTI, adaptability is embedded at multiple levels. Cognitive training tasks automatically adjust in difficulty according to individual performance, maintaining an optimal level of challenge. AST strategies (e.g., time management and attention techniques) are modified based on each student's capacity and readiness, while Parents' Psychoeducation allows for contextual tailoring to individual family environments. This responsiveness promotes a sense of competence, autonomy, and relevance, which are recognised as important drivers of engagement. By allowing participants to actively shape aspects of their intervention (e.g., when and how they engage), the protocol also supports the development of self-regulation and organisational skills, reinforcing the very capacities it aims to enhance.

The integration of brief duration, flexible delivery, and adaptive content is believed to strengthen the generalisability and real-world applicability of the intervention. Traditional intervention models that rely on extended duration and fixed delivery formats may be less feasible within everyday clinical or community contexts. In contrast, the present design reflects contemporary recommendations for accessible, scalable, and context-sensitive interventions that can be implemented across diverse settings, including home, school, and telehealth environments (Cochrane & Green, 2021; Cohen & Schleider, 2022). From an OT perspective, this alignment is particularly important, as interventions must be embedded within clients' daily routines and support participation in meaningful occupations.

Furthermore, by integrating structured cognitive training with context-based skill development and environmental support, the MOTI bridges the gap between controlled intervention delivery and functional performance in everyday life. This enhances the ecological validity of the study, while supporting the translation of intervention effects into real-world outcomes. The design therefore reflects a balance between methodological rigour and practical feasibility, positioning the intervention as not only effective within the research context, but also transferable to routine OT practice.

The overall intervention process was overseen by the researcher, a qualified OT, ensuring consistency in delivery and adherence to the protocol.

3.6 Research Design

The present study adopts a quantitative, quasi-experimental research design. Quasi-experimental approaches are widely employed in applied and clinical research contexts where random assignment to treatment conditions is impractical or ethically constrained, yet the evaluation of causal relationships remains essential (Charness et al., 2012; Steingrimsdottir & Arntzen, 2015; Zolan, 2026). Unlike true experimental designs, quasi-experiments do not rely on randomisation; instead, they make use of naturally occurring or pre-existing groups, thereby enabling investigation within real-world settings (Capili & Anastasi, 2024; Price, P. C., Jhangiani, R., & Chiang, 2018). This makes them particularly suitable for intervention-based research conducted in naturalistic environments, where control over participant allocation is limited (Capili & Anastasi, 2024).

In line with this, the chosen design incorporates pre- and post-intervention measurements, allowing for the assessment of changes over time within participants, as well as comparisons across individuals exposed to the intervention (Nianogo et al., 2023). Pre–post quasi-experimental designs are especially valuable for evaluating the effectiveness of interventions, as they facilitate the examination of outcome changes attributable to a given treatment by comparing baseline and follow-up measures (Nianogo et al., 2023). Furthermore, quasi-experimental methods have been shown to approximate the logic of randomised controlled trials, while accommodating the practical constraints often encountered in real-world research (Maciejewski, 2020).

As this study focuses on a novel treatment approach, the primary aim is to determine the extent to which participants benefit from their involvement in the intervention. Consistent with methodological guidance, quasi-experimental designs are particularly appropriate when the objective is to evaluate intervention outcomes in applied settings rather than to directly compare competing treatments (Cham et al., 2024). Accordingly, the emphasis is placed on within-group change and overall effectiveness, rather than on comparative efficacy against alternative interventions.

3.6.1 Population and Sampling

A total of 54 participants were enrolled using non-probability convenience sampling, based on voluntary response to the open call. Convenience sampling was necessary due to the absence of a centralised registry of adolescents with ADHD in Cyprus, limiting the feasibility of probability-based approaches (Ahmed, 2024; Battaglia, 2008). For detailed description see Chapter 4 Results – section 4.1 Participant Characteristics.

3.6.1.1 Sample size and Sampling Justification

Reliable epidemiological data on ADHD prevalence in Cyprus are limited, which constrained the determination of an optimal sample size and the feasibility of probability-based sampling. The most recent disaggregated estimate originates from the Ministry of Education's 2016–2017 Annual Report, documenting 742 students who received Educational Psychology Services for ADHD, of whom 226 were enrolled in secondary education (Ministry of Energy and Mineral Resources Annual Report 2016, 2016) . This figure, however, reflects only those adolescents who accessed services and does not represent the total population of individuals with ADHD in Cyprus.

More recent reports e.g. Ministry of Education (2024) classify ADHD within a broader category of "other neurodevelopmental disorders," encompassing ASD and movement disorders, and report 1,126 students aged 5–18 across all educational levels. These aggregated figures do not provide ADHD-specific prevalence data, further limiting the accuracy of population estimates required for formal sample size calculations.

Given the absence of precise and up-to-date epidemiological data, a non-probability convenience sampling approach was adopted. Recruitment was based on voluntary participation following an open call disseminated through schools, professional associations, and parent networks. Convenience sampling is commonly employed in applied and clinical research when access to a defined sampling frame is restricted (S. K. Ahmed, 2024; Battaglia, 2008), as was the case in the present study.

A total of 69 adolescents meeting the inclusion criteria were ultimately enrolled. Of them, 54 completed the intervention and are included in any statistical analysis. For details refer to section 4.1 Participant Characteristics. This sample size reflects both the

practical constraints of recruitment within the Cypriot context and the methodological suitability of repeated-measures designs, which enhance statistical power by reducing between-person variability.

3.6.2 Recruitment

Recruitment was facilitated through an open call distributed via school counsellors, the ADD-ADHD Cyprus Association, professional organisations (e.g., the Pancyprian Association of Psychotherapy), and parent associations across Cyprus. This strategy maximised accessibility and ensured broad dissemination in the absence of a national ADHD registry. This recruitment approach was designed to maximise accessibility and participation, particularly given the absence of a centralised registry of individuals with ADHD in Cyprus.

Inclusion and exclusion criteria were applied, as described in section 3.1 Participants and Recruitment. These criteria were established to ensure a relatively homogeneous sample and to minimize potential confounding variables that could affect the interpretation of intervention outcomes.

3.6.3 Ethical Considerations

Ethical approval for the study was initially obtained from the Department of Rehabilitation Sciences of the Cyprus University of Technology, under which the research was conducted as a doctoral study. Subsequently, approval was granted by the Cyprus National Bioethics Committee (Reg. No.: ΕΕΒΚ/ΕΠ/2021/10, dated 11/06/2021), (App. 1) the national authority responsible for the review and approval of research involving human participants.

Although the study was not conducted within school premises, additional approval was obtained from the Centre for Educational Research and Evaluation of the Cyprus Ministry of Education, Sports and Youth (Reg. No.: 7.15.01.25.8.2/6, dated 11/08/2021), (App.2) ensuring compliance with national educational research guidelines.

Participation required the provision of written informed consent from both parents or legal guardians and the adolescent participants. The consent process ensured that all

parties were fully informed regarding the study's aims, procedures, and any potential risks or benefits. Participation was entirely voluntary, and consent was obtained prior to the commencement of any research procedures.

3.7 Data Collection and measures

Data collection followed a multi-method approach combining standardised psychometric instruments, researcher-developed questionnaires, and performance-based cognitive assessments. The use of multiple data sources was intended to enhance construct validity and provide a comprehensive evaluation of participants' behavioural, cognitive, and emotional functioning. All selected instruments were chosen based on their established reliability and validity in the literature, particularly in relation to adolescent populations and ADHD research.

3.7.1 Sociodemographic Information

Sociodemographic information was collected through structured questionnaires completed by both parents and adolescents. These questionnaires were developed specifically for the purposes of the present study and captured key variables such as age, gender, educational background, and family characteristics. All researcher-developed data collection forms used in the present study are included in Appendix 3 & 4.

3.7.2 ADHD Symptom Severity

Core ADHD symptoms were assessed using the ADHD-Greek Scale, an 18-item parent-reported Likert-type questionnaire comprising two subscales—Attention Deficit and Hyperactivity–Impulsivity—each containing nine items (Kalantzi-Azizi et al., 2012). Parents rate the frequency of behaviours on a 4-point scale ranging from 0 ("almost never") to 3 ("almost always"), with higher scores indicating greater symptom severity. Subscale scores range from 0 to 27, and the total score reflects overall symptom expression, although the instrument is not diagnostic. The higher-scoring subscale indicates the dominant ADHD presentation. Parent-report measures such as this are widely used in ADHD research because they provide ecologically valid insights into adolescents' everyday functioning across home and school contexts.

3.7.3 Behavioural and emotional functioning

General mental health and behavioural functioning were assessed using the Achenbach System of Empirically Based Assessment (ASEBA), including the Child Behavior Checklist (CBCL 6–18) and the Youth Self-Report (YSR 11–18). These instruments assess a broad spectrum of emotional and behavioural problems, including internalising and externalising symptoms, as well as DSM-oriented scales (Achenbach & Rescorla, 2005). The ASEBA system is widely recognised for its strong psychometric properties and cross-informant design.

In addition to behavioural measures, a range of standardised cognitive tasks was administered to assess executive functions. WM was evaluated using the Digit Span Test, which requires participants to recall sequences of digits in forward and backward order, as well as a researcher-developed variation including a distraction component. The Digit Span Test is widely used as a measure of short-term and working memory capacity (Hillbert et al., 2014). Further assessment of cognitive functioning was conducted using the CogniFit™ Cognitive Assessment Battery, a computerised neuropsychological tool that evaluates multiple cognitive domains, including WM, attention, IC, planning, and CF (CogniFitTM 2023).

IC was assessed using a Continuous Attention Test (CAT) based on the Conners Continuous Performance Test paradigm (Shaked et al., 2020). This task requires participants to respond to target stimuli while inhibiting responses to non-target stimuli, thereby providing indices of sustained attention, impulsivity, and response inhibition. Outcome measures include omission errors, commission errors, and reaction time, which are commonly used indicators of attentional control and inhibitory processes.

CF was measured using the Trail Making Test (Parts A and B), a widely used neuropsychological instrument assessing processing speed, mental flexibility, sequencing, and visuomotor abilities (Bowie & Harvey, 2006; Kortte et al., 2002). Improvements in completion time are generally interpreted as enhanced EF.

Additional self-report and parent-report measures were administered to capture broader psychosocial constructs relevant to ADHD. These included the STReDI-SPES (theoretically based on Attribution Theory) (Papagianni & Theodorou, 2026), the Rosenberg Self-Esteem Scale (Galanou et al., 2014; M. Rosenberg, 1965), and a Greek-

adapted version of Tuckman's Procrastination Scale (Tuckman, 1991), while emotional regulation variables such as anger and aggression were measured using validated Greek instruments (Makri-Botsari, 2010) Together, these measures allowed for a multidimensional understanding of participants' functioning and potential changes following the intervention.

Although not originally developed as an intervention outcome measure, the STReDI-SPeS was used in the present study as both a participation-focused assessment and an outcome measure due to its demonstrated sensitivity to ADHD-related participation difficulties. Previous psychometric investigation (Papagianni & Theodorou, 2026) showed that the total score, and particularly the domains of academic disorganization and cognitive-attentional barriers, differentiated adolescents with ADHD from typically developing adolescents. However, the instrument was found to be more suitable for profiling participation-related needs than for screening or diagnosis. Consequently, it was employed to evaluate participation-related changes following intervention.

3.7.4 EF and cognitive measures

EF constitutes a complex, heterogeneous, and multidimensional construct. Its valid assessment requires the use of multiple complementary methods because no single measure adequately captures all EF components (Idowu et al., 2024; Wallisch et al., 2018). Furthermore, EF measures are frequently affected by task impurity, whereby tasks designed to assess a specific EF component also require additional cognitive abilities such as language, visuospatial processing, or processing speed (van der Sluis et al., 2007). As a result, performance on one EF measure does not necessarily predict performance on another task targeting the same construct (Shejet & Lozano Gutiérrez, 2019; van der Sluis et al., 2007).

Given the absence of consensus regarding optimal EF assessment and the diversity of theoretical approaches to EF (Miyake et al., 2000; van der Sluis et al., 2007), reliance on a single measure risksingle measure riskthe construct. Therefore, the present study employed a multimethod EF assessment battery integrating neuropsychological tests, computerised cognitive tasks, continuous performance measures, and self-report

instruments to capture a more comprehensive and ecologically valid profile of EF before and after intervention.

Within this assessment battery, the CogniFit™ Cognitive Assessment Battery served as the primary computerised measure of EF. The battery provides standardised performance indices across domains relevant to ADHD, including WM, sustained attention, IC, planning, processing speed, and CF. Performance on each task is automatically recorded and compared against age-referenced normative data, generating domain-specific scores that allow the identification of relative cognitive strengths and weaknesses. Computerised assessment offers the additional advantage of precise measurement of response accuracy and reaction times, providing objective indicators of cognitive performance that complement traditional neuropsychological measures. In the present study, CogniFit™ outcomes were used to provide a broader profile of executive and attentional functioning before and after intervention.

3.7.5 Working Memory

WM was assessed using the Digit Span Test, which requires participants to recall sequences of digits in both forward and backward order, as well as a researcher-developed variation incorporating a distraction component. The Digit Span Forward condition primarily assesses attention span and short-term verbal memory, whereas the Digit Span Backward condition places greater demands on working memory, mental manipulation, and executive control. The distraction condition was included to assess the ability to maintain and manipulate information in WM in the presence of competing stimuli, a difficulty commonly reported among individuals with ADHD. Performance was evaluated based on the maximum number of digits correctly recalled and overall recall accuracy. The Digit Span Test is widely used as a measure of short-term and WM capacity and has demonstrated utility in the assessment of attentional and EF difficulties (Hillbert et al., 2014).

3.7.6 IC and Sustained Attention

IC and sustained attention were assessed using a CAT based on the Conners Continuous Performance Test paradigm (Shaked et al., 2020). Continuous performance tasks are widely used in ADHD research because they provide objective behavioural indices of

attentional control and response inhibition. Participants were required to monitor a continuous series of stimuli and respond selectively to designated targets while suppressing responses to non-target stimuli. Performance was evaluated using omission errors, commission errors, and reaction time. Omission errors are considered indicators of inattention and failures in sustained attention, whereas commission errors reflect impulsive responding and reduced inhibitory control. Reaction time serves as an indicator of processing speed and attentional efficiency, while increased variability in response speed may suggest fluctuations in attentional regulation. Together, these indices provide a comprehensive assessment of vigilance, sustained attention, impulsivity, and IC.

3.7.7 Cognitive Flexibility

CF was measured using the Trail Making Test (Parts A and B), a widely used neuropsychological instrument assessing processing speed, mental/cognitive flexibility, sequencing, and visuomotor abilities (Bowie & Harvey, 2006; Kortte et al., 2002). Part A primarily assesses visual attention, scanning, and processing speed, whereas Part B places additional demands on CF and executive control by requiring participants to alternate between numerical and alphabetical sequences. In addition to completion times for Parts A and B, the B−A difference score was calculated.

The B−A difference score was examined. The difference score has been proposed as an index of CF and set-shifting that reduces the influence of basic processing speed and visuomotor demands common to both task conditions (Bowie & Harvey, 2006). Lower scores indicate reduced executive switching costs and more efficient CF (Bowie & Harvey, 2006; Kortte et al., 2002).

3.7.8 Data Collection Procedure

Data collection was carried out in five sequential stages, following recruitment and screening procedures. All procedures were conducted by the researcher, a trained and certified OT, under the supervision of the doctoral advisory team.

Stage 1: Recruitment and Initial Contact

Following dissemination of the participation call, interested parents contacted the researcher via telephone, email, or an online form. During this initial contact, general information about the study was provided and a preliminary screening was conducted to determine basic eligibility criteria (age and ADHD diagnosis).

Stage 2: Eligibility Assessment and Consent

Eligible families were invited to participate in structured interviews with both parents and adolescents. These interviews gathered detailed information regarding developmental history, ADHD-related symptoms, academic performance, and prior interventions. Based on this information, final eligibility decisions were made. Written informed consent was subsequently obtained from both parents (or legal guardians) and adolescent participants.

Stage 3: Pre-intervention Assessment

Participants who met the inclusion criteria proceeded to the baseline assessment phase. At this stage, both parents and adolescents completed the full set of questionnaires and cognitive assessments. Parents completed the ADHD Greek Scale and ASEBA questionnaires, while adolescents underwent cognitive testing (Digit Span Test, Continuous Attention Test, Trail Making Test, and CogniFit Assessment battery) and self-report measures.

Stage 4: Intervention Phase

The intervention phase consisted of a 30-day programme combining computerised cognitive training and AST. Participants were instructed to complete at least one 25-minute cognitive training session, four times per week. AST was introduced toward the end of the cognitive training period to support strategy use and functional application.

Stage 5: Post-intervention Assessment

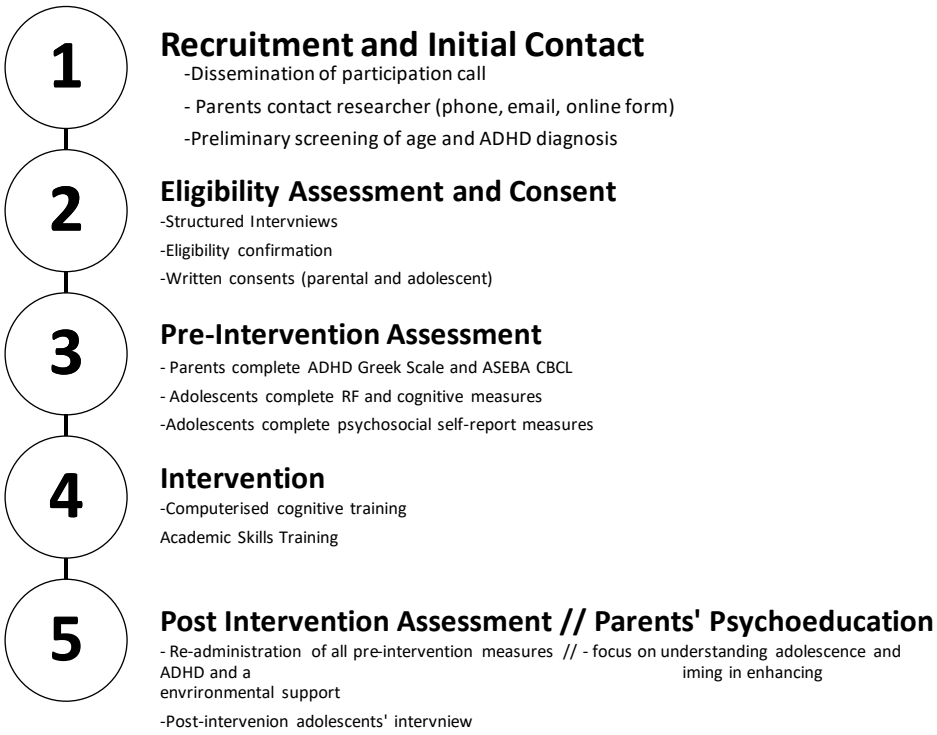
Upon completion of the intervention, all pre-intervention measures were re-administered to assess changes in cognitive, behavioural, and emotional functioning. A post-intervention interview was also conducted, focusing on perceived changes in symptoms, strengths, and daily functioning.

In parallel with the intervention, a voluntary six-session psychoeducational programme for parents was offered to parents. The sessions aimed to enhance parental

understanding of ADHD and support the development of consistent environmental strategies. Participation in this programme was not required for inclusion in the study and was not part of the formal outcome evaluation.

Figure 2 illustrates the five sequential stages (and one parallel component) of the data collection process, outlining participant flow from recruitment through eligibility screening, pre-intervention assessment, intervention completion and post-intervention evaluation, alongside the parallel parent psychoeducation component.

Figure 2: Data Collection Procedure



3.8 Data Analysis

Statistical analysis was conducted using IBM SPSS Statistics (Version 25.0). A significance level of $p < .05$ was adopted for all inferential analyses, reflecting the conventional threshold for determining statistical significance in behavioural and clinical research (Field, 2013; Pallant, 2020).

Data screening was undertaken prior to analysis to identify incomplete, inconsistent, or invalid responses. Cases with substantial missing data or evidence of invalid response patterns (e.g., identical responses across an entire questionnaire) were excluded from the relevant analyses. Consequently, sample sizes varied across outcome measures, and all

analyses were conducted using available valid data. For pre-post comparisons, only participants with valid scores at both assessment points were included in the respective paired analyses.

Descriptive statistics were initially calculated for all study variables. For continuous variables, measures of central tendency and dispersion were reported according to the distributional characteristics of the data. Normally distributed variables were summarised using means and standard deviations, whereas non-normally distributed variables were described using medians and interquartile ranges. Minimum and maximum values were also examined to assess score variability and identify potential outliers. Categorical variables were summarised using frequencies and percentages.

Prior to inferential analyses, the distribution of continuous variables was examined through visual inspection of histograms, Q-Q plots, boxplots, and formal tests of normality. The Shapiro-Wilk test was used to assess normality due to its suitability and sensitivity for small to moderate sample sizes (Field, 2013; Pallant, 2020) Variables demonstrating significant departures from normality were analysed using non-parametric statistical procedures.

To evaluate intervention-related changes, pre- and post-intervention scores were compared using paired analyses. For variables that violated normality assumptions, the Wilcoxon signed-rank test was employed. The Wilcoxon signed-rank test is the non-parametric alternative to the paired-samples t-test and is appropriate for repeated measurements obtained from the same participants when data are ordinal or non-normally distributed (Field, 2013; Pallant, 2020). For variables meeting assumptions of normality, paired-samples t-tests were conducted where appropriate.

Associations between continuous variables were examined using Spearman's rank-order correlation coefficient (Spearman's rho) when variables were non-normally distributed. Spearman's rho is a non-parametric measure of association that evaluates the strength and direction of monotonic relationships without requiring normally distributed data (Field, 2013; Pallant, 2020). Associations between categorical variables were examined using Pearson's chi-square test.

Given the repeated-measures design, all pre-post analyses were conducted on paired observations, thereby accounting for the dependence between measurements obtained

from the same participants. No formal adjustment for multiple comparisons (e.g., Bonferroni correction) was applied. This decision was made because the study was exploratory in nature and sought to examine a broad range of cognitive, behavioural, and psychosocial outcomes. Consequently, statistically significant findings should be interpreted with appropriate caution, particularly when considering isolated effects across multiple outcome measures.

Overall, the analytical strategy was selected to ensure that statistical procedures were aligned with the measurement characteristics and distributional properties of the data, thereby maximising the validity, robustness, and interpretability of the findings.

4 Results

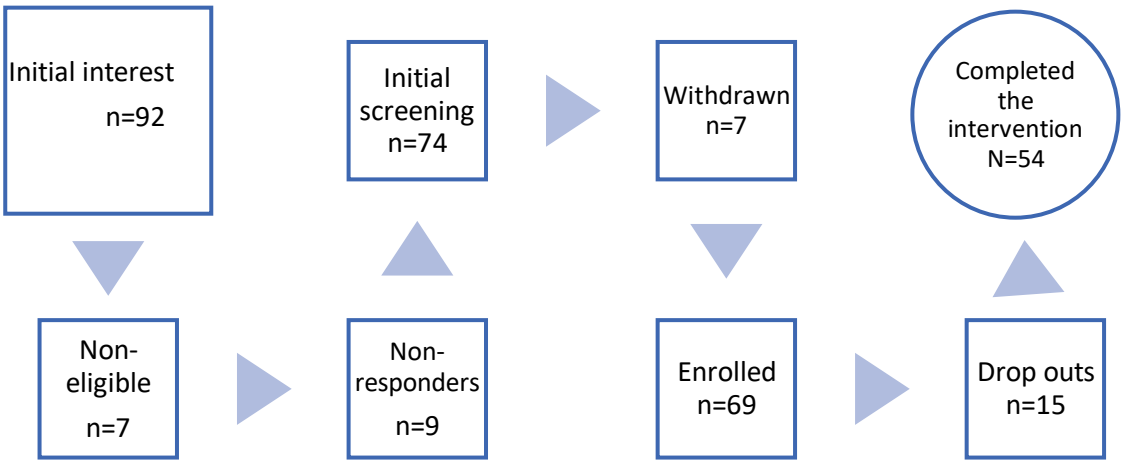
This chapter presents the findings of the study assessing the impact of the MOTI on executive functioning in adolescents with ADHD in Cyprus. Results are reported in the order outlined in the methodology: participant characteristics, baseline measures, post-intervention outcomes, and statistical analyses. Data are presented objectively without interpretation; discussion of their significance will follow in Chapter 6.

4.1 Participant Characteristics

4.1.1 Recruitment and Retention

A total of 92 parents made an initial contact to express their interest or to collect more information about the study. After initial screenings, 69 adolescents were eligible to participate and thus, enrolled in the study. A percentage of 20.28% dropped out or withdrew from the study and the rest 79.71% (N=54) completed the intervention. A visual representation of the procedure's flow is demonstrated in figure 3.

Figure 3: participants' flow.



4.1.2 Demographic Profile

The demographic characteristics of the sample are presented in Table 4. The final sample consisted of 54 participants, with a higher proportion of males (67%) compared to females (33%). Participants were aged between 13 and 17 years, with a mean age of 14.38 years (SD = 1.48), indicating that the sample primarily comprised early to mid-adolescents.

Regarding geographical distribution, the majority of participants resided in Limassol (66.66%), followed by Nicosia (22.22%), with smaller proportions from Larnaka (9.25%) and Pafos (1.85%).

Family income levels were relatively evenly distributed across categories, although a larger proportion reported high income (38.88%), followed by average (29.62%) and low income (25.92%), with a small percentage of missing data (5.5%). For the purposes of the current research, average income is the official estimation announced by the government of the Republic of Cyprus, high income is the self-reported income which is higher than the average and low income is, respectively, the income which is lower than the average.

Parental education data shows that among fathers (n = 47), most had completed higher education (44.68%), followed by postgraduate studies (Master's degree: 19.14%; PhD: 2.12%), while smaller proportions had completed basic (21.27%) or vocational education (12.76%). A similar pattern was observed for mothers (n= 49), with the majority holding higher education (44.89%) or postgraduate qualifications (Master's degree: 34.69%; PhD: 2.04%).

Finally, most participants lived in two-parent households (74.07%), while approximately one-quarter (25.92%) reported living in single-parent families.

Table 4. Demographic characteristics of participants (N=54).

Variable	**Category**	**n**	**%**
Gender	Male	36	67.00
	Female	18	33.00
Age	M (SD)	-	14.38 (1.48)

	Range	-	13-17
Town	Nicosia	12	22.22
	Limassol	36	66.66
	Larnaka	5	9.25
	Pafos	1	1.85
Family income	Low	14	25.92
	Average	16	29.62
	High	21	38.88
	Missing	3	5.50
Parents' educational status	**Father (n=47)**		
	Basic education	10	21.27
	Technical / vocational education	6	12.76
	Higher education	21	44.68
	MSc	9	19.14
	PhD	1	2.12
	Mother (m=49)		
	Basic education	6	12.24
	Technical / vocational education	3	6.12
	Higher education	22	44.89
	MSc	17	34.69
	PhD	1	2.04
Family type	Two-parent household	40	74.07

	Single-parent household	14	25.92

Note: percentages are based on available data. Father n=47; Mother n=49; Total sample N=54.

4.1.3 Family Mental Health Profile

Information regarding the presence of ADHD and other mental health disorders among family members is presented in Table 5. No confirmed cases of ADHD were reported for either mothers or fathers; however, ADHD was confirmed in 7 siblings. Suspected (as defined by the presence of symptoms but not formal diagnosis) ADHD was reported in 14 mothers, 12 fathers, and 12 siblings.

Regarding other mental health conditions, confirmed diagnoses were reported for 1 mother, 3 fathers, and 8 siblings. Additionally, suspected mental health disorders were identified primarily among fathers (n = 12), with minimal suspected cases reported for siblings (n = 1) and none for mothers.

Overall, the findings suggest a higher occurrence of both confirmed and suspected neurodevelopmental and mental health difficulties within the broader family context, particularly among siblings and fathers.

Table 5. Family history of ADHD and Mental health conditions.

Construct	Mother	Father	Sibling
ADHD-confirmed	0	0	7
ADHD-suspected	14	12	12
Mental Health disorders – confirmed	1	3	8
Mental health disorders - suspected	0	12	1

Note: values represent the number of family members reported for each category.

4.1.4 ADHD diagnostic presentation

Table 6 presents participants' ADHD diagnostic presentation across gender. The inattentive subtype was the most common overall, accounting for 58.18% of the sample, with slightly higher prevalence among females (63.15%) compared to males (55.5%). In contrast, the hyperactive–impulsive subtype was less frequent, representing 41.81% of the total sample, and was more commonly observed in males (44.4%) than in females (36.85%).

Overall, the findings indicate a predominance of inattentional presentations across both genders, while hyperactive–impulsive symptoms were relatively more characteristic of male participants.

Table 6. ADHD diagnostic presentation by gender.

Presentation	Male	Female	Total
Inattentional	20 (55.55%)	12 (66.66%)	32 (59.25%)
Hyperactive – Impulsive	16 (44.44%)	6 (33.33%)	22 (40.74%)

Note: values represent number of adolescents. Percentages in the Male and Female columns represent proportions within each gender group. Percentages in the Total column represent proportions based on the full sample (N = 54).

4.1.5 Treatment history

Table 7 presents participants' previous and current treatment status. The majority of participants had not received any form of treatment either during their development (n = 40) or at the time of the intervention (n = 42). Among those who had received treatment, non-pharmacological interventions were more common than medication-only approaches at both time points. A small number of participants reported combined treatments involving both medication and non-pharmacological approaches. Notably, there was a slight increase in the number of participants receiving medication at the time of the intervention compared to earlier stages.

Table 7. Previous and Current Treatment Status of Participants (N=54)

Type of treatment	Any time during development	At the time of intervention
Medication only	1	5
Non-pharmacological only	11	6
Combination (medication + non-pharmacological)	3	2
None	40	42

Note. Values represent the number of adolescents reporting each treatment type. Counts are based on the full sample (N = 54).

4.2 Pre-Intervention Measures

4.2.1 ADHD Core Symptoms

It is important to note that, within the context of the present study, all the scales used do not serve a diagnostic function. Accordingly, the primary focus lies in examining potential changes in symptom scores from pre- to post-intervention, rather than in assessing the presence or severity of ADHD-related risk among participants.

Core ADHD symptoms, including attention difficulties and hyperactivity–impulsivity, were assessed using multiple complementary instruments to enhance the robustness of measurement.

In the pre-intervention assessment, as presented on Table 8, participants demonstrated elevated levels of ADHD-related symptoms as measured by the ADHD-Greek Scale. The mean score on the Attention Deficit subscale was 17.86 (SD = 6.32), indicating moderate to high levels of attentional difficulties across the sample.

In comparison, the Hyperactive/Impulsive subscale yielded a lower mean score of 9.77 (SD = 6.39), reflecting low to moderate levels of hyperactive and impulsive symptoms.

Taken together, these findings suggest that the sample was characterized primarily by attentional difficulties rather than overt hyperactive or impulsive behaviours.

Table 8. Pre-Intervention Scores on the ADHD – Greek Scale.

Subscale	Score
Attention deficit scale	M=17.86 (SD= 6.32)
Hyperactive/Impulsive scale	M=9.77 (SD= 6.39)
ADHD-Greek scale combined	Mdn=25.5 (IQR=18-31.8)

Note. Mean and standard deviation are reported for normally distributed subscales. Median and interquartile range are reported for the combined score due to non-normal distribution.

Pre-intervention scores on the ADHD-Greek Scale showed different distribution patterns across subscales. The Attention Deficit scale (M = 17.86, SD = 6.32) and the Hyperactive/Impulsive scale (M = 9.77, SD = 6.39) were reported using means and standard deviations, indicating approximately normal distributions. This suggests that attentional symptoms and hyperactive/impulsive behaviours were spread relatively evenly across participants, with no extreme skewness. Symptom severity in these domains appears moderate, reflecting consistent difficulties in sustained attention and impulse regulation.

In contrast, the ADHD-Greek combined score was reported using a median and interquartile range (Mdn = 25.5, IQR = 18–31.8), reflecting a non-normal distribution. This pattern indicates greater variability and possible skewness in overall ADHD symptom severity, suggesting that some adolescents presented with substantially higher combined symptom levels than others.

Overall, the results indicate moderate and relatively stable difficulties in attention and hyperactivity/impulsivity at baseline, alongside greater variability in overall ADHD severity, highlighting a heterogeneous symptom profile within the group prior to intervention.

Table 9 summarises the pre-intervention scores of the Achenbach System of Empirically Based Assessment (ASEBA). Both Checklists for Parents (CBCL) and Checklists for Adolescents (YSR) follow two different assessment systems: DSM-based scale and Syndrome Scale.

Table 9. Pre-Intervention ASEBA Scores on CBCL and YSR

Scale	M (SD)
YSR Syndrome Scale – Attention difficulties	9.20 (3.55)
YSR DSM Scale	8.26 (3.26)
CBCL Syndrome Scale	8.63 (3.93)
CBCL DSM Scale	6.93 (3.18)

Note. All values represent mean scores and standard deviations from the ASEBA adolescent and parent report forms at pre-intervention.

Pre-intervention ASEBA scores indicated elevated levels of attention-related difficulties across both adolescent self-reports and parent reports. On the adolescents' measures, the mean score for the Syndrome Scale attention difficulties was 9.20 (SD = 3.55), while the DSM-oriented scale yielded a mean of 8.26 (SD = 3.26). Similarly, parent-reported scores suggested comparable levels of difficulties, with a mean of 8.63 (SD = 3.93) on the Syndrome Scale and 6.93 (SD = 3.18) on the DSM scale.

Overall, these findings indicate the presence of notable attention-related symptoms at baseline; however, mean scores remained below clinical threshold levels, suggesting elevated but not clinically severe symptomatology across the sample.

The emerging profile of the participants as formed based on the presentation of the core symptoms indicates a predominantly inattentive symptom profile, with higher Attention Deficit scores in ADHD-Greek scale. This aligns and somewhat confirms the diagnoses as reported by parents.

4.2.2 EF and other Cognitive Functions

The results are presented based on the assessment tool used pre- and post-intervention. EF and cognitive outcomes are summarised beginning with the pre-intervention Cognifit scores, as presented in Table 10, which provide the baseline against which post-intervention changes were evaluated.

Table 10. Pre-Intervention Cognifit™ Assessment Battery Scores

Cognitive Domain	Mdn (IQR)
Cognifit Planning	540 (240.5-700)
Cognifit working memory	307 (169.5-483)
Cognifit short-term memory	407 (192-590.5)
Cognifit focused attention	458 (258-610)
Cognifit inhibition	36 (13-223.5)

Note. Median and interquartile range (IQR) are reported due to non-normal distributions across all Cognifit™ Assessment Battery variables.

Pre-intervention CogniFit Assessment Battery scores indicated variability across EF domains within the sample. Planning and focused attention showed relatively higher median scores (Mdn = 540 and 458, respectively), suggesting comparatively better performance in these areas. In contrast, WM (Mdn = 307) and short-term memory (Mdn = 407) were more moderate, indicating challenges in information processing and retention. Notably, inhibition demonstrated the lowest median score (Mdn = 36) and a wide interquartile range, reflecting substantial variability and suggesting marked difficulties in IC among participants.

Overall, the pattern of results indicates uneven executive functioning at baseline, with pronounced weaknesses in IC and WM.

Table 11, below, presents adolescents' pre-intervention self-reported difficulties across cognitive, attentional, and behavioural domains. Median scores indicate notable challenges in thought bombardment (4), memory difficulties (4), attention difficulties (4), and planning and organizing difficulties (4), suggesting substantial executive-function strain.

Table 11. Pre-Intervention Self-Reported Cognitive, Attentional and Behavioural Difficulties.

Construct	Mdn (IQR)
Thought bombardment	4 (3-5)
Mind absence	2 (2-3)
Impulsive decisions	2.5 (1-3)
Impulsive talking	3 (2-3)
Inability to control behavriour	2 (1-3)
Memory difficulties	4 (3-4)
Attention difficulties	4 (4-4)
Planning and organising difficulties	4 (4-4)
Sustained attention during homework	2(1-2)
Sustained attention during class	2(1-2)

Note. Median and interquartile range (IQR) are reported due to non-normal distributions across all self-reported variables.

Moderate levels of impulsivity (impulsive talking and decision-making) and behavioural control difficulties are also evident. Scores for sustained attention during homework and class are low (median = 2), highlighting reduced capacity to maintain focus in academic contexts.

Overall, the table depicts a high cognitive load, ED, and context-dependent attentional instability of the participant students.

Pre-intervention performance on the Trail Making Test was examined to characterise baseline processing speed, CF, and executive cost among participants, with scores being presented in Table 12.

Table 12. Pre-Intervention Trail Making Test Measures (N=53)

Measure	Median	IQR	Mean	SD	Shapiro–Wilk W	p
Trail Making A (Pre)	35	26–42	36.30	13.58	.904	< .001
Trail Making B (Pre)	83	65–107	87.72	27.67	.975	.334
Trail Making B–A (Pre)	46	32–68	51.42	25.12	.948	.023

Note. Shapiro–Wilk tests were used to assess normality.

Descriptive statistics indicated substantial variability across all three measures. Trail Making A, which assesses basic visual sequencing and processing speed, showed a median completion time of 35 seconds (IQR = 26–42). Trail Making B, a more demanding measure of alternating sequencing and cognitive flexibility, demonstrated markedly slower performance, with a median of 83 seconds (IQR = 65–107). The derived executive cost score (B–A) also showed considerable individual differences, with a median of 46 seconds (IQR = 32–68), reflecting variability in the additional cognitive load required for alternating sequencing.

Normality testing using the Shapiro–Wilk statistic indicated that Trail Making A ($W = .904$, $p < .001$) and Trail Making B–A ($W = .948$, $p = .023$) significantly deviated from normality, whereas Trail Making B did not ($W = .975$, $p = .334$). These findings support the use of non-parametric inferential analyses for subsequent pre–post comparisons, particularly for Trail Making A and B–A.

Spearman correlations were conducted to examine associations among the three Trail Making measures and the results are reported on Table 13.

Table 13. Spearman Correlations Among Pre-Intervention Trail Making Measures (N=53)

Measure Pair	ρ	p
Trail Making A ↔ Trail Making B	.402	.003
Trail Making A ↔ Trail Making B–A	–.060	.667

Trail Making B ↔ Trail Making B–A	.843	< .001

Note. Spearman's rho correlations were used due to non-normality in Trail Making A and B–A.

A moderate positive correlation was observed between Trail Making A and Trail Making B ($\rho = .402$, $p = .003$), indicating that slower basic sequencing performance was associated with slower alternating sequencing. In contrast, Trail Making A was not significantly related to the executive cost score ($\rho = –.060$, $p = .667$), suggesting that processing speed alone did not predict the additional cognitive demands of alternating sequencing. A very strong positive correlation was found between Trail Making B and B–A ($\rho = .843$, $p < .001$), demonstrating that participants who performed more slowly on the alternating sequencing task also exhibited substantially higher executive cost. This pattern reflects the shared cognitive demands of Trail Making B and the derived B–A measure, both of which rely heavily on CF and EF.

Overall, the pre-intervention results reveal typical adolescent performance patterns, with greater variability and higher cognitive load reflected in Trail Making B and B–A. These baseline characteristics provide a clear foundation for evaluating intervention-related changes in subsequent analyses.

Table 14. Pre-Intervention Digit Span Test Performance (N=51)

Measure	Median	IQR (Q1–Q3)
Digit Span Forward	4	3–4
Digit Span Backwards	3	2–4
Digit Span Distraction	2	1–3.3

Note. IQR = Interquartile Range.

Table 14 presents participants' baseline performance on Digit Span tasks assessing working memory. Median scores were 4 (IQR = 3–4) for the forward condition, 3 (IQR = 2–4) for the backward condition, and 2 (IQR = 1–3.3) for the distraction condition.

Overall, performance decreased as task complexity increased, indicating greater difficulty when tasks required manipulation of information and resistance to interference, consistent with reduced memory capacity as measured pre-intervention.

We observe a clear decline in performance as task complexity increases, with adolescents performing best on Digit Span Forward (Mdn = 4), moderately on Backward (Mdn = 3), and poorest on Distraction (Mdn = 2).

Adolescents in the sample achieved a median score of 4 on the forward span, which decreased to 3 on the backward span and dropped further to 2 when distractors were introduced.

Table 15. Pre-Intervention CAT Performance (N=53)

Measure	Mean (SD)	Median (Q1–Q3)
CAT Perseverations	29.38 (49.66)	—
CAT Omissions	—	2.5 (1.5–4.7)
CAT Commissions	—	66 (47.2–87.1)
CAT Reaction Time (ms)	—	467 (405–504.5)

Note. CAT = Continuous Attention Test. Mean and standard deviation were available only for perseverations; median and interquartile range (IQR) were used for all non-normally distributed variables.

Table 15 presents participants' baseline performance on the Continuous Attention Test (CAT). CAT perseverations were reported using means and standard deviations, indicating that this variable followed an approximately normal distribution. In contrast, omissions, commissions, and reaction time were reported using medians and interquartile ranges, reflecting non-normal distributions characterized by skewness and outliers. Normal distributions are symmetrical and allow the use of parametric statistics, whereas non-normal distributions require non-parametric approaches such as the Wilcoxon signed-rank test.

Median omission errors were 2.5 (IQR = 1.5–4.7), indicating moderate difficulties in sustained attention. Commission errors were notably higher (Mdn = 66, IQR = 47.2–87.1), reflecting challenges in inhibitory control and impulse regulation. Reaction time showed a median of 467 ms (IQR = 405–504.5), suggesting moderate processing speed with some variability across participants.

In addition, CAT perseverations showed a mean of 29.38 (SD = 49.66), indicating substantial variability in repetitive error patterns. The high standard deviation suggests that while some adolescents made few perseverative errors, others showed pronounced difficulty disengaging from incorrect response tendencies—an indicator of reduced cognitive flexibility and inhibitory control.

Overall, the findings point to difficulties in both attentional accuracy and inhibitory control at pre-intervention, alongside relatively stable but variable response speed.

4.2.3 Social and emotional state

Pre-intervention self-esteem, assessed with the Rosenberg Self-Esteem Scale, showed a median score of 18 (IQR = 13.5–22.75), indicating a non-normal distribution of responses. The use of median and interquartile range suggests variability and skewness in adolescents' self-perceptions. Overall, the score reflects moderate self-esteem levels, with several participants reporting lower confidence and self-worth prior to the intervention.

Table 16: Pre-Intervention Psychosocial Measures

Measure	**Median (Q1–Q3)**	**Mean (SD)**
Self-Esteem (Rosenberg Scale) N=41	18 (13.5–22.75)	—
Academic Self-Concept (STReDI-SPeS) N=52	—	34.07 (8.52)
Anger as a Trend	—	22.54 (7.36)
Expectations for the Future	—	10.78 (3.18)

Pre-intervention scores on the psychosocial measures showed approximately normal distributions, as indicated by the use of *means and standard deviations*. Academic self-concept measured with the STReDI-SPeS had a mean of 34.07 (SD = 8.52), reflecting moderate confidence in academic abilities, though with notable variability across adolescents. Anger as a trend showed a mean of 22.54 (SD = 7.36), suggesting elevated but not extreme levels of trait-like anger, consistent with emotional reactivity

often observed in adolescents with attentional or regulatory challenges. Expectations for the future had a mean of 10.78 (SD = 3.18), indicating moderately positive but somewhat cautious future outlooks.

Overall, the pattern reflects moderate academic self-beliefs, heightened emotional tension, and tempered optimism.

Table 17. Descriptive statistics for pre-intervention emotional-state variables

Variable	M	SD
Frequent anger outbursts	2.31	0.77
Difficulties expressing emotional state	2.89	1.27
Anxiety	3.29	1.13
Anger (trait)	3.02	0.98
Boredom	3.42	0.98
Sadness	2.78	0.95

As presented on table 17, pre-intervention emotional-state scores were reported using *means and standard deviations*, indicating approximately normal distributions across all variables. Frequent anger outbursts showed a mean of 2.31 (SD = 0.77), reflecting occasional but present difficulties with emotional reactivity. Difficulties expressing emotional state were moderately elevated (M = 2.89, SD = 1.27), suggesting challenges in emotional awareness and communication.

Levels of anxiety (M = 3.29, SD = 1.13) and anger as a trait (M = 3.02, SD = 0.98) were moderately high, indicating persistent emotional tension and a tendency toward irritability. Boredom (M = 3.42, SD = 0.98) emerged as one of the more prominent emotional experiences, consistent with attentional disengagement. Sadness (M = 2.78, SD = 0.95) was moderate, suggesting some variability in mood but not severe depressive effect.

Overall, the pattern reflects moderate emotional dysregulation, with elevated anxiety, irritability, and boredom, alongside difficulties in emotional expression.

Finaly, psycho-emotional state is presented through the pre-intervention scores on elements of the SAEBA scale as seen on Table 18.

Tabel 18: Descriptive Statistics for pre-intervention Syndrome and DSM scale variables on YSR (students' reports).

Scale	**Variable**	**M**	**SD**
Syndrome Scale	Stress	8.52	4.90
	Depression	4.54	2.48
	Social difficulties	5.50	3.35
	Aggressive behaviour	11.24	6.48
DSM Scale	Emotional difficulties	7.35	4.02
	Stress	4.59	2.48

Pre-intervention scores on the Syndrome Scale and DSM Scale were reported using *means and standard deviations*, indicating that these variables followed approximately normal distributions. This suggests that symptom levels were spread relatively evenly across participants, without strong skewness or extreme outliers.

On the Syndrome Scale, stress showed a mean of 8.52 (SD = 4.9), reflecting moderate levels of physiological and emotional tension. Depression had a mean of 4.54 (SD = 2.48), indicating mild depressive symptoms with some variability. Social difficulties (M = 5.5, SD = 3.35) suggested moderate challenges in peer interactions, while aggressive behaviour (M = 11.24, SD = 6.48) was relatively elevated, pointing to heightened behavioural dysregulation.

On the DSM Scale, emotional difficulties (M = 7.35, SD = 4.02) reflected moderate emotional distress, and stress (M = 4.59, SD = 2.48) indicated persistent but not severe stress symptoms.

Overall, the pattern suggests moderate emotional and behavioural difficulties at baseline, characterised by stress, irritability, social challenges, and behavioural dysregulation.

Pre-intervention scores on the parents' version of the Syndrome Scale and DSM Scale were reported using means and standard deviations, indicating that these variables followed approximately normal distributions. This suggests that parents' ratings of their children's emotional and behavioural symptoms were spread relatively evenly across the sample, without strong skewness or extreme outliers. Table 19 summarises scores on both scales.

Table 19: Descriptive statistics for pre-intervention Syndrome and DSM scale variables on CBCL (parents report)

Scale	Variable	M	SD
Syndrome Scale	Stress	7.39	4.15
	Depression	5.90	8.98
	Social difficulties	5.83	3.06
	Aggressive behaviour	9.00	5.57
DSM Scale	Emotional difficulties	5.13	3.27
	Stress	3.43	2.49

Pre-intervention scores on the parents' version of the Syndrome Scale and DSM Scale were reported using *means and standard deviations*, indicating that these variables followed approximately normal distributions. This suggests that parents' ratings of their children's emotional and behavioural symptoms were spread relatively evenly across the sample, without strong skewness or extreme outliers.

On the Syndrome Scale, parents reported stress at a mean of 7.39 (SD = 4.15), reflecting moderate levels of tension and worry observed in their children. Depression showed a mean of 5.9 (SD = 8.98), indicating substantial variability, with some children showing minimal depressive symptoms and others showing more pronounced mood difficulties. Social difficulties (M = 5.83, SD = 3.06) suggested moderate challenges in peer interactions, while aggressive behaviour (M = 9, SD = 5.57) reflected elevated behavioural dysregulation, consistent with impulsivity and frustration-based reactions.

On the DSM Scale, parents rated emotional difficulties at a mean of 5.13 (SD = 3.27), indicating moderate emotional distress, and stress at 3.43 (SD = 2.49), reflecting persistent but not severe stress symptoms.

Overall, parents' reports depict a moderate level of emotional and behavioural difficulties at baseline, characterised by stress, mood variability, social challenges, and behavioural dysregulation.

As demonstrated in Table 20, across domains, adolescents consistently report higher emotional intensity, greater stress, and more behavioural dysregulation than parents perceive. This pattern is typical in adolescent mental-health assessments, where internalising symptoms (stress, emotional difficulties, mood) are often less visible to caregivers.

Table 20: Descriptive statistics and interpretive comparison of adolescents' and parents' pre-intervention ratings.

Construct	Adolescents' Ratings (M, SD)	Parents' Ratings (M, SD)	Interpretation
Stress	8.52 (4.90)	7.39 (4.15)	Adolescents report higher internal stress than parents perceive.
Depression	4.54 (2.48)	5.90 (8.98)	Parents show greater variability, suggesting uneven recognition of mood symptoms.
Social difficulties	5.50 (3.35)	5.83 (3.06)	Strong agreement: both groups report moderate social challenges.
Aggressive behaviour	11.24 (6.48)	9.00 (5.57)	Adolescents report more behavioural dysregulation than parents observe.

Emotional difficulties (DSM)	7.35 (4.02)	5.13 (3.27)	Adolescents report higher emotional distress than parents recognise.
Stress (DSM)	4.59 (2.48)	3.43 (2.49)	Parents consistently underestimate internal stress symptoms.

Across domains, adolescents consistently report higher emotional intensity, greater stress, and more behavioural dysregulation than parents perceive. This pattern is typical in adolescent mental-health assessments, where internalizing symptoms (stress, emotional difficulties, mood) are often less visible to caregivers.

The strongest agreement appears in social difficulties, where both perspectives converge on moderate impairment. Divergence is most pronounced in stress, emotional difficulties, and aggressive behaviour, suggesting that adolescents experience internal tension and frustration that may not always manifest overtly at home.

4.2.4 General Mental health state

Scores for both adolescents and parents were reported using means and standard deviations, indicating that all constructs followed approximately normal distributions with relatively symmetrical variability across respondents. As shown in Table 21, across all domains, adolescents consistently reported higher levels of emotional, behavioural, and mental-load difficulties than parents.

Table 21: Comparison of adolescents' and parents' pre-intervention ratings across psychosocial constructs.

Construct	Adolescents' Ratings (M, SD)	Parents' Ratings (M, SD)
Internalised symptoms	17.65 (9.50)	14.55 (7.94)
Externalised symptoms	16.54 (9.88)	13.21 (7.52)
General mental load	61.09 (27.28)	51.07 (21.28)

Oppositional defiant symptoms	4.52 (2.59)	3.50 (2.32)
Conduct disorder symptoms	5.80 (4.46)	3.23 (3.38)

Scores for both adolescents and parents were reported using means and standard deviations, indicating that all constructs followed approximately normal distributions with relatively symmetrical variability across respondents. Across all domains, adolescents consistently reported higher levels of emotional, behavioural, and mental-load difficulties than parents.

Adolescents' internalised symptoms (M = 17.65, SD = 9.5) exceeded parents' ratings (M = 14.55, SD = 7.94), suggesting that young people experience more internal distress—such as anxiety, sadness, or worry—than caregivers typically recognise. A similar pattern emerged for externalised symptoms, where adolescents reported higher behavioural and anger-related difficulties (M = 16.54, SD = 9.88) compared to parents (M = 13.21, SD = 7.52), indicating that outward behavioural challenges may be more intense from the adolescents' perspective.

General mental load was also higher in adolescents (M = 61.09, SD = 27.28) than in parents' reports (M = 51.07, SD = 21.28), reflecting a greater subjective sense of cognitive and emotional burden. For oppositional defiant symptoms (adolescents: M = 4.52; parents: M = 3.5) and conduct-related symptoms (adolescents: M = 5.8; parents: M = 3.23), adolescents again reported more difficulties, suggesting that oppositionality and rule-breaking behaviours may be more internally experienced than externally observed. Overall, the pattern indicates that adolescents perceive greater emotional strain, behavioural dysregulation, and mental load than parents report.

Finally, Health Related Quality of Life (HRQoL) was assessed for the students, pre-intervention. The Kidscreen-27 (*KIDSCREEN-27 - Kidscreen.Org*, n.d.; *Questionnaires - Kidscreen.Org*, n.d.)was used to assess adolescents' perceived Quality of Life across five domains: Physical Well-Being, Psychological Well-Being, Autonomy and Parent

Relations, Social Support and Peers, and School Environment. Descriptive analyses indicated generally positive levels of well-being with meaningful variability across domains.

Physical Well-Being scores ranged from 9 to 25 (M = 18.11, SD = 4.62), reflecting moderately high perceived physical health and activity levels. Psychological Well-Being showed a similar pattern (range = 10–29; M = 22.53, SD = 4.56), suggesting that most adolescents reported positive emotions and life satisfaction, although a subset experienced lower emotional well-being. Autonomy and Parent Relations demonstrated the highest mean (range = 13–35; M = 26.91, SD = 5.32), indicating strong perceived family support and opportunities for independent decision-making. This domain also showed the greatest variability, suggesting heterogeneity in family dynamics within the sample.

Social Support and Peers scores were generally positive (range = 5–20; M = 14.73, SD = 3.44), reflecting supportive peer relationships for most participants. Finally, School Environment scores (range = 4–18; M = 11.98, SD = 3.11) indicated moderate satisfaction with school life, with some adolescents reporting lower engagement or comfort in the school setting.

Normality was examined using histograms, Q–Q plots, detrended Q–Q plots, and boxplots. All five subscales demonstrated approximately normal distributions, with only mild outliers that did not meaningfully affect distributional assumptions. Parametric analyses were therefore appropriate.

Taken together, the Kidscreen-27 results suggest that adolescents entered the intervention with moderately high overall Quality of Life (SCORETOTAL M = 94.00, SD = 15.72), corresponding to approximately 70% of the maximum possible score. The presence of variability across domains—particularly in psychological well-being, peer relations, and school satisfaction—indicates meaningful differences in perceived well-being and adequate room for improvement. Overall, the sample can be characterised as generally resilient, yet heterogeneous, with specific areas where support may be beneficial.

4.2.5 General Participants' profile

Pre-intervention findings provide a comprehensive baseline profile of the participating adolescents, integrating evidence from cognitive performance measures, self-report questionnaires and parent ratings. Across assessment modalities, a consistent pattern emerged of attentional, EF, emotional and behavioural difficulties of varying intensity.

In regards to ADHD symptomatology, participants demonstrated a predominantly inattentive profile, characterised by moderate attention-related difficulties and comparatively lower levels of hyperactive and impulsive behaviours. This pattern was evident across both the ADHD-Greek Scale and ASEBA attention-related measures and was consistent with parental reports of diagnosis. Cognitive assessments further revealed weaknesses in EF, particularly in IC, WM, sustained attention, and CF. Performance on the CAT, Trail Making Test, Digit Span tasks, and CogniFit Assessment Battery measures indicated difficulties in maintaining attention, regulating responses, resisting interference, and adapting to changing cognitive demands.

Self-reported cognitive and behavioural difficulties reinforced this profile. Adolescents described frequent problems with attention, memory, planning and organisation, accompanied by elevated cognitive load and reduced attentional stability in academic settings. High commission errors, substantial variability in perseverative responding, and reduced performance as task complexity increased further suggest challenges in IC and self-regulation.

The psychosocial and emotional findings revealed additional areas of vulnerability. Self-esteem was generally moderate, while academic self-concept reflected cautious confidence in academic abilities. Participants reported elevated levels of anxiety, boredom, irritability, and difficulties expressing emotions, alongside moderate levels of sadness and anger-related tendencies. Emotional and behavioural assessments also indicated moderate levels of stress, emotional difficulties, social challenges, and behavioural dysregulation.

A consistent feature across the ASEBA measures was the discrepancy between adolescent and parent reports. Adolescents generally reported higher levels of internal distress and behavioural difficulties than were reflected in parent ratings. This pattern was also observed in broader symptom domains, where adolescents reported higher

levels of internalised symptoms (M = 17.65, SD = 9.50 vs. M = 14.55, SD = 7.94), externalised symptoms (M = 16.54, SD = 9.88 vs. M = 13.21, SD = 7.52), general mental load (M = 61.09, SD = 27.28 vs. M = 51.07, SD = 21.28), oppositional-defiant symptoms (M = 4.52, SD = 2.59 vs. M = 3.50, SD = 2.32), and conduct-related symptoms (M = 5.80, SD = 4.46 vs. M = 3.23, SD = 3.38). These findings suggest that some emotional and behavioural difficulties were experienced more strongly by adolescents than were observed by their caregivers.

Despite these challenges, the KIDSCREEN-27 findings indicated generally positive levels of health-related quality of life, particularly in the domains of autonomy and parent relations, psychological well-being, and peer support. Nevertheless, considerable variability was evident across participants, especially in psychological well-being, peer relations, and school-related experiences.

Overall, the baseline data portrays a heterogeneous group of adolescents characterised by attentional and executive-function difficulties, emotional dysregulation, moderate psychosocial challenges, and elevated subjective mental burden. At the same time, the presence of generally positive QoL indicators and supportive interpersonal relationships suggests important areas of resilience within the sample prior to intervention.

4.3 Effects of the intervention

4.3.1 Changes in ADHD Core Symptoms

A Wilcoxon signed-rank test was conducted to examine changes in ADHD symptom scores from pre- to post-intervention and the results are shown on Table 22.

Table 22: Post-Intervention means, standard deviations and changes in scores on ADHD-Greek scale.

Measure	Pre-Intervention Median (Q1–Q3)	Post-Intervention Median (Q1–Q3)	Z	p
ADHD-Greek Scale Total	25.5 (18–31.8)	25.5 (17.5–31.5)	−1.337	.181

ADHD – Attention Deficit	21.0 (19–25.2)	17.0 (13.2–20.7)	−1.829	.067
ADHD – Hyperactive/Impulsive	11.0 (3–17.7)	16.0 (5.7–21.7)	−0.748	.454

For the ADHD-Greek Scale Total Score, there was no statistically significant difference between pre-intervention (Mdn = 25.5, *IQR* = 18–31.8) and post-intervention (Mdn = 25.5, *IQR* = 17.5–31.5), *Z* = –1.34, *p* = .181.

For the Attention Deficit subscale, median scores decreased from 21 (*IQR* = 19–25.2) to 17 (*IQR* = 13.2–20.7), indicating a trend toward improvement; however, this change did not reach statistical significance, *Z* = –1.83, *p* = .067.

For the Hyperactive/Impulsive subscale, median scores increased from 11 (*IQR* = 3–17.7) to 16 (*IQR* = 5.7–21.7), with no statistically significant difference observed, *Z* = –0.75, *p* = .454.

Overall, no statistically significant changes were detected across the three measures, though the Attention Deficit subscale approached significance, suggesting a possible trend toward symptom reduction in this domain.

The ASEBA was used to evaluate behavioral and emotional functioning from both adolescent self-reports and parent reports, using the Syndrome and DSM-oriented scales with results being demonstrated in Table 23.

Table 23: Pre-intervention and post-intervention ASEBA scores for adolescents and parents.

Measure	Pre-Intervention M (SD)	Post-Intervention M.A. (S.D.)
Adolescents' Syndrome Scale	9.2 (3.55)	9.86 (4.47)
Adolescents' DSM Scale	8.26 (3.26)	7.79 (3.91)

Parents' Syndrome Scale	8.63 (3.93)	8.56 (4.7)
Parents' DSM Scale	6.93 (3.18)	5.63 (3.14)

The Achenbach System of Empirically Based Assessment (ASEBA) was used to evaluate behavioral and emotional functioning from both adolescent self-reports and parent reports, using the Syndrome and DSM-oriented scales.

For the Adolescents' Syndrome Scale, the mean score increased slightly from pre-intervention (*M* = 9.20, *SD* = 3.55) to post-intervention (*M* = 9.86, *SD* = 4.47). The Adolescents' DSM-Oriented Scale, the mean score decreased from 8.26 (*SD* = 3.26) to 7.79 (*SD* = 3.91). For the Parents' Syndrome Scale, mean scores remained essentially stable, shifting from 8.63 (*SD* = 3.93) pre-intervention to 8.56 (*SD* = 4.70) post-intervention. For the Parents' DSM-Oriented Scale, mean scores decreased from 6.93 (*SD* = 3.18) to 5.63 (*SD* = 3.14).

A series of Wilcoxon signed-rank tests were conducted to evaluate pre- to post-intervention changes across EF and self-regulation indicators. Overall, as shown in Table 24 results showed selective improvements rather than global change across domains.

Table 24: Pre-and post-intervention median scores with Wilcoxon signed-rank test results.

Measure	**Pre-Intervention Median (Q1–Q3)**	**Post-Intervention Median (Q1–Q3)**	**Z**	**p**	**r**
Thought bombardment	4.00 (3–5)	4.00 (2.5–5)	−0.447	.655	−0.07
Mind absence	2.00 (2–3)	3.00 (2–3)	−0.333	.739	−0.05
Impulsive decisions	2.50 (1–3)	3.00 (2–3)	−1.613	.107	−0.24
Impulsive talking	3.00 (2–3)	3.00 (2.5–3)	−0.707	.480	−0.10

Inability to control behaviour	2.00 (1–3)	2.00 (1.5–3)	−0.302	.763	−0.04
Memory difficulties	4.00 (3–4)	3.00 (2–4)	−1.897	.058	−0.28
Attention difficulties	4.00 (4–4)	4.00 (3–4)	−1.414	.157	−0.21
Planning & organising difficulties	4.00 (4–4)	4.00 (3–4)	−2.121	.034	−0.31
Sustained attention (homework)	2.00 (1–2)	2.00 (1–3)	0.001	< .999	0.00
Sustained attention (class)	2.00 (1–2)	2.00 (1–3)	−0.632	.527	−0.09

A series of Wilcoxon signed-rank tests were conducted to evaluate pre- to post-intervention changes across executive-function and self-regulation indicators. Overall, results showed selective improvements rather than global change across domains.

The only statistically significant change was observed in Planning and Organising Difficulties, which demonstrated a reduction from pre-intervention to post-intervention, $Z = -2.12$, $p = .034$, with a medium effect size ($r = .31$). This indicates a meaningful improvement in adolescents' ability to plan, structure tasks, and organise behaviour following the intervention.

Several additional domains showed non-significant but directionally positive trends, reflected in small effect sizes. These included Impulsive Decisions ($r = .24$), Attention Difficulties ($r = .21$), and Memory Difficulties ($r = .28$), the latter approaching statistical significance ($p = .058$). These patterns suggest emerging improvements in cognitive

control and working-memory-related functioning, although they did not reach conventional significance thresholds.

Other domains—such as Thought Bombardment, Mind Absence, Impulsive Talking, Inability to Control Behaviour, and Sustained Attention (homework and class)—showed negligible effect sizes ($r < .10$), indicating stability across the intervention period.

Taken together, the results suggest that the intervention produced targeted gains in organisational and planning abilities, with additional small improvements in related EF processes. More intensive or prolonged intervention may be required to produce broader changes across impulsivity, sustained attention, and behavioural regulation.

4.3.2 Changes in cognitive functions

Table 25 below, summarises changes in cognitive functions, as measured after the intervention.

Table 25: Combined Pre-Post Results for Trail Making Test A, B and B-A (N=32)

Measure	Pre Median (IQR)	Post Median (IQR)	Z	p	r
Trail Making A	35 (26–42)	23 (19–32)	–3.746	< .001	.662
Trail Making B	83 (65–107)	61.5 (56–77)	–4.053	< .001	.716
Trail Making B–A	46 (32–68)	38 (31–45)	–2.377	.017	.420

Wilcoxon signed-rank tests revealed significant improvements across all Trail Making measures following the intervention. Trail Making A performance improved substantially ($Z = –3.746$, $p < .001$, $r = .662$), indicating a large reduction in basic sequencing time. Trail Making B also showed a very large improvement ($Z = –4.053$, $p < .001$, $r = .716$), reflecting enhanced cognitive flexibility and alternating sequencing efficiency. Executive cost (Trail Making B–A) decreased significantly ($Z = –2.377$, $p = .017$, $r = .420$), representing a medium effect size and suggesting that participants

required less additional cognitive effort to shift between sequences post-intervention. Together, these results demonstrate important gains in processing speed, CF and EF.

Performance on Trail Making A, Trail Making B, and Trail Making B–A was analysed using medians and interquartile ranges, indicating non-normal distributions at both time points and supporting the use of the Wilcoxon signed-rank test. Completion times showed clear improvements following the intervention across all components of the Trail Making Test.

For Trail Making A, median performance decreased from 31 seconds (IQR = 23–40) to 23 seconds (IQR = 19–31.8), $Z = –3.75$, $p < .001$, $r = .80$, indicating a large improvement in processing speed and visual scanning. For Trail Making B, median completion time decreased from 82 seconds (IQR = 64–102) to 61.5 seconds (IQR = 56.3–77.3), $Z = –4.05$, $p < .001$, $r = .86$, reflecting a large enhancement in CF and set-shifting. Finally, Trail Making B–A scores decreased from 46 seconds (IQR = 32–58) to 38 seconds (IQR = 31–45), $Z = –2.377$, $p = .017$, $r = .43$, indicating a medium-to-large reduction in executive-load cost.

Together, these results demonstrate statistically important and practically meaningful improvements in processing speed, CF, and executive control following the intervention.

Table 26 below, presents median scores and interquartile ranges (IQR) for CAT omissions, commissions, and reaction time before and after the intervention, along with Wilcoxon signed-rank test statistics. CAT omissions showed a statistically significant reduction, indicating improved sustained attention. Changes in commissions and reaction time did not reach statistical significance.

Table 26: Pre- and post-intervention Performance on CAT Omissions, Commissions and Reaction Time.

Measure	Pre-Intervention Median (Q1–Q3)	Post-Intervention Median (Q1–Q3)	Z	p	r
CAT omissions	2.5 (1.5–4.7)	1.0 (0.3–3.4)	−1.992	.046	.38

CAT commissions	66.0 (47.2–87.1)	59.7 (33.2–81.2)	−1.822	.068	.34
CAT reaction time (ms)	467 (405–504.5)	472 (442.8–520.3)	−1.784	.074	.34

All three CAT variables were analyzed using *medians and interquartile ranges*, indicating non-normal distributions at both time points and supporting the use of the Wilcoxon signed-rank test. CAT omissions decreased from 2.5 (1.5–4.7) to 1 (0.3–3.4), yielding a statistically significant improvement ($z = –1.992$, $p = .046$) with a small-to-moderate effect size ($r = .38$). This suggests a meaningful reduction in missed targets, reflecting better sustained attention following the intervention.

CAT commissions also showed a numerical reduction—from 66 to 59.7—but the change did not reach significance ($p = .068$), and the effect size was small ($r = .34$). This pattern indicates a trend toward improved IC, though not strong enough to be considered a reliable change at the group level.

For CAT reaction time, median performance increased slightly from 467 ms to 472 ms, with a non-significant result ($p = .074$) and a small effect size ($r = .34$). This suggests stable processing speed, with no meaningful slowing or improvement.

Following, tale 27 represents the scores on variable cognitive skills as measured by the Cognifit Assessment Battery, pre- and post-intervention.

Table 27: Pre- and post-intervention Performance on cognitive variables measured by Cognifit™ Assessment Battery

Measure	**Pre-Intervention Median (Q1–Q3)**	**Post-Intervention Median (Q1–Q3)**	**Z**	**p**	**r**
Planning	540 (240.5-700)	604 (404.5-711.5)	-1.224	0.221	.29
Working Memeory	307 (169.5-483)	388 (300-570)	-3.224	**0.001**	.76

Short Term memory	407 (192-590.5)	476 (248.5-647)	-1.510	0.131	.36
Focused Attention	458 (258-610)	476 (324-606.5)	-0.188	0.851	.04
Inhibition	36 (13-223.5)	87 (29.5-261.5)	-1.703	0.089	0.23

All Cognifit variables were analysed using medians and interquartile ranges, indicating non-normal distributions at both time points and supporting the use of the Wilcoxon signed-rank test. Across the four domains, the intervention produced one clear improvement, one strong improvement, and two stable outcomes.

Planning showed a numerical increase from 540 (240.5–700) to 604 (404.5–711.5), but this change was not statistically significant (p = .221) and had a small effect size (r = .29), suggesting stable planning abilities with no reliable group-level improvement. In contrast, WM demonstrated a substantial and statistically significant increase from 307 (169.5–483) to 388 (300–570), with a large effect size (r = .76). This indicates an important improvement in the ability to hold and manipulate information, one of the strongest cognitive gains observed in the dataset.

Short-term memory also increased numerically (407 → 476), but the change did not reach significance (p = .131), reflecting a small, non-significant trend toward improvement (r = .36). Finally, focused attention remained essentially unchanged (458 → 476), with a negligible effect size (r = .04), indicating stable attentional focus across the intervention period.

IC improved from a median of 36 (13–223.5) to 87 (29.5–261.5). Although the change did not reach statistical significance (p = .089), the effect size (r = .23) reflects a small improvement consistent with enhanced IC following the intervention.

Table 28: Pre-intervention (N = 51) and post-intervention (N = 27) performance on Digit Span Forward, Backwards, and Distraction.

Measure	Pre-Intervention Median (Q1–Q3)	Post-Intervention Median (Q1–Q3)	Z	p	r
Digit Span Forward	4 (3–4)	4 (4–4)	−1.983	.047	.38
Digit Span Backwards	3 (2–4)	4 (2–4)	−1.977	.048	.38
Digit Span Distraction	2 (1–3.3)	3 (2–4)	−2.457	.014	.47

All three Digit Span subtests were analysed using *medians and interquartile ranges*, indicating non-normal distributions at both time points and supporting the use of the Wilcoxon signed-rank test. Across the subtests, the intervention produced consistent and statistically significant improvements in working-memory performance. Result are summarized on Table 28, above.

Digit Span Forward increased from 4 (3–4) to 4 (4–4), with a significant change (z = –1.983, p = .047) and a small-to-moderate effect size (r = .38). This reflects better immediate attention and simple verbal storage capacity. Digit Span Backwards also improved significantly (z = –1.977, p = .048; r = .38), increasing from 3 (2–4) to 4 (2–4).

The strongest improvement was observed in Digit Span Distraction, which increased from 2 (1–3.3) to 3 (2–4), with a significant result (z = –2.457, p = .014) and a moderate effect size (r = .47).

4.3.3 Changes in social and emotional aspects

Scores on emotional and social components are presented in Table 29 and Table 30 below.

Table 29: Pre- and post-intervention Performance on the Rosenberg Self-Esteem Scale

Measure	Pre-Intervention Median (Q1-Q3)	Post-Intervention Median (Q1-Q3)	Z	P
Self-Esteem (Rosenberg scale)	18 (13.5-22.75)	19 (14.5-22.75)	-1.142	.253

Self-esteem, assessed with the Rosenberg Self-Esteem Scale, was analysed using medians and interquartile ranges, indicating a non-normal distribution at both time points. Median scores increased slightly from 18 (13.5–22.75) pre-intervention to 19 (14.5–22.75) post-intervention. However, the Wilcoxon signed-rank test showed that this change was not statistically significant ($z = –1.142$, $p = .253$), indicating that the observed improvement reflects a small, non-reliable shift rather than a meaningful change in self-esteem at the group level.

Table 30: Pre- and Post-Intervention Performance on STReDI-SPeS Psychosocial Constructs

Measure	**Pre-Intervention M (SD)**	**Post-Intervention M (SD)**
Academic Self-concept	34.07(8.52)	36.68 (7.18)
Anger as a trend	22.54(7.36)	21 (7.04)
Expectations for the future	10.78(3.18)	9.89 (2.71)

All three psychosocial constructs—academic self-concept, anger as a trend, and expectations for the future—were analysed using means and standard deviations, indicating approximately normal distributions at both time points. Because higher scores reflect greater pessimism and lower scores reflect greater optimism, the direction of change must be interpreted accordingly.

Academic self-concept increased slightly from 34.07 (SD = 8.52) to 36.68 (SD = 7.18). Under this scoring rule, this shift represents a small increase in pessimism about

academic abilities, suggesting that students felt *slightly less confident* academically after the intervention.

Anger as a trend decreased from 22.54 (SD = 7.36) to 21.00 (SD = 7.04), indicating a reduction in pessimistic or negative emotional tone. This suggests a modest improvement in emotional regulation, with adolescents experiencing anger as less pervasive or overwhelming.

For expectations for the future, scores decreased from 10.78 (SD = 3.18) to 9.89 (SD = 2.71). Because lower scores indicate greater optimism, this change reflects a small improvement in future outlook, suggesting that adolescents became slightly more hopeful or positive about what lies ahead.

Overall, the pattern shows mixed effects: a small increase in academic pessimism, a modest reduction in anger-related negativity, and a slight improvement in optimism about the future. These findings suggest that the intervention influenced emotional tone and future orientation more positively than academic self-beliefs.

Table 31: Pre- and Post-Intervention Emotional-State Scores

Measure	**Pre-Intervention M (SD)**	**Post-Intervention M (SD)**
Frequent anger outbursts	2.31 (0.77)	2.11 (0.76)
Difficulties expressing emotional state	2.89 (1.27)	2.53 (1.37)
Anxiety	3.29 (1.13)	3.06 (1.16)
Anger as a trait	3.02 (0.98)	3.06 (1.00)
Boredom	3.42 (0.98)	3.65 (0.79)
Sadness	2.78 (0.95)	2.88 (1.15)

All emotional-state variables were analysed using means and standard deviations, indicating approximately normal distributions at both time points. Across the six constructs, the intervention produced small, mostly non-significant shifts, reflecting modest improvements in emotional expression and anxiety, but slight increases in boredom and sadness.

Scores for frequent anger outbursts decreased from 2.31 (SD = 0.77) to 2.11 (SD = 0.76), suggesting a small reduction in reactive anger. Difficulties expressing emotional state also declined from 2.89 (SD = 1.27) to 2.53 (SD = 1.37), indicating a modest improvement in emotional communication. Anxiety showed a slight reduction from 3.29 (SD = 1.13) to 3.06 (SD = 1.16), reflecting lower emotional tension for some adolescents.

In contrast, anger as a trait remained stable (3.02 → 3.06), indicating no meaningful change in chronic irritability. Boredom increased from 3.42 (SD = 0.98) to 3.65 (SD = 0.79), suggesting greater disengagement or reduced motivation post-intervention. Sadness also increased slightly (2.78 → 2.88), indicating a small rise in low-mood experiences, though variability increased as well.

Table 32: Pre- and Post-Intervention YSR ASEBA Syndrome and YSR DSM Scale Scores

Measure	**Pre-Intervention M (SD)**	**Post-Intervention M (SD)**
Syndrome Scale		
Stress	8.52 (4.90)	8.14 (5.29)
Depression	4.54 (2.48)	4.07 (2.70)
Social difficulties	5.50 (3.35)	5.00 (2.99)
Aggressive behaviour	11.24 (6.48)	10.43 (4.18)
DSM Scale		
Emotional difficulties	7.35 (4.02)	6.57 (5.21)
Stress	4.59 (2.48)	4.64 (2.71)

All variables from the Syndrome Scale and DSM scale were analysed using means and standard deviations, indicating approximately normal distributions at both time points. Across all domains, the intervention produced small numerical reductions in most symptoms, though the magnitude of change suggests stability rather than clinically meaningful improvement.

On the Syndrome Scale, stress decreased slightly from 8.52 (SD = 4.9) to 8.14 (SD = 5.29), indicating a minimal reduction in perceived stress. Depression also declined modestly from 4.54 (SD = 2.48) to 4.07 (SD = 2.7), suggesting a small improvement in mood, though variability increased. Social difficulties decreased from 5.5 (SD = 3.35) to 5.0 (SD = 2.99), reflecting a slight improvement in social functioning. Aggressive behaviour showed a small reduction from 11.24 (SD = 6.48) to 10.43 (SD = 4.18), indicating marginally lower behavioural dysregulation.

On the DSM scale, emotional difficulties decreased from 7.35 (SD = 4.02) to 6.57 (SD = 5.21), suggesting a modest reduction in emotional strain, though the increased SD indicates greater variability in post-intervention responses. In contrast, DSM stress remained essentially unchanged (4.59 → 4.64), indicating stable stress levels despite minor shifts in other domains.

Overall, the pattern reflects small, non-significant improvements across most emotional and behavioural domains, with no evidence of strong or consistent change. The intervention appears to have produced subtle reductions in stress, mood symptoms, social difficulties, and aggression, while DSM-level stress remained stable.

Table 33: Pre- and Post-Intervention CBCL ASEBA Syndrome and CBCL DSM Scale Scores (Parents' Reports)

Measure	Pre-Intervention M (SD)	Post-Intervention M (SD)
CBCL Syndrome Scale		
Stress	7.39 (4.15)	6.80 (4.80)
Depression	5.90 (8.98)	4.56 (3.20)
Social difficulties	5.83 (3.06)	4.63 (4.44)
Aggressive behaviour	9.00 (5.57)	8.13 (5.45)
CBCL DSM Scale		
Emotional difficulties	5.13 (3.27)	8.75 (15.18)
Stress	3.43 (2.49)	3.81 (2.76)

All variables from the parents' Syndrome Scale and DSM scale were analysed using means and standard deviations, indicating approximately normal distributions at both time points. Overall, parents reported small numerical reductions in most emotional and behavioural symptoms following the intervention, suggesting modest perceived improvements, though the magnitude of change indicates general stability rather than strong intervention effects.

On the Syndrome Scale, stress decreased slightly from 7.39 (SD = 4.15) to 6.8 (SD = 4.8), indicating a minor reduction in perceived stress. Depression showed a more noticeable numerical decrease from 5.9 (SD = 8.98) to 4.56 (SD = 3.2), suggesting some improvement in mood, although the large pre-intervention SD indicates substantial variability in parents' perceptions. Social difficulties decreased from 5.83 (SD = 3.06) to 4.63 (SD = 4.44), reflecting a modest improvement in social functioning, though post-intervention variability increased. Aggressive behaviour also declined slightly from 9.00 (SD = 5.57) to 8.13 (SD = 5.45), indicating a small reduction in behavioural dysregulation.

On the DSM scale, emotional difficulties increased from 5.13 (SD = 3.27) to 8.75 (SD = 15.18). This rise, combined with the very large post-intervention SD, suggests greater variability and inconsistency in parents' perceptions rather than a uniform increase in symptoms. In contrast, DSM stress remained relatively stable (3.43 → 3.81), indicating no meaningful change in parents' ratings of stress-related symptoms.

Overall, parents' reports show small improvements in stress, depression, social difficulties, and aggression, but substantial variability in emotional-difficulty ratings. The pattern suggests that while some behavioural and emotional indicators improved slightly, parents perceived the adolescents' overall functioning as largely stable following the intervention.

4.3.4 General Mental Health state

Following, Table 34 summarises the pre- and post intervention scores on the adolescents' report (YSR) of the ASEBA and Table 36 for the same structures, summarises the parents's report (CBCL) scores.

Table 34: Pre- and Post-Intervention YSR ASEBA Scores (Adolescents' Reports)

Construct	Pre-Intervention M (SD)	Post-Intervention M (SD)
Internalised symptoms	17.65 (9.50)	16.29 (10.69)
Externalised symptoms	16.54 (9.88)	16.00 (6.96)
General mental load	61.09 (27.28)	59.43 (28.33)
Oppositional defiant symptoms	4.52 (2.59)	4.79 (2.12)
Conduct disorder symptoms	5.80 (4.46)	5.21 (3.51)

Across all five constructs, adolescents' scores were reported using means and standard deviations, indicating approximately normal distributions at both time points. Overall, the pattern reflects small, non-significant reductions in most emotional-behavioural symptoms, suggesting modest improvements but no strong intervention effect.

Internalised symptoms decreased from 17.65 (SD = 9.5) to 16.29 (SD = 10.69), indicating a slight reduction in internal distress (e.g., anxiety, sadness, withdrawal). Although the change is small, the direction suggests marginal improvement in inward-focused emotional strain.

Externalised symptoms also declined slightly from 16.54 (SD = 9.88) to 16.00 (SD = 6.96), reflecting a minor reduction in outward behavioural difficulties, such as irritability or impulsive actions.

General mental load decreased from 61.09 (SD = 27.28) to 59.43 (SD = 28.33), suggesting a small reduction in perceived cognitive-emotional burden, though the large SDs indicate substantial variability across adolescents.

In contrast, oppositional defiant symptoms increased slightly from 4.52 (SD = 2.59) to 4.79 (SD = 2.12). This small rise may reflect persistent challenges with defiance or argumentativeness, though the change is minimal.

Conduct disorder symptoms decreased from 5.80 (SD = 4.46) to 5.21 (SD = 3.51), indicating a modest reduction in rule-breaking or disruptive behaviours.

Overall, adolescents' reports show a pattern of small improvements in internalised symptoms, externalised symptoms, general mental load, and conduct-related behaviours, with a slight increase in oppositionality. These findings suggest that the intervention produced subtle, domain-specific shifts rather than broad or robust changes in adolescents' emotional-behavioural functioning.

Table 35: Pre- and Post-Intervention ASEBA CBCL Scores (Parents' Reports)

Construct	**Pre-Intervention M (SD)**	**Post-Intervention M (SD)**
Internalised symptoms	14.55 (7.94)	13.31 (7.59)
Externalised symptoms	13.21 (7.52)	11.56 (7.62)
General mental load	51.07 (21.28)	42.50 (25.73)
Oppositional defiant symptoms	3.50 (2.32)	3.63 (2.50)
Conduct disorder symptoms	3.23 (3.38)	3.50 (2.63)

All constructs were analysed using means and standard deviations, indicating approximately normal distributions at both time points. Overall, parents perceived small improvements in most emotional-behavioural domains following the intervention, though the magnitude of change suggests general stability rather than strong effects.

Internalised symptoms decreased from 14.55 (SD = 7.94) to 13.31 (SD = 7.59), indicating a modest reduction in inward emotional distress (e.g., sadness, anxiety). Externalised symptoms declined from 13.21 (SD = 7.52) to 11.56 (SD = 7.62), suggesting fewer outward behavioural difficulties, such as irritability or impulsivity. General mental load showed the largest decrease—from 51.07 (SD = 21.28) to 42.5 (SD = 25.73)—indicating that parents perceived a notable reduction in overall cognitive-emotional burden. In contrast, oppositional defiant symptoms increased slightly (3.50 → 3.63), suggesting minor persistence or slight worsening in

argumentative or defiant behaviours. Conduct disorder symptoms also increased slightly (3.23 → 3.50), though the change is small and likely not clinically meaningful.

Overall, parents' reports suggest modest improvements in internalised symptoms, externalised symptoms, and general mental load, with small increases in oppositional and conduct-related behaviours.

4.3.5 Summary of Results

After the intervention, the overall participant profile reflects a pattern of selective cognitive improvements, modest emotional stabilization, and largely unchanged behavioural symptoms, with some discrepancies between adolescents' self-reports and parents' observations. Cognitive outcomes show the clearest gains: participants demonstrated strong improvements in executive-function tasks, particularly in working memory, cognitive flexibility (Trail Making B), processing speed (Trail Making A), and reduced attentional lapses (CAT omissions). These changes indicate a post-intervention profile characterised by better mental organization, improved information manipulation, and enhanced sustained attention.

In contrast, emotional and psychosocial indicators show small, domain-specific shifts rather than broad improvements. Adolescents reported slight reductions in internalised symptoms, externalised behaviours, and general mental load, suggesting a mild easing of emotional strain. Parents similarly perceived small improvements in stress, mood, and social functioning. However, both groups noted stable or slightly increased oppositional and conduct-related behaviours, indicating that behavioural regulation remained a challenge despite cognitive gains.

Self-esteem and broader psychosocial constructs showed minimal change, with academic self-concept increasing slightly (reflecting more pessimism under the scoring rule) and emotional-state variables showing mixed patterns, small reductions in anger and anxiety but slight increases in boredom and sadness. These findings suggest that while participants became cognitively more capable, their emotional landscape remained complex, with improvements in some areas but persistent vulnerabilities in others.

Taken together, the post-intervention profile depicts adolescents who are cognitively stronger, slightly less emotionally burdened, and generally stable in behavioural functioning, with improvements more evident in internal cognitive processes than in observable emotional or behavioural expressions. The divergence between adolescents' and parents' reports further highlights that internal distress remains more pronounced than what caregivers perceive, underscoring the importance of integrating both perspectives in interpreting intervention outcomes.

5 Discussion

5.1 Introduction

The present study examined the effectiveness of a multicomponent OT intervention designed to enhance EF, academic participation and psychosocial well-being in adolescents with ADHD. The findings demonstrate important gains in several performance-based EF domains and in particular, WM, CF, processing speed, sustained attention and interference control. Meanwhile, self-reported executive difficulties and psycho-emotional indicators showed more modest or non-significant changes. Findings, collectively support the feasibility and potential impact on an occupation-centered, developmentally appropriate intervention that integrates cognitive and academic skills training and contextual supports. Results contribute to theoretical models of ADHD, advance OT practice and extend rehabilitation science by demonstrating that meaningful neurocognitive changes can be achieved in adolescence, as a result of a structured occupation-focused intervention.

The MOTI contributes to theoretical models of ADHD, advances OT practice and extends rehabilitation science by demonstrating that meaningful neurocognitive changes can be achieved in adolescence through structured, occupation-based interventions.

In the following sections, empirical findings are integrated with contemporary theory, clinical practice and OT models. Further, the following sessions address how the results of challenge existing assumptions, what they mean for intervention design and how clinicians should adapt their practice on this evidence.

5.2 Preliminary Discussion: Demographic and Pre-Intervention Profile

The overall demographic profile of the sample seems to align with patterns commonly described in ADHD research. Regarding gender, our sample consists of 67% males and 33% females reflecting the 2:1 ratio typically reported in ADHD literature (Ayano et al., 2023). Gender distribution of this study fits well within the expected epidemiological patterns. Similarly, age distribution – participants aged 13 to 17 years with a mean age

M=14.38, reflects the developmental period where ADHD symptoms shift from hyperactivity to more subtle EF difficulties (De Rossi et al., 2023).

Regarding ADHD presentation, the predominant Inattentive subtype (58.18%) matches contemporary findings showing that in adolescence, the inattentive presentations become more common (Biederman et al., 2000; Faraone et al., 2006; Willcutt et al., 2012) Research supports that inattentive presentations become more common among girls in adolescence (Coxe et al., 2021; Greven et al., 2018; Ositkovska & Bayer, 2020) and this aligns with our findings where among female participants, 63% have the inattentive subtype. At the same time, for male participants, the higher hyperactive-impulsive proportion also fits established gender patterns (Coxe et al., 2021; Ositkovska & Bayer, 2020; Slobodin & Davidovitch, 2019).

On the other hand, the socio-economic profile of parents and the overall socio-economic status of the family slightly differs from many studies reporting higher ADHD prevalence in lower-SES families (Rowland et al., 2018; Russell et al., 2014). Parents of participant students in our study are reported to have gained a degree of higher education, while family income is reported to be among average and above average for Cyprus.

The absence of confirmed parental ADHD diagnoses despite notable suspected symptoms aligns with research showing substantial underdiagnosis of adult ADHD (Faraone et al., 2021). Elevated rates of neurodevelopmental and mental health difficulties among siblings further support familial aggregation of ADHD (Asherson, 2016).

Treatment history also reflects broader international patterns: most participants had never received treatment during childhood (n = 40) and remained untreated during adolescence (n = 42). This mirrors international concerns that ADHD in adolescence is highly impairing yet systematically underserved (Buitelaar, 2017; Türk et al., 2023). Adolescents often fall between child-focused and adult-focused service structures, resulting in reduced access to both pharmacological and psychosocial interventions (D. Coghill & Seth, 2015). These findings underscore the need for developmentally

sensitive, sustained interventions addressing the unique challenges adolescents with ADHD face.

5.3 Pre-Intervention Cognitive, Emotional and Behavioural Profile

Participants' pre-intervention profile reflects a cluster of cognitive, attentional and psychosocial difficulties consistent with contemporary ADHD research. A predominantly inattentive presentation is demonstrated, with elevated scores on the Attention Deficit subscale of the ADHD-Greek Scale (M=17.86) and lower scores on the Hyperactivity-Impulsivity Subscale (M=9.77). This pattern aligns with developmental evidence showing that hyperactivity tends to decline with age while inattention and EF deficits become more salient and pervasive (Franke et al., 2018; Slobodin et al., 2015).

EF measures reveal pronounced weaknesses in IC, WM, short-term memory and CF. Scores on Cognifit tests indicate substantial variability with inhibition showing the lowest median score (Mdn=36). Performance on Trail Making Test. Further reflects reduced CF and elevated executive cost, with strong correlations between Trail Making B and B-A (ρ=.843), underscoring shared cognitive demands.

Self-reported cognitive and behavioural difficulties highlighted substantial subjective cognitive load, including thought bombardment, memory difficulties, attention difficulties and planning and organizing challenges. Low sustained attention scores during homework and class reflected functional impairment in academic contexts.

Examining psychosocial measures, we see that these indicate moderate emotional dysregulation, elevated anxiety, irritability, boredom and difficulties in social life. Adolescents consistently rated their emotional and behavioural symptoms as more severe than their parents did. This is a pattern well-documented in adolescent mental health research (De Los Reyes & Kazdin, 2004; De Los Reyes & Ohannessian, 2016).

Despite these difficulties, adolescents demonstrated moderately high HRQoL, particularly in autonomy and parent relations, suggesting resilience and supportive family environments. Strong parent-child relationship has been found to be helpful for adjustment for students with ADHD during their transition to college (A. E. Stevens et al., 2024), while it is also associated with better self-perception (Ma et al., 2017). Our

finding somehow contradicts the prevailing view that HRQoL is comparatively lower in ADHD – a view that is strongly supported by research evidence eg (Y. chen Lee et al., 2016; López-Villalobos et al., 2018; Wanni Arachchige Dona et al., 2023) On the other hand when taking into consideration the educational and economic status of the parents' of our participants, which are both reported as mostly above average, this absence of low self-reported HRQoL might be explained. In the European KIDSCREEN study, higher parental educational status improved several child HRQoL dimensions (Von Rueden et al., 2006).

Evidence suggest that parents' higher education and better socioeconomic position are usually associated with better child/adolescent HRQoL, but the relationship is not purely direct (Cassedy et al., 2013; Markham & Spencer, 2022; Richard et al., 2024; Von Rueden et al., 2006). The evidence suggests that material resources, family environment, and parent-child relationship quality often mediate or strengthen this link, and in some studies household income is more predictive than education (Cassedy et al., 2013; Markham & Spencer, 2022; Richard et al., 2024; Von Rueden et al., 2006).

Summarizing, the pre-intervention data depict a profile characteristic of adolescent ADHD: predominant inattention, uneven EF, elevated cognitive load, emotional dysregulation and moderate psychosocial strain. This baseline provides a potential foundation for interpreting subsequent intervention effects.

5.4 Interpretation of key findings

The guiding research question of the current study was to what extent (if any) a multicomponent occupational therapy intervention (MOTI), combining cognitive training, academic skills training, and optional parental involvement, improves executive functioning and psycho-emotional wellbeing in adolescent students with ADHD. This general research question was examined through eight hypotheses, presented in Chapter 2.

Before interpreting each hypothesis individually, it is useful to present a synthesis of how the research questions, hypotheses, measures, and outcomes relate to one another. Given the multicomponent nature of the intervention and the breadth of outcomes

assessed, a structured overview is necessary to clarify how each research question was operationalised and how the corresponding hypotheses were tested. The table 36 below summarises this alignment and the overall pattern of findings, providing a foundation for the subsequent in-depth interpretation of each hypothesis.

Table 36 Alignment of Research Questions, Hypotheses, Measures, and Findings

Research Question (RQ)	**Hypothesis (H)**	**Measures Used**	**Result Summary**
RQ1. Does the intervention improve working memory?	H1. Working memory will improve.	Cognifit Working Memory; Digit Span Forward; Digit Span Backwards; Digit Span Distraction	**Supported.** Significant improvements across all Digit Span subtests and Cognifit WM (large effect, r = .76).
RQ2. Does the intervention improve cognitive flexibility?	H2. Cognitive flexibility will improve.	Trail Making Test B; Trail Making B–A	**Supported.** Significant improvements with very large effects (r = .716) and medium effects (r = .420).
RQ3. Does the intervention improve inhibitory control?	H3. Inhibitory control will improve.	Cognifit Inhibition; CAT Commissions; CAT Reaction Time; STReDI impulsivity items	**Not supported.** Small, non-significant trends (r = .23–.34). No significant change.
RQ4. Does the intervention improve general cognitive abilities (processing	H4. General cognitive abilities will improve.	Trail Making A; CAT Reaction Time; Cognifit Focused Attention	**Partially supported.** Processing speed improved strongly (Trail A, r = .662). Reaction time remained stable.

speed, reaction time)?			
RQ5. Does the intervention improve planning and organisational abilities?	H5. Planning & organisation will improve.	Cognifit Planning; STReDI Planning & Organising Difficulties	**Supported.** STReDI Planning & Organising improved significantly ($p = .034$, $r = .31$). Cognifit Planning showed a positive trend.
RQ6. Does the intervention improve sustained attention?	H6. Sustained attention will improve.	CAT Omissions; CAT Commissions; Sustained Attention (homework/class); Cognifit Focused Attention	**Partially supported.** CAT Omissions improved significantly ($p = .046$, $r = .38$). Other measures stable.
RQ7. Does the intervention influence psycho-emotional functioning?	H7. Psycho-emotional functioning will improve.	Rosenberg Self-Esteem; STReDI psychosocial constructs; Emotional State Scores; ASEBA (adolescent + parent reports)	**Partially supported.** Small improvements in anger, emotional expression, optimism, internalised/externalised symptoms. No strong effects.
RQ8. Does the intervention reduce core ADHD symptoms?	H8. ADHD symptoms will decrease.	ADHD-Greek Scale Total; ADHD Attention Deficit; ADHD Hyperactive/Impulsive	**Not supported.** No significant changes. Attention Deficit showed a trend ($p = .067$).

5.5 Hypothesis 1: Working Memory Improvements

Hypothesis 1 proposed that participation in the MOTI would lead to statistically significant improvements in WM performance. The results clearly support this hypothesis, with converging evidence across two independent assessment tools: the Cognifit Assessment Battery and the Digit Span subtests. WM scores increased significantly on the Cognifit Working Memory Index ($Z = –3.22$, $p = .001$), and all three Digit Span conditions—forward, backward, and distraction—showed statistically significant gains (all $p < .05$). This convergence across a computerized, multi-task cognitive battery and a standardized neuropsychological measure strengthens the validity and robustness of the observed improvement.

These findings are theoretically meaningful as they align with Miyake's unity/diversity model of EF (Friedman & Miyake, 2016; Miyake et al., 2000) The model sees WM as a core function supporting higher-order cognition and involving the continuous monitoring, refreshing and revising of task-relevant information (Miyake et al., 2000; Saylik et al., 2022).

Assessment of WM in the current study was based on multiple formats, in order to capture as many processes as possible. We observed important gains across storage-based test (Digit Span forward), manipulation-based test (Digit Span backward) and interference-resistant test (Digit Span distraction). Improvements in all areas (or processes) indicate enhanced cognitive inhibition, supporting Barkley's model of ADHD as a disorder of BI that cascades into broader dysfunction (R. A. Barkley, 1997, 2014).

The observed improvements in WM have meaningful implications for adolescents' everyday functioning, academic performance and capacity to manage complex cognitive demands. This lies on the well-known strong association of WM with fluid intelligence, attentional control and self-regulation (Berger et al., 2025; Sala & Gobet, 2020; Sana & Fenesi, 2025).

Comparing the results with findings of other researchers, we observe that these are consistent with a substantial body of empirical evidence, demonstrating that structured

cognitive training can enhance WM in adolescents with ADHD. For example, Steeger et al (2016), reported significant improvements following a computerized working-memory training program of 25-day duration, similar to the computerized component of cognitive training of the MOTI. Likewise, Stevens et al (2016), found that Cogmed™ training, produced measurable gains in WM among adolescents, reinforcing the responsiveness of this domain to structured practice. Meta-analyses gave evidence that further support these conclusions. Veloso et al (2020) and Al-Saad et al (2021) repost consistent improvements in WM, across diverse cognitive-training protocols for children and adolescents with ADHD. These reviews highlight the potential of WM to be effectively trained, even in adolescence, and particularly when interventions incorporate adaptive difficulty, repeated practice and feedback – all these features are embedded within the MOTI.

The current findings also align with research on multicomponent interventions, which combine cognitive training with behavioral, metacognitive or psychoeducational elements. These approaches have been shown to give stronger and more reliable positive effects in WM that single-component programs do (Klingberg, 2010; Rapport et al., 2013). The significant improvement in interference-resistant WM observed in this study, mirrors findings from the study of Nejati et al (2023) who reported gains both in WM and IC, following the attendance of a comprehensive EF training.

In conclusion, results provide strong empirical support for the first Hypothesis – WM scores have shown significant improvement after intervention. This improvement across all WM measures, combined with large effect sizes and cross-instrument convergence, indicate that the MOTI effectively enhanced a core EF domain central to cognitive, academic and behavioral functioning in adolescents with ADHD. These findings contribute to theoretical models of ADHD, reinforce the value of multicomponent EF interventions and highlight WM as a key target for OT and rehabilitation sciences.

5.6 Hypothesis 2: CF Improvements

Hypothesis 2 proposed that participation in the MOTI would lead to a significant improvement in CF, as measured by pre- and post-intervention performance. The study results provide potentially strong evidence in support for the hypothesis, with significant

gains observed across all three Trail Making indices – Trail Making A, Trail Making B and Trail Making B-A which gives the executive-load cost score.

Performance on Trail Making A, assessing processing speed and visual scanning efficiency, improved substantially. From a median of 31sec (IQR=23-40) to 23sec (IQR=19-31.8), z=-3.75, p<.001 and r=.80. Trail Making B, which is the primary indicator of CF and set-shifting, showed an even larger improvement, with a decrease in completion time from 82sec pre-intervention (IQR=64.102) to 61.5 post-intervention (IQR=56.3-77.3), z=-4.05, p<.001 and r=.86. Importantly, the Trail Making B-A score, which isolates the additional executive load required for set-shifting beyond basic processing speed, also improved significantly, from 46 seconds (IQR=32-58) pre-intervention to 38 seconds (IQR=31-45), z=-2.377, p=0.17, r=.43. Reduction in executive load coast indicates that the additional cognitive effort needed to shift between sets was reduced (thus improved) after the intervention.

The combined pattern of improvements across Trail Making A, B and B-A provides compelling evidence that participation in MOTI strengthened both foundational and higher-order components of CF. According to the unity/diversity model of Miyake et al (2000), CF relies on the co-ordinated functioning of multiple EF components, including processing speed, WM updating and IC. The observed significant reduction in Trail Making B-A scores is meaningful as it reflects an improvement in efficiency in executive processes required to disengage from one cognitive set (one set of rules) and transit to another, which is a central ability in adoptive functioning.

Furthermore, findings align with contemporary neurocognitive models of ADHD, which conceptualize the condition as involving multidimensional ED rather than isolated deficits (Wang et al., 2025). Difficulties in CF are often associated with difficulties adapting to changing academic demands, reorganizing information and shifting strategies, areas in which students with ADHD commonly struggle (Giannakopoulos, 2025; Sibley et al., 2014, 2019; Wixted et al., 2016).

Our results are consistent with a growing body of evidence demonstrating that structured cognitive training can enhance CF. Findings by Lee et al (2024) and Olfer & Band (2018) indicate that repeated practice on tasks requiring rapid switching and reorganization of responses leads to measurable improvements in set-shifting ability. The observed change and its size, in Trail Making B scores in the current study, is

comparable to gains reported in other EF intervention studies such as those of Shuai et al (2017), who observed significant improvements, among other components, in CF and reductions in behavioral problems, following a multi-domain EF training program. Other researchers studying multicomponent interventions that integrate cognitive practices with metacognitive strategies and contextualized tasks, like the structure of MOTI, have been shown to produce stronger and more generalizable improvements in CF than single-component interventions (Evans et al., 2018; Rapport et al., 2013)

In OT, enhanced CF is considered to have direct implications for a vast area of activities, occupations and roles. Academic participation and performance, social functioning, ADLs and IADLs are all directly influenced areas. Improved set-shifting supports the ability to move between subjects, adapt to classroom changing demands, reorganize information and manage complex tasks (Indira et al., 2026; Wixted et al., 2016). CF, as a core process for problem solving abilities and creativity (Indira et al., 2026).

The findings along with the established importance of CF reinforce the value of embedding its training within meaningful academic and daily activities, consistent with the emphasis that OT poses on occupation-centered cognitive intervention. They also highlight the importance of multicomponent approaches that integrate cognitive training with strategy instruction and real-world application, advancing OT practice.

5.7 Hypothesis 3: IC Improvements

Hypothesis 3 proposed that participation in the MOTI would lead to significant improvements in IC, a core EF frequently impaired in adolescents with ADHD. The results offer partial support for this hypothesis. Performance on the CAT showed a non-significant reduction in commission errors—from a median of 66 (IQR = 47.2–87.1) to 59.7 (IQR = 33.2–81.2), $Z = –1.822$, $p = .068$—indicating a trend toward improved BI, though not reaching statistical significance. In contrast, interference-resistant WM, assessed through Digit Span Distraction, improved significantly from a median of 2 (IQR = 1–3.3) to 3 (IQR = 2–4), $Z = –2.457$, $p = .014$, $r = .47$. This pattern suggests that the MOTI may have strengthened cognitive inhibition, the ability to resist interference and suppress irrelevant information, more effectively than motor inhibition, which involves suppressing prepotent behavioural responses.

This improvement is particularly meaningful when interpreted through Barkley's behavioural inhibition framework, which directly maps onto the cognitive demands of the Digit Span Distraction task. According to Barkley, ADHD arises from difficulties inhibiting prepotent responses, stopping ongoing behaviour, and sustaining IC during delay periods—especially in distracting contexts. The Digit Span Distraction task operationalises these mechanisms almost exactly: adolescents must maintain goal-directed behaviour (remembering the digit sequence) while resisting interference from an irrelevant question, suppressing the urge to respond to the distractor, and re-establishing the original cognitive set after the delay. The significant improvement observed in this condition therefore reflects strengthened cognitive inhibition and enhanced capacity to maintain information in the presence of competing stimuli. This aligns with Barkley's conceptualisation of BI deficits as foundational impairments that cascade into broader ED, and suggests that the MOTI may have effectively targeted the interference-control component of inhibition, even if behavioural impulsivity (as measured by CAT commissions) showed only modest change.

IC is a foundational component of EF, enabling individuals to regulate impulses, delay responses, and maintain goal-directed behaviour (Barkley, 2015). Deficits in this domain are strongly associated with academic difficulties, emotional dysregulation, and behavioural challenges in adolescents with ADHD. The improvement observed in interference control is therefore meaningful, as it reflects enhanced capacity to maintain task-relevant information while filtering out distractions—an ability closely tied to classroom performance and everyday self-regulation.

The mixed pattern of results aligns with existing research indicating that inhibitory control is often slower to improve than other EF components and may require more intensive or longer-duration interventions to produce robust gains (Alderson et al., 2017). Cognitive inhibition and motor inhibition rely on partially distinct neural systems, and interventions may differentially affect these components. The present findings suggest that the MOTI successfully strengthened higher-order inhibitory processes, even if improvements in behavioural impulsivity were more modest. Cognitive inhibition, which relies more heavily on WM and attentional control, may be more responsive to structured cognitive training—particularly when interventions

incorporate repeated practice, adaptive difficulty, and metacognitive strategies, as in the MOTI.

The dissociation between cognitive and behavioural inhibition aligns with dual-component models of IC, which distinguish between the suppression of irrelevant information and the suppression of impulsive actions. The significant improvement in interference-resistant WM supports Barkley's (2015) model of ADHD, which conceptualizes BI as the foundational deficit that cascades into broader ED, including WM and self-regulation. Enhanced interference control suggests strengthened capacity to maintain task-relevant information while filtering out competing stimuli—an ability closely tied to academic performance, attentional stability, and everyday self-management.

Our results mirrors findings from previous EF-training studies. Nejati et al. (2023) reported improvements in cognitive inhibition following comprehensive EF training, while Meyer et al. (2020) found that IC training improved ADHD symptoms in children aged 8–11. However, studies such as Bikic et al. (2018) have shown limited change in behavioural impulsivity following digital cognitive training, suggesting that motor inhibition may require contextualized, real-world practice rather than purely computerized tasks.

The significant improvement in interference-resistant WM aligns with findings from Shuai et al. (2017), who demonstrated gains in IC and WM following a multicomponent EF intervention that incorporated real-life application and parental involvement. In contrast, Qian et al. (2017) found more modest improvements in inhibition following digital-only WM training, reinforcing the importance of ecological, context-embedded intervention formats—an approach reflected in the MOTI.

For OTs, these findings highlight the importance of differentiating between cognitive and behavioural aspects of inhibition. The MOTI's success in strengthening cognitive inhibition suggests that OT practitioners should incorporate structured cognitive tasks that challenge interference control, such as dual-task activities, distraction-resistant working-memory tasks, and strategy-based attentional routines. The limited change in behavioural impulsivity underscores the need for environmental support, behavioural coaching, and contextualized practice within daily routines—consistent with OT's emphasis on occupation-centered intervention and ecological validity.

5.8 Hypothesis 4: General Cognitive Abilities (Processing Speed and Reaction Time)

Hypothesis 4 proposed that participation in the MOTI would lead to significant improvements in general cognitive abilities, operationalised as processing speed and reaction time. The results provide strong support for improvements in processing speed, but limited support for changes in reaction time.

Processing speed, assessed through Trail Making A, improved substantially from a median of 31 seconds (IQR = 23–40) to 23 seconds (IQR = 19–31.8), $Z = –3.75$, $p < .001$, $r = .80$. This large effect size indicates a meaningful enhancement in the speed with which adolescents could visually scan, sequence, and process information under timed conditions. In contrast, reaction time, measured through the CAT, showed a small, non-significant increase from 467 ms (IQR = 405–504.5) to 472 ms (IQR = 442.8–520.3), $Z = –1.784$, $p = .074$, suggesting stability rather than improvement.

Processing speed is widely considered a foundational cognitive resource that supports higher-order EF, including WM, CF and IC (Braaten et al., 2020; Cook et al., 2018) . The substantial improvement observed here may therefore have contributed to, or reflected, the parallel gains seen in these domains. Enhanced processing speed reduces cognitive load, allowing adolescents to allocate more resources to complex tasks such as problem solving, planning, and academic work.

The stability of reaction time is theoretically consistent with research indicating that basic psychomotor speed is less malleable through cognitive-academic training and may require more intensive or motor-based interventions. Reaction time tasks typically tap lower-level neural processes that do not benefit directly from EF training.

The present findings align with studies that show that multicomponent EF interventions can improve processing speed. Shuai et al. (2017), reported significant gains in speeded EF tasks following ecological EF training, while Lee et al. (2024), found improvements in processing efficiency after repeated cognitive-flexibility practice. In contrast, digital-only interventions such as Qian et al. (2017), often show limited change in reaction time, reinforcing the idea that psychomotor speed may not respond robustly to cognitive training alone.

The dissociation between processing speed and reaction time mirrors findings from meta-analyses (Cortese et al., 2015; Veloso et al., 2020) which report stronger effects for complex EF tasks than for simple reaction-time measures.

For occupational therapists, improved processing speed has direct implications for academic participation, daily routines, and task efficiency. Faster visual scanning and sequencing support reading fluency, written expression, and the ability to complete schoolwork within time constraints. The stability of reaction time highlights the need for OT practitioners to differentiate between cognitive and motor components of speed and to incorporate motor-based or sensorimotor activities when targeting reaction-time improvements.

In conclusion Hypothesis 4 is partially supported by the research findings.

5.9 Hypothesis 5: Planning and Organizational Skills

Hypothesis 5 proposed that participation in the MOTI would lead to significant improvements in planning and organizational abilities. The results provide weak support for this hypothesis. Planning scores increased from a median of 540 (IQR = 240.5–700) to 604 (IQR = 404.5–711.5), but this change did not reach statistical significance ($Z = –1.224$, $p = .221$). Although the direction of change was positive, the magnitude was insufficient to meet the threshold for statistical significance, suggesting that planning may require longer intervention duration or more intensive strategy-based training.

Planning is a higher-order executive function that relies on the integration of multiple EF components, including WM, CF and IC. The limited change observed here is consistent with theoretical models suggesting that planning improves more slowly and requires explicit strategy instruction, extended practice, and real-world application (Langberg et al., 2018). The significant gains observed in foundational EF domains—WM, CF, processing speed, and sustained attention—may represent precursors to future improvements in planning, even if the direct measure did not yet reflect statistically significant change.

The results also align with the unity/diversity model (Miyake et al., 2000), which positions planning as a composite skill dependent on multiple EF components. The

MOTI strengthened these foundational components, suggesting that planning may improve with longer intervention duration or more intensive strategy-based training.

Research consistently shows that planning and organisation are among the most challenging EF domains for adolescents with ADHD. Evans et al. (2018) and Langberg et al. (2018) found that improvements in planning often require explicit instruction, environmental support, and extended intervention duration. Shuai et al. (2017) reported modest improvements in planning following multicomponent EF training, but these gains were smaller than improvements in working memory or inhibition—mirroring the pattern observed in the present study.

The modest upward trend observed here is also consistent with findings from interventions that emphasise cognitive remediation but do not include intensive planning-strategy modules. In contrast, interventions that incorporate structured organisational coaching, such as the Homework, Organization, and Planning Skills (HOPS) program, tend to produce stronger improvements in planning and school functioning—highlighting the need for contextualised, occupation-based planning practice.

For OTs, these findings highlight the need to embed planning and organisational skills within meaningful daily routines, academic tasks, and real-world contexts. OT practitioners should provide explicit strategy instruction, scaffold planning tasks, and incorporate environmental supports to facilitate generalisation. The results reinforce the importance of occupation-centred approaches that integrate planning practice into authentic school and home activities, consistent with OT's emphasis on ecological validity and functional relevance.

5.10 Hypothesis 6: Sustained Attention Improvements

Hypothesis 6 proposed that participation in the MOTI would lead to significant improvements in sustained attention. The results provide clear support for this hypothesis. CAT omissions—a sensitive indicator of lapses in sustained attention—decreased significantly from a median of 2.5 (IQR = 1.5–4.7) to 1 (IQR = 0.3–3.4), $Z = –1.992$, $p = .046$, $r = .38$. This reduction indicates improved ability to maintain focus over time and resist attentional lapses during repetitive or monotonous tasks.

Sustained attention improvements were also indirectly reflected in the substantial gains observed in Trail Making A, which requires continuous attentional engagement and rapid visual scanning. Together, these results suggest that the MOTI strengthened both vigilance and attentional persistence.

Sustained attention is central to ADHD and is essential for academic functioning, task completion, and self-regulation. Improvements in this domain align with neurocognitive models positioning attentional dysregulation as a core feature of ADHD (Tamm et al., 2013). Enhanced sustained attention reduces cognitive fatigue, improves task adherence, and supports the ability to follow multi-step instructions—skills that are critical during adolescence.

The significant reduction in omissions also supports the unity/diversity model (Miyake et al., 2000), which conceptualizes sustained attention as closely linked to processing speed and WM. The parallel improvements observed across these domains suggest that the MOTI strengthened the broader attentional-executive system.

The present findings are consistent with studies demonstrating that multicomponent EF interventions can enhance sustained attention. Shuai et al. (2017) reported improvements in attentional persistence following ecological EF training, while Nejati et al. (2023) found gains in sustained attention after comprehensive working-memory training. In contrast, digital-only interventions such as ACTIVATE (Bikic et al., 2018) have shown limited effects on sustained attention, reinforcing the importance of contextualized, real-world practice—an approach embedded in the MOTI.

For OTs, improved sustained attention has direct implications for school participation, homework completion, and classroom engagement. OT practitioners can build on these gains by embedding attentional practice within meaningful academic tasks, using graded activity demands, and incorporating environmental supports to maintain focus. The results highlight the value of occupation-centered EF interventions that integrate attentional practice into authentic daily routines.

5.11 Hypothesis 7: Psycho-Emotional Outcomes

Hypothesis 7 extended the present study beyond executive functioning to examine whether the MOTI was also associated with measurable changes in adolescents' psycho-

emotional functioning, including self-esteem, anxiety, mood-related difficulties, and broader emotional and behavioural difficulties. Across all four hypotheses, the results provide limited support: observed changes were generally small, directionally positive in most domains, and did not reach statistical significance.

Regarding self-esteem, assessed with the Rosenberg Self-Esteem Scale, increased marginally from a median of 18 to 19, but this change was not statistically significant ($Z = -1.142$, $p = .253$). Adolescents' self-reported anxiety decreased slightly from a mean of 3.29 ($SD = 1.13$) to 3.06 ($SD = 1.16$); although descriptively in the expected direction, this reduction was not accompanied by a significant test statistic in the present analysis. Neither part of the hypothesis can therefore be considered statistically supported, although both point towards a modest, favourable trend.

Mood-related indicators produced a mixed pattern. Frequent anger outbursts and difficulties expressing emotional state both decreased from pre- to post-intervention, consistent with improved emotional regulation. However, boredom increased slightly (3.42 to 3.65), and sadness also rose marginally (2.78 to 2.88), while anger as a trait remained essentially unchanged. Those parts therefore received only partial and inconsistent support, with improvements in some mood indicators offset by small increases in others.

Broader emotional and behavioural difficulties, assessed via the SAEBA Syndrome and DSM scales, showed small, generally non-significant reductions in internalised symptoms, externalised symptoms, and general mental load according to adolescent self-report, with a broadly similar pattern in parent report. Oppositional defiant symptoms showed a slight increase in both reporters. These changes were not of sufficient magnitude to constitute statistically reliable improvement.

Hypothesis 7 was not statistically supported. This pattern is not unexpected: the MOTI was designed primarily as a cognitive and academic-skills intervention, with parental psychoeducation as a supporting rather than a primary emotion-focused component. Psycho-emotional constructs such as self-esteem, anxiety, and broader emotional regulation are shaped by a wide range of factors beyond executive functioning, including social relationships, family dynamics, and accumulated experiences of academic or social difficulty, and may require longer exposure, larger samples, or more explicitly emotion-focused intervention content to shift reliably. The consistently

positive, if non-significant, direction of change across most psycho-emotional indicators nonetheless suggests that improvements in executive functioning may be beginning to have a modest downstream effect on wellbeing, an effect that a longer or larger-scale trial may be better powered to detect.

5.12 Hypothesis 8: Core AHDH Symptoms

Hypothesis 8 proposed reductions in core ADHD symptoms. Results do not support this hypothesis.

Post-intervention results reveal a pattern of selective, domain-specific gains, particularly in executive functions, alongside largely stable ADHD core symptoms. At the symptom level, Wilcoxon tests showed no statistically significant change in the ADHD-Greek total score, and only a trend toward improvement in the Attention Deficit subscale ($p = .067$), while Hyperactive/Impulsive scores increased without reaching significance. As noted in Results, "overall, no statistically significant changes were detected across the three measures, though the Attention Deficit subscale approached significance, suggesting a possible trend toward symptom reduction in this domain." This profile is consistent with literature indicating that short-term, skills-based interventions in adolescence often yield greater impact on functional and cognitive outcomes than on parent-rated or scale-based ADHD symptom severity, especially in quasi-experimental designs without medication changes (Sonuga-Barke et al., 2013; De Rossi et al., 2023). The modest reductions in ASEBA DSM-oriented scores (for both adolescents and parents) further support a small but not robust shift in perceived ADHD-related difficulties, aligning with meta-analytic findings that non-pharmacological interventions typically produce small to moderate effects on behavioural ratings (Cortese et al., 2015).

The present findings mirror results from digital-only EF interventions such as Qian et al. (2017), which reported improvements in EF but limited change in emotional symptoms. In contrast, ecological EF interventions with strong parental involvement—such as Shuai et al. (2017)—have shown broader improvements in emotional and behavioural functioning, suggesting that generalisation of emotional gains may require family-based or context-embedded components.

Meta-analyses (Cortese & Coghill, 2018; Coghill et al., 2023) also report that non-pharmacological interventions often produce stronger effects on cognitive outcomes than on emotional or behavioural symptoms, reinforcing the pattern observed in the present study.

5.13 General Discussion

The findings of the present study highlight the importance of integrating emotional regulation strategies into (EF interventions when psycho-emotional outcomes are a priority. OTs can enhance EF-focused programs by incorporating mindfulness, coping strategies, sensory regulation techniques, and social–emotional learning components, alongside family involvement and contextualised practice. These elements support emotional wellbeing and facilitate behavioural change within adolescents' everyday environments.

Within the broader ADHD literature, multimodal treatment remains the most consistently supported approach, with cognitive training and skills-based interventions frequently positioned as promising components (Groenman et al., 2022; Nazarova et al., 2022; Ogundele & Ayyash, 2023; Sibley et al., 2025; Watson et al., 2015). Despite this promise, evidence for cognitive training is mixed, and several reviews emphasise the need for more rigorous, developmentally sensitive research (Caye et al., 2019; Coghill et al., 2023; Fabiano et al., 2015; Peterson et al., 2024; Ramos Galarza et al., 2024). The present study responds directly to these calls by implementing a multicomponent intervention grounded in the growing consensus that strengthening EF—particularly WM, IC, CF and planning - is central to improving functional outcomes (Ramos Galarza et al., 2024; Ramos Galarza & Pérez Salas, 2021; Re et al., 2015; Rueda et al., 2021; Veloso et al., 2020).

A critical contribution of this study is its exclusive focus on adolescents aged 13–18 years. Most cognitive training research includes children as young as 7 or 8, leaving mid-to-late adolescence comparatively under-examined. Yet adolescence is characterised by heightened academic demands, increased autonomy, and elevated risk for functional impairment (Coghill et al., 2023; Feldman et al., 2018; Sibley et al.,

2025). By targeting this developmental period, the present study addresses a significant gap in the literature.

Only one published intervention closely mirrors the multi-domain structure of the current protocol, this of Shuai et al. (2017). Both interventions targeted multiple EF domains and incorporated parental psychoeducation and non-computerised components to support real-life transfer. The present study extends this work by placing stronger emphasis on school-based functioning, explicitly targeting academic routines, classroom engagement, and participation—areas of particular relevance for adolescents.

The broader cognitive training literature presents a complex picture. Findings regarding effects on EF, non-executive cognitive skills, and core ADHD symptoms remain inconsistent. Some meta-analyses report strong support for psychosocial interventions, whereas others present equivocal results (Fabiano et al., 2015). Non-pharmacological interventions often demonstrate short-term benefits, but evidence for generalisation to everyday functioning is limited (Coghill et al., 2023). The European ADHD Guidelines Group further notes that non-blinded trials tend to report larger effects, raising questions about expectancy and measurement bias (Cortese & Coghill, 2018). Nevertheless, several meta-analyses identify positive effects in verbal and visual memory (Cortese et al., 2015) and WM (Cortese et al., 2016), findings that resonate with the improvements observed in the present study.

Individual studies also support the potential of cognitive training to enhance specific EF domains (Meyer et al., 2020; Nejati, 2021; Nejati et al., 2023; Olfers & Band, 2018; Shuai et al., 2017; Zhao et al., 2024). Taken together, these findings highlight both the promise and limitations of cognitive training and underscore a developmental gap: most interventions target children, not adolescents. The present study addresses this gap by focusing exclusively on secondary school students whose academic pressures, social contexts, and autonomy differ substantially from those of younger children.

Methodologically, the study shares similarities with Dovis et al. (2015), who used a computer-game-based intervention delivered at home. While Dovis et al. employed a single narrative game, the present study used a varied series of game-like cognitive tasks, offering a broader range of EF challenges. Both studies demonstrate that

computer-based cognitive training can enhance specific EF components in young people with ADHD.

In summary, the existing literature demonstrates both the potential and limitations of cognitive training interventions. The present study contributes to this field by targeting an under-researched population, employing a multicomponent intervention that integrates cognitive, behavioural, and real-life application elements, and demonstrating significant improvements in key EF domains. These findings align with and extend previous research while addressing notable gaps in developmental focus and intervention design.

5.14 Summary of Intervention Effectiveness in Relation to the Present Study

The present findings provide evidence for the effectiveness of a hybrid, multicomponent intervention in improving EF among adolescents with ADHD. Significant gains were observed in WM, CF, sustained attention, and processing speed, with positive trends in IC and planning. These outcomes align with existing research while extending the literature by demonstrating that combining computer-based training with real-life skills development yields potentially robust and ecologically valid improvements.

The novelty of the intervention lies in its hybrid design, which merges structured computerised cognitive training with occupation-focused application tasks. This approach reflects core OT principles by emphasising the translation of cognitive gains into meaningful daily activities, particularly within the school context. No existing intervention fully replicates this combination of components. The present study therefore contributes uniquely to the field by demonstrating that EF training can be enhanced when embedded within an occupation-centred framework.

5.15 Cultural, national and professional significance

Cyprus has lacked an evidence-supported, culturally adapted EF intervention for adolescents with ADHD, and this lack has shaped both national practice and the lived experiences of young people with the condition. Existing services have relied primarily

on tutoring, behavioural strategies, or pharmacological management, with minimal availability of structured cognitive-occupational interventions that address the underlying executive function mechanisms contributing to academic and daily-life difficulties. Within this context, the MOTI represents a landmark development: it is the first empirically evaluated EF-focused intervention designed specifically for Cypriot adolescents, and the first formal academic attempt to articulate a cognitive-functional profile for this population. This contribution is particularly significant given the longstanding absence of national ADHD guidelines, the lack of systematic data collection, and the limited recognition of ADHD within disability and educational policy frameworks in Cyprus.

The protocol was developed in formal Greek and aligned with Cypriot classroom norms, assessment practices, family roles, and help-seeking pathways. This cultural anchoring enhances ecological validity by ensuring that instructions, metacognitive strategies, and psychoeducational materials are understood as intended and resonate with adolescents' everyday academic realities. It also supports the transfer of cognitive gains to daily routines such as homework, classroom participation, and independent study, strengthening the intervention's functional relevance. By embedding the protocol within the linguistic and cultural context of Cyprus, the study ensures measurement invariance and minimises bias, offering a model for culturally responsive intervention development in small or under-researched countries.

The MOTI provides a structured alternative and compliments to traditional tutoring practices, which remains the dominant response to academic difficulties in Cyprus. Whereas tutoring typically focuses on repetition and content reinforcement, the MOTI targets the cognitive mechanisms that underpin learning and academic performance. This shift represents a conceptual advancement in national practice, positioning cognitive-occupational intervention as a viable and necessary complement to existing educational supports.

The study's contribution extends beyond intervention development to the creation of the first formal cognitive-functional profile of Cypriot adolescents with ADHD. Through its multi-method assessment strategy and integration of performance-based and self-report measures, the study provides an academically grounded description of the executive,

attentional, and organisational challenges faced by adolescents in Cyprus. This profile fills a critical gap in national knowledge, offering clinicians, educators, and policymakers a clearer understanding of the cognitive demands that shape academic participation and daily functioning. It also establishes a foundation for future research, enabling comparisons across cohorts, informing service development, and supporting the creation of national guidelines.

These national contributions are closely linked to broader professional advancements within OT. By demonstrating the feasibility and potential benefits of an occupation-centred EF intervention during adolescence, the study supports expanding OT practice beyond predominantly compensatory approaches. The findings show how cognitive remediation strategies can be integrated with meaningful participation goals, promoting engagement in everyday occupations central to adolescent development.

Furthermore, the study reinforces OT's contribution to interdisciplinary ADHD care by highlighting the interaction between cognition, environment, and occupational performance. The protocol shows how interventions can be developmentally appropriate, culturally responsive, and contextually relevant while remaining grounded in meaningful daily activities. Through its emphasis on academic participation, self-management, and everyday routines, the study demonstrates the profession's capacity to address areas that influence educational success, autonomy, and preparation for adult roles.

Collectively, the study contributes to both the Cypriot evidence base and the ongoing development of OT practice. By providing a culturally-informed intervention and advancing understanding of the cognitive-functional characteristics of adolescents with ADHD, it offers evidence that may inform future clinical practice, research initiatives, educational support systems, and policy development within Cyprus and comparable contexts.

5.16 Cognitive and Functional Gains

Improvements in WM, processing speed, CF, sustained attention, and planning have direct and far-reaching relevance for adolescents' daily functioning. Enhanced WM

supports multi-step academic tasks such as following complex instructions, solving mathematical problems, composing written work, and engaging in classroom discussions. This domain has been consistently linked to mathematical abilities, language proficiency, fluid intelligence, and self-regulation (Berger et al., 2025), making gains in WM particularly meaningful for adolescents navigating demanding academic environments. Increases in processing speed and CF further facilitate efficient task completion, enabling adolescents to shift between subjects, adapt to changing classroom expectations, and manage transitions with greater ease. These improvements reduce the cognitive bottlenecks that often contribute to frustration, avoidance, and academic disengagement.

Reductions in planning and organising difficulties indicate strengthened time management, improved structuring of schoolwork, and more effective handling of responsibilities. Adolescents who previously struggled to initiate tasks, break assignments into manageable steps, or maintain organised study routines are better equipped to meet academic deadlines and manage competing demands. Improvements in sustained attention reduce reliance on external prompts from teachers or parents, supporting greater independence during lessons, homework, and extended study periods. Enhanced attentional control also contributes to improved behavioural regulation, as adolescents are better able to maintain focus, resist distractions, and persist through cognitively demanding tasks.

Together, these gains reduce cognitive load and enhance participation across school, home, and community occupations. Adolescents experience increased confidence in their ability to manage academic challenges, greater consistency in daily routines, and improved engagement in meaningful activities. Strengthened EF also support social participation, as improved CF and self-regulation facilitate smoother peer interactions and more adaptive responses to social demands. In this way, the observed improvements extend beyond isolated cognitive skills and contribute to broader functional competence, reinforcing the central role of executive functioning in adolescent development and occupational performance.

5.17 Service Delivery and Ecological Validity

The findings support the inclusion of multicomponent cognitive-occupational interventions in both school-based and clinical programs, highlighting their value as developmentally appropriate and ecologically valid approaches for adolescents with ADHD. Unlike single-component interventions that target isolated cognitive skills, the hybrid design used in this study addresses cognitive, behavioural, and functional aspects of EF simultaneously. This integrated structure aligns closely with OT's holistic philosophy, which emphasises the interplay between cognitive capacities, emotional regulation, environmental demands, and meaningful participation. By combining computer-based cognitive training with real-life academic application tasks, the intervention ensures that gains are not confined to laboratory-style performance but instead translate into improved everyday functioning.

The structured yet flexible format—short sessions, home-based delivery, and opportunities for self-directed engagement—further strengthens its suitability for adolescents. This developmental period is characterised by a heightened need for autonomy, competence, and agency, and interventions that respect these needs are more likely to achieve sustained engagement. The MOTI's design reduces common barriers to participation, such as scheduling constraints, transportation challenges, and academic overload, while simultaneously empowering adolescents to take ownership of their progress. These features likely contributed to the strong adherence observed and demonstrate how cognitive-occupational interventions can be embedded within the rhythms of daily life.

Collectively, these elements illustrate how multicomponent, contextually grounded interventions can enhance both cognitive performance and functional participation, supporting their integration into routine school-based services, community programs, and clinical practice.

5.18 Implications for Occupational Therapy Theory, Practice, Education and Policy

The study advances OT theory by reinforcing the PEO model, demonstrating that EF capacities are central personal factors influencing occupational performance. Improvements in WM, CF, and sustained attention translated into enhanced participation in school-based occupations, illustrating the dynamic interaction between cognitive abilities, environmental demands, and occupational engagement. By showing that strengthened EF enables adolescents to meet academic expectations, manage routines, and participate more effectively in classroom activities, the findings provide empirical support for PEO's core assertion that occupational performance emerges from the fit between person, environment, and occupation. Strengthening EF effectively improved this fit, enabling adolescents to navigate complex academic environments with greater competence and autonomy.

The findings also support the MOHO, particularly its emphasis on volition, performance capacity, and habituation. Enhanced EF capacities allowed adolescents to initiate tasks more readily, persist through challenges, and regulate their behaviour during demanding academic activities. These behavioural changes reflect improvements in volitional engagement and performance capacity, while reductions in disorganisation and temporal mismanagement suggest emerging stability in habituated routines. The integration of cognitive training with real-life academic tasks aligns closely with MOHO's conceptualisation of occupational competence as the ability to sustain patterns of doing that meet environmental expectations. The MOTI's design therefore operationalises MOHO principles by strengthening the cognitive foundations that support purposeful, organised, and sustained occupational participation.

The study further contributes to the Cognitive Orientation to daily Occupational Performance (CO-OP) and cognitive strategy training traditions within OT. By embedding cognitive remediation within meaningful occupations—specifically academic routines—the intervention demonstrates that EF training is most effective when contextualised within real-world performance demands. This approach challenges traditional assumptions that adolescents primarily benefit from compensatory strategies

such as planners or checklists. Instead, the EF improvements observed indicate that restorative cognitive intervention is both feasible and effective during adolescence, supporting contemporary perspectives in rehabilitation science that highlight ongoing neurocognitive plasticity during this developmental period.

Beyond theoretical advancement, the study contributes to professional development and education within OT. The MOTI provides a concrete, replicable model for operationalising OT theories in practice, offering educators and practitioners a structured example of how cognitive remediation, metacognitive strategy instruction, and occupation-centred intervention can be integrated into a cohesive protocol. This enhances professional training by demonstrating how theoretical constructs such as volition, performance capacity, and occupational engagement can be translated into practical intervention components tailored to adolescents' developmental needs.

At the policy level, adolescent-specific ADHD protocols position OT as a key stakeholder in inclusive education, adolescent mental health services, and school-based intervention planning. By offering evidence-based tools that address both cognitive and functional aspects of academic participation, OT strengthens its advocacy capacity and interdisciplinary visibility. The ability to demonstrate measurable improvements in executive functioning and school engagement enhances OT's credibility within educational and healthcare systems, reinforcing its role as a profession that bridges health, learning, and social participation.

Collectively, these theoretical, educational, and policy contributions underscore the broader professional advancement that adolescent ADHD interventions bring to occupational therapy. By anchoring cognitive remediation within meaningful occupations and adolescents' lived realities, the study strengthens OT's disciplinary identity as a profession committed to holistic, evidence-based, and contextually relevant care.

Collectively, the clinical, educational, and policy implications of the present study underscore the broader professional advancement that adolescent-focused ADHD protocols bring to occupational therapy. By demonstrating that EF interventions can be both restorative and occupation-centred during adolescence, the study expands the

traditional boundaries of OT practice, which has historically prioritised compensatory strategies for this age group. The MOTI provides empirical support for a more balanced therapeutic approach—one that integrates cognitive remediation with functional, contextually grounded participation goals.

This contribution strengthens OT's disciplinary identity as a profession uniquely positioned to address the complex interplay between cognition, environment, and occupational engagement. The study illustrates how OTs can design interventions that are developmentally attuned, culturally responsive, and ecologically valid, thereby reinforcing OT's relevance within interdisciplinary care for adolescents with ADHD. Furthermore, the protocol's emphasis on academic participation and daily routines highlights OT's capacity to influence domains that are central to adolescent development, including autonomy, competence, and preparation for adult roles.

By anchoring intervention strategies in the lived realities of adolescents and embedding them within meaningful occupations, the study enhances the visibility and credibility of OT in both clinical and educational systems. In doing so, it contributes to the ongoing evolution of the profession as a leader in holistic, evidence-based, and contextually relevant care for youth with neurodevelopmental conditions.

5.19 Strengths and Limitations

While the intervention yielded promising results and demonstrated considerable potential for supporting adolescents with ADHD, it is equally important to evaluate the methodological strengths and limitations that shape the interpretation of these findings. A balanced appraisal ensures transparency, strengthens the credibility of the research, and identifies areas for refinement in future studies. The following sections therefore outline the key strengths of the study, followed by a critical discussion of its limitations and the implications these hold for future research and practice.

5.19.1 Strengths of the Study

The present study possesses several methodological and conceptual strengths that enhance the credibility, robustness, and interpretive value of its findings. One of the most notable strengths lies in the multi-method assessment strategy, which enabled a

comprehensive and nuanced evaluation of executive-function change. Rather than relying on a single type of measure, the study incorporated neuropsychological tests, computerised cognitive batteries, continuous performance measures, and self-report questionnaires. This methodological triangulation ensured that improvements were not artefacts of a specific testing format or measurement bias but instead reflected converging evidence across independent tools. The consistency of results across these diverse instruments—ranging from performance-based indicators such as the Trail Making Test and Digit Span tasks to subjective reports from adolescents and parents—substantially strengthens the validity of the conclusions.

The integration of both objective and subjective measures represents another important strength. Objective tests captured quantifiable changes in processing speed, WM, CF, and sustained attention, while self-report questionnaires provided insight into how adolescents perceived their own functioning in daily life. This dual approach enhances the ecological relevance of the findings, as it acknowledges that cognitive improvements are meaningful not only when they appear on standardised tests but also when they translate into perceived changes in everyday performance. The alignment between objective gains and subjective experiences suggests that the intervention produced changes that were both measurable and personally meaningful to participants.

A further strength of the study is the deliberate design of the intervention itself, which targeted multiple EF domains simultaneously. Many cognitive-training programs focus narrowly on a single skill, such as WM or IC. In contrast, the MOTI was intentionally structured to address a broader constellation of EF components, including WM, CF, IC, planning, and sustained attention. This multi-domain approach increases the likelihood of producing generalised and functionally relevant improvements, as EF components operate in an integrated manner in real-life contexts. The significant gains observed across several domains support the value of this comprehensive design.

The study also benefits from its developmentally sensitive focus on adolescence, a population that is underrepresented in cognitive-training research. Most existing studies target younger children, leaving a gap in evidence for adolescents who face distinct cognitive, academic, and psychosocial challenges. By focusing on individuals aged 13 to 18, the study addresses this gap and provides evidence that EF interventions can be effective during a developmental period characterised by ongoing neurocognitive

maturation. This strengthens the study's contribution to literature and underscores the importance of designing interventions that are tailored to the developmental realities of adolescence.

An additional methodological strength lies in the integration of STReDI-SPeS findings into the intervention design. Prior analyses using the STReDI-SPeS identified academic disorganisation, temporal mismanagement, and cognitive-attentional barriers as central participation challenges for adolescents with ADHD. These domains directly informed the Academic Skills Training component, ensuring that the intervention targeted difficulties grounded in adolescents' lived academic experiences rather than relying solely on clinician-driven assumptions. This assessment-to-intervention alignment enhances ecological validity, strengthens the occupational relevance of the protocol, and supports a clear distinction between ADHD-specific barriers and broader adolescent participation experiences. Embedding assessment findings into intervention planning reflects a client-centred, methodologically robust approach that reinforces the specificity and functional orientation of the MOTI.

Another strength lies in the ecological and cultural validity of the intervention. The MOTI was developed in formal Greek and aligned with the educational norms, family structures, and help-seeking patterns of Cyprus. This cultural anchoring ensured that instructions, metacognitive strategies, and psychoeducational materials were accessible and meaningful to participants and their families. By embedding the intervention within the linguistic and cultural context of the target population, the study enhances the generalisability of its findings within Cyprus and provides a model for culturally responsive intervention development.

Finally, the study's home-based delivery model represents a practical strength that enhances feasibility and accessibility. Adolescents and their families often struggle to commit to long-term clinic-based interventions due to scheduling constraints, transportation barriers, and competing academic demands. The flexible, home-based structure of the MOTI reduced these barriers, likely contributing to strong adherence and engagement. This design also increases the potential for scalability and integration into routine care, making the intervention more accessible to a wider range of adolescents.

In summary, the study's methodological triangulation, integration of objective and subjective measures, multi-domain intervention design, developmental specificity, cultural responsiveness, and practical feasibility collectively strengthen the validity and impact of its findings. These strengths position the study as a meaningful contribution to the evidence base on executive-function interventions for adolescents with ADHD.

5.19.2 Limitations of the Study

Despite the methodological strengths of the present study, several limitations must be acknowledged to contextualise the findings and guide interpretation. First, the relatively small sample size limits the statistical power of the analyses and restricts the generalisability of the results to the broader population of adolescents with ADHD. While the observed improvements across multiple executive-function domains are promising, larger samples are necessary to confirm the robustness of these effects and to detect more subtle changes that may not have reached significance in the current study.

Attrition represents a second limitation. Participant withdrawal before and during the intervention may have introduced systematic bias, as individuals who completed the programme may differ in important ways from those who discontinued. For example, adolescents with higher motivation, stronger family support, or fewer comorbid difficulties may have been more likely to remain engaged. This could inflate estimates of intervention effectiveness and reduce the representativeness of the final sample.

Incomplete post-intervention data represents an additional limitation. Although 54 adolescents completed the intervention, not all participants completed every post-intervention assessment, and some responses were excluded due to incomplete or invalid response patterns. As a result, sample sizes varied across outcome measures, reducing statistical power for some analyses and limiting the comparability of findings across assessment domains.

The absence of long-term follow-up also limits the interpretation of the findings. Without additional post-intervention assessments, it is not possible to determine whether the improvements observed were maintained over time or diminished after the programme ended. Longitudinal follow-up studies provide important information

regarding the durability of intervention-related gains and their potential influence on longer-term developmental outcomes.

Potential practice effects should also be considered. Several assessment tools required participants to complete similar tasks before and after the intervention, raising the possibility that some improvement may reflect increased familiarity with testing procedures rather than genuine cognitive change. Although multiple independent measures reduce this concern, they cannot eliminate it entirely. Importantly, the convergence of findings across neuropsychological tests, computerised cognitive assessments, self-report measures, and parent ratings increases confidence that at least part of the observed improvement reflects meaningful change.

An additional measurement-related limitation concerns the STReDI-SPeS. Although previous analyses demonstrated acceptable known-groups validity, ROC analyses suggested only modest discriminative accuracy. Consequently, findings derived from this measure should be interpreted as reflecting adolescents' perceptions of their academic participation and functioning rather than serving as indicators of ADHD status or diagnostic classification.

The sample's characteristics further limit generalisability. The predominance of male participants reflects the higher prevalence of ADHD in boys but restricts the applicability of the findings to female adolescents, whose symptom presentation and executive-function profiles may differ. Similarly, the relatively narrow age range of participants (13-18 years) limits generalisation to younger children and adults with ADHD. In addition, the geographical concentration of participants in Limassol and the relatively high educational level of many parents suggest a sample with specific socioeconomic and cultural characteristics that may not represent the wider ADHD population.

Finally, the heterogeneity of ADHD presentations within the sample may have contributed to variability in intervention responsiveness. Participants differed in symptom profiles, severity, and EF difficulties, factors that may influence how beneficial specific intervention components are. Although this diversity enhances the ecological validity of the study, future research should consider stratifying analyses by

ADHD presentation and symptom severity to better understand differential response patterns.

Taken together, these limitations suggest interpreting the findings with appropriate caution. Nevertheless, the study provides valuable evidence regarding the potential benefits of cognitive-training interventions for adolescents with ADHD and offers a foundation for future research employing larger samples, controlled designs, and long-term follow-up assessments.

5.20 Future Research Directions

The limitations identified in this study do not diminish the value of its contributions; rather, they illuminate important avenues for continued investigation. As the field of adolescent ADHD intervention evolves, there is a growing need for research that is developmentally sensitive, culturally responsive, and methodologically rigorous. The next section outlines future directions for research and for the advancement of OT, highlighting opportunities to refine the intervention, expand its reach, and deepen its impact on adolescent functioning and participation.

Future research should build on the promising findings of the present study by addressing the methodological and conceptual limitations identified. Increasing sample size and participant diversity is essential for enhancing statistical power and improving the generalisability of results. Recruiting adolescents from different regions, socioeconomic backgrounds, and educational settings would provide a more representative understanding of how multicomponent interventions function across varied contexts.

Longer intervention periods and longitudinal follow-up assessments are also needed to determine the durability of cognitive gains. Executive-function improvements may fluctuate over time, particularly during adolescence, when developmental changes are rapid and environmental demands intensify. Follow-up assessments at three, six, and twelve months would provide valuable insight into whether gains are sustained, strengthened, or diminished.

Future studies should also explore the mechanisms of change within multicomponent interventions. By examining which components—computerised training, strategy

instruction, parental psychoeducation, or real-life application tasks—contribute most meaningfully to improvement, researchers can refine intervention design and enhance efficiency. Component-analysis studies or factorial designs would be particularly valuable in this regard.

Another important direction involves embedding explicit transfer strategies within the intervention. While the current protocol included real-life application tasks, future iterations could incorporate structured generalisation exercises, such as teacher-supported classroom strategies, homework-planning routines, or digital tools that prompt adolescents to apply executive-function skills in daily activities. Such strategies may help bridge the gap between performance-based improvements and functional behaviour change.

Research should also examine the integration of complementary approaches, such as behavioural interventions, environmental modifications, mindfulness-based strategies, or coaching models. These approaches may address domains that are less responsive to cognitive training alone, particularly hyperactivity, impulsivity, and emotional regulation.

Finally, future studies should consider the role of technology-enhanced delivery, including mobile applications, telehealth platforms, and adaptive digital tools. These innovations may increase accessibility, personalize training intensity, and support ongoing maintenance of gains.

5.21 Implications and Future Directions for OT

Developing an adolescent-specific ADHD intervention protocol in Cyprus opens several important pathways for advancing OT practice, research, and international collaboration. At the clinical level, future work should validate the protocol through randomised controlled trials and longitudinal designs to establish its efficacy, sustainability, and ecological validity across diverse adolescent populations. Such studies should examine not only cognitive outcomes but also functional indicators such as academic performance, social participation, emotional regulation, and transition-to-adulthood skills.

From a research perspective, the Cyprus-based protocol provides a valuable foundation for cross-cultural comparison. Investigating how intervention components translate across different linguistic, cultural, and educational contexts would contribute to the global discourse on culturally anchored ADHD care. Comparative studies could illuminate the strengths of native-language protocols and inform the adaptation of interventions for multilingual or multicultural populations. This line of research would position OT as a leader in culturally responsive intervention design.

In terms of professional development, the protocol offers opportunities to integrate adolescent ADHD intervention training into OT curricula, both locally and internationally. Embedding these tools into education will prepare future practitioners to address neurodevelopmental conditions with greater precision, confidence, and cultural sensitivity. The protocol can also serve as a model for policy advocacy, demonstrating how OT contributes to inclusive education, adolescent mental-health services, and school-based support systems.

Future directions should also emphasise developing interdisciplinary collaboration models, where OTs work alongside educators, psychologists, speech-language therapists, and paediatricians to deliver coordinated care. The protocol's hybrid nature makes it particularly suitable for integration into school-based services, where OTs can support teachers in implementing EF strategies within classroom routines.

Finally, the Cyprus-based protocol underscores the profession’s capacity to innovate at the intersection of culture, language, and developmental science. Future work should therefore prioritise both local refinement and international dissemination, positioning OT as a discipline that delivers contextually relevant, evidence-based, and globally impactful interventions.

5.22 Closing Conclusion

The findings of the present study demonstrate that executive function interventions for adolescents with ADHD can be both restorative and occupation-centred, yielding measurable cognitive and functional gains that extend into meaningful daily activities. By developing and evaluating the first culturally informedro EF intervention for Cypriot adolescents—and simultaneously offering the first formal academic profile of this

population—the study addresses longstanding gaps in national practice and contributes novel evidence to the international OT literature. The MOTI's multicomponent, developmentally sensitive, and ecologically grounded design illustrates how cognitive remediation can be embedded within meaningful occupations to enhance participation, autonomy, and academic engagement. The integration of theoretical models such as PEO, MOHO, and CO-OP further strengthens the study's conceptual foundation, positioning occupational therapy as a key contributor to adolescent ADHD care. Overall, the study advances theory, practice, education, and policy, offering a robust platform for future research and supporting the evolution of occupational therapy as a profession committed to holistic, evidence-based, and contextually relevant intervention.

References

Adamou, M., Asherson, P., Arif, M., Buckenham, L., Cubbin, S., Dancza, K., Gorman, K., Gudjonsson, G., Gutman, S., Kustow, J., Mabbott, K., May-Benson, T., Muller-Sedgwick, U., Pell, E., Pitts, M., Rastrick, S., Sedgwick, J., Smith, K., Taylor, C., … Young, S. (2021). Recommendations for occupational therapy interventions for adults with ADHD: a consensus statement from the UK adult ADHD network. *BMC Psychiatry*, *21*(1), 72. https://doi.org/10.1186/s12888-021-03070-z

Agnew-Blais, J. C., Polanczyk, G. V., Danese, A., Wertz, J., Moffitt, T. E., & Arseneault, L. (2018). Young adult mental health and functional outcomes among individuals with remitted, persistent and late-onset ADHD. *The British Journal of Psychiatry : The Journal of Mental Science*, *213*(3), 526–534. https://doi.org/10.1192/bjp.2018.97

Ahmed, S. F., Ellis, A., Ward, K. P., Chaku, N., & Davis-Kean, P. E. (2022). Working Memory Development From Early Childhood to Adolescence Using Two Nationally Representative Samples. *Developmental Psychology*, *58*(10), 1962–1973. https://doi.org/10.1037/dev0001396

Ahmed, S. F., Tang, S., Waters, N. E., & Davis-Kean, P. (2019). Executive function and academic achievement: Longitudinal relations from early childhood to adolescence. *Journal of Educational Psychology*, *111*(3), 446–458. https://doi.org/10.1037/EDU0000296

Ahmed, S. K. (2024). How to choose a sampling technique and determine sample size for research: A simplified guide for researchers. *Oral Oncology Reports*, *12*, 100662. https://doi.org/10.1016/j.oor.2024.100662

Akyurek, G., Aygun Gurbuz, D., & Irmak, D. E. (2024). Comparison of the Executive Functions, Occupational Performance and Perceived Occupational Proficiency in Children with Neurodevelopmental Disorder. *Journal of Occupational Therapy, Schools, & Early Intervention*, *17*(2), 348–365. https://doi.org/10.1080/19411243.2023.2203417

Alabdulakareem, E., & Jamjoom, M. (2020). Computer-assisted learning for improving ADHD individuals' executive functions through gamified interventions: A review.

In *Entertainment Computing* (Vol. 33). Elsevier B.V. https://doi.org/10.1016/j.entcom.2020.100341

Alderson, R. M., Patros, C. H. G., Tarle, S. J., Hudec, K. L., Kasper, L. J., & Lea, S. E. (2017). Working memory and behavioral inhibition in boys with ADHD: An experimental examination of competing models. *Child Neuropsychology*, *23*(3), 255–272. https://doi.org/10.1080/09297049.2015.1105207

Alehagen, L., Bölte, S., & Black, M. H. (2024). Application of the international classification of functioning, disability, and health in autism and attention-deficit hyperactivity disorder: A scoping review. *Autism*, *29*, 310–328. https://doi.org/10.1177/13623613241272044

Al-Saad, M. S. H., Al-Jabri, B., & Almarzouki, A. F. (2021). A Review of Working Memory Training in the Management of Attention Deficit Hyperactivity Disorder. *Frontiers in Behavioral Neuroscience*, *15*, 686873. https://doi.org/10.3389/FNBEH.2021.686873/XML

Ambrose, H. (2021). Experiencing success: an occupational therapy partnership programme. Gymnastics for children with attention deficit hyperactivity disorder. *Irish Journal of Occupational Therapy*, *49*(2), 84–88. https://doi.org/10.1108/IJOT-03-2021-0005

American Psychiatric Association. (2013). Diagnostic and Statistical Manual of Mental Disorders. *Diagnostic and Statistical Manual of Mental Disorders*. https://doi.org/10.1176/APPI.BOOKS.9780890425596

American Psychiatric Association. (2022). Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR). In *Diagnostic and Statistical Manual of Mental Disorders*. American Psychiatric Association Publishing. https://doi.org/10.1176/appi.books.9780890425787

American Psychological Association. (2021). *Professional Practice Guidelines for Evidence-Based Psychological Practice in Health Care.* https://www.apa.org/about/policy/evidence-based-psychological-practice-health-care.pdf

Anastopoulos, A. D., Langberg, J. M., Eddy, L. D., Silvia, P. J., & Labban, J. D. (2021). A randomized controlled trial examining CBT for college students with ADHD.

Journal of Consulting and Clinical Psychology, *89*(1), 21–33. https://doi.org/10.1037/CCP0000553,

Andersen, A. C., Sund, A. M., Thomsen, P. H., Lydersen, S., Haugan, A. L. J., & Nøvik, T. S. (2024). Executive function measured by BRIEF in adolescents diagnosed and treated for ADHD: problem profiles and agreement between informants. *Child Neuropsychology*, *30*(1), 45–59. https://doi.org/10.1080/09297049.2023.2174506

Andersen, A. C., Thomsen, P. H., Lydersen, S., Sund, A. M., Haugan, A.-L. J., & Nøvik, T. S. (2025). Behaviour ratings of executive functions in adolescents with ADHD: correlation with core symptoms and functional impairment measured by multiple informants. *Nordic Journal of Psychiatry*, *79*(5), 347–353. https://doi.org/10.1080/08039488.2025.2506558

Andersson Frondelius, I., Ranjbar, V., & Danielsson, L. (2019). Adolescents' experiences of being diagnosed with attention deficit hyperactivity disorder: A phenomenological study conducted in Sweden. *BMJ Open*, *9*(8). https://doi.org/10.1136/BMJOPEN-2019-031570

Anker, E., Bendiksen, B., & Heir, T. (2018). Comorbid psychiatric disorders in a clinical sample of adults with ADHD, and associations with education, work and social characteristics: A cross-sectional study. *BMJ Open*, *8*(3). https://doi.org/10.1136/BMJOPEN-2017-019700

Antshel, K. M., Faraone, S. V., & Gordon, M. (2014). Cognitive Behavioral Treatment Outcomes in Adolescent ADHD. *Journal of Attention Disorders*, *18*(6), 483–495. https://doi.org/10.1177/1087054712443155

Antshel, K. M., Hier, B. O., & Barkley, R. A. (2014). Executive Functioning Theory and ADHD. *Handbook of Executive Functioning*, 107–120. https://doi.org/10.1007/978-1-4614-8106-5_7

Asherson, P. (2016). ADHD across the lifespan. *Medicine*, *44*(11), 683–686. https://doi.org/10.1016/j.mpmed.2016.08.012

Ayano, G., Demelash, S., Gizachew, Y., Tsegay, L., & Alati, R. (2023). The global prevalence of attention deficit hyperactivity disorder in children and adolescents:

An umbrella review of meta-analyses. *Journal of Affective Disorders*, *339*(6), 860–866. https://doi.org/10.1016/j.jad.2023.07.071

Azami, S., Moghadas, A., Sohrabi-Esmrood, F., Nazifi, M., Mirmohamad, M., Hemmati, F., Ahmadi, A., Hamzeh-poor, P., Khari, S., & Lakes, K. (2016). A pilot randomized controlled trial comparing computer-assisted cognitive rehabilitation, stimulant medication, and an active control in the treatment of ADHD. *Child and Adolescent Mental Health*, *21*(4), 217–224. https://doi.org/10.1111/CAMH.12157;JOURNAL:JOURNAL:14692155;PAGE:STRING:ARTICLE/CHAPTER

Babajanyan, D., Freame, L., Steele, R., & Poulton, A. (2023). Understanding Attentional Functioning in Adult Attention Deficit Hyperactivity Disorder—Could This Improve Diagnostic Specificity? *International Journal of Environmental Research and Public Health*, *20*(6), 5077. https://doi.org/10.3390/IJERPH20065077/S1

Baddeley, A. (2012). Working memory: Theories, models, and controversies. *Annual Review of Psychology*, *63*, 1–29. https://doi.org/10.1146/ANNUREV-PSYCH-120710-100422

Baggetta, P., & Alexander, P. A. (2016). Conceptualization and Operationalization of Executive Function. *Mind, Brain, and Education*. https://doi.org/10.1111/mbe.12100

Baggio, S., Fructuoso, A., Guimaraes, M., Fois, E., Golay, D., Heller, P., Perroud, N., Aubry, C., Young, S., Delessert, D., Gétaz, L., Tran, N. T., & Wolff, H. (2018). Prevalence of attention deficit hyperactivity disorder in detention settings: A systematic review and meta-analysis. *Frontiers in Psychiatry*, *9*(AUG). https://doi.org/10.3389/FPSYT.2018.00331

Bahr, E. (2023). *Occupational Therapy for ADHD: Effective Strategies*. https://neurolaunch.com/ot-for-adhd/?form=MG0AV3

Bai, G. N., Wang, Y. F., Yang, L., & Niu, W. Y. (2015). Effectiveness of a focused, brief psychoeducation program for parents of ADHD children: Improvement of medication adherence and symptoms. *Neuropsychiatric Disease and Treatment*, *11*, 2721–2735. https://doi.org/10.2147/NDT.S88625

Banaschewski, T., Becker, K., Döpfner, M., Holtmann, M., Rösler, M., & Romanos, M. (2017). Attention-Deficit/Hyperactivity Disorder. *Deutsches Ärzteblatt International*, *114*(9), 149–158. https://doi.org/10.3238/arztebl.2017.0149

Banaschewski, T., Häge, A., Hohmann, S., & Mechler, K. (2023). Perspectives on ADHD in children and adolescents as a social construct amidst rising prevalence of diagnosis and medication use. *Frontiers in Psychiatry*, *14*. https://doi.org/10.3389/FPSYT.2023.1289157/PDF

Baniqued, P. L., Allen, C. M., Kranz, M. B., Johnson, K., Sipolins, A., Dickens, C., Ward, N., Geyer, A., & Kramer, A. F. (2015). Working memory, reasoning, and task switching training: Transfer effects, limitations, and great expectations? *PLoS ONE*, *10*(11). https://doi.org/10.1371/JOURNAL.PONE.0142169

Barbaresi, W. J., Colligan, R. C., Weaver, A. L., Voigt, R. G., Killian, J. M., & Katusic, S. K. (2013). Mortality, ADHD, and Psychosocial Adversity in Adults With Childhood ADHD: A Prospective Study. *Pediatrics*, *131*(4), 637–644. https://doi.org/10.1542/peds.2012-2354

Barkley, R. (1997). Behavioral inhibition, sustained attention, and executive functions: Constructing a unifying theory of ADHD. *Psychological Bulletin*, *121*(1), 65–94. https://doi.org/10.1037//0033-2909.121.1.65

Barkley, R. (2010). Differential diagnosis of adults with ADHD: the role of executive function and self-regulation. *The Journal of Clinical Psychiatry*, *71*(7), e17. https://doi.org/10.4088/JCP.9066TX1C

Barkley, R. (2014). *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment (4th ed.)*.

Barkley, R. A. (2022). Improving Clinical Diagnosis Using the Executive Functioning—Self-Regulation Theory of ADHD. *Https://Doi.Org/10.1521/Adhd.2022.30.1.1*, *30*(1), 1–9. https://doi.org/10.1521/ADHD.2022.30.1.1

Barnes, C. (2019). Understanding the social model of disability. *Routledge Handbook of Disability Studies*, 14–31. https://doi.org/10.4324/9780429430817-2/UNDERSTANDING-SOCIAL-MODEL-DISABILITY-COLIN-BARNES

Barnes, M. A. (2023). Executive Functions: What are they Good for? A Perspective from Intervention Research. *Mind, Brain, and Education*, *17*(4), 238–245. https://doi.org/10.1111/MBE.12371

Baroni, A., & Castellanos, F. X. (2014). Neuroanatomic and Cognitive Abnormalities in Attention-Deficit/Hyperactivity Disorder in the Era of "High Definition" Neuroimaging. *Current Opinion in Neurobiology*, *0*, 1. https://doi.org/10.1016/J.CONB.2014.08.005

Bass, J. D., de Sam Lazaro, S. L., & Baum, C. M. (2025). Person-Environment-Occupation-Performance Model. In *Routledge Companion to Occupational Therapy: Theories, Concepts and Models* (pp. 330–344). Taylor and Francis. https://doi.org/10.4324/9781003526766-26

Bass, J. D., de Sam Lazaro, S. L., Baum, C. M., & Marchant, J. K. (2024). Editorial: The Person-Environment-Occupation-Performance (PEOP) Model—An OTJR Focused Issue. *OTJR: Occupational Therapy Journal of Research*, *44*(3), 449–454. https://doi.org/10.1177/15394492241252578;PAGEGROUP:STRING:PUBLICATION

Bass, J. D., Marchant, J. K., de Sam Lazaro, S. L., & Baum, C. M. (2024). Application of the Person-Environment-Occupation-Performance Model: A Scoping Review. *OTJR : Occupation, Participation and Health*, *44*(3), 521–540. https://doi.org/10.1177/15394492241238951

Bauer, N. S., Ofner, S., Moore, C., Lynch, D., Wiehe, S. E., Downs, S. M., Carroll, A. E., & Kronenberger, W. G. (2019). Assessment of the Effects of Pediatric Attention Deficit Hyperactivity Disorder on Family Stress and Well-Being: Development of the IMPACT 1.0 Scale. *Global Pediatric Health*, *6*, 2333794X19835645. https://doi.org/10.1177/2333794X19835645

Baum, C. M., Bass, J. D., & Christiansen, C. H. (2021). The Person-Environment-Occupation-Performance Model. In E. A. S. . Duncan (Ed.), *Foundations for Practice in Occupational Therapy* (p. 217). Elsevier.

Baum, C. M., Connor, L. T., Morrison, T., Hahn, M., Dromerick, A. W., & Edwards, D. F. (2008). Reliability, validity, and clinical utility of the executive function performance

test: A measure of executive function in a sample of people with stroke. *American Journal of Occupational Therapy*, *62*(4), 446–455. https://doi.org/10.5014/ajot.62.4.446

Becker, S. P., Luebbe, A. M., & Langberg, J. M. (2012). Co-occurring Mental Health Problems and Peer Functioning Among Youth with Attention-Deficit/Hyperactivity Disorder: A Review and Recommendations for Future Research. In *Clinical Child and Family Psychology Review* (Vol. 15, Number 4, pp. 279–302). https://doi.org/10.1007/s10567-012-0122-y

Ben-Dor Cohen, M., Eldar, E., Maeir, A., & Nahum, M. (2021). Emotional dysregulation and health related quality of life in young adults with ADHD: a cross sectional study. *Health and Quality of Life Outcomes 2021 19:1*, *19*(1), 270-. https://doi.org/10.1186/S12955-021-01904-8

Berenguer, C., Roselló, B., Colomer, C., Baixauli, I., & Miranda, A. (2018). Children with autism and attention deficit hyperactivity disorder. Relationships between symptoms and executive function, theory of mind, and behavioral problems. *Research in Developmental Disabilities*, *83*, 260–269. https://doi.org/10.1016/J.RIDD.2018.10.001

Berger, E. M., Fehr, E., Hermes, H., Schunk, D., & Winkel, K. (2025). The Impact of Working-Memory Training on Children's Cognitive and Noncognitive Skills. *Https://Doi.Org/10.1086/732884*, *13*(2). https://doi.org/10.1086/732884

Bergman-Nutley, S., & Klingberg, T. (2014). Effect of working memory training on working memory, arithmetic and following instructions. *Psychological Research 2014 78:6*, *78*(6), 869–877. https://doi.org/10.1007/S00426-014-0614-0

Best, J. R., & Miller, P. H. (2010). A Developmental Perspective on Executive Function. *Child Development*, *81*(6), 1641–1660. https://doi.org/10.1111/j.1467-8624.2010.01499.x

Best, J. R., Miller, P. H., & Jones, L. L. (2009). Executive functions after age 5: Changes and correlates. *Developmental Review*, *29*(3), 180–200. https://doi.org/10.1016/j.dr.2009.05.002

Bian, J., Liu, X., & Wang, C. (2025). Executive Function and Brain Region Development in ADHD: Mechanisms and Interventions in the Prefrontal Cortex

and Related Circuits. *Advances in Precision Medicine*, *10*(1), 15–21. https://doi.org/10.18063/APM.V10I1.681

Biederman, J., Mick, E., & Faraone, S. V. (2000). Age-dependent decline of symptoms of attention deficit hyperactivity disorder: Impact of remission definition and symptom type. *American Journal of Psychiatry*, *157*(5), 816–818. https://doi.org/10.1176/APPI.AJP.157.5.816

Biele, G., Overgaard, K. R., Friis, S., Zeiner, P., & Aase, H. (2022). Cognitive, emotional, and social functioning of preschoolers with attention deficit hyperactivity problems. *BMC Psychiatry 2022 22:1*, *22*(1), 78-. https://doi.org/10.1186/s12888-021-03638-9

Blair, C. (2017). Educating executive function. *Wiley Interdisciplinary Reviews: Cognitive Science*, *8*(1–2), e1403. https://doi.org/10.1002/WCS.1403

Bloemen, A. J. P., Oldehinkel, A. J., Laceulle, O. M., Ormel, J., Rommelse, N. N. J., & Hartman, C. A. (2018). The association between executive functioning and psychopathology: General or specific? *Psychological Medicine*, *48*(11), 1787–1794. https://doi.org/10.1017/S0033291717003269

Boland, H., DiSalvo, M., Fried, R., Woodworth, K. Y., Wilens, T., Faraone, S. V., & Biederman, J. (2020). A literature review and meta-analysis on the effects of ADHD medications on functional outcomes. *Journal of Psychiatric Research*, *123*, 21–30. https://doi.org/10.1016/J.JPSYCHIRES.2020.01.006

Bölte, S., Alehagen, L., Black, M. H., Hasslinger, J., Wessman, E., Remnélius, K. L., Marschik, P. B., D'arcy, E., Seidel, A., Girdler, S., & Zander, E. (2024). Assessment of functioning in ADHD according to World Health Organization standards: First revision of the International Classification of Functioning, Disability and Health Core Sets. *Developmental Medicine & Child Neurology*, *66*(9), 1201–1214. https://doi.org/10.1111/dmcn.15865

Bölte, S., de Schipper, E., Holtmann, M., Karande, S., de Vries, P. J., Selb, M., & Tannock, R. (2013). Development of ICF Core Sets to standardize assessment of functioning and impairment in ADHD: the path ahead. *European Child & Adolescent Psychiatry 2013 23:12*, *23*(12), 1139–1148. https://doi.org/10.1007/S00787-013-0496-5

Bölte, S., Mahdi, S., Coghill, D., Gau, S. S. F., Granlund, M., Holtmann, M., Karande, S., Levy, F., Rohde, L. A., Segerer, W., de Vries, P. J., & Selb, M. (2018a). Standardised assessment of functioning in ADHD: consensus on the ICF Core Sets for ADHD. *European Child and Adolescent Psychiatry*, *27*(10), 1261–1281. https://doi.org/10.1007/S00787-018-1119-Y/TABLES/7

Bölte, S., Mahdi, S., Coghill, D., Gau, S. S. F., Granlund, M., Holtmann, M., Karande, S., Levy, F., Rohde, L. A., Segerer, W., de Vries, P. J., & Selb, M. (2018b). Standardised assessment of functioning in ADHD: consensus on the ICF Core Sets for ADHD. *European Child & Adolescent Psychiatry 2018 27:10*, *27*(10), 1261–1281. https://doi.org/10.1007/S00787-018-1119-Y

Bombonato, C., Del Lucchese, B., Ruffini, C., Di Lieto, M. C., Brovedani, P., Sgandurra, G., Cioni, G., & Pecini, C. (2024). Far Transfer Effects of Trainings on Executive Functions in Neurodevelopmental Disorders: A Systematic Review and Metanalysis. *Neuropsychology Review*, *34*(1), 98–133. https://doi.org/10.1007/S11065-022-09574-Z/FIGURES/6

Boop, C., Cahill, S. M., Davis, C., Dorsey, J., Gibbs, V., Herr, B., Kearney, K., Liz Griffin Lannigan, E., Metzger, L., Miller, J., Owens, A., Rives, K., Synovec, C., Winistorfer, W. L., & Lieberman, D. (2020a). Occupational therapy practice framework: Domain and process fourth edition. In *American Journal of Occupational Therapy* (Vol. 74, pp. 1–87). https://doi.org/10.5014/ajot.2020.74S2001

Boop, C., Cahill, S. M., Davis, C., Dorsey, J., Gibbs, V., Herr, B., Kearney, K., Liz Griffin Lannigan, E., Metzger, L., Miller, J., Owens, A., Rives, K., Synovec, C., Winistorfer, W. L., & Lieberman, D. (2020b). Occupational Therapy Practice Framework: Domain and Process—Fourth Edition. *The American Journal of Occupational Therapy*, *74*(Supplement_2), 7412410010p1-7412410010p87. https://doi.org/10.5014/ajot.2020.74S2001

Bowie, C. R., & Harvey, P. D. (2006). Administration and interpretation of the Trail Making Test. *Nature Protocols*, *1*(5), 2277–2281. https://doi.org/10.1038/nprot.2006.390

Bowyer, P. L., Kramer, J., Kielhofner, G., Maziero-Barbosa, V., & Girolami, G. (2007). Measurement Properties of the Short Child Occupational Profile (SCOPE). *Physical & Occupational Therapy In Pediatrics*, *27*(4), 67–85. https://doi.org/10.1080/J006V27N04_05

Bozhilova, N., Michelini, G., Kuntsi, J., & Asherson, P. (2018). Mind wandering perspective on attention-deficit/hyperactivity disorder. *Neuroscience & Biobehavioral Reviews*, *92*, 464–476. https://doi.org/10.1016/J.NEUBIOREV.2018.07.010

Brooks, R., & Bannigan, K. (2019). Occupational therapy interventions in child and adolescent mental health to increase participation: A mixed methods systematic review. *British Journal of Occupational Therapy*, *84*(8), 474–487. https://doi.org/10.1177/03080226211008718

Brown, K. A., Samuel, S., & Patel, D. R. (2018). Pharmacologic management of attention deficit hyperactivity disorder in children and adolescents: a review for practitioners. *Translational Pediatrics*, *7*(1), 36–47. https://doi.org/10.21037/TP.2017.08.02

Brown, T. E. (2013). A new understanding of ADHD in children and adults: Executive function impairments. *A New Understanding of ADHD in Children and Adults: Executive Function Impairments*, *9780203067536*, 1–192. https://doi.org/10.4324/9780203067536

Bryck, R. L., & Fisher, P. A. (2012). Training the Brain Practical Applications of Neural Plasticity From the Intersection of Cognitive Neuroscience, Developmental Psychology, and Prevention Science. *American Psychologist*, *67*(2), 87–100. https://doi.org/10.1037/a0024657

Budman, J., Zaguri-Vittenberg, S., Maeir, A., & Tal-Saban, M. (2025). Occupational experiences and attributions of typically developing adolescents. *Physical and Occupational Therapy in Pediatrics*, *45*(4), 468–482. https://doi.org/10.1080/01942638.2025.2463347

Buitelaar, J. K. (2017). Optimising treatment strategies for ADHD in adolescence to minimise “lost in transition” to adulthood. *Epidemiology and Psychiatric Sciences*, *26*(5), 448–452. https://doi.org/10.1017/S2045796017000154

Cabelguen, C., Hadjadj Aoul, S., Kammerer, E., Brustolin, D., Shadili, G., Vesproumis, P., Romo, L., & Purper-Ouakil, D. (2026). Adolescence and ADHD: Practical proposals regarding the transition of care. *L'Encéphale*. https://doi.org/10.1016/J.ENCEP.2026.01.007

Capili, B., & Anastasi, J. K. (2024). An Introduction to the Quasi-Experimental Design (Nonrandomized Design). *The American Journal of Nursing*, *124*(11), 50. https://doi.org/10.1097/01.NAJ.0001081740.74815.20

Carvalho, S. (2026). Executive dysfunction as a transdiagnostic mechanism of psychopathology: a neurocognitive framework for diagnosis and intervention. *Frontiers in Human Neuroscience*, *20*, 1778271. https://doi.org/10.3389/FNHUM.2026.1778271

Cassedy, A., Drotar, D., Ittenbach, R., Hottinger, S., Wray, J., Wernovsky, G., Newburger, J. W., Mahony, L., Mussatto, K., Cohen, M. I., & Marino, B. S. (2013). The impact of socio-economic status on health related quality of life for children and adolescents with heart disease. *Health and Quality of Life Outcomes*, *11*(1). https://doi.org/10.1186/1477-7525-11-99

Castellanos, F. X., Kelly, C., & Milham, M. P. (2009). The restless brain: Attention-deficit hyperactivity disorder, resting-state functional connectivity, and intrasubject variability. *Canadian Journal of Psychiatry*, *54*(10), 665–672. https://doi.org/10.1177/070674370905401003

Castellanos, F. X., & Proal, E. (2012). Large-scale brain systems in ADHD: Beyond the prefrontal-striatal model. In *Trends in Cognitive Sciences* (Vol. 16, Number 1, pp. 17–26). https://doi.org/10.1016/j.tics.2011.11.007

Catalá-López, F., Hutton, B., Núñez-Beltrán, A., Page, M. J., Ridao, M., Saint-Gerons, D. M., Catalá, M. A., Tabarés-Seisdedos, R., & Moher, D. (2017). The pharmacological and non-pharmacological treatment of attention deficit hyperactivity disorder in children and adolescents: A systematic review with network meta-analyses of randomised trials. *PLoS ONE*, *12*(7). https://doi.org/10.1371/JOURNAL.PONE.0180355

Caye, A., Swanson, J. M., Coghill, D., & Rohde, L. A. (2019). Treatment strategies for ADHD: an evidence-based guide to select optimal treatment. *Molecular Psychiatry*, *24*(3), 390–408. https://doi.org/10.1038/S41380-018-0116-

3;SUBJMETA=1311,337,378,476,631,692,699;KWRD=ADHD,MOLECULAR+BIOLOGY,NEUROSCIENCE

Caye, A., Swanson, J., Thapar, A., Sibley, M., Arseneault, L., Hechtman, L., Arnold, L. E., Niclasen, J., Moffitt, T., & Rohde, L. A. (2016). Life Span Studies of ADHD—Conceptual Challenges and Predictors of Persistence and Outcome. *Current Psychiatry Reports*, *18*(12), 111. https://doi.org/10.1007/s11920-016-0750-x

Celestino, N. K. R. (2023). *The use of games to increase performance occupational therapy of adults with attention deficit hyperactivity disorder (ADHD)*. https://doi.org/10.56238/HOMEINTERNATIONALANAIS-062

Chacko, A., Jensen, S. A., Lowry, L. S., Cornwell, M., Chimklis, A., Chan, E., Lee, D., & Pulgarin, B. (2016). Engagement in Behavioral Parent Training: Review of the Literature and Implications for Practice. *Clinical Child and Family Psychology Review*, *19*(3), 204–215. https://doi.org/10.1007/S10567-016-0205-2

Chacko, A., Kofler, M., Jarrett, M., Chacko, A., Kofler, M., & Jarrett, M. (2014). Improving Outcomes for Youth with ADHD: A Conceptual Framework for Combined Neurocognitive and Skill-Based Treatment Approaches. *Clin Child Fam Psychol Rev*, *17*, 368–384. https://doi.org/10.1007/s10567-014-0171-5

Chacko, A., Merrill, B. M., Kofler, M. J., & Fabiano, G. A. (2024). Improving the efficacy and effectiveness of evidence-based psychosocial interventions for attention-deficit/hyperactivity disorder (ADHD) in children and adolescents. *Translational Psychiatry*, *14*(1), 244. https://doi.org/10.1038/S41398-024-02890-3

Chaimaha, N., Sriphetcharawut, S., Lersilp, S., & Chinchai, S. (2017). Effectiveness of therapeutic programs for students with ADHD with executive function deficits. *Journal of Occupational Therapy, Schools, & Early Intervention*, *10*(4), 436–456. https://doi.org/10.1080/19411243.2017.1359131

Cham, H., Lee, H., & Migunov, I. (2024). Quasi-experimental designs for causal inference: an overview. *Asia Pacific Education Review 2024 25:3*, *25*(3), 611–627. https://doi.org/10.1007/S12564-024-09981-2

Champ, R. E., Adamou, M., & Tolchard, B. (2021). The impact of psychological theory on the treatment of Attention Deficit Hyperactivity Disorder (ADHD) in adults: A

scoping review. *PLoS ONE*, *16*(12 December). https://doi.org/10.1371/JOURNAL.PONE.0261247

Chang, Z., Quinn, P. D., Hur, K., Gibbons, R. D., Sjölander, A., Larsson, H., & D'Onofrio, B. M. (2017). Association between medication use for attention-deficit/hyperactivity disorder and risk of motor vehicle crashes. *JAMA Psychiatry*. https://doi.org/10.1001/jamapsychiatry.2017.0659

Charach, A., Ickowicz, A., & Schachar, R. (2004). Stimulant Treatment Over Five Years: Adherence, Effectiveness, and Adverse Effects. *Journal of the American Academy of Child & Adolescent Psychiatry*, *43*(5), 559–567. https://doi.org/10.1097/00004583-200405000-00009

Charness, G., Gneezy, U., & Kuhn, M. A. (2012). Experimental methods: Between-subject and within-subject design. *Journal of Economic Behavior and Organization*, *81*(1), 1–8. https://doi.org/10.1016/J.JEBO.2011.08.009

Chaulagain, A., Lyhmann, I., Halmøy, A., Widding-Havneraas, T., Nyttingnes, O., Bjelland, I., & Mykletun, A. (2023). A systematic meta-review of systematic reviews on attention deficit hyperactivity disorder. *European Psychiatry*, *66*(1), e90. https://doi.org/10.1192/J.EURPSY.2023.2451

Cherkasova, M. V, Roy, A., Molina, B. S. G., Scott, G., Weiss, G., Barkley, R. A., Biederman, J., Uchida, M., Hinshaw, S. P., Owens, E. B., & Hechtman, L. (2022). Review: Adult Outcome as Seen Through Controlled Prospective Follow-up Studies of Children With Attention-Deficit/Hyperactivity Disorder Followed Into Adulthood. *Journal of the American Academy of Child & Adolescent Psychiatry*, *61*, 378–391. https://doi.org/10.1016/j.jaac.2021.05.019

Cheung, P., & Fung, X. (2020). A review on the case studies of using the model of human occupation. *Social Health and Behavior*, *3*(1), 3–9. https://doi.org/10.4103/SHB.SHB_49_19

Christoforou, M., Jones, E. J. H., White, P., & Charman, T. (2023). *Executive function profiles of preschool children with autism spectrum disorder and attention-deficit/hyperactivity disorder: A systematic review*. https://doi.org/10.1002/jcv2.12123

Clarkson, C., Boshoff, K., & Kernot, J. (2021). Occupational therapy interventions for adolescents: a scoping review. *The Allied Health Scholar*, *2*(1), 51–102. https://doi.org/10.21913/TAHS.V2I1.1575

Coastal, Z. (2025). *Understanding the Neurobiological Mechanisms of Attention-Deficit/ Hyperactivity Disorder (ADHD)*. https://doi.org/10.4172/2375-4494.1000733

Cochrane, A., & Green, C. S. (2021). New Directions in Training Designs. *Cognitive Training: An Overview of Features and Applications: Second Edition*, 25–40. https://doi.org/10.1007/978-3-030-39292-5_3

Coghill, D., Banaschewski, T., Cortese, S., Asherson, P., Brandeis, D., Buitelaar, J., Daley, D., Danckaerts, M., Dittmann, R. W., Doepfner, M., Ferrin, M., Hollis, C., Holtmann, M., Paramala, S., Sonuga-Barke, E., Soutullo, C., Steinhausen, H. C., Van der Oord, S., Wong, I. C. K., … Simonoff, E. (2023). The management of ADHD in children and adolescents: bringing evidence to the clinic: perspective from the European ADHD Guidelines Group (EAGG). *European Child & Adolescent Psychiatry*, *32*(8), 1337. https://doi.org/10.1007/S00787-021-01871-X

Coghill, D. R., Banaschewski, T., Soutullo, C., Cottingham, M. G., & Zuddas, A. (2017). Systematic review of quality of life and functional outcomes in randomized placebo-controlled studies of medications for attention-deficit/hyperactivity disorder. *European Child & Adolescent Psychiatry 2017 26:11*, *26*(11), 1283–1307. https://doi.org/10.1007/S00787-017-0986-Y

Coghill, D., & Seth, S. (2015). Effective management of attention-deficit/hyperactivity disorder (ADHD) through structured re-assessment: the Dundee ADHD Clinical Care Pathway. *Child and Adolescent Psychiatry and Mental Health*, *9*(1), 52. https://doi.org/10.1186/S13034-015-0083-2

CogniFit Scientific Validation. (n.d.). Retrieved November 9, 2025, from https://support.cognifit.com/s/article/cognifit-scientific-validation?language=en_US

CogniFitTM. (2023). Cognitive Assessment Battery (CAB) ®. *CogniFit*, 3–17. www.cognifit.com

Cohen, K. A., & Schleider, J. L. (2022). Adolescent dropout from brief digital mental health interventions within and beyond randomized trials. *Internet Interventions*, *27*, 100496. https://doi.org/10.1016/J.INVENT.2022.100496

Colautti, L., Iannello, P., Antonietti, A., & Cancer, A. (2025). Classification of response inhibition measures: a proposal for a two-dimensional taxonomy. *Current Psychology 2025 44:6*, *44*(6), 4393–4410. https://doi.org/10.1007/S12144-025-07486-8

Conesa, P. J., & Duñabeitia, J. A. (2021). Effects of computer-based training on children's executive functions and academic achievement. *The Journal of Educational Research*, *114*(6), 562–571. https://doi.org/10.1080/00220671.2021.1998881

Connor, L. T., & Maeir, A. (2011). Putting executive performance in a theoretical context. *OTJR Occupation, Participation and Health*, *31*(1), S3–S7. https://doi.org/10.3928/15394492-20101108-02;WGROUP:STRING:PUBLICATION

Cortese, S., Adamo, N., Del Giovane, C., Mohr-Jensen, C., Hayes, A. J., Carucci, S., Atkinson, L. Z., Tessari, L., Banaschewski, T., Coghill, D., Hollis, C., Simonoff, E., Zuddas, A., Barbui, C., Purgato, M., Steinhausen, H. C., Shokraneh, F., Xia, J., & Cipriani, A. (2018). Comparative efficacy and tolerability of medications for attention-deficit hyperactivity disorder in children, adolescents, and adults: a systematic review and network meta-analysis. *Lancet Psychiatry*, *5*(9), 727–738. https://doi.org/10.1016/s2215-0366(18)30269-4

Cortese, S., Aoki, Y. Y., Itahashi, T., Castellanos, F. X., & Eickhoff, S. B. (2021). Systematic Review and Meta-analysis: Resting-State Functional Magnetic Resonance Imaging Studies of Attention-Deficit/Hyperactivity Disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *60*(1), 61–75. https://doi.org/10.1016/J.JAAC.2020.08.014

Cortese, S., Ferrin, M., Brandeis, D., Buitelaar, J., Daley, D., Dittmann, R. W., Holtmann, M., Santosh, P., Stevenson, J., Stringaris, A., Zuddas, A., & Sonuga-Barke, E. J. S. (2015). Cognitive training for attention-deficit/hyperactivity disorder: Meta-analysis of clinical and neuropsychological outcomes from

randomized controlled trials. *Journal of the American Academy of Child and Adolescent Psychiatry*, *54*(3), 164–174. https://doi.org/10.1016/j.jaac.2014.12.010

Cortese, S., Moreira-Maia, C. R., St Fleur, D., Morcillo-Peñalver, C., Rohde, L. A., & Faraone, S. V. (2016). Association between ADHD and obesity: A systematic review and meta-analysis. *American Journal of Psychiatry*, *173*(1), 34–43. https://doi.org/10.1176/appi.ajp.2015.15020266

Cortese, S., Sabé, M., Chen, C., Perroud, N., & Solmi, M. (2022). Half a century of research on Attention-Deficit/Hyperactivity Disorder: A scientometric study. *Neuroscience & Biobehavioral Reviews*, *140*, 104769. https://doi.org/10.1016/J.NEUBIOREV.2022.104769

Coxe, S., Sibley, M. H., & Becker, S. P. (2021). Presenting problem profiles for adolescents with ADHD: differences by sex, age, race, and family adversity. *Child and Adolescent Mental Health*, *26*(3), 228–237. https://doi.org/10.1111/camh.12441

Cramm, H., Krupa, T., Missiuna, C., Lysaght, R. M., & Parker, K. C. H. (2013). Broadening the occupational therapy toolkit: An executive functioning lens for occupational therapy with children and youth. *American Journal of Occupational Therapy*, *67*(6), e139–e147. https://doi.org/10.5014/ajot.2013.008607

Cramm, H., Krupa, T., Missiuna, C., Lysaght, R., & Parker, K. (2016). The expanding relevance of executive functioning in occupational therapy: Is it on your radar? *Australian Occupational Therapy Journal*, *63*(3), 214–217. https://doi.org/10.1111/1440-1630.12244

Cuffe, S. P., Visser, S. N., Holbrook, J. R., Danielson, M. L., Geryk, L. L., Wolraich, M. L., & McKeown, R. E. (2020). ADHD and Psychiatric Comorbidity: Functional Outcomes in a School-Based Sample of Children. *Journal of Attention Disorders*, *24*(9), 1345–1354. https://doi.org/10.1177/1087054715613437

Curatolo, P., D'Agati, E., & Moavero, R. (2010). The neurobiological basis of ADHD. In *Italian Journal of Pediatrics*. https://doi.org/10.1186/1824-7288-36-79

Cybele Raver, C., & Blair, C. (2016). Neuroscientific insights: Attention, working memory, and inhibitory control. *Future of Children*, *26*(2), 95–118. https://doi.org/10.1353/FOC.2016.0014

da Silva, B. S., Grevet, E. H., Silva, L. C. F., Ramos, J. K. N., Rovaris, D. L., & Bau, C. H. D. (2023). An overview on neurobiology and therapeutics of attention-deficit/hyperactivity disorder. *Discover Mental Health*, *3*(1), 2. https://doi.org/10.1007/s44192-022-00030-1

Dahl, V., Ramakrishnan, A., Spears, A. P., Jorge, A., Lu, J., Bigio, N. A., & Chacko, A. (2020). Psychoeducation Interventions for Parents and Teachers of Children and Adolescents with ADHD: a Systematic Review of the Literature. *Journal of Developmental and Physical Disabilities*, *32*(2), 257–292. https://doi.org/10.1007/S10882-019-09691-3/TABLES/2

Dajani, D. R., & Uddin, L. Q. (2015). Demystifying cognitive flexibility: Implications for clinical and developmental neuroscience. *Trends in Neurosciences*, *38*(9), 571–578. https://doi.org/10.1016/j.tins.2015.07.003

Dalen, L., Sonuga-Barke, E. J. S., Hall, M., & Remington, B. (2004). Inhibitory deficits, delay aversion and preschool AD/HD: Implications for the dual pathway model. *Neural Plasticity*, *11*(1–2), 1–11. https://doi.org/10.1155/NP.2004.1;ISSUE:ISSUE:DOI

Dallman, A. R., Williams, K. L., & Villa, L. (2022). Neurodiversity-Affirming Practices are a Moral Imperative for Occupational Therapy. *The Open Journal of Occupational Therapy*, *10*(2), 1–9. https://doi.org/10.15453/2168-6408.1937

Dalsgaard, S., Østergaard, S. D., Leckman, J. F., Mortensen, P. B., & Pedersen, M. G. (2015). Mortality in children, adolescents, and adults with attention deficit hyperactivity disorder: a nationwide cohort study. *The Lancet*, *385*(9983), 2190–2196. https://doi.org/10.1016/S0140-6736(14)61684-6

David, P., Clancy, Z., Blair, B., Willoughby, M. T., Larson, M., Higgins, E., & Sussman, A. (2017). *Executive Function: Implications for Education*. http://ies.ed.gov/.

De La Fuente, A., Xia, S., Branch, C., & Li, X. (2013). A review of attention-deficit/hyperactivity disorder from the perspective of brain networks. *Frontiers in Human Neuroscience*, *7*(MAY), 46248. https://doi.org/10.3389/FNHUM.2013.00192/BIBTEX

De Los Reyes, A., & Kazdin, A. E. (2004). Measuring informant discrepancies in clinical child research. *Psychological Assessment*, *16*(3), 330–334. https://doi.org/10.1037/1040-3590.16.3.330

De Los Reyes, A., & Ohannessian, C. M. C. (2016). Introduction to the Special Issue: Discrepancies in Adolescent–Parent Perceptions of the Family and Adolescent Adjustment. *Journal of Youth and Adolescence 2016 45:10*, *45*(10), 1957–1972. https://doi.org/10.1007/S10964-016-0533-Z

De Rossi, P., D'Aiello, B., Pretelli, I., Menghini, D., Di Vara, S., & Vicari, S. (2023). Age-related clinical characteristics of children and adolescents with ADHD. *Frontiers in Psychiatry*, *14*, 1069934. https://doi.org/10.3389/fpsyt.2023.1069934

De Rossi, P., Pretelli, I., Menghini, D., D'aiello, B., Di Vara, S., & Vicari, S. (2022). Gender-Related Clinical Characteristics in Children and Adolescents with ADHD. *Journal of Clinical Medicine*, *11*(2). https://doi.org/10.3390/JCM11020385

Di Lorenzo, R., Balducci, J., Poppi, C., Arcolin, E., Cutino, A., Ferri, P., D'Amico, R., & Filippini, T. (2021). Children and adolescents with ADHD followed up to adulthood: a systematic review of long-term outcomes. *Acta Neuropsychiatrica*, *33*(6), 283–298. https://doi.org/10.1017/neu.2021.23

Diamond, A. (2013). Executive Functions. *Annual Review of Psychology*, *64*(1), 135–168. https://doi.org/10.1146/annurev-psych-113011-143750

Diamond, A. (2020). Executive functions. *Handbook of Clinical Neurology*, *173*, 225–240. https://doi.org/10.1016/B978-0-444-64150-2.00020-4

Differences between ICD-11 and DSM-5 TR criteria for ADHD. (2024). In *ACAMH Learn*. https://doi.org/10.13056/acamh.13695

Doffer, D. P. A., Dekkers, T. J., Hornstra, R., van der Oord, S., Luman, M., Leijten, P., Hoekstra, P. J., van den Hoofdakker, B. J., & Groenman, A. P. (2023). Sustained improvements by behavioural parent training for children with attention-deficit/hyperactivity disorder: A meta-analytic review of longer-term child and parental outcomes. *JCPP Advances*, *3*(3). https://doi.org/10.1002/JCV2.12196

Dorr, M. M., & Armstrong, K. J. (2019). Executive Functioning and Impairment in Emerging Adult College Students With ADHD Symptoms. *Journal of Attention Disorders*, *23*(14), 1759–1765. https://doi.org/10.1177/1087054718787883

Drechsler, R., Brem, S., Brandeis, D., Grünblatt, E., Berger, G., & Walitza, S. (2020a). ADHD: Current Concepts and Treatments in Children and Adolescents. *Neuropediatrics*, *51*(05), 315–335. https://doi.org/10.1055/S-0040-1701658

Drechsler, R., Brem, S., Brandeis, D., Grünblatt, E., Berger, G., & Walitza, S. (2020b). ADHD: Current concepts and treatments in children and adolescents. *Neuropediatrics*, *51*(5), 315–335. https://doi.org/10.1055/S-0040-1701658,

DuPaul, G. J., & Jimerson, S. R. (2014). Assessing, understanding, and supporting students with ADHD at school: Contemporary science, practice, and policy. In *School Psychology Quarterly* (Vol. 29, Number 4, pp. 379–384). American Psychological Association Inc. https://doi.org/10.1037/spq0000104

Duric, N. S., Assmus, J., Gundersen, D., Duric Golos, A., & Elgen, I. B. (2017). Multimodal treatment in children and adolescents with attention-deficit/hyperactivity disorder: a 6-month follow-up. *Nordic Journal of Psychiatry*, *71*(5), 386–394. https://doi.org/10.1080/08039488.2017.1305446

Dvorsky, M. R., & Langberg, J. M. (2019). Predicting Impairment in College Students With ADHD: The Role of Executive Functions. *Journal of Attention Disorders*, *23*(13), 1624–1636. https://doi.org/10.1177/1087054714548037

Eccleston, L., Williams, J., Knowles, S., & Soulsby, L. (2019). Adolescent experiences of living with a diagnosis of ADHD: a systematic review and thematic synthesis. *Emotional and Behavioural Difficulties*, *24*(2), 119–135. https://doi.org/10.1080/13632752.2019.1582762

Elbe, P., Bäcklund, C., Vega-Mendoza, M., Sörman, D., Gavelin, H. M., Nyberg, L., & Ljungberg, J. K. (2023). Computerized Cognitive Interventions for Adults With ADHD: A Systematic Review and Meta-Analysis. *Neuropsychology*, *37*(5), 519–530. https://doi.org/10.1037/NEU0000890

Emilsson, M., Gustafsson, P. A., Öhnström, G., & Marteinsdottir, I. (2017). Beliefs regarding medication and side effects influence treatment adherence in adolescents

with attention deficit hyperactivity disorder. *European Child and Adolescent Psychiatry*, *26*(5), 559–571. https://doi.org/10.1007/s00787-016-0919-1

Erarslan, I., Budak, M., & Tarakci, D. (2026). Effects of music-based occupational therapy activities on attention executive functions in children with attention deficit and hyperactivity disorder. *PLOS ONE*, *21*(5), e0349284. https://doi.org/10.1371/JOURNAL.PONE.0349284

European Network Adult ADHD – Impact of psychiatric comorbidities on adults with ADHD. (n.d.). Retrieved May 23, 2026, from https://www.eunetworkadultadhd.com/impact-of-psychiatric-comorbidities-on-adults-with-adhd/

Evans, S. W., Owens, J. S., Wymbs, B. T., & Ray, A. R. (2018). Evidence-Based Psychosocial Treatments for Children and Adolescents With Attention Deficit/Hyperactivity Disorder. *Journal of Clinical Child & Adolescent Psychology*, *47*(2), 157–198. https://doi.org/10.1080/15374416.2017.1390757

Fabiano, G. (2008). Father Participation in Behavioral Parent Training for ADHD: Review and Recommendations for Increasing Inclusion and Engagement. *Article in Journal of Family Psychology*. https://doi.org/10.1037/0893-3200.21.4.683

Fabiano, G. A., Schatz, N. K., Aloe, A. M., Chacko, A., & Chronis-Tuscano, A. (2015). A Systematic Review of Meta-Analyses of Psychosocial Treatment for Attention-Deficit/Hyperactivity Disorder. *Clinical Child and Family Psychology Review*, *18*(1), 77–97. https://doi.org/10.1007/S10567-015-0178-6/TABLES/5

Fabiano, G. A., Schatz, N. K., Aloe, A. M., Pelham, W. E., Smyth, A. C., Zhao, X., Merrill, B. M., Macphee, F., Ramos, M., Hong, N., Altszuler, A., Ward, L., Rodgers, D. B., Liu, Z., Karatoprak Ersen, R., & Coxe, S. (2021). Comprehensive Meta-Analysis of Attention-Deficit/Hyperactivity Disorder Psychosocial Treatments Investigated Within Between Group Studies. *Review of Educational Research*, *91*(5), 718–760. https://doi.org/10.3102/00346543211025092

Faraone, S. V., Asherson, P., Banaschewski, T., Biederman, J., Buitelaar, J. K., Ramos-Quiroga, J. A., Rohde, L. A., Sonuga-Barke, E. J. S., Tannock, R., & Franke, B. (2015). Attention-deficit/hyperactivity disorder. *Nature Reviews Disease Primers*, *1*. https://doi.org/10.1038/NRDP.2015.20

Faraone, S. V., Banaschewski, T., Coghill, D., Zheng, Y., Biederman, J., Bellgrove, M. A., Newcorn, J. H., Gignac, M., Al Saud, N. M., Manor, I., Rohde, L. A., Yang, L., Cortese, S., Almagor, D., Stein, M. A., Albatti, T. H., Aljoudi, H. F., Alqahtani, M. M. J., Asherson, P., … Wang, Y. (2021). The World Federation of ADHD International Consensus Statement: 208 Evidence-based conclusions about the disorder. *Neuroscience & Biobehavioral Reviews*, *128*, 789–818. https://doi.org/10.1016/J.NEUBIOREV.2021.01.022

Faraone, S. V., Biederman, J., & Mick, E. (2006). The age-dependent decline of attention deficit hyperactivity disorder: A meta-analysis of follow-up studies. In *Psychological Medicine* (Vol. 36, Number 2, pp. 159–165). https://doi.org/10.1017/S003329170500471X

Feldman, M. E., Charach, A., & Bélanger, S. A. (2018). ADHD in children and youth: Part 2—Treatment. *Paediatrics & Child Health*, *23*(7), 462–472. https://doi.org/10.1093/PCH/PXY113

Fernández-Martín, P., Tovar-Suárez, D., Rodríguez-Herrera, R., León, J. J., Cánovas, R., & Flores, P. (2025). Behavioral and neurofunctional profiles of delay aversion in children with attention-deficit hyperactivity disorder. *Translational Psychiatry*, *15*(1), 125. https://doi.org/10.1038/s41398-025-03353-z

Field, A. (2013). *Discovering Statistics Using Spss PDF* (4th ed.). Sage.

Filipe, A. M., & Holroyd, D. (2026). Mapping the social studies of ADHD: From medicalization theory to neurodiversity in the digital age, and future directions. *Health (United Kingdom)*. https://doi.org/10.1177/13634593261449197;CSUBTYPE:STRING:AHEAD

Fischer, M., Barkley, R. A., Smallish, L., & Fletcher, K. (2005). Executive functioning in hyperactive children as young adults: Attention, inhibition, response perseveration, and the impact of comorbidity. *Developmental Neuropsychology*, *27*(1), 107–133. https://doi.org/10.1207/s15326942dn2701_5

Fisher, A. G. (2013). Occupation-centred, occupation-based, occupation-focused: Same, same or different? *Scandinavian Journal of Occupational Therapy*, *20*(3), 162–173. https://doi.org/10.3109/11038128.2012.754492

Fisher, O., Berger, I., Grossman, E. S., & Maeir, A. (2022). Online and Intellectual Awareness of Executive Functioning in Daily Life among Adolescents with and without ADHD. *Journal of Attention Disorders*, *26*(6), 870–880. https://doi.org/10.1177/10870547211031982

Fletcher, J., & Wolfe, B. (2009). Long-term consequences of childhood adhd on criminal activities. *Journal of Mental Health Policy and Economics*, *12*(3). https://doi.org/10.2139/SSRN.1489147

Fogel, Y. (2022). The Discrepancy between Actual Performance and Self-Awareness among Adolescents with Executive Function Deficits. *Children*, *9*(5), 684. https://doi.org/10.3390/CHILDREN9050684

Fogel, Y. (2025). Dynamic testing with graduated prompts training: Adolescents with executive function deficits. *Hong Kong Journal of Occupational Therapy*, *38*(1), 33–40. https://doi.org/10.1177/15691861251315120

Fogel, Y., Rosenblum, S., Hirsh, R., Chevignard, M., & Josman, N. (2020). Daily Performance of Adolescents with Executive Function Deficits: An Empirical Study Using a Complex-Cooking Task. *Occupational Therapy International*, *2020*. https://doi.org/10.1155/2020/3051809

Foubister, L., Rennie, F., & Williams, J. (2020). Parents in Control: Parental perceptions of problem behaviors before and after attending an ADHD-specific parent-training program. *Journal of Child and Adolescent Psychiatric Nursing*, *33*(1), 30–37. https://doi.org/10.1111/jcap.12261

Franke, B., Michelini, G., Asherson, P., Banaschewski, T., Bilbow, A., Buitelaar, J. K., Cormand, B., Faraone, S. V., Ginsberg, Y., Haavik, J., Kuntsi, J., Larsson, H., Lesch, K.-P., Ramos-Quiroga, J. A., Réthelyi, J. M., Ribases, M., & Reif, A. (2018). Live fast, die young? A review on the developmental trajectories of ADHD across the lifespan. *European Neuropsychopharmacology*, *28*(10), 1059–1088. https://doi.org/10.1016/j.euroneuro.2018.08.001

French, B., Nalbant, G., Wright, H., Sayal, K., Daley, D., Groom, M. J., Cassidy, S., & Hall, C. L. (2024). The impacts associated with having ADHD: an umbrella review. *Frontiers in Psychiatry*, *15*, 1343314. https://doi.org/10.3389/fpsyt.2024.1343314

Friedel, E., Staniland, L., Baker, L., Koperska, A., Mathy, A., Ramji, A. V., Dwyer, P., & Zaneva, M. (2025). *Toward Neurodiversity-Affirming Language for ADHD*. https://doi.org/10.31234/OSF.IO/GUCYM_V2

Friedman, N. P., & Miyake, A. (2016). Unity and Diversity of Executive Functions: Individual Differences as a Window on Cognitive Structure. *Cortex; a Journal Devoted to the Study of the Nervous System and Behavior*, *86*, 186. https://doi.org/10.1016/J.CORTEX.2016.04.023

Friedman, N. P., Miyake, A., Altamirano, L. J., Corley, R. P., Young, S. E., Rhea, S. A., & Hewitt, J. K. (2016). Stability and change in executive function abilities from late adolescence to early adulthood: A longitudinal twin study. *Developmental Psychology*. https://doi.org/10.1037/dev0000075

Fung, L. (2024). *Strengths-Based Models and Neurodiversity*. 39–59. https://doi.org/10.1007/978-3-031-55072-0_3

Galanou, C., Galanakis, M., Alexopoulos, E., & Darviri, C. (2014). Rosenberg Self-Esteem Scale Greek Validation on Student Sample. *Psychology*, *05*(08), 819–827. https://doi.org/10.4236/psych.2014.58093

Gallo, E. F., & Posner, J. (2016). Moving towards causality in attention-deficit hyperactivity disorder: overview of neural and genetic mechanisms. *The Lancet. Psychiatry*, *3*(6), 555. https://doi.org/10.1016/S2215-0366(16)00096-1

Gałuszka, Z., Papachristoforou, N., Michałka, D., Makar, M., Bartuś, T., Góra, Ż., Bąk, E., Głowacka, J., Kocjan, A., & Chmiel, R. (2025). A Review of Treatment Methods and Available Therapies for Individuals with ADHD. *Quality in Sport*, *37*, 57072. https://doi.org/10.12775/QS.2025.37.57072

Gao, Y., Shuai, D., Bu, X., Hu, X., Tang, S., Zhang, L., Li, H., Hu, X., Lu, L., Gong, Q., & Huang, X. (2019). Impairments of large-scale functional networks in attention-deficit/hyperactivity disorder: A meta-analysis of resting-state functional connectivity. *Psychological Medicine*, *49*(15), 2475–2485. https://doi.org/10.1017/S003329171900237X

Garas, P., & Balazs, J. (2020). Long-Term Suicide Risk of Children and Adolescents With Attention Deficit and Hyperactivity Disorder—A Systematic Review. *Frontiers in Psychiatry*, *11*. https://doi.org/10.3389/fpsyt.2020.557909

Garcia-Argibay, M., Li, L., Du Rietz, E., Zhang, L., Yao, H., Jendle, J., Ramos-Quiroga, J. A., Ribasés, M., Chang, Z., Brikell, I., Cortese, S., & Larsson, H. (2023). The association between type 2 diabetes and attention- deficit/hyperactivity disorder: A systematic review, meta-analysis, and population-based sibling study. *Neuroscience & Biobehavioral Reviews*, *147*, 105076. https://doi.org/10.1016/J.NEUBIOREV.2023.105076

Gehricke, J. G., Kruggel, F., Thampipop, T., Alejo, S. D., Tatos, E., Fallon, J., & Muftuler, L. T. (2017). The brain anatomy of attention-deficit/hyperactivity disorder in young adults – a magnetic resonance imaging study. *PLoS ONE*, *12*(4), e0175433. https://doi.org/10.1371/JOURNAL.PONE.0175433

Gestsdottir, S., Geldhof, G. J., Birgisdóttir, F., & Andrésdóttir, J. C. (2022). Intentional Self-Regulation and Executive Functions: Overlap and Uniqueness in Predicting Positive Development Among Youth in Iceland. *Https://Doi.Org/10.1177/02724316221113355*, *43*(5), 545–576. https://doi.org/10.1177/02724316221113355

Giannakopoulos, G. (2025). Adolescents with ADHD in the school environment: A comprehensive review of academic, social, and emotional challenges and interventions Journal of Clinical Images and Medical Case Reports. *Open Access*, *6*. https://doi.org/10.52768/2766-7820/3528

Gilbert, M., Boecker, M., Reiss, F., Kaman, A., Erhart, M., Schlack, R., Westenhöfer, J., Döpfner, M., & Ravens-Sieberer, U. (2025). Gender and Age Differences in ADHD Symptoms and Co-occurring Depression and Anxiety Symptoms Among Children and Adolescents in the BELLA Study. *Child Psychiatry and Human Development*, *56*(4), 1162–1172. https://doi.org/10.1007/S10578-023-01622-W/TABLES/5

Gioia, G. A., Isquith, P. K., Guy, S. C., & Kenworthy, L. (2024). Behavior Rating Inventory of Executive Function® Second Edition. In *PsycTESTS Dataset*. https://doi.org/10.1037/t79467-000

Goering, S. (2015). Rethinking disability: the social model of disability and chronic disease. *Current Reviews in Musculoskeletal Medicine*, *8*(2), 134. https://doi.org/10.1007/S12178-015-9273-Z

Gomez, R., Chen, W., & Houghton, S. (2023). Differences between DSM-5-TR and ICD-11 revisions of attention deficit/hyperactivity disorder: A commentary on implications and opportunities. *World Journal of Psychiatry*, *13*(5), 138–143. https://doi.org/10.5498/wjp.v13.i5.138

Gonda, X., Balint, S., Rethelyi, J. M., & Dome, P. (2024). Settling a distracted globe: An overview of psychosocial and psychotherapeutic treatment of attention-deficit/hyperactivity disorder. *European Neuropsychopharmacology*, *83*, 1–8. https://doi.org/10.1016/J.EURONEURO.2024.03.002

González-Madruga, K., Staginnus, M., & Fairchild, G. (2022). Alterations in Structural and Functional Connectivity in ADHD: Implications for Theories of ADHD. *Current Topics in Behavioral Neurosciences*, *57*, 445–481. https://doi.org/10.1007/7854_2022_345/FIGURES/7

Gordon, C. T., & Hinshaw, S. P. (2020). Executive Functions in Girls With and Without Childhood ADHD Followed Through Emerging Adulthood: Developmental Trajectories. *Journal of Clinical Child and Adolescent Psychology*, *49*(4), 509–523. https://doi.org/10.1080/15374416.2019.1602840

Graham, F., Kessler, D., Nott, M., Bernie, C., Kanagasabai, P., & Barthow, C. A. (2024). A scoping review of coaching in occupational therapy: Mapping methods, populations and outcomes. *Australian Occupational Therapy Journal*, *71*(6), 1106–1130. https://doi.org/10.1111/1440-1630.12991

Graham, S., & Weiner, B. (2011). Motivation: past, present, and future. *APA Educational Psychology Handbook, Vol 1: Theories, Constructs, and Critical Issues.*, 367–397. https://doi.org/10.1037/13273-013

Grajo, L. C., Candler, C., & Sarafian, A. (2020). Interventions within the scope of occupational therapy to improve Children's academic participation: A systematic review. *American Journal of Occupational Therapy*, *74*(2). https://doi.org/10.5014/AJOT.2020.039016

Greven, C. U., Richards, J. S., & Buitelaar, J. K. (2018). Sex differences in ADHD. *Case Studies in Clinical Psychological Science: Bridging the Gap from Science to Practice*, (August), 1–7. https://doi.org/10.1093/MED/9780198739258.003.0016

Gudka, R., Price, A., Mcglynn, E., Lister, K., Shaw, N., Pitchforth, E., Mughal, F., French, B., Ward, J. H., Newlove-Delgado, T., Mcglynn, · Elleie, Faraz Mughal, ·, French, · Blandine, John, ·, & Ward, H. (2025). Digital health interventions with healthcare information and self-management resources for young people with ADHD: a mixed-methods systematic review and narrative synthesis. *European Child & Adolescent Psychiatry*, *34*, 1817–1835. https://doi.org/10.1007/s00787-025-02676-y

Guideline Overview – CADDRA. (n.d.). Retrieved April 4, 2026, from https://www.caddra.ca/guideline-overview/

Gunzenhauser, C., & Nückles, M. (2021). Training Executive Functions to Improve Academic Achievement: Tackling Avenues to Far Transfer. *Frontiers in Psychology*, *12*, 624008. https://doi.org/10.3389/FPSYG.2021.624008/BIBTEX

Gureasko-Moore, S., DuPaul, G. J., & White, G. P. (2006). The effects of self-management in general education classrooms on the organizational skills of adolescents with ADHD. *Behavior Modification*, *30*(2), 159–183. https://doi.org/10.1177/0145445503259387

Gurlek, S., & Bumin, G. (2026). The effect of cognitive orientation to daily occupational performance in children with attention deficit hyperactivity disorder: A pilot randomized controlled study. *Applied Neuropsychology: Child*. https://doi.org/10.1080/21622965.2024.2385679

Haegele, J. A., & Hodge, S. (2016). Disability Discourse: Overview and Critiques of the Medical and Social Models. *Quest*, *68*(2), 193–206. https://doi.org/10.1080/00336297.2016.1143849

Hahn-Markowitz, J., Berger, I., Manor, I., & Maeir, A. (2017). Impact of the Cognitive–Functional (Cog–Fun) Intervention on Executive Functions and Participation Among Children With Attention Deficit Hyperactivity Disorder: A Randomized Controlled Trial. *The American Journal of Occupational Therapy*, *71*(5). https://doi.org/10.5014/AJOT.2017.022053

Hahn-Markowitz, J., Manor, I., & Maeir, A. (2011). Effectiveness of Cognitive-Functional (Cog-Fun) intervention with children with attention deficit hyperactivity disorder: A pilot study. *American Journal of Occupational Therapy*, *65*(4), 384–392. https://doi.org/10.5014/ajot.2011.000901

Han, G., Helm, J., Iucha, C., Zahn-Waxler, C., Hastings, P. D., & Klimes-Dougan, B. (2016). Are Executive Functioning Deficits Concurrently and Predictively Associated with Depressive and Anxiety Symptoms in Adolescents? *Journal of Clinical Child & Adolescent Psychology*, *45*(1), 44–58. https://doi.org/10.1080/15374416.2015.1041592

Harden, K. P., Engelhardt, L. E., Mann, F. D., Patterson, M. W., Grotzinger, A. D., Savicki, S. L., Thibodeaux, M. L., Freis, S. M., Tackett, J. L., Church, J. A., & Tucker-Drob, E. M. (2020). Genetic Associations Between Executive Functions and a General Factor of Psychopathology. *Journal of the American Academy of Child and Adolescent Psychiatry*, *59*(6), 749–758. https://doi.org/10.1016/j.jaac.2019.05.006

Heaps, A. (2025). How does occupational therapy literature conceptualise executive functions and how this influences occupational therapy assessment? An integrative review. *British Journal of Occupational Therapy*, *88*(10), 600–613. https://doi.org/10.1177/03080226251321341;JOURNAL:JOURNAL:BJOD;PAGE:STRING:ARTICLE/CHAPTER

Helmold, M., & Martensen, M. (2025). *Neurodiversity and Neurodivergence: Subject and Definition*. 1–14. https://doi.org/10.1007/978-3-032-09343-1_1

Henning, C., Summerfeldt, L. J., & Parker, J. D. A. (2021). ADHD and Academic Success in University Students: The Important Role of Impaired Attention. *Journal of Attention Disorders*, *26*(6), 893. https://doi.org/10.1177/10870547211036758

Hinojosa, J., Kramer, P., & Thomson, L. K. (1997a). Statement--fundamental concepts of occupational therapy: occupation, purposeful activity, and function. *The American Journal of Occupational Therapy : Official Publication of the American Occupational Therapy Association*, *51*(10), 864–866. https://doi.org/10.5014/ajot.51.10.864

Hinojosa, J., Kramer, P., & Thomson, L. K. (1997b). Statement—Fundamental Concepts of Occupational Therapy: Occupation, Purposeful Activity, and

Function. *The American Journal of Occupational Therapy*, *51*(10), 864–866. https://doi.org/10.5014/AJOT.51.10.864

Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. *Trends in Cognitive Sciences*, *16*(3), 174–180. https://doi.org/10.1016/J.TICS.2012.01.006

Horanicova, S., Husarova, D., Madarasova Geckova, A., Lackova Rebicova, M., Sokolova, L., de Winter, A. F., & Reijneveld, S. A. (2024). Adolescents' academic performance: what helps them and what hinders them from achievement and success? *Frontiers in Psychology*, *15*, 1350105. https://doi.org/10.3389/FPSYG.2024.1350105/BIBTEX

Horowitz-Kraus, T. (2013). Differential Effect of Cognitive Training on Executive Functions and Reading Abilities in Children With ADHD and in Children With ADHD Comorbid With Reading Difficulties. *Http://Dx.Doi.Org/10.1177/1087054713502079*, *19*(6), 515–526. https://doi.org/10.1177/1087054713502079

Hotez, E., Rosenau, K. A., Fernandes, P., Eagan, K., Shea, L., & Kuo, A. A. (2022). A National Cross-Sectional Study of the Characteristics, Strengths, and Challenges of College Students With Attention Deficit Hyperactivity Disorder. *Cureus*, *14*(1), e21520. https://doi.org/10.7759/cureus.21520

Hotte-Meunier, A., Sarraf, L., Bougeard, A., Bernier, F., Voyer, C., Deng, J., El Asmar, S., Stamate, A. N., Corbière, M., Villotti, P., & Sauvé, G. (2024). Strengths and challenges to embrace attention-deficit/hyperactivity disorder in employment—A systematic review. *Neurodiversity*, *2*. https://doi.org/10.1177/27546330241287655

Hyland-Monks, R., Cronin, L., McNaughton, L., & Marchant, D. (2018). The role of executive function in the self-regulation of endurance performance: A critical review. In *Progress in Brain Research* (Vol. 240, pp. 353–370). Elsevier B.V. https://doi.org/10.1016/bs.pbr.2018.09.011

Ianni, L., Mazer, B., Thomas, A., & Snider, L. (2021a). The Role of Occupational Therapy with Children with Attention Deficit Hyperactivity Disorder (ADHD): A Canadian National Survey. *Journal of Occupational Therapy, Schools, & Early Intervention*, *14*(2), 162–183. https://doi.org/10.1080/19411243.2020.1822259

Ianni, L., Mazer, B., Thomas, A., & Snider, L. (2021b). The Role of Occupational Therapy with Children with Attention Deficit Hyperactivity Disorder (ADHD): A Canadian National Survey. *Journal of Occupational Therapy, Schools, & Early Intervention*, *14*(2), 162–183. https://doi.org/10.1080/19411243.2020.1822259

Ikegami, M., Sorama, M., Katayama, A., & Omiya, H. (2026). Executive and motivational pathways to ADHD traits in the general population: a structural equation model of working memory, attention, delay discounting, and decision-making. *BMC Psychology 2026 14:1*, *14*(1), 525-. https://doi.org/10.1186/S40359-026-04279-X

Ikiugu, M. N., Plastow, N. A., & van Niekerk, L. (2019). Eclectic Application of Theoretical Models in Occupational Therapy: Impact on Therapeutic Reasoning. *Occupational Therapy In Health Care*, *33*(3), 286–305. https://doi.org/10.1080/07380577.2019.1630884

Ikiugu, M. N., Smallfield, S., & Condit, C. (2009). A framework for combining theoretical conceptual practice models in occupational therapy practice. *Canadian Journal of Occupational Therapy*, *76*(3), 162–170. https://doi.org/10.1177/000841740907600305

Inchley, J., Currie, D., Budisavljevic, S., Torsheim, T., Jåstad, A., Cosma, A., Kelly, C., & Már Arnarsson, Á. (2018). Spotlight on adolescent health and well-being survey in Europe and Canada International report VOLUME 1. KEY FINDINGS. *Health Behaviour in School-Aged Children*. http://apps.who.int/bookorders.

Indira, R., Turapova, R., Mukhlisov, S., Mamatkasimov, J., Gofurov, A., Urolov, B., & Razakov, F. (2026). The Role of Cognitive Flexibility in Improving Problem-Solving and Decision-Making Skills in Educational Environments. *Indian Journal of Information Sources and Services*, *16*(1), 639–644. https://doi.org/10.51983/IJISS-2026.16.1.66

Isaac, V., Lopez, V., & Escobar, M. J. (2024). Arousal dysregulation and executive dysfunction in attention deficit hyperactivity disorder (ADHD). *Frontiers in Psychiatry*, *14*, 1336040. https://doi.org/10.3389/FPSYT.2023.1336040

Ishikawa, S., Fujii, K., Kunoh, K., & Kimura, D. (2024). Assessment of the Effect of Meaningful Occupations on Motivation by Orbitofrontal Cortex Activation Using

Near-Infrared Spectroscopy. *Cureus*, *16*(8), e66541. https://doi.org/10.7759/CUREUS.66541

J, S., Nøvik, T. S., Thomsen, P. H., Indredavik, M. S., & T, J. (2015). *Improved quality of life among adolescents with attention-deficit/hyperactivity disorder is mediated by protective factors: a cross sectional survey* (Vol. 15, Number 1).

Jangmo, A., Stålhandske, A., Chang, Z., Chen, Q., Almqvist, C., Feldman, I., Bulik, C. M., Lichtenstein, P., D'Onofrio, B., Kuja-Halkola, R., & Larsson, H. (2019). Attention-Deficit/Hyperactivity Disorder, School Performance, and Effect of Medication. *Journal of the American Academy of Child and Adolescent Psychiatry*, *58*(4), 423–432. https://doi.org/10.1016/J.JAAC.2018.11.014

Janzen, T., Chang, S., & Farrelly, G. (2024). Management of Adolescents and Young Adults With Attention-Deficit/Hyperactivity Disorder. *The Primary Care Companion For CNS Disorders*, *26*(4). https://doi.org/10.4088/PCC.24nr03718

Jaworska, N., & MacQueen, G. (2015). Adolescence as a unique developmental period. *Journal of Psychiatry and Neuroscience*, *40*(5), 291–293. https://doi.org/10.1503/JPN.150268

Jennum, P., Sørensen, A. V., Baandrup, L., Ibsen, M., Ibsen, R., & Kjellberg, J. (2025). Long-term effects of attention deficit hyperactivity disorder (ADHD) on social functioning and health care outcomes. *Journal of Psychiatric Research*, *182*, 212–220. https://doi.org/10.1016/j.jpsychires.2025.01.016

Jiang, X., Liu, L., Ji, H., & Zhu, Y. (2018). Association of affected neurocircuitry with deficit of response inhibition and delayed gratification in attention deficit hyperactivity disorder: A narrative review. *Frontiers in Human Neuroscience*, *12*, 374178. https://doi.org/10.3389/FNHUM.2018.00506/TEXT

Jiménez-Muñoz, L., Lopez-Fernandez, O., Peñuelas-Calvo, I., Delgado-Gómez, D., Miguélez-Fernández, C., López-González, S., González-Garrido, C., Baca-García, E., Carballo, J. J., & Porras-Segovia, A. (2025). Persistence of ADHD into adulthood and associated factors: A prospective study. *Psiquiatría Biológica*, *32*(2), 100529. https://doi.org/10.1016/J.PSIQ.2024.100529

Jones, S., & Hesse, M. (2018). Adolescents With ADHD: Experiences of Having an ADHD Diagnosis and Negotiations of Self-Image and Identity. *Journal of Attention Disorders*, *22*(1), 92–102. https://doi.org/10.1177/1087054714522513;PAGE:STRING:ARTICLE/CHAPTER

Josman, N., & Meyer, S. (2019). Conceptualisation and use of executive functions in paediatrics: A scoping review of occupational therapy literature. *Australian Occupational Therapy Journal*, *66*(1), 77–90. https://doi.org/10.1111/1440-1630.12525

Karamali-Esmaili, S. (2019). Model of Human Occupation: A Review on Clinical Applications in Rehabilitation of Children. *The Scientific Journal of Rehabilitation Medicine*, *8*(4), 291–302. https://doi.org/10.22037/JRM.2019.111756.2093

Katsantonis, I., & McLellan, R. (2023). Students' voices: a qualitative study on contextual, motivational, and self-regulatory factors underpinning language achievement. *Education Sciences*, *13*(8), 804. https://doi.org/10.3390/EDUCSCI13080804/S1

Katzman, M. A., Bilkey, T. S., Chokka, P. R., Fallu, A., & Klassen, L. J. (2017). Adult ADHD and comorbid disorders: clinical implications of a dimensional approach. *BMC Psychiatry*, *17*(1), 302. https://doi.org/10.1186/S12888-017-1463-3

Kelsch, K. L., Miller, K. L., Kelsch, K. L., & Miller, K. L. (2016). Occupational Therapy Interventions for ADHD: A Systematic Review. *Occupational Therapy Capstones*. https://commons.und.edu/ot-grad/107

Kent, J. (2024). Neurodiversity Embracing Differences in ADHD and Autism Spectrum Disorders. *Journal of Mental Disorders*, *10*(01). https://doi.org/10.37421/2471-271X.2024.10.292

Kent, K. M., Pelham, W. E., Molina, B. S. G., Sibley, M. H., Waschbusch, D. A., Yu, J., Gnagy, E. M., Biswas, A., Babinski, D. E., & Karch, K. M. (2011). The academic experience of male high school students with ADHD. *Journal of Abnormal Child Psychology*, *39*(3), 451–462. https://doi.org/10.1007/S10802-010-9472-4

KIDSCREEN-27 - kidscreen.org. (n.d.). Retrieved July 7, 2026, from https://www.kidscreen.org/english/questionnaires/kidscreen-27/

Killeen, P. R. (2019). Models of attention-deficit hyperactivity disorder. *Behavioural Processes*, *162*, 205–214. https://doi.org/10.1016/J.BEPROC.2019.01.001

Kim, M. J., Park, H. Y., Yoo, E. Y., & Kim, J. R. (2020). Effects of a Cognitive-Functional Intervention Method on Improving Executive Function and Self-Directed Learning in School-Aged Children with Attention Deficit Hyperactivity Disorder: A Single-Subject Design Study. *Occupational Therapy International*, *2020*(1), 1250801. https://doi.org/10.1155/2020/1250801

Kılıç, B. K., Bumin, G., Öğütlü, H., & Türkçapar, M. H. (2026). Comprehensive Effects of Occupational Therapy Using Ayres Sensory Integration® in Children With ADHD: A Randomized Controlled Trial. *American Journal of Occupational Therapy*, *80*(1). https://doi.org/10.5014/AJOT.2025.051083/28488

Klassen, A. F., Miller, A., & Fine, S. (2000). Clinical practice guideline: diagnosis and evaluation of the child with attention-deficit/hyperactivity disorder. American Academy of Pediatrics. *Pediatrics*, *105*(5), 1158–1170. https://doi.org/10.1542/peds.105.5.1158

Klingberg, T. (2010). Training and plasticity of working memory. In *Trends in Cognitive Sciences* (Vol. 14, Number 7, pp. 317–324). Elsevier Current Trends. https://doi.org/10.1016/j.tics.2010.05.002

Klowan, A., Kadlec, M. B., Johnston, S., Klowan, A., Kadlec, M. B., & Johnston, S. (2023). The Parents' Perspective: Experiences in Parent-Mediated Pediatric Occupational Therapy for Children with Neurodevelopmental Disorders. *The Open Journal of Occupational Therapy*, *11*(1), 1–13. https://doi.org/10.15453/2168-6408.1958

Knapp, K., & Morton, J. B. (2017). Executive Functioning. In *Executive Functions in Children's Everyday Lives* (pp. 9–20). https://doi.org/10.1093/acprof:oso/9780199980864.003.0002

Kofler, M. J., Alderson, R. M., Raiker, J. S., Bolden, J., Sarver, D. E., & Rapport, M. D. (2014). Working memory and intraindividual variability as neurocognitive

indicators in ADHD: Examining competing model predictions. *Neuropsychology*, *28*(3), 459–471. https://doi.org/10.1037/neu0000050

Kofler, M. J., Irwin, L. N., Soto, E. F., Groves, N. B., Harmon, S. L., & Sarver, D. E. (2019). Executive Functioning Heterogeneity in Pediatric ADHD. *Journal of Abnormal Child Psychology*, *47*(2), 273–286. https://doi.org/10.1007/S10802-018-0438-2

Kofler, M. J., Sarver, D. E., Harmon, S. L., Moltisanti, A., Aduen, P. A., Soto, E. F., & Ferretti, N. (2018). Working memory and organizational skills problems in ADHD. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *59*(1), 57–67. https://doi.org/10.1111/jcpp.12773

Kornblau, B. L., & Robertson, S. M. (2021). Special issue on occupational therapy with neurodivergent people. *American Journal of Occupational Therapy*, *75*(3). https://doi.org/10.5014/AJOT.2021.753001/12510

Kortte, K. B., Horner, M. D., & Windham, W. K. (2002). The Trail Making Test, Part B: Cognitive Flexibility or Ability to Maintain Set? *Applied Neuropsychology*, *9*(2), 106–109. https://doi.org/10.1207/S15324826AN0902_5

Koumoula, A., Lauro, ·, Marchionatti, E., Caye, A., Karagiorga, V. E., Balikou, P., Lontou, K., Arkoulaki, V., Simioni, · André, Serdari, A., Konstantinos Kotsis, ·, Basta, M., Kapsimali, E., Mitropoulou, · Andromachi, Klavdianou, · Nikanthi, Zeleni, D., Mitroulaki, S., Botzaki, A., Gerostergios, G., … Salum, G. A. (2024). *The science of child and adolescent mental health in Greece: a nationwide systematic review*. *33*, 3359–3375. https://doi.org/10.1007/s00787-023-02213-9

Kreider, C. M., Medina, S., & Slamka, M. R. (2019). Strategies for Coping with Time-Related and Productivity Challenges of Young People with Learning Disabilities and Attention-Deficit/Hyperactivity Disorder. *Children*, *6*(2), 28. https://doi.org/10.3390/CHILDREN6020028

Krieger, V., Amador-Campos, J. A., & Guàrdia-Olmos, J. (2020). Executive functions, Personality traits and ADHD symptoms in adolescents: A mediation analysis. *PLOS ONE*, *15*(5), e0232470. https://doi.org/10.1371/JOURNAL.PONE.0232470

Krieger, V., Amador-Campos, J. A., & Peró-Cebollero, M. (2019). Interrater agreement on behavioral executive function measures in adolescents with Attention Deficit Hyperactivity Disorder. *International Journal of Clinical and Health Psychology*, *19*(2), 141–149. https://doi.org/10.1016/j.ijchp.2019.02.007

Lambez, B., Harwood-Gross, A., Golumbic, E. Z., & Rassovsky, Y. (2020). Non-pharmacological interventions for cognitive difficulties in ADHD: A systematic review and meta-analysis. *Journal of Psychiatric Research*, *120*, 40–55. https://doi.org/10.1016/J.JPSYCHIRES.2019.10.007

Langberg, J. M., Epstein, J. N., Becker, S. P., Girio-Herrera, E., & Vaughn, A. J. (2012). Evaluation of the Homework, Organization, and Planning Skills (HOPS) Intervention for Middle School Students with ADHD as Implemented by School Mental Health Providers. *School Psychology Review*, *41*(3), 342–364. http://www.ncbi.nlm.nih.gov/pubmed/25355991

Langberg, J. M., Epstein, J. N., Girio-Herrera, E., Becker, S. P., Vaughn, A. J., & Altaye, M. (2011). Materials Organization, Planning, and Homework Completion in Middle-School Students with ADHD: Impact on Academic Performance. *School Mental Health*, *3*(2), 93–101. https://doi.org/10.1007/s12310-011-9052-y

Langberg, J. M., Molina, B. S. G., Arnold, L. E., Epstein, J. N., Altaye, M., Hinshaw, S. P., Swanson, J. M., Wigal, T., & Hechtman, L. (2011). Patterns and predictors of adolescent academic achievement and performance in a sample of children with attention-deficit/hyperactivity disorder. *Journal of Clinical Child and Adolescent Psychology*, *40*(4), 519–531. https://doi.org/10.1080/15374416.2011.581620

Larsson-Lund, M., & Nyman, A. (2017). Participation and occupation in occupational therapy models of practice: A discussion of possibilities and challenges. *Scandinavian Journal of Occupational Therapy*, *24*(6), 393–397. https://doi.org/10.1080/11038128.2016.1267257

Lasky, A. K., Weisner, T. S., Jensen, P. S., Hinshaw, S. P., Hechtman, L., Arnold, L. E., W. Murray, D., & Swanson, J. M. (2016). ADHD in context: Young adults' reports of the impact of occupational environment on the manifestation of ADHD. *Social Science & Medicine*, *161*, 160–168. https://doi.org/10.1016/J.SOCSCIMED.2016.06.003

Laugesen, B., Lauritsen, M. B., Jørgensen, R., Sørensen, E. E., Grønkjær, M., & Rasmussen, P. (2017). ADHD and Everyday Life: Healthcare as a Significant Lifeline. *Journal of Pediatric Nursing*, *35*, 105–112. https://doi.org/10.1016/j.pedn.2017.03.001

Laverdure, P., & Beisbier, S. (2021). Occupation-and activity-based interventions to improve performance of activities of daily living, play, and leisure for children and youth ages 5 to 21: A systematic review. *American Journal of Occupational Therapy*, *75*(1). https://doi.org/10.5014/ajot.2021.039560

Law, M., Baptiste, S., Mccoll, M., Opzoomer, A., Polatajko, H., & Pollock, N. (1990). The Canadian occupational performance measure: an outcome measure for occupational therapy. *Canadian Journal of Occupational Therapy. Revue Canadienne d'ergotherapie*, *57*(2), 82–87. https://doi.org/10.1177/000841749005700207

Lawrence, D., Houghton, S., Dawson, V., Sawyer, M., & Carroll, A. (2021). Trajectories of academic achievement for students with attention-deficit/hyperactivity disorder. *British Journal of Educational Psychology*, *91*(2), 755–774. https://doi.org/10.1111/BJEP.12392

Lawson, R. A., Papadakis, A. A., Higginson, C. I., Barnett, J. E., Wills, M. C., Strang, J. F., Wallace, G. L., & Kenworthy, L. (2015). Everyday executive function impairments predict comorbid psychopathology in autism spectrum and attention deficit hyperactivity disorders. *Neuropsychology*, *29*(3), 445–453. https://doi.org/10.1037/NEU0000145

Lee, L. Y., Healy, M. P., Fischer, N. L., Tong, K., Chen, A. S., Sahakian, B. J., & Kourtzi, Z. (2024). Cognitive flexibility training for impact in real-world settings. *Current Opinion in Behavioral Sciences*, *59*, 101413. https://doi.org/10.1016/J.COBEHA.2024.101413

Lee, Y. chen, Yang, H. J., Chen, V. C. hung, Lee, W. T., Teng, M. J., Lin, C. H., & Gossop, M. (2016). Meta-analysis of quality of life in children and adolescents with ADHD: By both parent proxy-report and child self-report using PedsQL™. *Research in Developmental Disabilities*, *51–52*, 160–172. https://doi.org/10.1016/j.ridd.2015.11.009

Levanon-Erez, N., Cohen, M., Traub Bar-Ilan, R., & Maeir, A. (2017). Occupational identity of adolescents with ADHD: A mixed methods study. *Scandinavian Journal of Occupational Therapy*, *24*(1), 32–40. https://doi.org/10.1080/11038128.2016.1217927

Levanon-Erez, N., Kampf-Sherf, O., & Maeir, A. (2019). Occupational therapy metacognitive intervention for adolescents with ADHD: Teen Cognitive-Functional (Cog-Fun) feasibility study. *British Journal of Occupational Therapy*, *82*(10), 618–629. https://doi.org/10.1177/0308022619860978/ASSET/IMAGES/LARGE/10.1177_0308022619860978-FIG1.JPEG

Levy, T., Kronenberg, S., Crosbie, J., & Schachar, R. J. (2020). Attention-deficit/hyperactivity disorder (ADHD) symptoms and suicidality in children: The mediating role of depression, irritability and anxiety symptoms. *Journal of Affective Disorders*, *265*, 200–206. https://doi.org/10.1016/j.jad.2020.01.022

Liu, L., Wang, Y., Chen, W., Gao, Y., Li, H., Wang, Y., Chan, R. C. K., & Qian, Q. (2022). Network analysis of 18 attention-deficit/hyperactivity disorder symptoms suggests the importance of "Distracted" and "Fidget" as central symptoms: Invariance across age, gender, and subtype presentations. *Frontiers in Psychiatry*, *13*, 974283. https://doi.org/10.3389/fpsyt.2022.974283

Lopez, P. L., Torrente, F. M., Ciapponi, A., Lischinsky, A. G., Cetkovich-Bakmas, M., Rojas, J. I., Romano, M., & Manes, F. F. (2018). Cognitive-behavioural interventions for attention deficit hyperactivity disorder (ADHD) in adults. In *Cochrane Database of Systematic Reviews* (Vol. 2018, Number 3). John Wiley and Sons Ltd. https://doi.org/10.1002/14651858.CD010840.pub2

López-Villalobos, J. A., Garrido-Redondo, M., Sacristán-Martín, A. M., Martínez-Rivera, M. T., López-Sánchez, M. V., Andrés-De Llano, J. M., Rodríguez-Molinero, L., & Camina-Gutiérrez, A. B. (2018). Children's and adolescents' perception of their quality of life in cases of attention deficit hyperactivity disorder with and without pharmacological treatment and in controls. *Revista de Neurologia*, *67*(6), 195–202. https://doi.org/10.33588/rn.6706.2017517

Loren, R. E. A., Vaughn, A. J., Langberg, J. M., Cyran, J. E. M., Proano-Raps, T., Smolyansky, B. H., Tamm, L., & Epstein, J. N. (2015). Effects of an 8-Session Behavioral Parent Training Group for Parents of Children With ADHD on Child Impairment and Parenting Confidence. *Journal of Attention Disorders*, *19*(2), 158–166. https://doi.org/10.1177/1087054713484175

Luo, Y., Weibman, D., Halperin, J. M., & Li, X. (2019). A Review of Heterogeneity in Attention Deficit/Hyperactivity Disorder (ADHD). *Frontiers in Human Neuroscience*, *13*. https://doi.org/10.3389/fnhum.2019.00042

Lv, Y.-B., Cheng, W., Wang, M.-H., Wang, X.-M., Hu, Y.-L., Lv, L.-Q., & Health, P. (2023). Multimodal integrated intervention for children with attention-deficit/hyperactivity disorder. *World J Clin Cases*, *11*(18), 4267–4276. https://doi.org/10.12998/wjcc.v11.i18.4267

Lyhne, C. N., Pedersen, P., Nielsen, C. V., & Bjerrum, M. B. (2021). Needs for occupational assistance among young adults with ADHD to deal with executive impairments and promote occupational participation – a qualitative study. *Nordic Journal of Psychiatry*, *75*(5), 362–369. https://doi.org/10.1080/08039488.2020.1862911

Ma, J. L. C., Lai, K. Y. C., & Lo, J. W. K. (2017). Impact of age and symptom severity on parent-child relationships and self-perception among Chinese children with Attention Deficit Hyperactivity Disorder. *Social Work in Mental Health*, *15*(5), 538–554. https://doi.org/10.1080/15332985.2016.1261752

MacDonald, H. J., Kleppe, R., Szigetvari, P. D., & Haavik, J. (2024). The dopamine hypothesis for ADHD: An evaluation of evidence accumulated from human studies and animal models. *Frontiers in Psychiatry*, *15*, 1492126. https://doi.org/10.3389/FPSYT.2024.1492126/FULL

Maciejewski, M. L. (2020). Quasi-experimental design. *Biostatistics & Epidemiology*, *4*(1), 38–47. https://doi.org/10.1080/24709360.2018.1477468

Magnano, P., Boerchi, D., Lodi, E., & Patrizi, P. (2020). The effect of non-intellective competencies and academic performance on school satisfaction. *Education Sciences 2020, Vol. 10, Page 222*, *10*(9), 222. https://doi.org/10.3390/EDUCSCI10090222

Makri-Botsari, E. (2010). *Ψυχομετρικά εργαλεία αξιολόγησης του Θυμού, της Επιθετικότητα και του Εκφοβισμού* (1st ed., Vol. 1). Papazisis.

Mann, D. P., Snover, R., Boyd, J. R., List, A. J., Kuhn, A. J., Devereaux, B. N., Chenoweth, S. M., & Middaugh, G. L. (2015). Executive functioning: relationship with high school student role performance. *The Open Journal of Occupational Therapy*, *3*(4). https://doi.org/10.15453/2168-6408.1153

Maraver, M. J., Bajo, M. T., & Gomez-Ariza, C. J. (2016). Training on working memory and inhibitory control in young adults. *Frontiers in Human Neuroscience*, *10*(NOV2016), 588. https://doi.org/10.3389/fnhum.2016.00588

Maritz, R., Baptiste, S., Darzins, S. W., Magasi, S., Weleschuk, C., & Prodinger, B. (2018). Linking occupational therapy models and assessments to the ICF to enable standardized documentation of functioning. *Canadian Journal of Occupational Therapy. Revue Canadienne d'ergotherapie*, *85*(4), 330–341. https://doi.org/10.1177/0008417418797146

Markham, W. A., & Spencer, N. (2022). Factors that mediate the relationships between household socio-economic status and childhood Attention Deficit Hyperactivity Disorder (ADHD) in children and adolescents: A systematic review. *PLoS ONE*, *17*(3 March). https://doi.org/10.1371/journal.pone.0262988

Martel, M. M., Goh, P. K., Lee, C. A., Karalunas, S. L., & Nigg, J. T. (2021). Longitudinal attention-deficit/hyperactivity disorder symptom networks in childhood and adolescence: Key symptoms, stability, and predictive validity. *Journal of Abnormal Psychology*, *130*(5), 562–574. https://doi.org/10.1037/abn0000661

Martella, D., Aldunate, N., Fuentes, L. J., & Sánchez-Pérez, N. (2020). Arousal and Executive Alterations in Attention Deficit Hyperactivity Disorder (ADHD). *Frontiers in Psychology*, *11*, 540568. https://doi.org/10.3389/FPSYG.2020.01991/TEXT

Martin, A. J. (2014). The role of ADHD in academic adversity: Disentangling ADHD effects from other personal and contextual factors. *School Psychology Quarterly*, *29*(4), 395–408. https://doi.org/10.1037/spq0000069

Martin, C. P., & Hoza, B. (2020). *Evidence-Based Treatments for Attention-Deficit/Hyperactivity Disorder (ADHD)*. 155–168. https://doi.org/10.1007/978-3-030-44226-2_11

Martin, J., Walters, R. K., Demontis, D., Mattheisen, M., Lee, S. H., Robinson, E., Brikell, I., Ghirardi, L., Larsson, H., Lichtenstein, P., Eriksson, N., Werge, T., Mortensen, P. B., Pedersen, M. G., Mors, O., Nordentoft, M., Hougaard, D. M., Bybjerg-Grauholm, J., Wray, N. R., … Werge, T. (2018). A Genetic Investigation of Sex Bias in the Prevalence of Attention-Deficit/Hyperactivity Disorder. *Biological Psychiatry*, *83*(12), 1044–1053. https://doi.org/10.1016/j.biopsych.2017.11.026

Martinez-Nunez, B., & Quintero, J. (2019). Update the Multimodal Treatment of ADHD (MTA): twenty years of lessons. *Actas Espanolas de Psiquiatria*, *1*(47), 16–22. https://www.researchgate.net/publication/331147748_Update_the_Multimodal_Treatment_of_ADHD_MTA_twenty_years_of_lessons

Mastorci, F., Lazzeri, M. F. L., Vassalle, C., & Pingitore, A. (2024). The Transition from Childhood to Adolescence: Between Health and Vulnerability. *Children 2024, Vol. 11, Page 989*, *11*(8), 989. https://doi.org/10.3390/children11080989

Matotek, J. (2025). The Relationship between Working Memory and Academic Achievement. *Interdisciplinary Description of Complex Systems*, *23*(4), 340–353. https://doi.org/10.7906/indecs.23.4.2

May, T., Birch, E., Chaves, K., Cranswick, N., Culnane, E., Delaney, J., Derrick, M., Eapen, V., Edlington, C., Efron, D., Ewais, T., Garner, I., Gathercole, M., Jagadheesan, K., Jobson, L., Kramer, J., Mack, M., Misso, M., Murrup-Stewart, C., … Bellgrove, M. (2023). The Australian evidence-based clinical practice guideline for attention deficit hyperactivity disorder. *The Australian and New Zealand Journal of Psychiatry*, *57*(8), 1101–1116. https://doi.org/10.1177/00048674231166329

Mayes, S. D., Calhoun, S. L., Baweja, R., Feldman, L., Syed, E., Gorman, A. A., Montaner, J., Annapareddy, J., Gupta, N., Bello, A., & Siddiqui, F. (2015). Suicide Ideation and Attempts are Associated with Co-occurring Oppositional Defiant Disorder and Sadness in Children and Adolescents with ADHD. *Journal of*

Psychopathology and Behavioral Assessment, *37*(2), 274–282. https://doi.org/10.1007/S10862-014-9451-0

McDougal, E., Tai, C., Stewart, T. M., Booth, J. N., & Rhodes, S. M. (2023). Understanding and Supporting Attention Deficit Hyperactivity Disorder (ADHD) in the Primary School Classroom: Perspectives of Children with ADHD and their Teachers. *Journal of Autism and Developmental Disorders*, *53*(9), 3406–3421. https://doi.org/10.1007/s10803-022-05639-3

McGrath, J. J., Al-Hamzawi, A., Alonso, J., Altwaijri, Y., Andrade, L. H., Bromet, E. J., Bruffaerts, R., Caldas de Almeida, J. M., Chardoul, S., Chiu, W. T., Degenhardt, L., Demler, O. V., Ferry, F., Gureje, O., Haro, J. M., Karam, E. G., Karam, G., Khaled, S. M., Kovess-Masfety, V., … Zaslavsky, A. M. (2023). Age of onset and cumulative risk of mental disorders: a cross-national analysis of population surveys from 29 countries. *The Lancet. Psychiatry*, *10*(9), 668–681. https://doi.org/10.1016/S2215-0366(23)00193-1

McGrath, L. M., Braaten, E. B., Doty, N. D., Willoughby, B. L., Wilson, H. K., O'Donnell, E. H., Colvin, M. K., Ditmars, H. L., Blais, J. E., Hill, E. N., Metzger, A., Perlis, R. H., Willcutt, E. G., Smoller, J. W., Waldman, I. D., Faraone, S. V., Seidman, L. J., & Doyle, A. E. (2016). Extending the "cross-disorder" relevance of executive functions to dimensional neuropsychiatric traits in youth. *Journal of Child Psychology and Psychiatry and Allied Disciplines*. https://doi.org/10.1111/jcpp.12463

Mechler, K., Banaschewski, T., Hohmann, S., & Häge, A. (2022). Evidence-based pharmacological treatment options for ADHD in children and adolescents. *Pharmacology and Therapeutics*, *230*. https://doi.org/10.1016/J.PHARMTHERA.2021.107940

Medrano Nava, E., Flores-Lázaro, J. C., Nicolini Sánchez, H., & Juárez García, F. (2024). Effects of comorbidity on executive functions among children with ADHD, finding trends. *Applied Neuropsychology: Child*, *13*(2), 100–112. https://doi.org/10.1080/21622965.2022.2135440

Mette, C. (2023). Time Perception in Adult ADHD: Findings from a Decade—A Review. *International Journal of Environmental Research and Public Health*, *20*(4), 3098. https://doi.org/10.3390/IJERPH20043098/S1

Meyer, K. N., Santillana, R., Miller, B., Clapp, W., Way, M., Bridgman-Goines, K., & Sheridan, M. A. (2020). Computer-based inhibitory control training in children with Attention-Deficit/Hyperactivity Disorder (ADHD): Evidence for behavioral and neural impact. *PLoS ONE*, *15*(11 December). https://doi.org/10.1371/JOURNAL.PONE.0241352

Mikami, A. Y., Qi, H., & Miller, C. E. (2022). *Psychosocial Interventions for Peer Relationship Problems in Children with Attention-Deficit/Hyperactivity Disorder*. 183–212. https://doi.org/10.1007/978-3-030-97208-0_10

Miller, M., Nevado-Montenegro, A. J., & Hinshaw, S. P. (2012). Childhood executive function continues to predict outcomes in young adult females with and without childhood-diagnosed ADHD. *Journal of Abnormal Child Psychology*, *40*(5), 657–668. https://doi.org/10.1007/S10802-011-9599-Y/FIGURES/2

Ministry of Education, Culture, S. and Youth. (2018). *Ministry of Education: Annual Report 2017*. http://moec.gov.cy/etisia-ekthesi/pdf/annual_report_2017_gr.pdf

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The Unity and Diversity of Executive Functions and Their Contributions to Complex "Frontal Lobe" Tasks: A Latent Variable Analysis. *Cognitive Psychology*, *41*(1), 49–100. https://doi.org/10.1006/COGP.1999.0734

Miyake, A., & Friedman P, N. (2012). The Nature and Organization of Individual Differences in Executive Functions: Four General Conclusions. *Current Directions in Psychological Science*, *21*(1), 8. https://doi.org/10.1177/0963721411429458

Mohan, A., Iacono, W. G., McGue, M., Nelson, K. M., Roisman, G. I., Santos, J., Wilson, S., & Schaefer, J. D. (2026). Socioeconomic Consequences of Childhood Attention-Deficit/Hyperactivity Disorder: A Longitudinal Twin Study. *Journal of the American Academy of Child & Adolescent Psychiatry*. https://doi.org/10.1016/J.JAAC.2026.03.012

Molitor, S. J., Oddo, L. E., Eadeh, H. M., & Langberg, J. M. (2018). Executive Function Deficits in Adolescents With ADHD: Untangling Possible Sources of Heterogeneity. *Journal of Emotional and Behavioral Disorders*. https://doi.org/10.1177/1063426618763125

Moreau, D., & Conway, A. R. A. (2014). The case for an ecological approach to cognitive training. In *Trends in Cognitive Sciences* (Vol. 18, Number 7, pp. 334–336). Elsevier Ltd. https://doi.org/10.1016/j.tics.2014.03.009

Mousavi, S. T., Jamali, G., & Raji, P. (2025). The relationship between executive function and activities of daily living in children with specific learning disorders. *Applied Neuropsychology. Child*, *14*(1). https://doi.org/10.1080/21622965.2023.2270755

National Institute for Health and Care Excellence NICE. (2019). Attention deficit hyperactivity disorder: Diagnosis and management. In *Progress in Neurology and Psychiatry* (Vol. 22, pp. 1–62). https://doi.org/10.1002/pnp.511

National Institute of Mental Health. (2013, November). *The Multimodal Treatment of Attention Deficit Hyperactivity Disorder Study (MTA): Questions and Answers*. https://www.nimh.nih.gov/funding/clinical-research/practical/mta/the-multimodal-treatment-of-attention-deficit-hyperactivity-disorder-study-mtaquestions-and-answers?form=MG0AV3

Nazarova, V. A., Sokolov, A. V., Chubarev, V. N., Tarasov, V. V., & Schiöth, H. B. (2022). Treatment of ADHD: Drugs, psychological therapies, devices, complementary and alternative methods as well as the trends in clinical trials. *Frontiers in Pharmacology*, *13*. https://doi.org/10.3389/FPHAR.2022.1066988/PDF

Nejati, V., Derakhshan, Z., & Mohtasham, A. (2023). The effect of comprehensive working memory training on executive functions and behavioral symptoms in children with attention deficit-hyperactivity disorder (ADHD). *Asian Journal of Psychiatry*, *81*. https://doi.org/10.1016/j.ajp.2023.103469

Neurodivergent Test. (2025, June 29). *Executive Dysfunction: Beyond Laziness & Into Neurodiversity*. https://neurodivergenttest.org/blog/executive-dysfunction-beyond-laziness-into-neurodiversity

Neurodiversity: Understanding ADHD, Autism, Dyslexia & Brain Differences | iPsychology. (n.d.). Retrieved June 4, 2026, from https://ipsychology.net/neurodiversity/

Nianogo, R. A., Benmarhnia, T., & O'Neill, S. (2023). A comparison of quasi-experimental methods with data before and after an intervention: an introduction for epidemiologists and a simulation study. *International Journal of Epidemiology*, *52*(5), 1522. https://doi.org/10.1093/IJE/DYAD032

Nicholson, T., & Lee, R. (2026). How Do We Navigate the Conceptual Tension Between Paradigms of ADHD? *Neurodiversity*, *4*. https://doi.org/10.1177/27546330261433280

Nicolaidis, C. (2012). What can physicians learn from the neurodiversity movement? *Virtual Mentor*, *14*(6), 503–510. https://doi.org/10.1001/VIRTUALMENTOR.2012.14.6.OPED1-1206

Nielsen, S. K., Kelsch, K., & Miller, K. (2017). Occupational Therapy Interventions for Children with Attention Deficit Hyperactivity Disorder: A Systematic Review. *Occupational Therapy in Mental Health*, *33*(1), 70–80. https://doi.org/10.1080/0164212X.2016.1211060

Niermann, H. C. M., & Scheres, A. (2014). The relation between procrastination and symptoms of attention-deficit hyperactivity disorder (ADHD) in undergraduate students. *International Journal of Methods in Psychiatric Research*, *23*(4), 411–421. https://doi.org/10.1002/mpr.1440

Nigg, J. T. (2005). Neuropsychologic Theory and Findings in Attention-Deficit/Hyperactivity Disorder: The State of the Field and Salient Challenges for the Coming Decade. *Biological Psychiatry*, *57*(11), 1424–1435. https://doi.org/10.1016/J.BIOPSYCH.2004.11.011

Nigg, J. T. (2013). Attention-deficit/hyperactivity disorder and adverse health outcomes. *Clinical Psychology Review*, *33*(2), 215–228. https://doi.org/10.1016/j.cpr.2012.11.005

Norman, L. J., Price, J., Ahn, K., Sudre, G., Sharp, W., & Shaw, P. (2023). Longitudinal trajectories of childhood and adolescent attention deficit hyperactivity disorder

diagnoses in three cohorts. *EClinicalMedicine*, *60*, 102021. https://doi.org/10.1016/j.eclinm.2023.102021

Nourredine, M., Jurek, L., Salanti, G., Cipriani, A., Subtil, F., Efthimiou, O., Hamza, T., & Cortese, S. (2024). Efficacy of pharmacological interventions for ADHD: protocol for an updated systematic review and dose–response network meta-analysis. *Systematic Reviews 2024 13:1*, *13*(1), 256-. https://doi.org/10.1186/S13643-024-02675-1

Núñez-Jaramillo, L., Herrera-Solís, A., & Herrera-Morales, W. V. (2021). Adhd: Reviewing the causes and evaluating solutions. *Journal of Personalized Medicine*, *11*(3), 1–25. https://doi.org/10.3390/JPM11030166

Ogilvie, J. M., Shum, D. H. K., & Stewart, A. (2020). Executive Functions in Late Adolescence and Early Adulthood and Their Relationship with Risk-Taking Behavior. *Developmental Neuropsychology*, *45*(7–8), 446–468. https://doi.org/10.1080/87565641.2020.1833885

Ogundele, M. O., & Ayyash, H. F. (2023). ADHD in children and adolescents: Review of current practice of non-pharmacological and behavioural management. *AIMS Public Health*, *10*(1), 35–51. https://doi.org/10.3934/PUBLICHEALTH.2023004

Oldrati, V., Corti, C., Poggi, G., Borgatti, R., Urgesi, C., & Bardoni, A. (2020). Effectiveness of Computerized Cognitive Training Programs (CCTP) with Game-like Features in Children with or without Neuropsychological Disorders: a Meta-Analytic Investigation. *Neuropsychology Review*. https://doi.org/10.1007/s11065-020-09429-5

Olfers, K. J. F., & Band, G. P. H. (2018). Game-based training of flexibility and attention improves task-switch performance: near and far transfer of cognitive training in an EEG study. *Psychological Research*, *82*(1), 186–202. https://doi.org/10.1007/s00426-017-0933-z

Oroian, B. A., Nechita, P., & Szalontay, A. (2025). Hyperfocus in ADHD: A Misunderstood Cognitive Phenomenon. *European Psychiatry*, *68*(S1), S306–S306. https://doi.org/10.1192/J.EURPSY.2025.662

Ositkovska, O., & Bayer, O. (2020). Sex Differences in Attention-Deficit/Hyperactivity Disorder (ADHD): Short Literature Review. *Bulletin of Taras Shevchenko National University of Kyiv. Series "Psychology,"* (2 (12)), 72–76. https://doi.org/10.17721/BSP.2020.2(12).13

Overgaard, K. R., Oerbeck, B., Friis, S., Pripp, A. H., Aase, H., Ingeborgrud, C. B., & Biele, G. (2025). Functional Impairment Related to ADHD From Preschool to School Age. *Journal of Attention Disorders*, *29*(3), 220–230. https://doi.org/10.1177/10870547241301179

Özgen, H., Spijkerman, R., Noack, M., Holtmann, M., Schellekens, A. S. A., Van De Glind, G., Banaschewski, T., Barta, C., Begeman, A., Casas, M., Crunelle, C. L., Daigre Blanco, C., Dalsgaard, S., Demetrovics, Z., Den Boer, J., Dom, G., Eapen, V., Faraone, S. V., Franck, J., … Hendriks, V. (2020). International Consensus Statement for the Screening, Diagnosis, and Treatment of Adolescents with Concurrent Attention-Deficit/Hyperactivity Disorder and Substance Use Disorder. *European Addiction Research*, *26*(4–5), 223–232. https://doi.org/10.1159/000508385

Pallant, J. (2020). SPSS: SURVIVAL MANUAL: A STEP BY STEP GUIDE TO DATA ANALYSIS USING IBM SPSS: 7th EDITION. *SPSS: SURVIVAL MANUAL: A STEP BY STEP GUIDE TO DATA ANALYSIS USING IBM SPSS: 7th EDITION*, 1–361. https://doi.org/10.4324/9781003117452/SPSS-SURVIVAL-MANUAL-JULIE-PALLANT/RIGHTS-AND-PERMISSIONS

Panah, M. T., Taremian, F., Dolatshahi, B., Seddigh, S. H., Raeisian, F. S., & Panah, E. (2025). A comparison of Barkley's behavioral inhibition model (1997) with Barkley's updated executive functioning model in predicting adult ADHD symptoms: A preliminary report using structural equation modeling. *Applied Neuropsychology: Adult*, *32*(1), 140–152. https://doi.org/10.1080/23279095.2022.2158441

Papagianni, E. P., & Theodorou, E. (2026). Development and Standardization of the Strengths and Difficulties Self-Perception Scale for Adolescent Students (StreDi-SPeS). *OTJR: Occupational Therapy Journal of Research*. https://doi.org/10.1177/15394492261464057

Parkin, R., Nicholas, F. M., & Hayden, J. C. (2022). A systematic review of interventions to enhance adherence and persistence with ADHD pharmacotherapy. *Journal of Psychiatric Research*, *152*, 201–218. https://doi.org/10.1016/J.JPSYCHIRES.2022.05.044

Pas, P., Hulshoff Pol, H. E., Raemaekers, M., & Vink, M. (2021). Self-regulation in the pre-adolescent brain. *Developmental Cognitive Neuroscience*, *51*(6), 101012. https://doi.org/10.1016/j.dcn.2021.101012

Pehlivanidis, A.; Spyropoulou, A.; Galanopoulos, A.;Papachristou, C.A. & Papadimitriou, G. N. (2012). Attention deficit hyperactivity disorder (ADHD) in adults: Clinical recognition, diagnosis and therapeutic interventions. *Archives of Hellenic Medicine*, *29*(5), 562–576.

Pelham, W. E., Smith, B. H., Evans, S. W., Bukstein, O., Gnagy, E. M., Greiner, A. R., & Sibley, M. H. (2017). The Effectiveness of Short- and Long-Acting Stimulant Medications for Adolescents With ADHD in a Naturalistic Secondary School Setting. *Journal of Attention Disorders*, *21*(1), 40–45. https://doi.org/10.1177/1087054712474688

Pellicano, E., & den Houting, J. (2022). Annual Research Review: Shifting from 'normal science' to neurodiversity in autism science. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *63*(4), 381–396. https://doi.org/10.1111/JCPP.13534

Pérez-Rodríguez, S., Vidal-Ramírez, C., Triviño-Juárez, J. M., Del Pino-González, A., López-Atienza, G., Molina-Torres, E., Marín-Marín, J. A., Toledano-González, A., Rodríguez-Martínez, M. C., & Romero-Ayuso, D. (2026). Initial validation of daily time management self-report: differences in ADHD children and adolescents. *Educational and Developmental Psychologist*. https://doi.org/10.1080/20590776.2025.2545249

Peterson, B. S., Trampush, J., Brown, M., Maglione, M., Bolshakova, M., Rozelle, M., Miles, J., Pakdaman, S., Yagyu, S., Motala, A., & Hempel, S. (2024). Tools for the Diagnosis of ADHD in Children and Adolescents: A Systematic Review. *Pediatrics*, *153*(4), 2024065854. https://doi.org/10.1542/PEDS.2024-065854/196923

Peterson, B. S., Trampush, J., Maglione, M., Bolshakova, M., Rozelle, M., Miles, J., Pakdaman, S., Brown, M., Yagyu, S., Motala, A., & Hempel, S. (2024). Treatments for ADHD in Children and Adolescents: A Systematic Review. *Pediatrics*, *153*(4). https://doi.org/10.1542/PEDS.2024-065787

Phillips, S. T., Druskin, L. R., Mychailyszyn, M. P., Victory, E., Aman, E., & McNeil, C. B. (2024). The Efficacy of Parent–Child Interaction Therapy (PCIT) for Youth with Attention-Deficit/Hyperactivity Disorder (ADHD): A Meta-Analysis. *Child Psychiatry and Human Development*. https://doi.org/10.1007/S10578-024-01678-2

Poon, K. (2018). Hot and cool executive functions in adolescence: Development and contributions to important developmental outcomes. *Frontiers in Psychology*, *8*(JAN), 2311. https://doi.org/10.3389/fpsyg.2017.02311

Popit, S., Serod, K., Locatelli, I., & Stuhec, M. (2024). Prevalence of attention-deficit hyperactivity disorder (ADHD): systematic review and meta-analysis. *European Psychiatry : The Journal of the Association of European Psychiatrists*, *67*(1), e68. https://doi.org/10.1192/J.EURPSY.2024.1786

Prencipe, A., Kesek, A., Cohen, J., Lamm, C., Lewis, M. D., & Zelazo, P. D. (2011). Development of hot and cool executive function during the transition to adolescence. *Journal of Experimental Child Psychology*, *108*(3), 621–637. https://doi.org/10.1016/j.jecp.2010.09.008

Price, P. C., Jhangiani, R., & Chiang, I. (2018). *Quasi-Experimental Research – Research Methods in Psychology*. BC Campus Open Textbooks. https://opentextbc.ca/researchmethods/chapter/quasi-experimental-research/

Qian, Y., Liu, Y., Jiang, W. Q., Zhao, Z. M., Li, Y., Chen, J., & Du, Y. S. (2020). Randomized controlled study on the effect of multimodal therapy and drug therapy on children with attention deficit hyperactivity disorder. *Zhongguo Ertong Baojian Zazhi*, *28*(4), 395–398. https://doi.org/10.11852/ZGETBJZZ2019-1488

Qiu, H., Liang, X., Wang, P., Zhang, H., & Shum, D. H. K. (2023). Efficacy of non-pharmacological interventions on executive functions in children and adolescents with ADHD: A systematic review and meta-analysis. *Asian Journal of Psychiatry*, *87*. https://doi.org/10.1016/j.ajp.2023.103692

Questionnaires - kidscreen.org. (n.d.). Retrieved July 7, 2026, from https://www.kidscreen.org/english/questionnaires/

Raiker, J. S., Rapport, M. D., Kofler, M. J., & Sarver, D. E. (2012). Objectively-measured impulsivity and attention-deficit/hyperactivity disorder (ADHD): Testing competing predictions from the working memory and behavioral inhibition models of ADHD. *Journal of Abnormal Child Psychology*, *40*(5), 699–713. https://doi.org/10.1007/s10802-011-9607-2

Rajeh, A., Amanullah, S., Shivakumar, K., & Cole, J. (2017). Interventions in ADHD: A comparative review of stimulant medications and behavioral therapies. *Asian Journal of Psychiatry*, *25*, 131–135. https://doi.org/10.1016/J.AJP.2016.09.005

Ramos-Galarza, C., Acosta-Rodas, P., Bolaños-Pasquel, M., & Lepe-Martínez, N. (2020). The role of executive functions in academic performance and behaviour of university students. *Journal of Applied Research in Higher Education*, *12*(3), 444–455. https://doi.org/10.1108/JARHE-10-2018-0221

Ramos-Galarza, C., Brito, D., Rodríguez, B., Guerrero, B., Cruz-Cárdenas, J., & Bolaños-Pasquel, M. (2024). Systematic Review of Executive Function Stimulation Methods in the ADHD Population. *Journal of Clinical Medicine 2024, Vol. 13, Page 4208*, *13*(14), 4208. https://doi.org/10.3390/JCM13144208

Ramos-Galarza, C., & Pérez-Salas, C. (2021). Moderator Role of Monitoring in the Inhibitory Control of Adolescents With ADHD. *Journal of Attention Disorders*, *25*(2), 188–198. https://doi.org/10.1177/1087054718776478

Rapport, M. D., Orban, S. A., Kofler, M. J., & Friedman, L. M. (2013). Do programs designed to train working memory, other executive functions, and attention benefit children with ADHD? A meta-analytic review of cognitive, academic, and behavioral outcomes. *Clinical Psychology Review*, *33*(8), 1237–1252. https://doi.org/10.1016/j.cpr.2013.08.005

Reale, L., Bartoli, B., Cartabia, M., Zanetti, M., Costantino, M. A., Canevini, M. P., Termine, C., Bonati, M., Conte, S., Renzetti, V., Salvoni, L., Molteni, M., Salandi, A., Trabattoni, S., Effedri, P., Filippini, E., Pedercini, E., Zanetti, E., Fteita, N., … Rossi, G. (2017). Comorbidity prevalence and treatment outcome in children and

adolescents with ADHD. *European Child and Adolescent Psychiatry*, *26*(12), 1443–1457. https://doi.org/10.1007/S00787-017-1005-Z

Retz, W., Ginsberg, Y., Turner, D., Barra, S., Retz-Junginger, P., Larsson, H., & Asherson, P. (2021). Attention-Deficit/Hyperactivity Disorder (ADHD), antisociality and delinquent behavior over the lifespan. *Neuroscience and Biobehavioral Reviews*, *120*, 236–248. https://doi.org/10.1016/J.NEUBIOREV.2020.11.025

Richard, V., Lorthe, E., Dumont, R., Loizeau, A., Baysson, H., Schrempft, S., Zaballa, M. E., Lamour, J., Barbe, R. P., Posfay-Barbe, K. M., Guessous, I., & Stringhini, S. (2024). Psychosocial factors mediate social inequalities in health-related quality of life among children and adolescents. *BMC Public Health*, *24*(1). https://doi.org/10.1186/s12889-024-20393-0

Rios-Davis, A., Sibley, M. H., Delgado, A., & Zulauf-McCurdy, C. (2023). Identifying Common and Unique Elements of Evidence-Based Treatments for Adolescent ADHD. *Journal of Child and Family Studies*, *32*(2), 466–480. https://doi.org/10.1007/S10826-022-02475-Y

Rodrigues, E. G., & Sposito, A. M. P. (2026). Occupational therapists' interventions with children with attention-deficit/hyperactivity disorder: a scoping review. *Cadernos Brasileiros de Terapia Ocupacional*, *34*, e4148. https://doi.org/10.1590/2526-8910.CTO420241481

Rodríguez-Nieto, G., Seer, C., Sidlauskaite, J., Vleugels, L., Van Roy, A., Hardwick, R., & Swinnen, S. (2022). Inhibition, Shifting and Updating: Inter and intra-domain commonalities and differences from an executive functions activation likelihood estimation meta-analysis. *NeuroImage*, *264*(4), 119665. https://doi.org/10.1016/j.neuroimage.2022.119665

Rogers, M., & Tannock, R. (2018). Are Classrooms Meeting the Basic Psychological Needs of Children With ADHD Symptoms? A Self-Determination Theory Perspective. *Journal of Attention Disorders*, *22*(14), 1354–1360. https://doi.org/10.1177/1087054713508926

Rosenberg, L., & Cohen Erez, A. (2023). Differences in Meaning of Occupations Between Children With and Without Neurodevelopmental Disorders. *OTJR :*

Occupation, Participation and Health, *43*(1), 35–42. https://doi.org/10.1177/15394492221094314

Rosenberg, M. (1965). Self report measures for love and compassion research: Self-esteem. *Personality and Individual Differences*, *35*(2), 213–240. https://doi.org/10.1007/s12671-015-0407-6

Rowland, A. S., Skipper, B. J., Rabiner, D. L., Qeadan, F., Campbell, R. A., Naftel, A. J., & Umbach, D. M. (2018). Attention-Deficit/Hyperactivity Disorder (ADHD): Interaction between socioeconomic status and parental history of ADHD determines prevalence. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *59*(3), 213–222. https://doi.org/10.1111/jcpp.12775

Rubia, K. (2018). Cognitive Neuroscience of Attention Deficit Hyperactivity Disorder (ADHD) and Its Clinical Translation. *Frontiers in Human Neuroscience*, *12*, 100. https://doi.org/10.3389/fnhum.2018.00100

Rueda, M. R., Cómbita, L. M., & Pozuelos, J. P. (2021). Cognitive Training in Childhood and Adolescence. *Cognitive Training: An Overview of Features and Applications: Second Edition*, 127–139. https://doi.org/10.1007/978-3-030-39292-5_9

Rueda, M. R., Pozuelos, J. P., & Cómbita, L. M. (2015). Cognitive Neuroscience of Attention From brain mechanisms to individual differences in efficiency. *AIMS Neuroscience*, *2*(4), 183–202. https://doi.org/10.3934/Neuroscience.2015.4.183

Rusca-Jordán, F., & Cortez-Vergara, C. (2020). Attention deficit and hyperactivity disorder in children and adolescents. A clinical review. *Revista de Neuro-Psiquiatria*, *83*(3), 148–156. https://doi.org/10.20453/RNP.V83I3.3794

Russell, G., Ford, T., Rosenberg, R., & Kelly, S. (2014). The association of attention deficit hyperactivity disorder with socioeconomic disadvantage: Alternative explanations and evidence. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *55*(5), 436–445. https://doi.org/10.1111/jcpp.12170

Sala, G., & Gobet, F. (2020). Working memory training in typically developing children: A multilevel meta-analysis. *Psychonomic Bulletin & Review*, *27*(3), 423–434. https://doi.org/10.3758/s13423-019-01681-y

Salari, N., Ghasemi, H., Abdoli, N., Rahmani, A., Shiri, M. H., Hashemian, A. H., Akbari, H., & Mohammadi, M. (2023). The global prevalence of ADHD in children and adolescents: a systematic review and meta-analysis. *Italian Journal of Pediatrics*, *49*(1), 1–12. https://doi.org/10.1186/S13052-023-01456-1/TABLES/5

Samuels, W. E., Tournaki, N., Blackman, S., & Zilinski, C. (2016). Executive functioning predicts academic achievement in middle school: A four-year longitudinal study. *The Journal of Educational Research*, *109*(5), 478–490. https://doi.org/10.1080/00220671.2014.979913

Sana, F., & Fenesi, B. (2025). Working Memory and Instructional Fit: Reintroducing Aptitude–Treatment Interaction in Education Research. *Behavioral Sciences*, *15*(6), 765. https://doi.org/10.3390/BS15060765

Sasser, T. R., Kalvin, C. B., & Bierman, K. L. (2016). Developmental trajectories of clinically significant attention-deficit/hyperactivity disorder (ADHD) symptoms from grade 3 through 12 in a high-risk sample: Predictors and outcomes. *Journal of Abnormal Psychology*, *125*(2), 207–219. https://doi.org/10.1037/abn0000112

Saylik, R., Williams, A. L., Murphy, R. A., & Szameitat, A. J. (2022). Characterising the unity and diversity of executive functions in a within-subject fMRI study. *Scientific Reports 2022 12:1*, *12*(1), 8182-. https://doi.org/10.1038/s41598-022-11433-z

Schmengler, H., Peeters, M., Stevens, G. W. J. M., Hartman, C. A., Oldehinkel, A. J., & Vollebergh, W. A. M. (2023). ADHD Symptoms and Educational Level in Adolescents: The Role of the Family, Teachers, and Peers. *Research on Child and Adolescent Psychopathology*, *51*(7), 1051–1066. https://doi.org/10.1007/S10802-023-01047-Y

ScienceDirect. (n.d.). *Cognitive flexibility - an overview | ScienceDirect Topics*. Retrieved December 2, 2019, from https://www.sciencedirect.com/topics/neuroscience/cognitive-flexibility/pdf

Sedgwick-Müller, J., & Müller-Sedgwick, U. (2025). Attention Deficit Hyperactivity Disorder (ADHD). In *The Palgrave Encyclopedia of Disability* (pp. 1–15). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-40858-8_177-1

Seegan, P. L., Miller, L., Young, A. S., Parrish, C., Cullen, B., & Reynolds, E. K. (2023). Enhancing Quality of Care Through Evidence-Based Practice: Training and Supervision Experiences. *American Journal of Psychotherapy*, *76*(3), 100–106. https://doi.org/10.1176/APPI.PSYCHOTHERAPY.20220015

Senior, C. J., Godovich, S. A., Habayeb, S., Alvord, M. K., & Rich, B. A. (2020). The Effects of a Resilience-based Group Intervention for Youth with ADHD. *Journal of Child and Adolescent Counseling*, *6*(3), 200–214. https://doi.org/10.1080/23727810.2020.1719353

Serey, A. K., Martínez-Líbano, J., & Barahona-Fuentes, G. (2025). Emotional Regulation and Subjective Well-Being in Adolescents: A Systematic Review. *Mental Health: Global Challenges Journal*, *8*(1), 14–26. https://doi.org/10.56508/mhgcj.v8i1.240

Sergeant, J. (2000). The cognitive-energetic model: an empirical approach to Attention-Deficit Hyperactivity Disorder. *Neuroscience & Biobehavioral Reviews*, *24*(1), 7–12. https://doi.org/10.1016/S0149-7634(99)00060-3

Sergeant, J. A. (2005). Modeling attention-deficit/hyperactivity disorder: A critical appraisal of the cognitive-energetic model. *Biological Psychiatry*, *57*(11), 1248–1255. https://doi.org/10.1016/j.biopsych.2004.09.010

Sergeant, J. A., Geurts, H., Huijbregts, S., Scheres, A., & Oosterlaan, J. (2003). The top and the bottom of ADHD: a neuropsychological perspective. *Neuroscience & Biobehavioral Reviews*, *27*(7), 583–592. https://doi.org/10.1016/j.neubiorev.2003.08.004

Serpell, Z. N., & Esposito, A. G. (2016). Development of Executive Functions: Implications for Educational Policy and Practice. *Policy Insights from the Behavioral and Brain Sciences*, *3*(2), 203–210. https://doi.org/10.1177/2372732216654718

Serwe, K. M., Cores, K., Mettler, M., Smith, J., Steger, K., Dougherty, D., McHugh, J., Piller, A., Riley, B., & Tomlin, G. (2021). International Position Statements on Evidence-Based Practice in Occupational Therapy: A Qualitative Content Analysis. *Annals of International Occupational Therapy*, *4*(3). https://doi.org/10.3928/24761222-20200619-02

Shah, P., & Holmes, J. (2023). Neurodiversity: Towards an interdisciplinary approach. *Neurodiversity*, *1*. https://doi.org/10.1177/27546330231187565

Shaked, D., Faulkner, L. M. D., Tolle, K., Wendell, C. R., Waldstein, S. R., & Spencer, R. J. (2020). Reliability and validity of the Conners' Continuous Performance Test. *Applied Neuropsychology:Adult*, *27*(5), 478–487. https://doi.org/10.1080/23279095.2019.1570199

Shaw, P., Eckstrand, K., Sharp, W., Blumenthal, J., Lerch, J. P., Greenstein, D., Clasen, L., Evans, A., Giedd, J., & Rapoport, J. L. (2007). Attention-deficit/hyperactivity disorder is characterized by a delay in cortical maturation. *Proceedings of the National Academy of Sciences of the United States of America*, *104*(49), 19649–19654. https://doi.org/10.1073/PNAS.0707741104;WGROUP:STRING:PUBLICATION

Shaw, P., Malek, M., Watson, B., Greenstein, D., De Rossi, P., & Sharp, W. (2013). Trajectories of cerebral cortical development in childhood and adolescence and adult attention-deficit/hyperactivity disorder. *Biological Psychiatry*, *74*(8), 599–606. https://doi.org/10.1016/j.biopsych.2013.04.007

Shaw, P., & Sudre, G. (2020). Adolescent attention deficit hyperactivity disorder: understanding teenage symptom trajectories. *Biological Psychiatry*, *89*(2), 152. https://doi.org/10.1016/j.biopsych.2020.06.004

Shroff, D. M., Dunn, N. C., Green, C. D., Breaux, R., Becker, S. P., & Langberg, J. M. (2023). Predictors of executive function trajectories in adolescents with and without ADHD: Links with academic outcomes. *Development and Psychopathology*. https://doi.org/10.1017/S0954579423000743

Shuai, L., Daley, D., Wang, Y. F., Zhang, J. S., Kong, Y. T., Tan, X., & Ji, N. (2017). Executive Function Training for Children with Attention Deficit Hyperactivity Disorder. *Chinese Medical Journal*, *130*(5), 549–558. https://doi.org/10.4103/0366-6999.200541

Shulman, E. P., Smith, A. R., Silva, K., Icenogle, G., Duell, N., Chein, J., & Steinberg, L. (2016). The dual systems model: Review, reappraisal, and reaffirmation. *Developmental Cognitive Neuroscience*, *17*, 103–117. https://doi.org/10.1016/J.DCN.2015.12.010

Sibley, M. H. (2021). Engagement strategies to promote treatment adherence and long-term success in adolescents with ADHD. *Journal of the American Academy of Child & Adolescent Psychiatry*, *60*(10), S69. https://doi.org/10.1016/j.jaac.2021.07.295

Sibley, M. H., Altszuler, A. R., Morrow, A. S., & Merrill, B. M. (2014). Mapping the academic problem behaviors of adolescents with ADHD. *School Psychology Quarterly : The Official Journal of the Division of School Psychology, American Psychological Association*, *29*(4), 422–437. https://doi.org/10.1037/spq0000071

Sibley, M. H., Evans, S. W., & Serpell, Z. N. (2010). Social cognition and interpersonal impairment in young adolescents with ADHD. *Journal of Psychopathology and Behavioral Assessment*, *32*(2), 193–202. https://doi.org/10.1007/s10862-009-9152-2

Sibley, M. H., Flores, S., Murphy, M., Basu, H., Stein, M. A., Evans, S. W., Zhao, X., Manzano, M., & van Dreel, S. (2025). Research Review: Pharmacological and non-pharmacological treatments for adolescents with attention deficit/hyperactivity disorder – a systematic review of the literature. *Journal of Child Psychology and Psychiatry*, *66*(1), 132–149. https://doi.org/10.1111/JCPP.14056

Sibley, M. H., Graziano, P. A., Kuriyan, A. B., Coxe, S., Pelham, W. E., Rodriguez, L., Sanchez, F., Derefinko, K., Helseth, S., & Ward, A. (2016). Parent-Teen Behavior Therapy + Motivational Interviewing for Adolescents with ADHD. *Journal of Consulting and Clinical Psychology*, *84*(8), 699–712. https://doi.org/10.1037/ccp0000106

Sibley, M. H., Graziano, P. A., Ortiz, M., Rodriguez, L., & Coxe, S. (2019). Academic impairment among high school students with ADHD: The role of motivation and goal-directed executive functions. *Journal of School Psychology*, *77*, 67–76. https://doi.org/10.1016/j.jsp.2019.10.005

Sibley, M. H., Reyes Francisco, J. C., Rios-Davis, A., & Graziano, P. A. (2022). Investigating routine care non-pharmacological treatment for adolescents with ADHD. *Frontiers in Health Services*, *2*. https://doi.org/10.3389/FRHS.2022.929521

Sibley, M. H., Swanson, J. M., Arnold, L. E., Hechtman, L. T., Owens, E. B., Stehli, A., Abikoff, H., Hinshaw, S. P., Molina, B. S. G., Mitchell, J. T., Jensen, P. S., Howard, A. L., Lakes, K. D., Pelham, W. E., Vitiello, B., Severe, J. B., Eugene Arnold, L., Hoagwood, K., Richters, J., … Stern, K. (2016). Defining ADHD Symptom Persistence in Adulthood: Optimizing Sensitivity and Specificity. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *58*(6), 655. https://doi.org/10.1111/JCPP.12620

Silk, T. J., Malpas, C. B., Beare, R., Efron, D., Anderson, V., Hazell, P., Jongeling, B., Nicholson, J. M., & Sciberras, E. (2019). A network analysis approach to ADHD symptoms: More than the sum of its parts. *PLoS ONE*, *14*(1). https://doi.org/10.1371/JOURNAL.PONE.0211053

Simeonsson, R. J., Lollar, D., Björck-Åkesson, E., Granlund, M., Brown, S. C., Zhuoying, Q., Gray, D., & Pan, Y. (2014). ICF and ICF-CY lessons learned: Pandora's box of personal factors. *Disability and Rehabilitation*, *36*(25), 2187–2194. https://doi.org/10.3109/09638288.2014.892638

Simmons, J. A., & Antshel, K. M. (2021). Bullying and Depression in Youth with ADHD: A Systematic Review. *Child and Youth Care Forum*, *50*(3), 379–414. https://doi.org/10.1007/S10566-020-09586-X

Siqueira, C. M., & Gurge-Giannetti, J. (2011). Poor school performance: an updated review. *Revista Da Associação Médica Brasileira (English Edition)*, *57*(1), 78–86. https://doi.org/10.1016/S2255-4823(11)70021-2

Sjöwall, D., Roth, L., Lindqvist, S., & Thorell, L. B. (2013). Multiple deficits in ADHD: executive dysfunction, delay aversion, reaction time variability, and emotional deficits. *Journal of Child Psychology and Psychiatry*, *54*(6), 619–627. https://doi.org/10.1111/jcpp.12006

Skalaban, L. J., Cohen, A. O., Conley, M. I., Lin, Q., Schwartz, G. N., Ruiz-Huidobro, N. A. M., Cannonier, T., Martinez, S. A., & Casey, B. J. (2022). Adolescent-specific memory effects: evidence from working memory, immediate and long-term recognition memory performance in 8–30 yr olds. *Learning & Memory*, *29*(8), 223–233. https://doi.org/10.1101/lm.053539.121

Skounti, M., Giannoukas, S., Dimitriou, E., Nikolopoulou, S., Linardakis, E., & Philalithis, A. (2010). Prevalence of attention deficit hyperactivity disorder in schoolchildren in Athens, Greece. Association of ADHD subtypes with social and academic impairment. *Attention Deficit and Hyperactivity Disorders*, *2*(3), 127–132. https://doi.org/10.1007/S12402-010-0029-8

Slobodin, O., Cassuto, H., & Berger, I. (2015). Age-Related Changes in Distractibility. *Journal of Attention Disorders*, 108705471557506. https://doi.org/10.1177/1087054715575066

Slobodin, O., & Davidovitch, M. (2019). Gender Differences in Objective and Subjective Measures of ADHD Among Clinic-Referred Children. *Frontiers in Human Neuroscience*, *13*, 481391. https://doi.org/10.3389/FNHUM.2019.00441/TEXT

Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., Il Shin, J., Kirkbride, J. B., Jones, P., Kim, J. H., Kim, J. Y., Carvalho, A. F., Seeman, M. V., Correll, C. U., & Fusar-Poli, P. (2021). Age at onset of mental disorders worldwide: large-scale meta-analysis of 192 epidemiological studies. *Molecular Psychiatry*, *27*(1), 281. https://doi.org/10.1038/s41380-021-01161-7

Song, P., Zha, M., Yang, Q., Zhang, Y., Li, X., & Rudan, I. (2021). *The prevalence of adult attention-deficit hyperactivity disorder: A global systematic review and meta-analysis*. *11*, 4009. https://doi.org/10.7189/jogh.11.04009

Sonuga-Barke, E., Bitsakou, P., & Thompson, M. (2010). Beyond the Dual Pathway Model: Evidence for the Dissociation of Timing, Inhibitory, and Delay-Related Impairments in Attention-Deficit/Hyperactivity Disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, *49*(4), 345–355. https://doi.org/10.1016/j.jaac.2009.12.018

Sonuga-Barke, E. J. S. (2002). Psychological heterogeneity in AD/HD—a dual pathway model of behaviour and cognition. *Behavioural Brain Research*, *130*(1–2), 29–36. https://doi.org/10.1016/S0166-4328(01)00432-6

Sonuga-Barke, E. J. S. (2003). The dual pathway model of AD/HD: an elaboration of neuro-developmental characteristics. *Neuroscience & Biobehavioral Reviews*, *27*(7), 593–604. https://doi.org/10.1016/j.neubiorev.2003.08.005

Sonuga-Barke, E. J. S. (2005). Causal Models of Attention-Deficit/Hyperactivity Disorder: From Common Simple Deficits to Multiple Developmental Pathways. *Biological Psychiatry*, *57*(11), 1231–1238. https://doi.org/10.1016/j.biopsych.2004.09.008

Sonuga-Barke, E. J. S., Becker, S. P., Bölte, S., Castellanos, F. X., Franke, B., Newcorn, J. H., Nigg, J. T., Rohde, L. A., & Simonoff, E. (2023). Annual Research Review: Perspectives on progress in ADHD from characterization to cause. *Journal of Child Psychology and Psychiatry*, *64*(4), 506–532. https://doi.org/10.1111/jcpp.13696

Sonuga-Barke, E., & Thapar, A. (2021). The neurodiversity concept: is it helpful for clinicians and scientists? *The Lancet Psychiatry*, *8*(7), 559–561. https://doi.org/10.1016/S2215-0366(21)00167-X

Sonuga-Barke, E., Wiersema, J. R., van der Meere, J. J., & Roeyers, H. (2010). Context-dependent Dynamic Processes in Attention Deficit/Hyperactivity Disorder: Differentiating Common and Unique Effects of State Regulation Deficits and Delay Aversion. *Neuropsychology Review*, *20*(1), 86–102. https://doi.org/10.1007/s11065-009-9115-0

Sorge, G. B., Skilling, T. A., & Toplak, M. E. (2015). Intelligence, Executive Functions, and Decision Making as Predictors of Antisocial Behavior in an Adolescent Sample of Justice-Involved Youth and a Community Comparison Group. *Journal of Behavioral Decision Making*. https://doi.org/10.1002/bdm.1864

Steeger, C. M., Gondoli, D. M., Gibson, B. S., & Morrissey, R. A. (2016). Combined cognitive and parent training interventions for adolescents with ADHD and their mothers: A randomized controlled trial. *Child Neuropsychology*, *22*(4), 394–419. https://doi.org/10.1080/09297049.2014.994485

Stein, B. D., Klein, G. R., Greenhouse, J. B., & Kogan, J. N. (2012). Treatment of Attention-Deficit Hyperactivity Disorder: Patterns of Evolving Care During the First Treatment Episode. *Psychiatric Services*, *63*(2), 122–129. https://doi.org/10.1176/appi.ps.201000532

Steinberg, L., & Chein, J. M. (2015). Multiple accounts of adolescent impulsivity. *Proceedings of the National Academy of Sciences of the United States of America*, *112*(29), 8807–8808. https://doi.org/10.1073/PNAS.1509732112

Steingrimsdottir, H. S., & Arntzen, E. (2015). On the utility of within-participant research design when working with patients with neurocognitive disorders. *Clinical Interventions in Aging*, *10*, 1189. https://doi.org/10.2147/CIA.S81868

Stevens, A. E., Lefler, E. K., Serrano, J. W., & Hartung, C. M. (2024). Transitioning to college with ADHD: a qualitative examination of parental support and the renegotiation of the parent-child relationship. *Current Psychology*, *43*(4), 3134–3149. https://doi.org/10.1007/s12144-023-04525-0

Stevens, M. C., Gaynor, A., Bessette, K. L., & Pearlson, G. D. (2016). A preliminary study of the effects of working memory training on brain function. *Brain Imaging and Behavior*, *10*(2), 387–407. https://doi.org/10.1007/s11682-015-9416-2

Suleiman, I. B., Okunade, O. A., Dada, E. G., & Ezeanya, U. C. (2024). Key factors influencing students' academic performance. *Journal of Electrical Systems and Information Technology*, *11*(1), 1–18. https://doi.org/10.1186/S43067-024-00166-W

Sultan, R. S., Liu, S. M., Hacker, K. A., & Olfson, M. (2021). Adolescents With Attention-Deficit/Hyperactivity Disorder: Adverse Behaviors and Comorbidity. *Journal of Adolescent Health*, *68*(2), 284–291. https://doi.org/10.1016/J.JADOHEALTH.2020.09.036

Swanson, E. N., Owens, E. B., & Hinshaw, S. P. (2014). Pathways to self-harmful behaviors in young women with and without ADHD: A longitudinal examination of mediating factors. *Journal of Child Psychology and Psychiatry and Allied Disciplines*. https://doi.org/10.1111/jcpp.12193

Tal-Saban, M., Zaguri-Vittenberg, S., & Ivzori, Y. (2025). Enhancing Occupational Therapists' Intervention Capabilities With Adolescents With Neurodevelopmental Disorders. *Canadian Journal of Occupational Therapy. Revue Canadienne d'ergotherapie*, *92*(1). https://doi.org/10.1177/00084174241272010

Tam, L. Y. C., Taechameekietichai, Y., & Allen, J. L. (2024). Individual child factors affecting the diagnosis of attention deficit hyperactivity disorder (ADHD) in children and adolescents: a systematic review. *European Child & Adolescent Psychiatry 2024 34:5*, *34*(5), 1469–1496. https://doi.org/10.1007/S00787-024-02590-9

Taun, J., Costanza, E., Hamilton, D., Kharazmi, O. A., Larouche, P., Nevrencan, T., & Collins, K. (2026). Developing Evidence-Based Program Recommendations for Children and Youth Impacted by ADHD: A Systematic Review of the Literature. *Clinical and Translational Neuroscience 2026, Vol. 10, Page 11*, *10*(2), 11. https://doi.org/10.3390/CTN10020011

Taylor, E., Döpfner, M., Sergeant, J., Asherson, P., Banaschewski, T., Buitelaar, J., Coghill, D., Danckaerts, M., Rothenberger, A., Sonuga-Barke, E., Steinhausen, H. C., & Zuddas, A. (2004). European clinical guidelines for hyperkinetic disorder - First upgrade. *European Child and Adolescent Psychiatry, Supplement*, *13*(1). https://doi.org/10.1007/S00787-004-1002-X

Taylor, R. R. ., Bowyer, Patricia., & Fisher, Gail. (2024). *Kielhofner's Model of Human Occupation : theory and application* (6th ed.). Wolters Kluwer.

Taylor, S. J., Barker, L. A., Heavey, L., & McHale, S. (2015). The longitudinal development of social and executive functions in late adolescence and early adulthood. *Frontiers in Behavioral Neuroscience*, *9*. https://doi.org/10.3389/fnbeh.2015.00252

The Neurobiology of ADHD. (2020).

Theodoraki, T. E., McGeown, S. P., Rhodes, S. M., & MacPherson, S. E. (2020). Developmental changes in executive functions during adolescence: A study of inhibition, shifting, and working memory. *The British Journal of Developmental Psychology*, *38*(1), 74–89. https://doi.org/10.1111/BJDP.12307

Thompson, A., & Steinbeis, N. (2020). Sensitive periods in executive function development. *Current Opinion in Behavioral Sciences*, *36*, 98–105. https://doi.org/10.1016/j.cobeha.2020.08.001

Titz, C., & Karbach, J. (2014). Working memory and executive functions: effects of training on academic achievement. In *Psychological Research* (Vol. 78, Number 6, pp. 852–868). Springer Verlag. https://doi.org/10.1007/s00426-013-0537-1

Toharudin, U., Rahmat, A., & Kurniawan, I. S. (2019). *The important of self-efficacy and self-regulation in learning: How should a student be?* 22074. https://doi.org/10.1088/1742-6596/1157/2/022074

Toplak, M. E., Bucciarelli, S. M., Jain, U., & Tannock, R. (2008). Executive Functions: Performance-Based Measures and the Behavior Rating Inventory of Executive Function (BRIEF) in Adolescents with Attention Deficit/Hyperactivity Disorder (ADHD). *Child Neuropsychology*, *15*(1), 53–72. https://doi.org/10.1080/09297040802070929

Toplak, M. E., Connors, L., Shuster, J., Knezevic, B., & Parks, S. (2008). Review of cognitive, cognitive-behavioral, and neural-based interventions for Attention-Deficit/Hyperactivity Disorder (ADHD). *Clinical Psychology Review*, *28*(5), 801–823. https://doi.org/10.1016/j.cpr.2007.10.008

Centers for Disease Control and Prevention. (2024). *Treatment of ADHD*. CDC. https://www.cdc.gov/adhd/treatment/index.html

Tuckman, B. W. (1991). The Development and Concurrent Validity of the Procrastination Scale. *Http://Dx.Doi.Org/10.1177/0013164491512022*, *51*(2), 473–480. https://doi.org/10.1177/0013164491512022

Turgay, A., Goodman, D. W., Asherson, P., Lasser, R. A., Babcock, T. F., Pucci, M. L., & Barkley, R. (2012). Lifespan persistence of ADHD: The life transition model and its application. *Journal of Clinical Psychiatry*, *73*(2), 192–201. https://doi.org/10.4088/JCP.10M06628

Türk, S., Korfmacher, A. K., Gerger, H., van der Oord, S., & Christiansen, H. (2023). Interventions for ADHD in childhood and adolescence: A systematic umbrella review and meta-meta-analysis. *Clinical Psychology Review*, *102*, 102271. https://doi.org/10.1016/J.CPR.2023.102271

Turnes, V. H. S., & Piacentini, N. (2025). Introduction to Executive Functions. In *Neuropsychology and Substance Use Disorders* (pp. 271–282). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-82614-6_10

Urben, S., Barisnikov, K., & Van Der Linden, M. (2014). Inhibition of a prepotent response and response-strategy adjustments in the stop-signal paradigm: A

developmental study. *Annee Psychologique*, *114*(1), 61–75. https://doi.org/10.4074/S0003503314001031

van der Oord, S., Vanaken, G.-J., & French, B. (2026). *Can the neurodiversity approach apply to ADHD? Exploring the lived experience of ADHD as neurodivergence*. https://doi.org/10.31234/OSF.IO/UDTG2_V1

Van Dessel, J., Morsink, S., Van der Oord, S., Lemiere, J., Moerkerke, M., Grandelis, M., Sonuga-Barke, E., & Danckaerts, M. (2019). Waiting impulsivity: a distinctive feature of ADHD neuropsychology? *Child Neuropsychology*, *25*(1), 122–129. https://doi.org/10.1080/09297049.2018.1441819

van Lier, P. A. C., & Deater-Deckard, K. (2016). Children's Elementary School Social Experience and Executive Functions Development: Introduction to a Special Section. In *Journal of Abnormal Child Psychology* (Vol. 44, Number 1, pp. 1–6). https://doi.org/10.1007/s10802-015-0113-9

van Rooij, D., Hoekstra, P. J., Mennes, M., von Rhein, D., Thissen, A. J. A. M., Heslenfeld, D., Zwiers, M. P., Faraone, S. V., Oosterlaan, J., Franke, B., Rommelse, N., Buitelaar, J. K., & Hartman, C. A. (2015). Distinguishing Adolescents With ADHD From Their Unaffected Siblings and Healthy Comparison Subjects by Neural Activation Patterns During Response Inhibition. *The American Journal of Psychiatry*, *172*(7), 674–683. https://doi.org/10.1176/appi.ajp.2014.13121635

van Stralen, J. (2016). Emotional dysregulation in children with attention-deficit/hyperactivity disorder. *Attention Deficit and Hyperactivity Disorders*, *8*(4), 175. https://doi.org/10.1007/S12402-016-0199-0

Vanderburg, J. L., Pagán, A. F., & Pearson, D. A. (2024). Neurodiversity Framework: Model, Tenets, and Critiques. *The Palgrave Encyclopedia of Disability*, 1–6. https://doi.org/10.1007/978-3-031-40858-8_65-1

Veloso, A., Vicente, S. G., & Filipe, M. G. (2020). Effectiveness of Cognitive Training for School-Aged Children and Adolescents With Attention Deficit/Hyperactivity Disorder: A Systematic Review. *Frontiers in Psychology*, *10*, 500233. https://doi.org/10.3389/FPSYG.2019.02983/BIBTEX

Verreckt, E., Grimm, E., Agrigoroaei, S., de Saint Hubert, M., Philippot, P., Cremer, G., & Schoevaerdts, D. (2021). *Investigating the relationship between specific executive functions and functional decline among community-dwelling older adults: results from a prospective pilot study*. https://doi.org/10.1186/s12877-022-03559-6

Von Rueden, U., Gosch, A., Rajmil, L., Bisegger, C., & Ravens-Sieberer, U. (2006). Socioeconomic determinants of health related quality of life in childhood and adolescence: Results from a European study. *Journal of Epidemiology and Community Health*, *60*(2), 130–135. https://doi.org/10.1136/jech.2005.039792

Vos, M., J Rommelse, N. N., Franke, B., Oosterlaan, J., Heslenfeld, D. J., Hoekstra, P. J., Klein, M., Faraone, S. V, Buitelaar, J. K., Hartman, C. A., & Vos mvos, M. (2022). *Characterizing the heterogeneous course of inattention and hyperactivity-impulsivity from childhood to young adulthood*. *31*, 1243–1253. https://doi.org/10.1007/s00787-021-01764-z

Wang, Y., Ma, L., Wang, J., Ding, Y., Liu, N., Men, W., Tan, S., Gao, J. H., Qin, S., He, Y., Dong, Q., & Tao, S. (2024). The neural and genetic underpinnings of different developmental trajectories of Attention-Deficit/Hyperactivity Symptoms in children and adolescents. *BMC Medicine 2024 22:1*, *22*(1), 223-. https://doi.org/10.1186/s12916-024-03449-1

Wang, Y., Zhao, Y., Hu, L., & Zhang, X. (2025). The Multidimensional Dynamic Feedback Model: A Comprehensive Framework for Understanding and Managing Attention-Deficit/Hyperactivity Disorder. *Children 2025, Vol. 12, Page 303*, *12*(3), 303. https://doi.org/10.3390/CHILDREN12030303

Wanni Arachchige Dona, S., Badloe, N., Sciberras, E., Gold, L., Coghill, D., & Le, H. N. D. (2023). The Impact of Childhood Attention-Deficit/Hyperactivity Disorder (ADHD) on Children's Health-Related Quality of Life: A Systematic Review and Meta-Analysis. *Journal of Attention Disorders*, *27*(6), 598–611. https://doi.org/10.1177/10870547231155438

Watroba, A., Luttinen, J., Lappalainen, P., Tolonen, J., & Ruotsalainen, H. (2024). Effectiveness of School-Based Occupational Therapy Interventions on School Skills and Abilities Among Children with Attention Deficit Hyperactivity and

Autism Spectrum Disorders: Systematic Review. *Journal of Occupational Therapy, Schools, and Early Intervention*, *17*(3), 671–703. https://doi.org/10.1080/19411243.2023.2224793

Watson, S. M. R., Richels, C., Michalek, A. P., & Raymer, A. (2015). Psychosocial Treatments for ADHD: A Systematic Appraisal of the Evidence. *Journal of Attention Disorders*, *19*(1), 3–10. https://doi.org/10.1177/1087054712447857

Wehmeier, P. M., Schacht, A., & Barkley, R. A. (2010). Social and Emotional Impairment in Children and Adolescents with ADHD and the Impact on Quality of Life. *Journal of Adolescent Health*, *46*(3), 209–217. https://doi.org/10.1016/J.JADOHEALTH.2009.09.009

Weiner, B. (1985). An attributional theory of achievement, motivation and emotion. *Psychological Review*, *92*(4), 548–573. https://doi.org/10.1037/0033-295X.92.4.548

Weissenberger, S., Klicperova-Baker, M., Vňuková, M., Raboch, J., & Ptáček, R. (2019). ADHD and Time Perception: Findings and Treatments. *Activitas Nervosa Superior 2019 61:3*, *61*(3), 131–135. https://doi.org/10.1007/S41470-019-00027-2

Wennberg, B., Janeslätt, G., Gustafsson, P. A., & Kjellberg, A. (2021). Occupational performance goals and outcomes of time-related interventions for children with ADHD. *Scandinavian Journal of Occupational Therapy*, *28*(2), 158–170. https://doi.org/10.1080/11038128.2020.1820570

Wennberg, B., Kjellberg, A., Gustafsson, P. A., Almqvist, L., & Janeslätt, G. (2019). *Daily time management and autonomy in school-age children with ADHD, intellectual disabilities, and typically developing children show different patterns*. https://doi.org/10.21203/RS.2.11687/V2

Westwood, S. J., Parlatini, V., Rubia, K., Cortese, S., Sonuga-Barke, E. J. S., Banaschewski, T., Baeyens, D., Bölte, S., Brandeis, D., Buitelaar, J., Carucci, S., Coghill, D., Daley, D., Döpfner, M., Ferrin, M., Galera, C., Hollis, C., Holtmann, M., Purper-Ouakil, D., … Zuddas, A. (2023). Computerized cognitive training in attention-deficit/hyperactivity disorder (ADHD): a meta-analysis of randomized controlled trials with blinded and objective outcomes. *Molecular Psychiatry*, *28*(4), 1402–1414. https://doi.org/10.1038/s41380-023-02000-7

WFOT. (2012). *About Occupational Therapy | WFOT*. https://wfot.org/about/about-occupational-therapy

Whitner, J. (2025). From theory to application: Cognitive-energetical frameworks in educational and workplace settings. *Journal of Psychology and Cognition*, *10*(2). https://doi.org/10.35841/aajpc-10.2.290

Whitney, P., Jameson, T., & Hinson, J. M. (2004). Impulsiveness and executive control of working memory. *Personality and Individual Differences*, *37*(2), 417–428. https://doi.org/10.1016/j.paid.2003.09.013

WHO. (2016). World Health Organization mhGAP Intervention Guide for mental, neurological and substance use disorders in non-specialized health settings. *World Health Organization*, *2.0*, 1–173. https://www.who.int/publications/i/item/9789241549790

Wiener, J. (2023). *Social Relationships of Individuals with ADHD Across the Lifespan*. 517–546. https://doi.org/10.1007/978-3-031-41709-2_20/SAVE-RESEARCH

Wiener, J., & Daniels, L. (2016). School Experiences of Adolescents With Attention-Deficit/Hyperactivity Disorder. *Journal of Learning Disabilities*, *49*(6), 567–581. https://doi.org/10.1177/0022219415576973

Wilbertz, G., Trueg, A., Sonuga-Barke, E. J. S., Blechert, J., Philipsen, A., & van Elst, L. T. (2013). Neural and psychophysiological markers of delay aversion in attention-deficit hyperactivity disorder. *Journal of Abnormal Psychology*, *122*(2), 566–572. https://doi.org/10.1037/A0031924

Wilens, T. E., Stone, M., Lanni, S., Berger, A., Wilson, R. L. H., Lydston, M., & Surman, C. B. (2024). Treating Executive Function in Youth With Attention Deficit Hyperactivity Disorder: A Review of Pharmacological and Non-Pharmacological Interventions. *Journal of Attention Disorders*, *28*(5), 751–790. https://doi.org/10.1177/10870547231218925

Willcutt, E. G., Nigg, J. T., Pennington, B. F., Solanto, M. V., Rohde, L. A., Tannock, R., Loo, S. K., Carlson, C. L., McBurnett, K., & Lahey, B. B. (2012). Validity of DSM-IV attention deficit/hyperactivity disorder symptom dimensions and

subtypes. *Journal of Abnormal Psychology*, *121 4*(4), 991–1010. https://doi.org/10.1037/a0027347

Wixted, E. K., Sue, I. J., Dube, S. L., & Potter, A. S. (2016). *Cognitive Flexibility and Academic Performance in College Students with ADHD: An fMRI Study*. https://hdl.handle.net/20.500.14849/5023

Wong, S. R., & Fisher, G. (2015). Comparing and Using Occupation-Focused Models. *Occupational Therapy in Health Care*, *29*(3), 297–315. https://doi.org/10.3109/07380577.2015.1010130

World Federation of Occupational Therapists. (2021). *Guidelines for the use of evidence in occupational therapy*. https://wfot.org/resources/guiding-principles-for-the-use-of-evidence-in-occupational-therapy

World Health Organisation. (n.d.). *Adolescent health.WHO.int*. Https://Www.Who.Int/Health-Topics/Adolescent-Health#tab=tab_1. Retrieved June 8, 2025, from https://www.who.int/health-topics/adolescent-health#tab=tab_1

World Health Organisation. (2019). *International Classification of Diseases for Mortality and Morbidity Statistics (ICD-11)*. https://icd.who.int/browse11/l-m/en.

World Health Organization. (2007). *International classification of functioning, disability and health—Children and youth version*. World Health Organization, Geneva.

Yang, H. N., Tai, Y. M., Yang, L. K., & Gau, S. S. F. (2013). Prediction of childhood ADHD symptoms to quality of life in young adults: Adult ADHD and anxiety/depression as mediators. *Research in Developmental Disabilities*, *34*(10), 3168–3181. https://doi.org/10.1016/j.ridd.2013.06.011

Yu, J. J., Salihovic, S., Zhao, X., & Glatz, T. (2024). The Association between ADHD Symptoms and Antisocial Behavior: Differential Effects of Maternal and Paternal Parenting Behaviors. *Youth 2024, Vol. 4, Pages 1405-1416*, *4*(4), 1405–1416. https://doi.org/10.3390/YOUTH4040089

Zendarski, N., Sciberras, E., Mensah, F., & Hiscock, H. (2016). *A longitudinal study of risk and protective factors associated with successful transition to secondary school in youth with ADHD: prospective cohort study protocol*. https://doi.org/10.1186/s12887-016-0555-4

Zetterqvist, V., Öster, C., Oremark, A., Myllys, L., Meyer, J., Ramklint, M., & Isaksson, J. (2025). I've really struggled but it does not seem to work: adolescents' experiences of living with ADHD - a thematic analysis. *BMC Psychology*, *13*(1), 75. https://doi.org/10.1186/s40359-025-02350-7

Zhao, Y., Zheng, Z., Pan, C., & Zhou, L. (2021). Self-esteem and academic engagement among adolescents: a moderated mediation model. *Frontiers in Psychology*, *12*, 690828. https://doi.org/10.3389/FPSYG.2021.690828/BIBTEX

Zolan, C. J. (2026). Within-Subjects Design: Understanding Individual Responses. *Best Practice for Experimental Methods in Architecture*, 39–48. https://doi.org/10.1007/978-3-032-15884-0_5

APPENDIX I

ΚΥΠΡΙΑΚΗ ΔΗΜΟΚΡΑΤΙΑ

ΕΘΝΙΚΗ ΕΠΙΤΡΟΠΗ ΒΙΟΗΘΙΚΗΣ ΚΥΠΡΟΥ

Αρ. Φακ.: ΕΕΒΚ/ΕΠ /2021/10
Αρ. Τηλ.: 22809038 / 22809039
Αρ. Φαξ: 22353878

11 Ιουνίου, 2021

Δρ Έλενα Θεοδώρου
Επίκουρη Καθηγήτρια
Τμήμα Επιστημών Αποκατάστασης
Τεχνολογικό Πανεπιστήμιο Κύπρου
Αρχ. Κυπριανού 30
3036 Λεμεσός

Αγαπητή Δρ Θεοδώρου,

Ερευνητική πρόταση με τίτλο:
«Development of a comprehensive Intervention Protocol for the Training of Executive Functions for Adolescents with ADHD Diagnosis»

Επιθυμώ ν΄ αναφερθώ στο πιο πάνω θέμα και να σας πληροφορήσω ότι η Επιτροπή Βιοηθικής Αξιολόγησης Βιοϊατρικής Έρευνας ενεργώντας με βάση την εκχωρηθείσα σ΄ αυτήν αρμοδιότητα από την Εθνική Επιτροπή Βιοηθικής Κύπρου, να αξιολογεί βιοηθικά ερευνητικές προτάσεις που αφορούν την βιοϊατρική έρευνα στον άνθρωπο, έχει πραγματοποιήσει την βιοηθική αξιολόγηση της πιο πάνω ερευνητικής σας πρότασης, η οποία σας αποστέλλεται συνημμένα.

Με εκτίμηση,

Δρ Ιουλία Παπαγέωργη
Πρόεδρος
Επιτροπής Βιοηθικής Αξιολόγησης
Βιοϊατρικής Έρευνας

ΕΕΒΚ ΕΠ 2021/10

ΕΜΠΙΣΤΕΥΤΙΚΟ

ΑΠΟΦΑΣΗ
ΕΠΙΤΡΟΠΗΣ ΒΙΟΗΘΙΚΗΣ ΑΞΙΟΛΟΓΗΣΗΣ
ΓΙΑ
ΕΓΚΡΙΣΗ Ή ΑΠΟΡΡΙΨΗ
ΠΡΟΓΡΑΜΜΑΤΟΣ

Η απόφαση της Επιτροπής Βιοηθικής Αξιολόγησης (ΕΒΑ) θα πρέπει να κοινοποιηθεί προς την Εθνική Επιτροπή Βιοηθικής Κύπρου μαζί με όλα τα υπόλοιπα έντυπα που αφορούν το πρόγραμμα για το οποίο λήφθηκε σχετική απόφαση.

Συμπληρώνεται από την Επιτροπή Βιοηθικής Αξιολόγησης

Τίτλος Προγράμματος για το οποίο γίνεται η αίτηση
Development of a comprehensive Intervention Protocol for the Training of Executive Functions for Adolescents with ADHD Diagnosis.
Επιστημονικός Υπεύθυνος του Προγράμματος
Δρ Έλενα Θεοδώρου

Όνομα Επιτροπής Βιοηθικής Αξιολόγησης	
Επιτροπή Βιοηθικής Αξιολόγησης Βιοϊατρικής Έρευνας	
Μέλη της Επιτροπής Βιοηθικής Αξιολόγησης	
Όνομα	Επίθετο
Ανδρέας	Τίφας
Ανδρέας	Χατζηττοφής
Γεώργιος	Σταύρου
Έλενα	Κάζη
Ελισάβετ	Παπαγεωργίου
Ιουλία	Παπαγεώργη
Ιωσηφίνα	Αντωνίου
Σταυρούλλα	Ξενοφώντος
Χριστίνα	Θεράποντος

Σχόλια από την Επιτροπή Βιοηθικής Αξιολόγησης με βάση τα οποία λήφθηκε η απόφαση για την αίτηση που υποβλήθηκε
Η Επιτροπή κατά τη σημερινή συνεδρίασή της ημερομηνίας 11/06/2021, πραγματοποίησε τη βιοηθική αξιολόγηση των πρόσθετων ή/και αναθεωρημένων εγγράφων που κατατέθηκαν στις 04/06/2021, σε συνέχεια απόφασης της Επιτροπής ημερομηνίας 14/05/2021. **Τα σχόλια της Επιτροπής κατά τη σημερινή συνεδρίαση παρουσιάζονται με έντονα μαύρα γράμματα.** **Σχόλια για το έντυπο EEBK 02:** 1. Στη σελ. 3/21 στο πεδίο "*Give details of how to recruit individuals* " Η Επιτροπή παρακαλεί να ενημερωθεί συγκεκριμένα για όλους τους φορείς που έχουν συγκατατεθεί να βοηθήσουν στην εύρεση συμμετεχόντων στην Έρευνα (Παιδίατρους, οργανισμούς κ.α). Είναι παράκληση της Επιτροπής όπως δοθούν περισσότερες πληροφορίες σχετικά με τον τρόπο που θα αποκτήσει πρόσβαση η ερευνητική ομάδα στα προσωπικά στοιχεία του κοινού. *Σχόλιο 14/05/2021: Απαντήθηκε. Η Επιτροπή θα αναμένει ενημέρωση για τους φορείς (δημόσιοι και ιδιωτικοί) που θα συμβάλουν στην στρατολόγηση συμμετεχόντων*

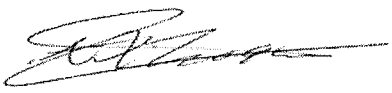
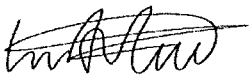
όταν αυτοί καθοριστούν και πριν την έναρξη της μελέτης. **Απαντήθηκε**

2. Η Επιτροπή διαπιστώνει μέσα από ερωτήματα που τίθενται στα ερευνητικά εργαλεία (Appendix I και Appendix II) ότι ο/η συμμετέχων/ούσα θα δηλώσει κατά πόσον βιώνει βία ή άλλη επιβλαβή συμπεριφορά. Είναι θερμή παράκληση όπως η ερευνητική ομάδα ενημερώσει την Επιτροπή για τον τρόπο με τον οποίο θα χειριστεί περιπτώσεις όπου θα δοθούν θετικές απαντήσεις σε τέτοια ερωτήματα και κατά πόσον θα γίνει παραπομπή σε αρμόδιες υπηρεσίες για τις δέουσες ενέργειες. *Σχόλιο 14/05/2021: Απαντήθηκε. Η Επιτροπή παρακαλεί όπως συμπεριληφθεί η σχετική πληροφόρηση στο Έντυπο Συγκατάθεσης EEBK 03.* **Απαντήθηκε**

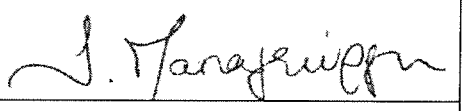
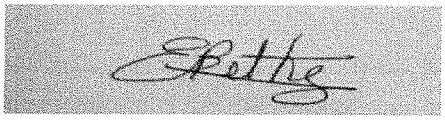
Συμπληρώνεται από την Επιτροπή Βιοηθικής Αξιολόγησης

Στοιχεία	ΝΑΙ	ΟΧΙ
Βιογραφικά Στοιχεία ΟΛΩΝ των ερευνητών και των συνεργατών τους		√
Δήλωση μη συγκρουόμενων συμφερόντων	√	
Περιγραφή του είδους του Προγράμματος	√	
Περιγραφή του πληθυσμού που θα μελετηθεί	√	
Ο τρόπος με τον οποίο θα στρατολογηθούν άτομα για το Πρόγραμμα	√	
Μελετήθηκαν προσεκτικά τα έντυπα συγκατάθεσης (ΕΕΒΚ03);	√	
Τα έντυπα που θα χρησιμοποιηθούν για την στρατολόγηση ατόμων	√	
Ολόκληρο το πρωτόκολλο του Προγράμματος	√	
Δικαιολόγηση για την χρήση εικονικής φαρμακευτικής αγωγής		√
Υπεύθυνη δήλωση από όλους τους ερευνητές και συνεργάτες τους ότι τα έντυπα πληροφόρησης και συναίνεσης τους δεσμεύουν	√	
Διασφάλιση της προστασίας των δεδομένων που αφορούν τα άτομα που θα λάβουν μέρος στο Πρόγραμμα	√	
Λεπτομέρειες για την χρηματοδότηση του Προγράμματος	√	
Έχουν εκδοθεί ειδικά συμβόλαια σε σχέση με αμοιβές ;		√
Θα δίδονται αμοιβές στα άτομα που θα συμμετάσχουν στο Πρόγραμμα ;		√
Θα υπάρξουν οποιεσδήποτε οικονομικές επιβαρύνσεις για τα άτομα που θα συμμετάσχουν στο Πρόγραμμα ;		√
Οι ερευνητές ή/και συνεργάτες τους θα παίρνουν αμοιβές ;		√
Έχουν περιγραφεί τα αναμενόμενα οφέλη του Προγράμματος ;	√	
Έχει διαφανεί ότι προκύπτουν οποιαδήποτε οφέλη προς τον χρηματοδότη, τους ερευνητές και τους συνεργάτες τους από το Πρόγραμμα ;	√	
Εάν πιο πάνω είναι ΝΑΙ, να εξηγηθεί: Δημοσιεύσεις	√	
Έχουν τεκμηριωθεί όλες οι διευθετήσεις που έγιναν σε σχέση με τις υπηρεσίες που τυχόν θα παρασχεθούν για το Πρόγραμμα ;	√	
Θα υπάρχει συνεχής ενημέρωση για την ασφάλεια των ατόμων που θα λαμβάνουν μέρος στο Πρόγραμμα ;	√	
Υπάρχουν διαδικασίες για την υποβολή παραπόνων/καταγγελιών;	√	
Διασφαλίζονται επαρκώς τα δικαιώματα των ερευνητών για τις δημοσιεύσεις των αποτελεσμάτων ;	√	
Έχει δεσμευθεί ο/η Επιστημονικός Υπεύθυνος ότι δεν θα γίνουν οποιεσδήποτε αλλαγές στο Πρόγραμμα από την ημέρα που θα εγκριθεί από την Επιτροπή Βιοηθικής ;	√	

***Αποτελεί ευθύνη της Επιτροπής Βιοηθικής Αξιολόγησης να σταθμίσει όλα τα στοιχεία που έχουν δοθεί, να δώσει την απαραίτητη βαρύτητα εκεί που χρειάζεται και να λάβει απόφαση ως προς το κατά πόσον έχουν δοθεί ικανοποιητικές επεξηγήσεις σε σχέση με το προτεινόμενο Πρόγραμμα.**

Δήλωση για «μη συγκρουόμενα συμφέροντα» από την Επιτροπή Βιοηθικής Αξιολόγησης		
Εμείς τα μέλη της Επιτροπής Βιοηθικής Αξιολόγησης που λάβαμε μέρος στις συνεδρίες σε σχέση με την παρούσα αίτηση, υπογράφοντας πιο κάτω δηλώνουμε υπεύθυνα ότι δεν έχουμε οποιαδήποτε άμεσα ή έμμεσα συγκρουόμενα συμφέροντα σε σχέση με το Πρόγραμμα που μελετήσαμε και εκδώσαμε σχετική απόφαση.		
Ονοματεπώνυμο	Υπογραφή	Ημερομηνία
Δρ Ανδρέας Τίφας	ΑΠΩΝ	11/06/2021
Δρ Ανδρέας Χατζηττοφής		11/06/2021
κ. Γεώργιος Σταύρου		11/06/2021
κα. Έλενα Κάζη		11/06/2021
Δρ Ελισάβετ Παπαγεωργίου		11/06/2021
Δρ Ιουλία Παπαγεώργη		11/06/2021
Δρ Ιωσηφίνα Αντωνίου		11/06/2021
Δρ Σταυρούλα Ξενοφώντος		11/06/2021
Δρ Χριστίνα Θεράποντος		11/06/2021

Τίτλος Προγράμματος
Development of a comprehensive Intervention Protocol for the Training of Executive Functions for Adolescents with ADHD Diagnosis.
Αριθμός Πρωτοκόλλου Εθνικής Επιτροπής Βιοηθικής Κύπρου
ΕΕΒΚ ΕΠ 2021/10
Απόφαση της Επιτροπής Βιοηθικής Αξιολόγησης (Εγκρίνεται ή Ζητούνται επιπρόσθετα στοιχεία ή Απορρίπτεται)
Εγκρίνεται 1. Νοείται ότι την νομική ευθύνη της επιστημονικής εγκυρότητας, αναγκαιότητας, πληρότητας και της συνολικής επιστημονικής αξίας της προτεινομένης έρευνας έχουν οι επιστημονικοί υπεύθυνοι της έρευνας και ο Φορέας του επιστημονικού υπεύθυνου. Όλοι οι πιο πάνω έχουν επίσης την νομική ευθύνη της διεξαγωγής της έρευνας με τη δέουσα επιστημονική επιμέλεια και φροντίδα. 2.Από 01/08/2012 η Εθνική Επιτροπή Βιοηθικής Κύπρου διενεργεί δειγματοληπτικό έλεγχο σε ερευνητικές προτάσεις που λαμβάνουν έγκριση. Περισσότερες λεπτομέρειες είναι διαθέσιμες στην ιστοσελίδα της Επιτροπής σε σχετική ανακοίνωση. 3.Το παρόν έντυπο απόφασης κοινοποιείται και στον χρηματοδότη της ερευνητικής πρότασης. 4. Οι ερευνητές υποχρεούνται να υποβάλλουν προς την Επιτροπή ανά εξάμηνο από σήμερα έκθεση για την εξέλιξη της έρευνας μέσω του εντύπου ΕΕΒΚ05. 5. Με το πέρας της έρευνας, οι ερευνητές υποχρεούνται όπως υποβάλουν στην Επιτροπή αναφορά μέσω του Εντύπου ΕΕΒΚ06. 6. Τονίζεται στους ερευνητές η υποχρέωσή τους να τηρούν τις εκάστοτε υποχρεώσεις τους με βάση την κείμενη νομοθεσία και κανονισμούς και ιδιαιτέρως η υποχρέωσή τους να ενημερώνουν άμεσα την Επιτροπή για οποιοδήποτε έκτακτο συμβάν ή οποιαδήποτε τροποποίηση στην πρόταση ως εγκρίθηκε, με την υποβολή των προνοουμένων εντύπων.
Μέλη που ήταν παρόντα στη λήψη απόφασης/Αποτέλεσμα Ψηφοφορίας
Ως αναφέρεται στη σελίδα 5 ανωτέρω και η απόφαση ήταν ομόφωνη
Ημερομηνία έκδοσης απόφασης ΕΒΑ: Ημερομηνία:……11…... Μήνας:……Ιουνίου…... Έτος:……2021…..…
Υπογράφει ο Πρόεδρος και ο Αντιπρόεδρος της Επιτροπής Βιοηθικής Αξιολόγησης

Αξίωμα	Όνομα	Επίθετο	Υπογραφή
Πρόεδρος	Ιουλία	Παπαγεώργη	
Αντιπρόεδρος	Ελισάβετ	Παπαγεωργίου	

APPENDIX 2

ΚΥΠΡΙΑΚΗ ΔΗΜΟΚΡΑΤΙΑ

ΥΠΟΥΡΓΕΙΟ
ΠΑΙΔΕΙΑΣ, ΠΟΛΙΤΙΣΜΟΥ
ΑΘΛΗΤΙΣΜΟΥ ΚΑΙ ΝΕΟΛΑΙΑΣ

ΔΙΕΥΘΥΝΣΗ
ΜΕΣΗΣ ΓΕΝΙΚΗΣ ΕΚΠΑΙΔΕΥΣΗΣ

Αρ. Φακ.: 7.15.01.25.8.2/6
Αρ. Τηλ.: 22800664
Αρ. Φαξ: 22428268
E-mail: circularsec@schools.ac.cy

11 Αυγούστου 2021

Κυρία
Ελισάβετ Παύλου Παπαγιάννη
Γεσθημανής 9
4108 Λεμεσός

Θέμα: Παραχώρηση άδειας για διεξαγωγή έρευνας

Αναφορικά με τη σχετική με το πιο πάνω θέμα αίτησή σας στο Κέντρο Εκπαιδευτικής Έρευνας και Αξιολόγησης, με ημερομηνία υποβολής 21/7/2021, πληροφορείστε ότι το αίτημά σας για διεξαγωγή έρευνας σε σχολεία Μέσης Γενικής Εκπαίδευσης, με θέμα *«Πιλοτική εφαρμογή καινοτόμου πρωτοκόλλου παρέμβασης για την ανάπτυξη και εκπαίδευση γνωστικών λειτουργιών για έφηβους μαθητές με Διαταραχή Ελλειμματικής Προσοχής με ή χωρίς Υπερκινητικότητα»*, στο πλαίσιο έρευνας για την απόκτηση διδακτορικού τίτλου σπουδών στο Τεχνολογικό Πανεπιστήμιο Κύπρου εγκρίνεται για το σχολικό έτος 2021 - 2022. Νοείται ότι θα λάβετε υπόψη τις εισηγήσεις του Κέντρου Εκπαιδευτικής Έρευνας και Αξιολόγησης οι οποίες επισυνάπτονται και ότι θα τηρήσετε τις ακόλουθες προϋποθέσεις:

1. θα εξασφαλίσετε τη συγκατάθεση των Διευθυντών/-ριών των σχολείων, τα οποία θα συμμετάσχουν στην έρευνα,
2. η συμμετοχή των μαθητών/-ριών και των γονέων/ κηδεμόνων τους θα είναι προαιρετική,
3. θα εξασφαλίσετε τη συγκατάθεση των συμμετεχόντων/συμμετεχουσών στην έρευνα,
4. δεν θα επηρεασθεί ο διδακτικός χρόνος και η ομαλή λειτουργία του σχολείου για τη διεξαγωγή της έρευνας,
5. θα χειριστείτε τα στοιχεία των εμπλεκομένων με τέτοιο τρόπο, ώστε να διασφαλιστεί πλήρως η ανωνυμία τους,
6. για τη χρήση μαγνητοφώνου ή οποιασδήποτε άλλης μεθόδου για τυχόν καταγραφή ήχου ή εικόνας, θα πρέπει να πάρετε άδεια γραπτώς από τους εμπλεκόμενους, οι οποίοι θα συμμετάσχουν, και τέλος
7. τα αποτελέσματα της έρευνας θα κοινοποιηθούν στο Υπουργείο Παιδείας, Πολιτισμού, Αθλητισμού και Νεολαίας και στα σχολεία που θα σας παραχωρήσουν διευκολύνσεις για τη διεξαγωγή της.

Ευχόμαστε καλή επιτυχία στους ερευνητικούς σας σκοπούς.

Δρ Κυπριανός Δ. Λούης
Διευθυντής
Μέσης Γενικής Εκπαίδευσης

ΒΚ

Τεχνολογικό Πανεπιστήμιο Κύπρου

ΚΩΔ:…….

Συνέντευξη Μαθητή

Ημερομηνία Συμπλήρωσης	

Α. Στοιχεία Μαθητή/Μαθήτριας

ΟΝΟΜΑΤΕΠΩΝΥΜΟ:	
ΗΛΕΚΤΡΟΝΙΚΗ ΔΙΕΥΘΥΝΣΗ:	
ΤΗΛ. ΕΠΙΚΟΙΝΩΝΙΑΣ (προαιρετικά)	

Β. ΠΛΗΡΟΦΟΡΙΕΣ ΓΙΑ ΤΟΝ/ΤΗΝ ΜΑΘΗΤΗ/ΜΑΘΗΤΡΙΑ

ΗΜΕΡΟΜΗΝΙΑ ΓΕΝΝΗΣΗΣ	
Β2 ΦΥΛΟ	1. ΑΓΟΡΙ 2. ΚΟΡΙΤΣΙ 3. ΑΛΛΗ ΑΠΑΝΤΗΣΗ
Β3 ΕΠΑΡΧΙΑ ΔΙΑΜΟΝΗΣ	1. ΛΕΜΕΣΟΣ 2. ΛΕΥΚΩΣΙΑ 3. ΛΑΡΝΑΚΑ 4. ΠΑΦΟΣ 5. ΑΜΜΟΧΩΣΤΟΣ
Β4 Πώς είναι συνήθως η κατάσταση στο σπίτι;	1. ΗΡΕΜΗ 2. ΜΕ ΕΝΤΑΣΕΙΣ 3. ΥΠΑΡΞΗ ΒΙΑΣ 4. ΔΥΣΚΟΛΗ ΛΟΓΩ ΟΙΚΟΝΟΜΙΚΩΝ 5. ΔΥΣΚΟΛΗ ΛΟΓΩ ΥΠΑΡΞΗΣ ΠΡΟΒΛΗΜΑΤΩΝ ΥΓΕΙΑΣ
Β5 Με ποιούς μένεις;	

Γ. ΙΣΤΟΡΙΚΟ

Γ1. Θα μπορούσεες να θυμηθείς και να περιγράψεις τον εαυτό σου ως μικρό/μικρή μαθητή/μαθήτρια;
Γ2. Αντιμετωπίζεις τώρα, κάποιες δυσκολίες; Ποιές είναι αυτές;
1. …… 2. …….. 3. ……

Ε. ΙΣΤΟΡΙΚΟ ΘΕΡΑΠΕΙΩΝ

Παίρνεις κάποια φάρμακα αυτό το διάστημα, για τη ΔΕΠΥ;

1. ΟΧΙ
2. ΝΑΙ

Ε2. ΑΝ ΝΑΙ,

Ε2.1 ΠΩΣ ΒΟΗΘΑ: ……

Ε2.2 ΠΩΣ ΑΙΣΘΆΝΕΣΑΙ ΓΙΑ ΤΟ ΓΕΓΟΝΌΣ ΟΤΙ ΠΑΊΡΝΕΙΣ ΦΑΡΜΑΚΑ;

1. Θετικά, νομίζω ότι είναι κάτι καλό
2. Αρνητικά, νομίζω ότι δεν μου ταιριάζει να παίρνω φάρμακα
3. Δεν είναι ούτε θετικό ούτε αρνητικό

Ε3. Αν όχι τώρα, έχεις λάβει στο παρελθόν κάποια φαρμακευτική αγωγή για ΔΕΠ-Υ;

1. ΟΧΙ
2. ΝΑΙ

Ε4. Αν ΝΑΙ,

Ε4.4 Γιατί σταμάτησε: ……

Ε4.5 Πώς βοήθησε: ……

Ε5. Λαμβάνεις τώρα άλλες θεραπείες;

1. ΟΧΙ
2. ΝΑΙ

Ε5.1 Αν ΝΑΙ, ποιές;

Ε5. 2 Νομίζεις ότι σε βοηθούν;

1. ΟΧΙ
2. ΝΑΙ

Ε7. Υπάρχει τώρα ή υπήρξε στο παρελθόν κάποιο άλλο πρόβλημα το οποίο θεωρείς ότι θα ήθελες να αναφέρεις;

1. ΟΧΙ
2. ΝΑΙ

Ε8. Εάν ΝΑΙ,

Ε8.1 ΠΕΡΙΓΡΑΨΤΕ ΤΟ ΠΡΟΒΛΗΜΑ:…….

Ε8.2 ΠΩΣ ΝΟΜΙΖΕΤΕ ΟΤΙ ΕΠΗΡΕΑΖΕΙ Ή ΕΠΗΡΕΑΖΕΤΑΙ ΑΠΟ ΤΗ ΔΕΠ-Υ:……

……

……..

Ε11. Λαμβάνεις αυτό το διάστημα φάρμακα για οποιοδήποτε άλλο λόγο; (αλλεργίες, βήχα, λοιμώξεις, ψυχο-συναισθηματικές δυσκολίες)

1. ΟΧΙ
2. ΝΑΙ

Ε11.1 Αν ναι, διευκρινήστε:……

ΣΤ. ΑΚΑΔΗΜΑΪΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ

Ζ1. Σχολείο:	1. ΓΥΜΝΑΣΙΟ 2. ΛΥΚΕΙΟ 3. ΤΕΧΝΙΚΗ ΣΧΟΛΗ ΤΑΞΗ:……
Ζ2. Επιδόσεις:	1. ΣΥΝΗΘΩΣ ΚΑΤΩ ΑΠΟ ΤΗ ΒΑΣΗ 2. ΒΑΣΗ Ή ΛΙΓΟ ΨΗΛΟΤΕΡΑ (ΜΕΧΡΙ 12) 3. ΜΕΣΕΣ ΧΑΜΗΛΕΣ (13-15) 4. ΜΕΣΕΣ (15-17) 5. ΥΨΗΛΕΣ (18+)

Ζ5. Σε σχέση με άλλες χρονιές οι επιδόσεις σου

1. ΕΧΟΥΝ ΒΕΛΤΙΩΘΕΙ
2. ΕΧΟΥΝ ΠΕΣΕΙ
3. ΠΑΡΑΜΕΝΟΥΝ ΣΤΑΘΕΡΕΣ

Ζ5.1 Σε σχέση με άλλες χρονιές, οι προσπάθειες σου

1. ΈΧΟΥΝ ΑΥΞΗΘΕΙ
2. ΕΧΟΥΝ ΜΕΙΩΘΕΙ
3. ΕΙΝΑΙ ΙΔΙΕΣ

Ζ5.2 Οι βαθμοί και οι επιδόσεις μου

1. Δεν με ενδιαφέρουν
2. Με ενδιαφέρουν ελάχιστα
3. Με ενδιαφέρουν πολύ
4. Είναι πάρα πολύ σημαντικά για μένα

Ζ7. Πώς αισθάνεσαι για το σχολείο;

1. Είμαι θετικός/η
2. Είμαι αρνητικός/η
3. Μου είναι αδιάφορο
4. Μου προκαλεί άγχος ή ανησυχία
5. Μου προκαλεί θυμό ή εκνευρισμό
6. Άλλο:
7. Άλλο:

Ζ8. Ποια είναι τα κυριότερα ή συχνότερα προβλήματα που αντιμετωπίζεις στο σχολείο;

Ζ9. Θα μπορούσες να περιγράψεις τον εαυτό σου ως επιμελή μαθητή / μαθήτρια;

1. ΟΧΙ
2. ΝΑΙ

Z10 Έχεις ιδιαίτερα ταλέντα ή ικανότητες;

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ, περιγράψτε:……

Z11 Υπάρχει κάποιο μάθημα στο οποίο ξεχωρίζεις για τις επιδόσεις σου ή που θεωρείς ότι είναι «το δυνατό» σου μάθημα;

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ, ποιο; …….

Z12 Χρειάζεσαι βοήθεια στο διάβασμα;

1. ΟΧΙ
2. ΝΑΙ

Z13 Χρειάζεται οι γονείς / κηδεμόνες, να ελέγχουν την ποιότητα των εργασιών που ετοιμάζεις;

1. ΟΧΙ
2. ΝΑΙ

Z14 Χρειάζεται οι γονείς / κηδεμόνες να σε υπενθυμίζουν τη ότι είναι ώρα να ξεκινήσεις το διάβασμα;

1. ΟΧΙ
2. ΝΑΙ

Z16 Έχεις γίνει ποτέ θύμα εκφοβισμού ή ανεπιθύμητων αστείων / πειραγμάτων;

1. ΟΧΙ
2. ΝΑΙ

Z16.1 Αν ΝΑΙ, διευκρινίστε: ……

Z17 Έτυχε ποτέ να έχουν οι άλλοι παράπονα με τη δική σου συμπεριφορά απέναντί τους;

1. ΟΧΙ
2. ΝΑΙ

Z17.1 Αν ΝΑΙ, διευκρινίστε: ……..

Z18 Έχεις αποβληθεί ή σου έχει μειωθεί η διαγωγή στο σχολείο;

1. ΟΧΙ
2. ΝΑΙ

Η. ΚΑΘΗΜΕΡΙΝΗ ΦΡΟΝΤΙΔΑ ΕΑΥΤΟΥ

	Η1. Χρειάζεσαι, οποιουδήποτε είδους βοήθεια (επίβλεψη, καθοδήγηση, υπενθύμιση) στις καθημερινές ρουτίνες φροντίδας εαυτού; (π.χ. καθαριότητα και υγιεινή, σίτιση, επιλογή ρούχων κτλ) 1. ΟΧΙ 2. ΝΑΙ Αν ΝΑΙ, εξηγήστε:…….
	Η2. Μπορείς να ξυπνήσεις και να ετοιμαστείς έγκαιρα από μόνη σου / μόνος σου, το πρωί για το σχολείο; 1. ΟΧΙ 2. ΝΑΙ
	Η4. Χρησιμοποιείς την τεχνολογία με ευχέρεια; (για σκοπούς άλλους εκτός παιχνιδιού π.χ. για αναζήτηση πληροφοριών) 1. ΟΧΙ 2. ΝΑΙ
	Η5. Κοιμάσαι τουλάχιστον 6 ώρες κάθε βράδυ; 1. ΟΧΙ 2. ΝΑΙ Η6. Έχεις δυσκολίες με τον ύπνο; 1. ΟΧΙ 2. ΝΑΙ Αν ΝΑΙ, διευκρινίστε: ……..
	Η6. Έχεις δυσκολίες με τη διατροφή; 1. ΟΧΙ 2. ΝΑΙ Αν ΝΑΙ, διευκρινίστε: ……
	Ε8. Τηρείς ένα ισορροπημένο καθημερινό πρόγραμμα το οποίο να περιλαμβάνει τις υποχρεώσεις σου, ώρες ξεκούρασης, αυτοφροντίδας και κοινωνικής αλληλεπίδρασης; 1. ΟΧΙ 2. ΝΑΙ
	Ε9. Είσαι σε θέση να φροντίσεις τον εαυτό σου, αν μείνεις πολλές ώρες μόνη / μόνος στο σπίτι; 1. ΟΧΙ 2. ΝΑΙ

Ε10. Διατηρείς τον προσωπικό σου χώρο καθαρό και τακτοποιημένο χωρίς τη βοήθεια γονιού, κηδεμόνα ή οικιακής βοηθού; 1. ΟΧΙ 2. ΝΑΙ

Θ. ΨΥΧΟ-ΣΥΝΑΙΣΘΗΜΑΤΙΚΗ ΚΑΤΑΣΤΑΣΗ

Θ1. Εκνευρίζεσαι ή αναστατώνεσαι συχνά ή εύκολα; 1. ΟΧΙ 2. ΝΑΙ
Θ2. Πώς θα χαρακτήριζες τη διάθεση σου συνήθως; ……
Θ3. Αισθάνεσαι ότι μπορείς να μιλήσεις για τα συναισθήματα σου σε κάποιον από τους γονείς ή κηδεμόνες σου; 1. ΟΧΙ 2. ΝΑΙ
Θ4. Μιλάς με τους γονείς / κηδεμόνες σου για τα καθημερινά γεγονότα; 1. ΟΧΙ 2. ΝΑΙ
Θ5. Πόσο συχνά έρχεστε σε αντιπαράθεση ή καβγαδίζετε με τους γονείς σου; 1. Σχεδόν ποτέ (δεν τσακωνόμαστε κάθε εβδομάδα) 2. Σπάνια (1-2 φορές την εβδομάδα) 3. Συχνά (3 ή περισσότερες φορές την εβδομάδα, αλλά όχι καθημερινά) 4. Καθημερινά 5. Πολλές φορές την ημέρα
Θ6. Ξεσπάς με έντονο τρόπο, με κλάματα ή φωνές ή / και βία; 1. ΟΧΙ 2. ΝΑΙ Αν ΝΑΙ, περιγράψτε:…….
Θ9 Ζητάς συχνά βοήθεια ή καθοδήγηση ή επίβλεψη από τους γονείς σου ακόμα και αν αυτά που κάνεις θεωρούνται απλά / εύκολα; 1. ΟΧΙ 2. ΝΑΙ
Θ10. Αναλαμβάνεις πρωτοβουλίες; 1. ΟΧΙ 2. ΝΑΙ
Θ12 Έχεις άγχος ή έντονες ανησυχίες;

1. ΟΧΙ 2. ΝΑΙ
Θ13 Γίνεσαι επιθετικός/η ή εριστικός/η; 1. ΟΧΙ 2. ΝΑΙ
Θ16 Κάνεις επικίνδυνα πράγματα, θέτει τον εαυτό ή τους άλλους σε κίνδυνο, επίτηδες ή κατά λάθος; 1. ΟΧΙ 2. ΝΑΙ
Θ17 Παίρνεις βιαστικές αποφάσεις ή οι αποφάσεις που παίρνεις σε φέρνουν συχνά σε δύσκολη θέση; 1. ΟΧΙ 2. ΝΑΙ
Θ18 Έχεις χόμπυ και ενδιαφέροντα; 1. ΟΧΙ 2. ΝΑΙ
Θ18 Έχεις στενούς φίλους 1. ΟΧΙ 2. ΝΑΙ
Θ19 Έχεις καλές σχέσεις και κοινωνικές συναναστροφές με τους συνομηλίκους σου; 1. ΟΧΙ 2. ΝΑΙ
Θ20 Νομίζετε ότι οι συμμαθητές και συμμαθήτριες σου σε αποδέχονται; 1. ΟΧΙ 2. ΝΑΙ
Θ21 Κάνεις σχέδια / όνειρα για το μέλλον; 1. ΟΧΙ 2. ΝΑΙ

Ι. ΕΠΙΤΕΛΙΚΕΣ ΛΕΙΤΟΥΡΓΙΕΣ

Ι1. Κατά τη διάρκεια μιας συζήτησης, κρατάς την προσοχή σου; 1. ΟΧΙ 2. ΝΑΙ 3.

1. ΟΧΙ 2. ΝΑΙ	I2 Μπορείς εύκολα να διακόψεις κάτι που κάνεις, αν σου ζητηθεί, και να ασχοληθείς με κάτι άλλο;
1. ΟΧΙ 2. ΝΑΙ	I3 Θυμάσαι εύκολα συζητήσεις και γεγονότα προηγούμενων ημερών;
1. ΟΧΙ 2. ΝΑΙ	I4 Μπορείς να προγραμματίσεις τις υποχρεώσεις σου έτσι ώστε να τις ολοκληρώσεις έγκαιρα;
1. ΟΧΙ 2. ΝΑΙ	I5 Σπαταλάς άσκοπα το χρόνο σου σε ανούσιες ενασχολήσεις;
1. ΟΧΙ 2. ΝΑΙ	I6 Αν παρουσιαστεί ένα απρόβλεπτο πρόβλημα (πχ διακοπή στο ίντερνετ), μπορείς να κάνεις κάποιες ενέργειες για την επίλυσή του;
1. ΟΧΙ 2. ΝΑΙ	I7 Συνηθίζεις να αφήνεις δραστηριότητες στη μέση και να ξεκινάς κάτι άλλο, να το παρατάς και αυτό κοκ;
1. ΟΧΙ 2. ΝΑΙ	I8 Συνηθίζεις να πετάγεσαι από το ένα θέμα στο άλλο;
1. ΟΧΙ 2. ΝΑΙ	I9 Χάνεις συχνά τα πράγματά σου;
1. ΟΧΙ 2. ΝΑΙ	I10 Μπορείς να ακολουθήσεις γραπτές οδηγίες σε δραστηριότητες με βήματα; Πχ. Να εκτελέσει μια συνταγή, να εισάγει ένα βίντεο σε μια εργασία που ετοιμάζει
1. ΟΧΙ 2. ΝΑΙ	I11 Μπορείς να ετοιμάσει μόνη σου / μόνος σου τη βαλίτσα για το σχολείο με επιτυχία;

I13 Επιλέξετε όσα ισχύουν. Συχνά δίνω την εντύπωση στους άλλους (οι άλλοι νομίζουν για μένα) ότι…

1. Είμαι «αλλού»
2. Είμαι αδιάφορη/αδιάφορος
3. Είμαι ενοχλημένη/εκνευρισμένη
4. «Ταξιδεύω» ή ονειροπολώ
5. Δεν αντιλαμβάνομαι όσα του / της λένε
6. Βαριέμαι
7. Είμαι έτοιμος / έτοιμη για καβγά
8. Είμαι παθητική / ος – δεν με ενδιαφέρει για το τί συμβαίνει γύρω μου

Απάντησε στις πιο κάτω ερωτήσεις, βάζοντας σε κύκλο την απάντηση που περιγράφει πόσο συχνά αισθάνεσαι αυτό που περιγράφουν ή πόσο πολύ νομίζεις ότι σε εκφράζει αυτό που περιγράφεται.

1. Είμαι αφηρημένος / αφηρημένη ή / και απρόσεκτος/η				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

2. Δυσκολεύομαι να συγκεντρωθώ				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

3. Το μυαλό μου «βομβαρδίζεται» συνεχώς από σκέψεις και ιδέες				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

4. Το μυαλό μου πετάγεται από σκέψη σε σκέψη				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

5. Δίνω προσοχή σε πράγματα που δεν έχουν σημασία ή σε πράγματα άσχετα με αυτό που προσπαθώ να κάνω.				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

6. Η παραμικρή κίνηση ή ο παραμικρός ήχος, τραβάνε την προσοχή μου και με εμποδίζουν να συγκεντρωθώ				
1	2	3	4	5

Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

7. Νιώθω ότι το μυαλό μου «αδειάζει» ή «σταματά»				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

8. Νομίζω ότι έχω δυσκολία στη μνήμη – ξεχνώ εύκολα ή θυμάμαι με λάθος τρόπο				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

9. Ο χρόνος δεν είναι αρκετός για να τελειώσω τις εργασίες στην τάξη ή ένα διαγώνισμα / μια εξέταση				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

10. Όσο καλά και να προετοιμαστώ, δεν μπορώ να θυμηθώ αυτά που έχω διαβάσει για ένα διαγώνισμα ή μια εξέταση.				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

11. Δυσκολεύομαι να δώσω όσο χρόνο χρειάζεται για να διαβάσω ικανοποιητικά ένα μάθημα ή για να προετοιμαστώ για μια εξέταση.				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

12. Ασχολούμαι με πράγματα που δεν έχουν σημασία, χάνοντας χρόνο, αντί να κάνω κάτι που θα έπρεπε ή που είναι σημαντικό να γίνει άμεσα.				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

13. Χάνω σημειώσεις, βιβλία, τετράδια και άλλα απαραίτητα πράγματα για το σχολείο ή τα χόμπυ μου.				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

14. Έχω έντονη ανάγκη να κινούμαι ή να παίζω κάτι στα δάκτυλα ή να κουνώ τα πόδια μου				
1	2	3	4	5

Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

15. Όταν αισθάνομαι κάτι έντονα (πχ. έχω αγωνία, βαριέμαι πολύ, λυπάμαι κλπ), δεν μπορώ να σταματήσω να κινούμαι				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

16. Παίρνω αποφάσεις χωρίς πρώτα να τις σκεφτώ αρκετά καλά				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

17. Λέω ή κάνω πράγματα χωρίς να τα σκεφτώ πρώτα				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

18. Ενώ ξέρω ότι δεν πρέπει να πω ή να κάνω κάτι, σαν να μην μπορώ να σταματήσω τον εαυτό μου				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

19. Ξεσπώ με έντονο τρόπο το θυμό μου				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

20. Μπορώ να οργανώσω το καθημερινό μου πρόγραμμα (και το διάβασμα) ώστε να αφιερώνω όσο χρόνο χρειάζεται σε κάθε δραστηριότητα ή σε κάθε μάθημα.				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

21. Νομίζω ότι έχω δυσκολίες στις σχέσεις μου με τους άλλους (συμμαθητές, φίλους)				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

22. Νομίζω ότι έχω δυσκολίες στον έλεγχο της συμπεριφοράς μου				
1	2	3	4	5

Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

23. Δυσκολεύομαι να εκφράσω τα συναισθήματά μου				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

24. Αισθάνομαι άγχος ή / και ανησυχία				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

25. Αισθάνομαι θλίψη				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

26. Αισθάνομαι χαρά και ενθουσιασμό				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

27. Αισθάνομαι ήρεμα, ήσυχα				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

28. Αισθάνομαι φόβο				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

29. Αισθάνομαι θυμό, ένταση ή εκνευρισμό				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

30. Αισθάνομαι υπερβολικά φορτισμένος/η				
1	2	3	4	5
Ποτέ	Σπάνια	Κάποιες φορές	Συχνά	Συνήθως ή πάντοτε

Τεχνολογικό Πανεπιστήμιο Κύπρου

ΚΩΔ:…….

Συνέντευξη γονιού / κηδεμόνα

Ημερομηνία Συμπλήρωσης	
α/α συνέντευξης	

Α. Στοιχεία Μαθητή/Μαθήτριας

ΟΝΟΜΑΤΕΠΩΝΥΜΟ:	
Ημερομηνία Γέννησης	
Τάξη / Σχολείο	

Β. Στοιχεία Γονέα / Κηδεμόνα

Να δοθούν τα στοιχεία του ατόμου που συμπληρώνει το έντυπο

ΟΝΟΜΑΤΕΠΩΝΥΜΟ:	
ΙΔΙΟΤΗΤΑ :	1. ΓΟΝΕΑΣ 2. ΚΗΔΕΜΟΝΑΣ (ΟΧΙ ΓΟΝΙΟΣ) 3. ΠΡΟΣΩΡΙΝΟΣ ΦΡΟΝΤΙΣΤΗΣΗ 4. ΑΛΛΟ:
ΤΗΛ. ΕΠΙΚΟΙΝΩΝΙΑΣ	
ΗΛΕΚΤΡΟΝΙΚΗ ΔΙΕΥΘΥΝΣΗ	

Γ. ΠΛΗΡΟΦΟΡΙΕΣ ΓΙΑ ΤΟΝ/ΤΗΝ ΜΑΘΗΤΗ/ΜΑΘΗΤΡΙΑ

ΕΠΑΡΧΙΑ ΔΙΑΜΟΝΗΣ	1. ΛΕΜΕΣΟΣ 2. ΛΕΥΚΩΣΙΑ 3. ΛΑΡΝΑΚΑ 4. ΠΑΦΟΣ 5. ΑΜΜΟΧΩΣΤΟΣ
Πώς θα περιγράφατε την καθημερινότητα της οικογένειας με την οποία διαμένει ο μαθητής;	1. ΗΡΕΜΗ 2. ΜΕ ΕΝΤΑΣΕΙΣ 3. ΥΠΑΡΞΗ ΒΙΑΣ 4. ΔΥΣΚΟΛΗ ΛΟΓΩ ΟΙΚΟΝΟΜΙΚΩΝ 5. ΔΥΣΚΟΛΗ ΛΟΓΩ ΥΠΑΡΞΗΣ ΠΡΟΒΛΗΜΑΤΩΝ ΥΓΕΙΑΣ
Υπάρχουν τώρα στην καθημερινότητα της οικογένειας, γεγονότα ή παράγοντες που ίσως επηρεάζουν το παιδί συναισθηματικά	
Ποιο το ανώτερο επίπεδο μόρφωσης του πατέρα	1. ΔΗΜΟΤΙΚΟ ΣΧΟΛΕΙΟ 2. ΓΥΜΝΑΣΙΟ 3. ΛΥΚΕΙΟ / ΤΕΧΝΙΚΗ ΣΧΟΛΗ

	4. ΠΑΝΕΠΙΣΤΗΜΙΟ 5. ΜΕΤΑΠΤΥΧΙΑΚΟ 6. ΔΙΔΑΚΤΟΡΙΚΟ
Ποιο το ανώτερο επίπεδο μόρφωσης της μητέρας	1. ΔΗΜΟΤΙΚΟ ΣΧΟΛΕΙΟ 2. ΓΥΜΝΑΣΙΟ 3. ΛΥΚΕΙΟ / ΤΕΧΝΙΚΗ ΣΧΟΛΗ 4. ΠΑΝΕΠΙΣΤΗΜΙΟ 5. ΜΕΤΑΠΤΥΧΙΑΚΟ 6. ΔΙΔΑΚΤΟΡΙΚΟ

Δ. ΙΣΤΟΡΙΚΟ

Κύρια διάγνωση:
Σε ποια ηλικία του μαθητή/τριας, ανησυχήσατε για πρώτη φορά ή προσέξατε ή ενημερωθήκατε για την πιθανότητα το παιδί σας να έχει κάποια διαταραχή;
Ποια ήταν τα κύρια συμπτώματα;
Από ποια ειδικότητα και πότε έγινε η πρώτη διάγνωση;
1. ΠΑΙΔΟΨΥΧΙΑΤΡΟ 2. ΠΑΙΔΟΝΕΥΡΟΛΟΓΟ 3. ΠΑΙΔΙΑΤΡΟ 4. ΕΚΠΑΙΔΕΥΤΙΚΟ ΨΥΧΟΛΟΓΟ 5. ΑΛΛΟ: ΗΛΙΚΙΑ ΠΡΩΤΗΣ ΔΙΑΓΝΩΣΗΣ:
Υπάρχουν άλλες διαγνώσεις;
1. ΟΧΙ 2. ΝΑΙ
Αν ΝΑΙ, ποιες;
Ποια είναι τα συμπτώματα που σας ανησυχούν ΤΩΡΑ;

Ε. ΙΣΤΟΡΙΚΟ ΘΕΡΑΠΕΙΩΝ

Λαμβάνει ο μαθητής / η μαθήτρια ΤΩΡΑ κάποια φαρμακευτική αγωγή για ΔΕΠ-Υ

1. ΟΧΙ
2. ΝΑΙ

ΑΝ ΝΑΙ,

ΠΟΙΟ ΣΚΕΥΑΣΜΑ:……

ΠΟΤΕ ΞΕΚΙΝΗΣΕ: …….

Αν όχι τώρα, έχει λάβει στο παρελθόν κάποια φαρμακευτική αγωγή για ΔΕΠ-Υ;

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ,

Ποιο σκεύασμα:……

Για πόσο διάστημα:……

Πότε σταμάτησε: ……..

Γιατί σταμάτησε: ……

Πώς βοήθησε: ……

Λαμβάνει ΤΩΡΑ άλλες θεραπείες;

1. ΟΧΙ
2. ΝΑΙ

Αν ναι,

ΕΙΔΟΣ	ΣΥΧΝΟΤΗΤΑ

Έχει λάβει στο παρελθόν άλλες θεραπείες;

1. ΟΧΙ
2. ΝΑΙ

Αν ναι,

ΕΙΔΟΣ	ΣΥΧΝΟΤΗΤΑ

Υπήρξε στο παρελθόν ή υπάρχει τώρα οποιοδήποτε άλλο ιατρικό, σωματικό ή ψυχολογικό πρόβλημα ή δυσκολία; 1. ΟΧΙ 2. ΝΑΙ Εάν ναι, περιγράψτε:……..
Εάν ΝΑΙ, ΠΕΡΙΓΡΑΨΤΕ ΤΟ ΠΡΟΒΛΗΜΑ:…….
9. Υπάρχει κάποια σωματική αναπηρία ή δυσκολία εκτέλεσης κινήσεων; 1. ΟΧΙ 2. ΝΑΙ Αν ΝΑΙ, διευκρινήστε: …….
Λαμβάνει αυτό το διάστημα φάρμακα για οποιοδήποτε άλλο λόγο; (αλλεργίες, βήχα, λοιμώξεις, ψυχο-συναισθηματικές δυσκολίες) 1. ΟΧΙ 2. ΝΑΙ Αν ναι, διευκρινήστε:…….
Υπάρχει ιστορικό κρανιοεγκεφαλικών τραυματισμών ή παθήσεων; 1.ΟΧΙ 2. ΝΑΙ

ΣΤ. ΟΙΚΟΓΕΝΕΙΑΚΟ ΙΣΤΟΡΙΚΟ

1. Υπάρχει άλλο μέλος της οικογένειας με διάγνωση ΔΕΠ/Υ;

1. ΟΧΙ
2. ΝΑΙ
3. Υπάρχει μόνο υποψία

Αν ΝΑΙ / ΙΣΩΣ, ποιος;

1. ΜΗΤΕΡΑ
2. ΠΑΤΕΡΑΣ
3. ΑΔΕΛΦΟΣ / ΑΔΕΛΦΗ
4. ΑΛΛΟΣ

ΣΥΓΓΕΝΗΣ:……..

Υπάρχει άλλο μέλος της οικογένειας με οποιαδήποτε άλλη διάγνωση;
1. ΟΧΙ 2. ΝΑΙ 3. Υπάρχει μόνο υποψία Αν ΝΑΙ, να δοθούν λεπτομέρειες (μόνο αν αφορά μέλος της άμεσης οικογένειας ή άτομο που ζει μαζί με το παιδί ή με το οποίο το παιδί περνά σημαντικό μέρος της ημέρας του)

Ζ. ΑΚΑΔΗΜΑΪΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ

Σχολείο:	1. ΓΥΜΝΑΣΙΟ 2. ΛΥΚΕΙΟ 3. ΤΕΧΝΙΚΗ ΣΧΟΛΗ ΤΑΞΗ:…….
Επιδόσεις:	1. ΣΥΝΗΘΩΣ ΚΑΤΩ ΑΠΟ ΤΗ ΒΑΣΗ 2. ΒΑΣΗ Ή ΛΙΓΟ ΨΗΛΟΤΕΡΑ (ΜΕΧΡΙ 12) 3. ΜΕΣΕΣ ΧΑΜΗΛΕΣ (13-15) 4. ΜΕΣΕΣ (15-17) 5. ΥΨΗΛΕΣ (18+)
Χρειάστηκε ποτέ να επαναλάβει οποιαδήποτε τάξη;	1. ΟΧΙ 2. ΝΑΙ ΑΝ ΝΑΙ, ΠΟΙΑ: …….. ΛΟΓΟΣ:…….
Λαμβάνει υπηρεσίες στήριξης από την ΥΕΨ; Π.χ. Ειδική Εκπαίδευση, τακτικές συναντήσεις με Εκπαιδευτική Ψυχολόγο	1. Δ/Ε 2. ΠΑΡΑΚΟΛΟΥΘΗΣΗ ΑΠΟ ΕΚΠ. ΨΥΧΟΛΟΓΟ 3. ΣΤΗΡΙΞΗ 4. ΑΠΑΛΛΑΓΗ ΑΠΟ ΜΑΘΗΜΑΤΑ 5. ΕΠΙΠΛΕΟΝ ΧΡΟΝΟΣ

	6. ΑΠΑΛΛΑΓΗ ΟΡΘΟΓΡΑΦΙΚΑ / ΣΥΝΤΑΚΤΙΚΑ

Σε σχέση με άλλες χρονιές οι επιδόσεις του μαθητή/της μαθήτριας

1. ΕΧΟΥΝ ΒΕΛΤΙΩΘΕΙ
2. ΕΧΟΥΝ ΠΕΣΕΙ
3. ΠΑΡΑΜΕΝΟΥΝ ΣΤΑΘΕΡΕΣ

Υπάρχουν προβλήματα διαγωγής ή δυσκολίες προσαρμογής στο σχολείο;

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ, εξηγήστε:

Μπορείτε να περιγράψετε τη διάθεσή της / του, απέναντι στο σχολείο;

1. Θετική
2. Αρνητική
3. Αδιάφορος/η
4. Το σχολείο του/της προκαλεί άγχος / φόβο / ανησυχία
5. Το σχολείο την/τον κάνει νευρική/νευρικό και ευέξαπτη/ευέξαπτο
6. Άλλο:
7. Άλλο:

Ποια είναι τα κυριότερα ή συχνότερα προβλήματα που αντιμετωπίζει στο σχολείο;

Έχει ιδιαίτερα ταλέντα ή ικανότητες;

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ, περιγράψτε:……

Υπάρχει κάποιο μάθημα στο οποίο ξεχωρίζει για τις επιδόσεις της / του ή που θεωρείται ότι είναι «το δυνατό» της / του μάθημα;

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ, ποιο; Μαθηματικά μέχρι πρόσφατα

Χρειάζεται βοήθεια στο διάβασμα;

1. ΟΧΙ
2. ΝΑΙ

Χρειάζεται οι γονείς / κηδεμόνες, να ελέγχουν την ποιότητα των εργασιών που ετοιμάζει ο μαθητής / η μαθήτρια;

1. ΟΧΙ
2. ΝΑΙ

Χρειάζεται οι γονείς / κηδεμόνες να υπενθυμίζουν τη μαθήτρια / μαθητή να ξεκινήσει το διάβασμα;

1. ΟΧΙ
2. ΝΑΙ

Έχετε ενημερωθεί από το σχολείο στο οποίο φοιτά τώρα, για δυσκολίες που εμφανίζονται στο σχολείο;

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ, διευκρινίστε:

Έχει αναφέρει ποτέ ότι γίνεται θύμα εκφοβισμού ή ανεπιθύμητων αστείων / πειραγμάτων;

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ, διευκρινίστε:

Έχετε ενημερωθεί ποτέ από τον ίδιο/την ίδια, από τους εκπαιδευτικούς ή άλλους γονείς ότι ο μαθητής / μαθήτρια εκφοβίζει, συμπεριφέρεται βίαια ή απρεπώς, κάνει «χοντρά» αστεία, σε άλλους συμμαθητές ή συμμαθήτριες του/της;

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ, διευκρινίστε: ……..

Έχει αποβληθεί ή της/του έχει μειωθεί η διαγωγή στο σχολείο;

1. ΟΧΙ
2. ΝΑΙ

Η. ΚΑΘΗΜΕΡΙΝΗ ΦΡΟΝΤΙΔΑ ΕΑΥΤΟΥ

Χρειάζεται ο μαθητής / η μαθήτρια, οποιουδήποτε είδους βοήθεια (επίβλεψη, καθοδήγηση, υπενθύμιση) στις καθημερινές ρουτίνες φροντίδας εαυτού; (π.χ. καθαριότητα και υγιεινή, σίτιση, επιλογή ρούχων κτλ)

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ, εξηγήστε:

Μπορεί να ξυπνήσει και να ετοιμαστεί έγκαιρα από μόνη της / μόνος του, το πρωί για το σχολείο;

1. ΟΧΙ
2. ΝΑΙ

Μπορεί να κάνει δουλειές ή θελήματα στα πλαίσια της ηλικίας του / της;
(π.χ. να πάει στο φούρνο ή το περίπτερο, να ετοιμάσει ένα σνακ ή ελαφρύ γεύμα για τον εαυτό του / της)

1. ΟΧΙ
2. ΝΑΙ

Χρησιμοποιεί την τεχνολογία με ευχέρεια; (για σκοπούς άλλους εκτός παιχνιδιού π.χ. για αναζήτηση πληροφοριών)

1. ΟΧΙ
2. ΝΑΙ

Φροντίζει την εμφάνιση και την προσωπική υγιεινή του / της όπως οι συνομήλικοι του / της;

1. ΟΧΙ
2. ΝΑΙ

Τηρεί ένα ισορροπημένο καθημερινό πρόγραμμα το οποίο να περιλαμβάνει τις υποχρεώσεις του / της, ώρες ξεκούρασης, αυτοφροντίδας και κοινωνικής αλληλεπίδρασης;

1. ΟΧΙ
2. ΝΑΙ

Διατηρεί τον προσωπικό της/του χώρο καθαρό και τακτοποιημένο χωρίς τη βοήθεια γονιού, κηδεμόνα ή οικιακής βοηθού;

1. ΟΧΙ
2. ΝΑΙ

Θ. ΨΥΧΟ-ΣΥΝΑΙΣΘΗΜΑΤΙΚΗ ΚΑΤΑΣΤΑΣΗ

Εκνευρίζεται ή αναστατώνεται συχνά ή εύκολα;

1. ΟΧΙ
2. ΝΑΙ

Πώς θα χαρακτηρίζατε τη σύνηθη της / του διάθεση;

Εκνευρίζεται εύκολα

Εκφράζει τα συναισθήματα ή / και τις σκέψεις και προβληματισμούς της/του σε εσάς ή στον άλλη γονιό / κηδεμόνα;

1. ΝΑΙ

Μιλά για την καθημερινότητα του (π.χ. για τα γεγονότα που γίνονται στο σχολείο) με εσάς ή τον άλλο γονιό ή κηδεμόνα;

1. ΝΑΙ

5. Πόσο συχνά έρχεστε σε αντιπαράθεση ή καβγαδίζετε;

1. Σχεδόν ποτέ
2. Σπάνια (1-2 φορές την εβδομάδα)
3. Συχνά (3 ή περισσότερες φορές την εβδομάδα)
4. Καθημερινά
5. Πολλές φορές την ημέρα

Ξεσπά με έντονο τρόπο, με κλάματα ή φωνές ή / και βία;

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ, περιγράψτε:

Εκφράζει σκέψεις ή συναισθήματα που σας προκαλούν ανησυχία;

1. ΟΧΙ
2. ΝΑΙ

Αν ΝΑΙ, περιγράψτε:…….

Ζητά συχνά τη βοήθεια / καθοδήγηση ή παρουσία σας ακόμα και για πράγματα τα οποία είναι εύκολα / απλά;

1. ΟΧΙ
2. ΝΑΙ

Αναλαμβάνει πρωτοβουλίες;

1. ΟΧΙ
2. ΝΑΙ

Έχει άγχος ή έντονες ανησυχίες;

1. ΟΧΙ
2. ΝΑΙ

Γίνεται επιθετικός/η ή εριστικός/η;

1. ΟΧΙ
2. ΝΑΙ

Χρειάζεται να της/του επιβάλλονται τακτικά τιμωρίες για τη συμπεριφορά της/του;

1. ΟΧΙ
2. ΝΑΙ

Ρυθμίζει τη συμπεριφορά της / του ώστε να είναι κατάλληλη ή αποδεκτή σε κάθε διαφορετική κατάσταση στην οποία μπορεί να βρεθεί;

1. ΟΧΙ
2. ΝΑΙ

Κάνει επικίνδυνα πράγματα, θέτει τον εαυτό ή τους άλλους σε κίνδυνο;

1. ΟΧΙ
2. ΝΑΙ

Παίρνει βιαστικές αποφάσεις ή οι αποφάσεις που παίρνει την φέρνουν συχνά σε δύσκολη θέση;

1. ΟΧΙ
2. ΝΑΙ

Έχει χόμπυ και ενδιαφέροντα; 1. ΟΧΙ 2. ΝΑΙ
Έχει στενούς φίλους 1. ΟΧΙ 2. ΝΑΙ
Έχει καλές σχέσεις και κοινωνικές συναναστροφές με τους συνομηλίκους της/του; 1. ΟΧΙ 2. ΝΑΙ
Νομίζετε ότι είναι αποδεκτή / αποδεκτός από τους συμμαθητές/συμμαθήτριες του/της 1. ΟΧΙ 2. ΝΑΙ
Κάνει σχέδια / όνειρα για το μέλλον; 1. ΟΧΙ 2. ΝΑΙ

Ι. ΓΝΩΣΤΙΚΕΣ ΛΕΙΤΟΥΡΓΙΕΣ

Κατά τη διάρκεια μιας συζήτησης, κρατά την προσοχή του; 1. ΟΧΙ **2.** ΝΑΙ
Μπορεί εύκολα να αφήσει κάτι που κάνει, αν του ζητηθεί, και να ασχοληθεί με κάτι άλλο; 1. ΟΧΙ **2.** ΝΑΙ
Θυμάται εύκολα συζητήσεις και γεγονότα προηγούμενων ημερών; 1. ΟΧΙ 2. ΝΑΙ
Μπορεί προγραμματίσει τις υποχρεώσεις της έτσι ώστε να τις ολοκληρώσει έγκαιρα; 1. ΟΧΙ 2. ΝΑΙ
Σπαταλά άσκοπα το χρόνο του / της, σε ανούσιες ενασχολήσεις; 1. ΟΧΙ 2. ΝΑΙ
Αν παρουσιαστεί ένα απρόβλεπτο πρόβλημα (πχ διακοπή στο ίντερνετ), μπορεί να κάνει κάποιες ενέργειες για την επίλυσή του; 1. ΟΧΙ 2. ΝΑΙ
Ενθουσιάζεται εύκολα με κάτι και το ίδιο εύκολα χάνει το ενδιαφέρον του/της; 1. ΟΧΙ

2. ΝΑΙ
Συνηθίζει να πετάγεται από το ένα θέμα στο άλλο; 1. ΟΧΙ 2. ΝΑΙ
Χάνει συχνά τα πράγματά του/της; 1. ΟΧΙ 2. ΝΑΙ
Μπορεί να ακολουθήσει γραπτές οδηγίες σε δραστηριότητες με βήματα; Πχ. Να εκτελέσει μια συνταγή, να εισάγει ένα βίντεο σε μια εργασία που ετοιμάζει 1. ΟΧΙ 2. ΝΑΙ
Επιλέξετε όσα ισχύουν. Συχνά δίνει την εντύπωση ότι 1. Είναι «αλλού» 2. Είναι αδιάφορη/αδιάφορος 3. Είναι ενοχλημένη/εκνευρισμένη 4. «Ταξιδεύει» ή ονειροπολεί 5. Δεν αντιλαμβάνεται όσα του / της λένε 6. Βαριέται 7. Είναι έτοιμος / έτοιμη για καβγά 8. Είναι παθητική / ος – δεν την/τον ενδιαφέρει για το ότι συμβαίνει γύρω της/του
Υπάρχει κάτι που θεωρείται σημαντικό να αναφέρεται για το παιδί σας, και το οποίο μπορεί με οποιοδήποτε τρόπο να επηρεάζει την υγεία, τη συμπεριφορά ή την συμμετοχή του σε δραστηριότητες ή στο ερευνητικό πρόγραμμα;

TIDieR

MOTI - ADHD (Multicomponent Occupational Therapy Intervention for adolescents with ADHD)

Why:

ADHD and executive function difficulties in adolescence remain under-investigated and under-treated. This is specifically observed in regards to targeted meaningful, age-appropriate interventions that might have an evidence-based background within the field of Occupational Therapy.

What (material):

The intervention protocol (MOTI) is built on three pillars. Two are delivered to adolescents (computerised Cognitive Training and Academic Skills Training), and one is delivered to their parents/carers (Parents' Psychoeducation). All pillars are described below:

1. **Cognitive Training.** The Cognitive Training component of the MOTI represents the most intensive and structured element of the intervention and is delivered through a computer-based format using the Cognifit™ platform. Cognifit™ is a standardised cognitive training and assessment tool designed to target a range of cognitive domains, including EF, attention, memory, and reasoning). The platform incorporates adaptive algorithms that adjust task difficulty in response to individual performance, thereby enabling personalised and progressive training that aligns with principles of neuroplasticity and repeated, targeted cognitive engagement.
2. **Academic Skills Training:** A PowerPoint presentation is used to demonstrate to the students basic methods and techniques that can enhance their participation in academic life. AST addressed four domains:(a) planning, organising, and prioritising, (b) time management, (c) management of sustained attention and focus, and (d) study techniques training. The component was delivered in six sessions of approximately 45 minutes, once or twice weekly depending on student preference, and was available either face-to-face or online.
3. **Parents' / carers' Psychoeducation Group:** Six-group sessions of 90 minutes each, delivered online. Topics include: 1. Introduction to ADHD, 2.Developmental perspectives on ADHD - childhood 3. Developmental perspectives - adolescence and adulthood, 4. Effective communication in the context of ADHD, 5. Supporting behaviour regulationa and setting boundaries and 6. positive parenting and supporting participation in every-day activities.

What (procedures):

1. **Cognitive Training.** Is delivered through the electronic platform CogniFit - which is a well-studied platform, specialising on computerised cognitive training for a various of conditions, including ADHD. Students were instructed to log-in the platform (a personalised account was created for each one) once a day for 4 days of the week. They can choose the specific day/time/location. The platform creates a personalised 25-minute training session each time, with graded activities that target specific executive function components (e.g., Working Memory) and other cognitive skills (e.g., sustained attention). The trainings include mostly non-verbal game-like activities. For the instructions, and where necessary, there is an option for language preference (Greek are available). Automatic reports are send to the researcher to keep track of the progress.
2. **Academic Skills Training:** A PowerPoint presentation is used to demonstrate to the students basic methods and techniques that can enhance their participation in academic life. AST addressed four domains:(a) planning, organising, and prioritising, (b) time management, (c) management of sustained attention and focus, and (d) study techniques training. The component was delivered in six sessions of approximately 45 minutes, once or twice weekly depending on student preference, and was available either face-to-face or online.

Structure and Content:

Planning, Organising, and Prioritising

MOTI - ADHD (Multidisciplinary Occupational Therapy Intervention for Students with ADHD)

Students first identified personal academic goals, including what level of performance they considered satisfactory for each school subject. They were then guided to identify priority subjects, based on difficulty, importance, or need for additional effort. In addition to school demands, students were asked to consider other occupations they wished to participate in during the week, including leisure, social, sport, or creative activities. This process was intended to support goal-directed behaviour and prioritisation within the student role. Following this, each student constructed a weekly planner. The planner included all fixed obligations (school timetable, private tutoring, family duties, appointments); all upcoming tests, exams, homework deadlines, and project deadlines; any planned but optional personal or social activities; and designated periods of free, unstructured time, particularly during the weekend. Students were explicitly encouraged to preserve some free time, as this was considered important for rest, perceived control over time, and balance within daily routines. Once fixed demands and free time had been identified, students scheduled daily weekday study periods, each lasting at least 90 minutes. These study periods were intended for homework completion, revision, and “deepening knowledge” activities. Students then added specific preparation periods for forthcoming tests and exams. At the end of the exercise, students discussed anticipated barriers (e.g., fatigue, competing demands, low motivation, impractical timing), and the planner was collaboratively revised where necessary.

Time management was addressed at both a macro-level and a micro-level. The macro-level component was embedded in the weekly planning exercise described above. The micro-level component involved teaching students to use the Pomodoro Technique as a structured approach to short-term study management.

Students were instructed to implement the technique as follows:
Choose one task or subject: students gathered all homework or study demands in front of them, prioritised them, and selected the task considered most important to start with.
Set a timer: students set a timer for 25 minutes and were instructed to work continuously for the entire interval, without switching tasks or using social media.
Take a short break: after the work interval, students took a break of 2–5 minutes, during which they were encouraged to attend to basic needs (e.g., water, toilet) and engage in light movement or stretching.
Repeat the cycle: the sequence was repeated as needed. After three Pomodoro cycles, students were allowed a longer break of up to 20 minutes, and only then were they permitted to check social media or go back online.
The protocol was adapted for attentional capacity. Students with severely reduced attention span were instructed to start with 15-minute work intervals and gradually increase by 2–3 minutes per week until they reached 25 minutes. Students with stronger attention capacity could gradually extend intervals up to 40 minutes, but not beyond.

Sustained Attention and Focus: Students were instructed to optimise their study environment in order to minimise distractions and increase the likelihood of remaining focused during academic tasks. The first step was to identify their own primary sources of distraction. For some students these were auditory (e.g., noise, conversations), whereas for others they were visual (e.g., movement, people passing, looking outside).

Once key distractions had been identified, students were encouraged to implement environmental adaptations such as using white-noise machines, background music, or noise-cancelling earbuds; arranging the desk or study chair so that windows, doors, or movement in the room were less visible; preparing all necessary materials in advance to reduce unnecessary interruptions; informing family members of the planned study period and requesting not to be interrupted during that interval.
The emphasis of this domain was not simply on “trying harder” to pay attention, but on creating a study context that reduced external interference and supported successful task persistence.

Study techniques: Students were trained in a range of practical study strategies intended to improve comprehension, retention, organisation of material, and active engagement with school subjects. Training included instruction in how to study and take notes effectively; how to prepare flashcards for memorisation and retrieval practice; how to create timelines,

MOTI - ADHD (Multicomponent, Occupational Therapy Intervention for Students with ADHD)

relation charts, and other visual organisers suited to different subjects, and to select strategies appropriate to the content demands of particular school subjects.

Students were additionally instructed in how to “deepen knowledge”, meaning how to move beyond minimal completion of homework and towards better understanding of academic material. They were encouraged to identify topics they did not understand, or topics they found interesting and wanted to explore further and then seek supplementary explanations using accessible resources. Examples included online channels or educational material that explained science, mathematics, chemistry, history, or other topics in more concrete, simplified, or engaging ways before returning to school textbooks and formal terminology.

3 Parents' / carers' Psychoeducation Group: Six-group sessions of 90 minutes each, delivered online.

Structure and Content of Sessions

Session 1: Introduction and Overview of ADHD
The initial session focused on establishing rapport and creating a supportive and collaborative group environment. Parents were invited to share general experiences of raising their adolescents, within comfortable boundaries. The structure, goals, and expectations of the programme were introduced, and a brief overview of ADHD was provided, framed as a neurodevelopmental difference within a continuum of human variability.
Session 2: Developmental Perspectives – Childhood
This session explored ADHD within the context of childhood development, including common patterns of behaviour and variability across individuals. Attention was given to understanding differences in development without pathologizing them, and to recognising how early experiences and environmental responses shape later participation.
Session 3: Developmental Perspectives – Adolescence and Early Adulthood
The third session focused on the transition to adolescence, a period characterised by increasing academic demands, autonomy, and social complexity. Parents were supported in understanding how these contextual changes interact with their adolescent’s cognitive and behavioural profile, influencing participation in school and everyday life.
Session 4: Effective Communication in the Context of ADHD
This session addressed parent–adolescent communication, with emphasis on strategies that support understanding and engagement. Techniques included maintaining clear and respectful communication, allowing time for response, reducing interruptions, and using positive and specific language. Parents were encouraged to reflect on their own communication patterns and to practise alternative approaches. Within a neurodiversity-informed framework, communication differences were approached as variations in processing and expression, requiring mutual adaptation rather than correction.
Session 5: Supporting Behaviour Regulation and Setting Boundaries
This session focused on strategies for supporting behaviour in a consistent and structured manner. Parents were introduced to the concept of natural and logical consequences, distinguishing these from punitive approaches. Emphasis was placed on setting clear, predictable boundaries while maintaining flexibility and respect for the adolescent’s developing autonomy. Parents were encouraged to balance guidance with independence, supporting the development of self-regulation within everyday contexts.
Session 6: Positive Parenting and Supporting Participation in Everyday Activities
The final session focused on practical strategies to support adolescents’ participation in daily occupations, particularly those related to academic tasks such as homework, planning, and organisation, as well as social engagement. Parents were introduced to specific strategies used within the intervention (e.g., structured study routines and time-management approaches such as the Pomodoro technique) and were encouraged to reinforce these within the home environment. Importantly, emphasis was placed on recognising and building on adolescents’ strengths, interests, and achievements, promoting a positive sense of competence and self-efficacy.
Across sessions, the Parents’ Psychoeducation component aimed to create a supportive and responsive environment that enables adolescents to apply the cognitive and academic skills targeted in the other components of the intervention. By enhancing parental understanding,

MOTI - ADHD (Motivation and support Strategies, this component contributes to the optimisation of

cognitive, occupational therapy, intervention for adolescents with ADHD)

environmental conditions that influence participation.

Who provided:

1. Cognitive Training: is provided fully online with a minimum initial interaction with the OT. The OT explains and introduces the procedure to the student, creates the personal account of the student and provides instructions to log-in and gets autmatic reports from the platform. The Cognifit platform does not permit for interventions by the researcher / OT.
2. Academic Skills Training: the structure and content were developed by the OT and the delivery of on-line sessions was made by the same OT - researcher.
3. Parents' / Carers' Psychoeducation: the structure and content were developed by the OT and the delivery of on-line sessions was made by the same OT - researcher.

How (mode of delivery; individual or group):

Cognitive Training: computer-based, on-line training. No personal interaction between the researcher and the student was necessary. The training is delivered fully by the CogniFit platform. Detailed automatic information is send to the researcher for monitoring.

Academic Skills Training: delivered on-line in one-to-one mode (the student and the researcher OT)

Parents' / Carer's Psychoeducation: delivered on-line in group basis (4 to 8 participants), deliveres by the researcher OT

Where:

There are no demands for infrastucture - the intervention can be delivered fully on-line.

When and how much:

1. Cognitive training: online sessions of a 25-minute duration each (pre-fixed by the Cognifit Platform). 4 Sessions a week for a duration of one month (30 days).
2. Academic Skills Trainig: Six on-line sessions of 45-minute duration each, once per week.
3. Parents' / Carers' Psychoeducation: six on-line group sessions of 90-minute duration each.

Tailoring:

Participant students received the same type of intervention - both Cognitive Training and Academic Skills Training. Parents' psychoeducation was complementary and was delivered after the completion of the two training components for the students.

Cognitive training followed the same procedure for each of the participant student. There is an automated grading of the difficulty level based on each students performance.

Academic Skills Training followed the same procedure for each participant student. If needed, more detailed explanations were provided or more personal questions or concerns were addressed during discussion.

Modification:

No modifications were necessary.

How well (planned):

The intervention was delivered and completed as planned with a rather foreseen medium dropout rate.

How well (actual):

The intervention was delivered as planned. The final assessment had limitations as not all the participants were available or showed for the post-intervention assessment.