TEACHER PERCEPTIONS OF ADHD CAUSALITY: IMPLICATIONS FOR EDUCATIONAL LEADERS

A Dissertation

presented to

the Faculty of the Graduate School

at the University of Missouri-Columbia

Department of Educational Leadership and Policy Analysis

MU Statewide Cooperative EdD Program in Educational Leadership

---

In Partial Fulfillment

of the Requirements for the Degree

EdD in Educational Leadership

---

by

CORBYN BARTELS

Dr. Cynthia J. Macgregor, Dissertation Supervisor

May 2022

The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

TEACHER PERCEPTIONS OF ADHD CAUSALITY: IMPLICATIONS FOR EDUCATIONAL LEADERS

presented by Corbyn Marie Bartels,

a candidate for the degree of Doctor of Education, and hereby certify that, in their opinion, it is worthy of acceptance.

_____

Professor Cynthia J. Macgregor

_____

Professor William J. Agnew

_____

Professor Tamara J. Arthaud

_____

Professor Kim K. Finch

DEDICATION

I dedicate this dissertation first and foremost to my husband, who unintentionally launched me into the world of exceptional learners. The energy and passion with which you approach all things have been a constant fascination (and maybe, at times, a frustration) over the last 27 years! Your support and encouragement have never faltered, and you have believed in me when I could not. Your energy and strength have sustained me through late nights and long days. You never once doubted I would finish this journey and I know, without a doubt, I would not have made it without you.

Next, I dedicate this dissertation to my four children, who are no longer children, but flourishing teens and young adults. While I am proud of my academic accomplishments, my proudest moments come when I see you embrace who God created you to be. Raising you has been the best education I could ask for! As you enter your seasons of higher education, whether that takes you into a classroom, a theater, a board room, or a sanctuary, may you, above all else, seek Godly wisdom and diligently seek His plans for your life. And when you meet an insurmountable obstacle, remember, "It's a spoon, Bro!"

In conclusion, I dedicate this dissertation to my parents. You claim I was born independent, wanting to hold my bottle, even when the only way I could do so was to use my toes! Thank you for allowing me to literally tackle life and not putting conventional limits on what I could attempt or explore. Further, thank you for teaching me to trust the Lord with all my heart and not lean on my own understanding, so that in all my ways I can acknowledge Him, and He can continue to direct my paths (Proverbs 3:5-6).

ACKNOWLEDGEMENTS

I would like to thank Dr. Macgregor for your invaluable supervision, support, and patience during this journey. You have an amazing way of clarifying and simplifying complex ideas and processes. Even when the rules of the game kept changing, you gracefully navigated our cohort through every obstacle, striving to keep our success a top priority.

I would also like to thank Dr. Ongaga for sharing your rich and diverse input throughout our coursework. While you and Dr. Mac did not always agree, your educated, respectful discussions taught us how to properly advocate for our beliefs.

I would also like to thank Dr. Finch and Dr. Agnew for your mentorship and guidance within my Master's program. Due to your encouragement, I pursued the EdD program, and I am honored to have you serve on my dissertation committee. Also, thank you, Dr. Arthaud, for pulling a chair up to the table and offering a lifetime of experience.

I would also like to thank my cohort members, especially Paul, who was my co-traveler for most of this journey, starting in Summer One and ending with the Fab Four. Thank you for your APA obsessiveness, your humor and your humble, but insightful input. (Did you catch that Bartels' comma?) Also, thank you ELPA support team for keeping me on track and managing all the necessary paperwork.

There are many other group members whose efforts and input shaped this experience. Thank you for persevering to the end – nothing could stop us, not even the pandemic!

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SECTION FIVE:

TEACHER PERCEPTIONS OF ADHD CAUSALITY: IMPLICATIONS FOR EDUCATIONAL LEADERS

Corbyn Marie Bartels

Dr. Cynthia J. Macgregor, Dissertation Supervisor

ABSTRACT

Students who exhibit behaviors commonly associated with Attention Deficit Hyperactivity Disorder (ADHD) are at risk for academic struggles and impaired relationships, often needing targeted interventions to be successful. While research supports the need for using interventions to improve classroom performance for students impacted by ADHD, it does not show if there is a relationship between the interventions a teacher uses or believes are effective and a teacher's perception of ADHD causality. Therefore, this study examined if there was a relationship. The data showed when a teacher feels something in the student's body is causing symptoms of ADHD, they are more willing to provide school-based supports. The data also showed when a teacher feels the child has more of a choice in their behaviors, the teacher is less likely to provide school-based supports. The data also showed that as the teacher's perception of a biological cause increased, they assumed more responsibility in providing interventions for the student. In addition, as the teacher's perception of an environmental cause increased, they placed increased responsibility on the child's family for interventions. Administrators can best support students impacted by ADHD by being proactive in advocating for stronger family and community partnerships and ensuring school-based interventions are being used with fidelity.

SECTION ONE:

INTRODUCTION TO DISSERTATION-IN-PRACTICE

Background of the Study

Attention Deficit Hyperactivity Disorder (ADHD) is a "childhood-onset neurodevelopmental disorder characterized by developmentally inappropriate levels of inattention, hyperactivity, and/or impulsivity, along with pervasive and significant functional impairment" (Ahmann, 2017, p. 121). ADHD symptoms impact approximately 8.2% of U.S. children (Danielson et al., 2018). Males are more than twice as likely as females to demonstrate characteristics consistent with an ADHD diagnosis (David, 2013). ADHD symptoms cause academic struggles, behavioral problems, inattention, hyperactivity, and impulsivity (American Academy of Pediatrics, 2011). These struggles occur because students displaying behaviors consistent with an ADHD diagnosis often have deficits in the areas of executive functioning skills, working memory, organizational skills, time management, and planning (Barkley & Fischer, 2011; Chacko et al., 2018).

Some researchers view ADHD as an epidemic and dub it the most prevalent health diagnosis for school-age children (Thyagarajan, 2016). Researchers believe affected students are at a greater risk for comorbid psychiatric problems such as conduct problems, substance abuse, and mood disorders (Levine & Anshel, 2011). School-based concerns for students exhibiting behaviors consistent with a diagnosis of ADHD include lower grades, substandard scores on standardized tests, referral for special education, decreased expectations from teachers, higher absenteeism rates, higher retention rates, and underdeveloped social skills (DuPaul et al., 2011).

Research shows behaviors consistent with a diagnosis of ADHD disrupt classroom instruction, contribute to lost teaching time, and impede social relationships (Stormont, 2001). It is the responsibility of the classroom teacher to select effective

interventions and avoid those that produce mediocre or even harmful results. In addition, it is necessary to train teachers in the use of the most effective interventions since "teacher preparation and certification are by far the strongest correlates of student achievement" (Darling-Hammond, 2000, p. 1). Research supports the use of classroom structure, executive functioning interventions, computer-assisted instruction, purposeful physical movement, behavior management strategies, parent education, and cognitive-behavioral social skills training (Benzing & Schmidt, 2019; Brock et al., 2010; DuPaul & Power, 2000; Evertson & Emmer, 1982; Harrison et al., 2019; Mrug et al., 2012; Pfiffner, 2011). When teachers correctly use interventions, the results are beneficial for students affected by ADHD, along with also improving the behavioral and academic outcomes of their classroom peers (Gaastra et al., 2016).

While research presents a myriad of ADHD interventions, Curtis et al. (2013) cited four interventions as being "empirically-based best practices for treating ADHD: psychostimulant medication, behavioral classroom management, behavioral parent training, and behavioral peer interventions in recreational settings" (p. 114). Various discipline areas will often collaborate to offer these interventions. For example, from the field of medicine transpires medication, the field of education develops parent training and academic support, and the field of psychology offers various therapies (Klassen et al., 1999).

Research overwhelmingly shows the behaviors associated with ADHD are best targeted by combining varied resources and using a multidisciplinary approach (Curtis et al., 2013; Gaastra et al., 2016; Levine & Anshel, 2011; Sibley et al., 2016). Studies also show treatment plans beginning with behavioral interventions instead of medications are

more impactful, along with being more cost-effective (Page et al., 2016). Further, the involvement of therapists is a helpful piece of a multidisciplinary approach, whether students access the therapy in-person or virtually (McCarty et al., 2015).

To obtain optimal results from a multidisciplinary approach, it is essential to involve school personnel who can teach intentional lessons on how to improve attentional skills, higher-order thinking skills, and reasoning skills (Cains, 2000). In addition, school-based interventions have an even higher chance of success if there is a positive cooperative relationship between the teacher and the student's parent(s) (Power et al., 2012). Further, researchers recommend for school-based interventions to include "both proactive (i.e., antecedent-based) and reactive (i.e., consequence-based) behavioral interventions" (DuPaul et al., 2011, p. 40). Finally, when grounded in Applied Behavior Analysis (ABA) principles, functional-assessment-based interventions decrease behaviors consistent with a diagnosis of ADHD (Miller & Lee, 2013; Stahr et al., 2006).

To avoid the side effects caused by medications prescribed for the symptoms of ADHD, some parents will choose to use non-research-based interventions. Besides avoiding side effects, these parent-provided interventions are often more cost-effective than medications (Sarris, 2011). Parent-provided interventions include items such as micronutrient supplements, herbs, dietary changes, improved sleep schedules, mindfulness activities, exercise, increasing time outdoors, and limiting time on electronics (Brock et al., 2010; Hall & Gushee, 2002; Lambez et al., 2020; Pelsser et al., 2017; Rodríguez et al., 2019).

There are two main perceptions of causality for ADHD. One perception of ADHD causality views ADHD as a neurocognitive condition evidenced by biological

abnormalities causing behavioral symptoms (Bradstreet et al., 2010). Research shows teachers who strongly believe in the biological causation of ADHD often tend to aggressively recommend placing students with behaviors consistent with a diagnosis of ADHD on medication (Snider et al., 2003). The other perception of ADHD causality is something in the child's environment is the cause. The most common hypothesized environmental trigger is poor home support, evidenced by inconsistent discipline, incomplete authoritative relationships, anger, avoidance, and limited relational satisfaction or attachment (Bunford et al., 2015). Teachers who strongly accredit the environment as the cause of behaviors consistent with a diagnosis of ADHD often believe students can control their behaviors through behavioral interventions and expect to see regression when the behavioral interventions are not being used (Sibley et al., 2016).

Statement of the Problem

The supposition of ADHD prevalence ranges from 1% to 26%, with estimates of approximately two-thirds of students who exhibit behaviors consistent with a diagnosis of ADHD will never receive a formal diagnosis (Tatlow-Golden et al., 2016). While not all students who exhibit behaviors consistent with a diagnosis of ADHD face identical classroom struggles, research has shown affected students are at a higher risk for negative academic consequences compared to their same-age peers (Kos et al., 2006).

Research shows 56% of students impacted with symptoms common to a diagnosis of ADHD will need some type of academic tutoring, 30% will be retained at least one grade, up to 40% will be placed in special education, and overall, they will be more likely than non-impacted peers to develop a dependence on drugs or alcohol, to experience greater mental health challenges, and to have worse post-secondary educational success

(Murphey et al., 2002). Furthermore, students affected by ADHD often display emotional dysfunction, which negatively affects family and peer relationships (Tarver et al., 2014).

Problem of Practice and Gap in the Literature

There is no unanimous agreement on which type of intervention is most effective in improving classroom instruction for students who exhibit behaviors consistent with a diagnosis of ADHD, nor does research show the definitive reasoning behind teachers' choice of interventions (Hall & Gushee, 2002; Rajeh et al., 2017). Therefore, the problem of practice addressed in this study is that while research supports the need for using interventions to improve classroom performance for students who exhibit behaviors consistent with a diagnosis of ADHD, there is a gap in the literature because it does not show if there is a relationship between the interventions a teacher uses or believes are effective for students impacted by ADHD and the teacher's perception of ADHD causality.

Purpose of the Study

The purpose of this study was to determine if there is a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and the teacher's perception of ADHD causality. To ascertain if a relationship exists, the study first examined teachers' perceptions of ADHD causality, based on the strength of their belief in biological and environmental factors as they relate to the DSM-5 ADHD criteria. Next, the study determined how effective teachers believe biomedical or parent-provided interventions are for students impacted by ADHD. The next step of the study was to explore the frequency of the teachers' use of school-based interventions for students with behaviors

consistent with a diagnosis of ADHD. Finally, the study determined if there was a relationship between the interventions a teacher uses or believes are effective for impacted students and a teacher's perception of ADHD causality.

Research Questions

The research questions that guided this study are:

1. To what extent do teachers perceive biology and the environment interact in the causality of the symptoms in a student identified as having behaviors consistent with a diagnosis of ADHD?
2. What biomedical interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD?
3. What parent-provided interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD?
4. What school-based interventions are most used by teachers for students identified as having behaviors consistent with a diagnosis of ADHD?
5. Is there a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality?

Figure 1.1 shows the alignment of the problem statement, the purpose statement, the conceptual framework components, the research questions, and the corresponding sections within the data instrument (see Figure 1.1).

Figure 1.1

Alignment Table for Teacher Perceptions of ADHD Study

Problem Statement: While research supports the need for the use of interventions to improve classroom performance for students who exhibit behaviors consistent with a diagnosis of ADHD, there is a gap in the literature because it does not show if there is a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality.			
Purpose Statement: The field of education would benefit from knowing if there is a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality.			
Framework	**Purpose**	**Research Question**	**Data Instrument**
Biological & Environmental Perceptions of ADHD Causality	Study teachers' perceptions of ADHD causality, based on their belief in biological and environmental factors.	To what extent do teachers perceive biology and the environment interact in the causality of the symptoms in a student identified as having behaviors consistent with a diagnosis of ADHD?	Survey: A 6-point Likert scale matrix with the 18 DSM-5 ADHD criteria, with a rating scale for Biological Causality & a rating scale for Environmental Causality.
Broad Knowledge Base of Available ADHD Interventions	Study which biomedical interventions teachers feel are most effective.	What biomedical interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD?	Survey: A 6-point Likert scale matrix to rate teacher belief in the effectiveness of biomedical interventions.
	Study which parent-provided interventions teachers feel are most effective.	What parent-provided interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD?	Survey: A 6-point Likert scale matrix to rate teacher belief in the effectiveness of parent-provided interventions.
	Study which school-based interventions teachers use the most.	What school-based interventions are most used by teachers for students identified as having behaviors consistent with a diagnosis of ADHD?	Survey: A 6-point Likert scale matrix to rate teacher use of school-based interventions.
Relationship Between Perception of Causality and Actions	Study if there is a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality.	Is there a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality?	(6) Bivariate correlation two-tailed tests

Conceptual Framework

Biological Causality

Even though ADHD is one of the most studied psychiatric disorders in America, according to Thapar et al. (2012), researchers have not yet determined “the single cause of ADHD and exposure to a risk factor does not necessarily result in disorder” (p. 260). Concerning biological causality, Boon (2020) found "individuals with ADHD have distinct anatomical brain differences compared to controls and important functional differences in mental processing" (p. 547). In addition, other biological events such as a traumatic brain injury, a childhood stroke, or a streptococcal infection can cause behaviors consistent with a diagnosis of ADHD (Livingstone et al., 2016). According to Quinn and Lynch (2016), "there is a broad consensus among international experts and organizations that ADHD is a genuine neurodevelopmental disorder based on empirical research" (p. 59). This consensus is grounded in genetic and neurological studies.

However, Thapar et al. (2013) did not agree and stated research demonstrates "the genetic risks implicated in ADHD generally tend to have small effect sizes or be rare" (p. 3). Therefore, they believed using genetics is not a reliable way of predicting or diagnosing ADHD. However, they did not completely discount genetics, but instead, believed genetics and environmental events interact in a student's presentation of ADHD symptoms. Thapar et al. (2013) found "inherited risks can contribute not only directly but are also likely to operate by increasing the likelihood of exposure to environmental adversity and altering sensitivity to environmental risks and protective factors" (p. 11).

Environmental Causality

Some previously researched environmental risks include exposure to the following toxins or situations: lead, tobacco smoke, alcohol, fluoridated water, manganese, phthalates, bisphenol A (BPA), polycyclic aromatic hydrocarbons (PAHs), poly-fluoroalkyl chemicals, inadequate diet, problematic family functioning, trauma, and low socioeconomic status (Deault, 2010; Lasky-Su et al., 2007; Polańska et al., 2012; Schullehner et al., 2020). Research shows some teachers believe ADHD characteristics have these aforementioned environmental triggers, while other teachers suppose ADHD characteristics are inherited (Carlson et al., 2006). Since researchers cannot definitively agree on a single ADHD causation, it is not surprising teachers also do not hold a unified perception of the cause of ADHD.

Biomedical Interventions

For this study, the biomedical interventions were based on the biomedical model. According to Deacon (2013), "the biomedical model posits that mental disorders are brain diseases and emphasizes pharmacological treatment to target presumed biological abnormalities" (p. 846). Examples of biomedical interventions for students who have behaviors consistent with a diagnosis of ADHD include:

- stimulants, such as methylphenidate (Adhansia XR, Aptensio XR, Concerta, Cotempla XR-ODT, Daytrana patch, Desoxyn, Jornay PM, Metadate, Methylin, Quillichew, Quillivant, and Ritalin); dextromethylphenidate (Dexedrine Spansule, Focalin, and Mydayis); amphetamine (Adderall, Adzenys ER, Dyanavel SR, Evekeo, Procentra,

and Zenzedi); and lisdexamfetamine (Vyvanse) (CDC, 2020; Sarris et al., 2011)

- tricyclic antidepressants (Imipramine, Amitriptyline, Desipramine, and Nortriptyline) (Sarris et al., 2011)
- nontricyclic antidepressants (Bupropion and Monoamine Oxidase) (Sarris et al., 2011)
- norepinephrine reuptake inhibitors (Strattera) (CDC, 2020; Sarris et al., 2011)alpha-adrenergicgic agents (Guanfacine XR - Intuniv; Clonidine XR - Kapvay) (CDC, 2020; Sarris et al., 2011)

Parent-Provided Interventions

For this study, parent-provided interventions were defined as interventions suspected to improve symptoms, but lack sufficient data to support the claim. Examples of parent-provided interventions for students who have behaviors consistent with a diagnosis of ADHD include:

- micronutrient supplements (Zinc, Iron, Magnesium, Vitamin B, Vitamin D, Omega-3 fatty acids) (Hall & Gushee, 2002)
- herbs (Ginkgo Biloba, French Maritime Pine Bark (FMPB), Ginseng, Valerian, St. John's Wort, Caffeine, Ningdong, Bacopa, and Passionflower (CDC, 2020; Hall & Gushee, 2002)
- lifestyle changes (exercise, adjusting sleep patterns, increasing the child's time spent outdoors, and limiting time on technology and media) (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n.d.); Chimiklis et al., 2018; Lambez et al., 2020; Purdie et al., 2002; Sheppard, 2015)

- dietary changes (exclusion of artificial food coloring, removing food preservatives from the child's diet, using a few-foods diet, removing extra sugar from the child's diet, increasing the child's protein intake, removing soda from the child's diet) (Pelsser et al., 2017; Sonuga-Barke et al., 2013)
- mindfulness exercises and yoga (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n.d.); Chimiklis et al., 2018; Lambez et al., 2020; Sheppard, 2015)
- therapies, such as neurofeedback therapy, music therapy, play therapy, and psychological therapy (Brock et al., 2010; Center for Children and Families, (n.d.); DuPaul et al., 2011; Lambez et al., 2020; Norouzi et al., 2018; Pfiffner, 2011; Purdie et al., 2002; Swank & Smith-Adcock, 2018)

School-Based Interventions

For this study, school-based interventions were defined as interventions which improve symptoms by virtue of an action taken either by the student or by an outside force to alter the student's behaviors and relationships within the school setting (*Psychosocial intervention: Definition & examples,* 2017). Examples of school-based interventions for students who have behaviors consistent with a diagnosis of ADHD include:

- behavior interventions, such as behavioral management reinforcement strategies consisting of using praise and social reinforcement, using choice as a reward, instilling a token economy, using contingent positive reinforcement, ignoring minor misbehavior, and allowing opportunities for the student to be successful in front of their peers (Brock et al., 2010;

CDC, 2020; Center for Children and Families, (n.d.); DuPaul et al., 2011; Filcheck & McNeil, 2004; Martinussen et al., 2011; Purdie et al., 2002) and behavior management, consequence-based approaches, such as teaching response cost, losing privileges, using behavioral contracts or charts, teaching when/then contingencies, using time-out, and using appropriate command language that is clear, specific, and manageable (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n.d.); DuPaul et al., 2011; Purdie et al., 2002)

- classroom interventions, such as changing a student's seat, clarifying/repeating instructions, providing breaks, allowing more time, shortening assignments, tailoring assignments to the student's level, following a basic classroom routine, deconstructing tasks, using timers, using non-verbal supports, using auditory reminder cues, posting visual prompts, focusing on relationship building, using pre-teaching skills, posting and reviewing rules often, allowing the student to use speech-to-text or text-to-speech, allowing the student a choice in how they show mastery of a concept, and limiting repetitive assignments (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n.d.); DuPaul et al., 2011; Evertson & Emmer, 1982; Jitendra et al., 2008; Martinussen et al., 2011; Purdie et al., 2002; Tyson, 2000; Wolraich et al., 2019)
- executive functioning interventions, such as allowing the student to work in a quieter environment, allowing the student to wear headphones, allowing the student to use a privacy board, using focusing tools,

providing guided notes, using different color markers, using mnemonics, asking probing questions, helping the student to connect new material clearly to prior knowledge, using an assignment notebook, using color-coded folders, teaching goal-setting, using a planner, and teaching self-monitoring (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n.d.); DuPaul et al., 2011; Hamilton & Astramovich, 2016; Martinussen et al., 2011) and computer-assisted instruction, used for skill acquisition and skill reinforcement and exergaming to support executive functioning (Benzing & Schmidt, 2019; Brock et al., 2010; CDC, 2020; Center for Children and Families, (n.d.); DuPaul et al., 2011)

- physical movement interventions, such as purposeful movement breaks, providing a seat that allows movement, allowing a student to stand to do work, allowing movement or fidgets, refraining from using the removal of recess as a punishment, and having the student be actively involved in the learning process versus passive involvement (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n.d.); Chimiklis et al., 2018; Lambez et al., 2020; Sheppard, 2015)
- peer-mediated interventions, such as using peer-tutoring, using group or paired learning, having transition buddies, sitting the student next to a role model, using peer modeling, and specific instruction in social skills and other behavioral competencies peers consider important, such as sports and game rules (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n.d.); Cordier et al., 2018; DuPaul et al., 2011)

Other interventions that can be initiated by the school, but not fully implemented within the classroom setting without parent cooperation include:

- school/home collaboration, such as using a communication notebook, using a daily report card, providing clearly written instructions on take-home assignments, and scheduling parent/teacher conferences (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n.d.); DuPaul et al., 2011; Kim et al., 2013; Malekpour et al., 2014; Mautone et al., 2011)
- parental supports, such as providing education on appropriate discipline strategies, referring to agencies for support, and providing essential items (Brock et al., 2010; Center for Children and Families, (n.d.); Lambez et al., 2020; Purdie et al., 2002)
- therapies, such as cognitive behavior therapy and group social therapy (Brock et al., 2010; Center for Children and Families, (n.d.); DuPaul et al., 2011; Lambez et al., 2020; Norouzi et al., 2018; Pfiffner, 2011; Purdie et al., 2002; Swank & Smith-Adcock, 2018)

Previous Research on Perception of Causality and Intervention Usage

A study by Furnham and Sarwar (2011) demonstrated "predictable correlations between beliefs about cause and treatments" (p. 301). While their study focused on autism instead of ADHD, Khasakhala and Galava (2016) determined there was a relationship between a teacher's perception of the causes of challenging behavior and a teacher's choice of behavior management strategies.

Research also provides data to support a relationship between parental perceptions of ADHD causality and their intervention choices (Johnston et al., 2005). For example,

parents who believe biological factors cause ADHD often choose medication, while parents who believe environmental factors cause ADHD often choose behavior management interventions. In addition, Lebowitz et al. (2016) showed having a biological view of causality positively affects adults' attitudes toward children who display behaviors consistent with a diagnosis of ADHD. Further, research showed even children hold predetermined beliefs that affect their choices when interacting with peers who have behaviors consistent with a diagnosis of ADHD (Na & Mikami, 2018).

Perceptions of Causality Defined

For the purpose of this study, when one holds a simple, biological view of ADHD causality, they believe only natural factors, such as aspects of a student's body or life processes, are causing the behaviors consistent with a diagnosis of ADHD. When one holds a simple, environmental view of ADHD causality, they believe only the factors surrounding the student through their upbringing or nurturing are causing the behaviors consistent with a diagnosis of ADHD.

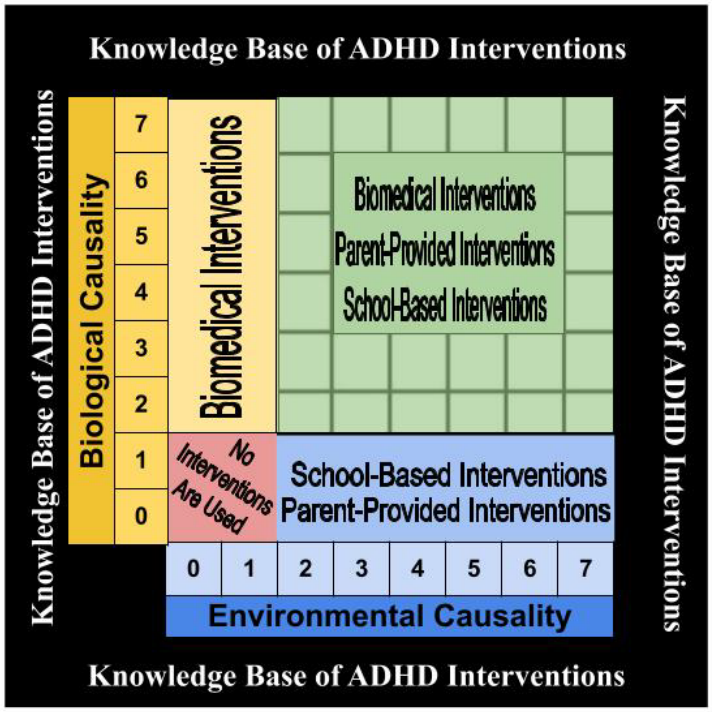
When one believes that an interaction between environmental and biological factors causes the behaviors, they have a complex view of ADHD causality (Dryer et al., 2006). Most research supports the complex view, believing behaviors consistent with a diagnosis of ADHD are due to the interdependence and mutual influence of both biological and environmental factors (Plomin et al., 1994; Robinson, 2004).

Figure 1.2, developed by the researcher, shows how the three previous components build the conceptual framework that guided this study: (1) biological and environmental perceptions of ADHD causality; (2) the broad knowledge base of available ADHD interventions; and (3) supporting research for the relationship between a person's

perception of causality and their subsequent actions. Using causality, interventions, and perception as a conjoined lens, a person's perception of ADHD causality impacts their ability to fully access the broad knowledge base of interventions (see Figure 1.2).

Figure 1.2

Impact of Causality on Intervention Options



When a person believes in only a single ADHD causation, they hold a simple view of causality. Since research shows beliefs impact behavior, the conceptual framework proposes their simplified belief system limits their ability to choose strategies from the full range of interventions. Thus, their access is constrained to the complete range of interventions shown to support students who display behaviors consistent with a diagnosis of ADHD.

When a person can accept there is an interaction between causal effects from both biological and environmental factors, they hold a complex view of causality. The

conceptual framework proposes their complex belief system expands their ability to choose any type of ADHD intervention. Thus, their access to the complete range of interventions shown to support students who display behaviors consistent with a diagnosis of ADHD is not limited.

Design of the Study

The researcher utilized a post-positivist approach, believing a quantitative study produces data representing "one reality, knowable within a specified level of probability" (Mertens, 2020, p. 11). The researcher believes the structure of knowledge is complex and the certainty of knowledge is tentative (DeBacker et al., 2008). Therefore, the researcher viewed the data as limited in its scope and recognized the study cannot identify all the contributing factors to explain teacher perceptions or intervention choices. The researcher acknowledged personal epistemological beliefs should not affect the study and followed Mertens's (2020) advice to "remain neutral to prevent values or biases from influencing the work by following prescribed procedures rigorously" (p. 15).

Methodology

The study used a quantitative correlational research design, which is a non-manipulation study. According to Rumrill (2004), "non-manipulation studies examine the strength or magnitude of association among variables, but no attempt is made to infer causality within an individual study" (p. 255). Therefore, the study did not add any type of intervention and study the result; it simply examined if there was a correlation between present teacher practices/beliefs and their perceptions of ADHD causality.

A correlation is one of the most common tests used to establish a relationship between two variables (Rumrill, 2004). The researcher used Spearman's correlation

(Field, 2018). To determine if there was a positive, negative, or no relationship between variables, all correlations were computed as two-tailed tests (Field, 2018). The correlations computed to test the hypotheses were bivariate, having two variables.

The researcher's hypothesis was: A relationship exists between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and the teacher's perception of ADHD causality. The null hypothesis was: No relationship exists between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and the teacher's perception of ADHD causality.

Setting

The researcher conducted the study within a public school district in southwestern Missouri. The school district serves approximately 6,400 students from three counties. The school district has ten school buildings. There is one main high school, with grades nine to twelve. There is also an alternative high school for at-risk students, which also has grades nine to twelve. There is one junior high, with grades seven and eight. There are two intermediate schools with grades five and six. There are four elementary schools with grades kindergarten to fourth. An additional elementary school has kindergarten to fifth.

The school district averages a 92% graduation rate. Approximately 87% of students report as white and 29.8% are eligible to take part in the Free or Reduced Lunch program. The student-to-teacher ratio is 19:1 and the teacher three-year retention rate is 66.2%. The school district has an average 12% special education incidence rate.

Sampling Method and Participants

The researcher used convenience sampling. According to Patton (2002), convenience sampling means persons taking part in the study were chosen because they were readily available. Another manner of describing convenience sampling is "one that you get because people who are willing to complete the survey are also available when you need them" (Fink, 2017, p. 99).

To conduct the convenience sampling, the researcher obtained permission from the superintendent to conduct the survey within the school district. Once the study's IRB was approved, the researcher contacted each building's principal to inform them of the study's purpose. She also requested permission to give a short presentation about the study and to hand out the surveys. Three principals agreed for the researcher to come to their buildings and meet with their staff. However, due to inclement weather days and other complications, only one building was able to host the researcher. In December 2021, two schools were given the survey and on January 2, eight schools were given the survey. The participants were given two weeks to complete the survey.

For the nine buildings in which the researcher could not do a personal presentation, the researcher sent an introductory email to each building principal, who then forwarded it to their staff. The email introduced the researcher, outlined the purpose of the study, provided the Informed Consent, and provided a digital copy of the survey. The email also notified the recipients they would be receiving a printed copy of the Informed Consent and the survey within the next three days in their school mailbox.

The researcher visited each school and placed survey packets in each eligible teacher's mailbox. The packet contained an envelope addressed to the researcher to be

used to return the completed survey. The researcher then sent a second email to thank the eligible participants for their participation and provided a link to the digital copy of the survey. Of the total number of surveys returned, only three were completed digitally and emailed. All other participants returned paper surveys through the mail.

Eligible teachers throughout the district's buildings were invited to participate. Participant criteria were as follows: (a) employed by NPS; (b) certified general education teacher (not special education); (c) have at least one year of teaching experience; (d) currently teaching in a general education classroom setting (not a special education classroom or intervention room); and (e) have at least one student who displays behaviors consistent with a diagnosis of ADHD, with or without a diagnosis (academic struggles or behavioral problems due to inattention, hyperactivity, and/or impulsivity).

To ensure all participants understood what was meant by "behaviors consistent with a diagnosis of ADHD," a clarifying paragraph based on the diagnostic criteria for ADHD found in the American Psychiatric Association's (2013) *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5) was provided within the Informed Consent. Along with listing the 18 DSM-5 ADHD diagnostic criteria, the paragraph clarified students did not need to have an official diagnosis of ADHD to be considered to have behaviors consistent with an ADHD diagnosis.

Data Collection Tools and Procedures

The researcher developed the data collection instrument, which was a survey (see Appendix A). The survey was distributed electronically and printed on paper. According to Merriam and Tisdell (2016), surveys are "intended to systematically describe the facts and characteristics of a given phenomenon" (p. 5). The survey aimed to determine a

teacher’s perception of ADHD causality and what interventions teachers use or believe are effective for students identified as having behaviors consistent with a diagnosis of ADHD.

Factors considered in the survey’s administration were the teachers' comfort with technology and their limited time. Therefore, the survey was designed to be completed either on paper or online. The researcher created the survey because no existing appropriate data collection tools were found. The researcher used various theories, criteria, and research studies to inform the item pool.

Mertens (2020) recommended for the researcher to "review the literature and ask other professionals and community members who are knowledgeable about the attribute and its measurement in the targeted sample to review the prototype" (p. 396). The researcher used special education teachers as advisors. The researcher shared the survey with the teachers and requested feedback to identify any confusing wording, input on the time the survey required to complete, and any technical issues. After receiving feedback, the researcher reassessed the instrument for bias and made revisions.

Survey Section One

Section One of the survey asked participants to identify the level they currently teach (elementary, intermediate, junior high, high school) and their number of years of teaching experience (2-3, 4-6, 7-9, 10+). In addition, the participants were asked to acknowledge receipt of the informed consent (see Appendix B). Putman and Rock (2018) defined informed consent as containing "specific information that allows the participants to assess the research study and subsequently participate of their free will as a result of

their understanding of the study" (p. 84). The last question of Section One was for participants to confirm they met the study's parameters.

Survey Section Two

Section Two of the survey gathered data to answer the research question: To what extent do teachers perceive biology and the environment interact in the causality of the symptoms in a student identified as having behaviors consistent with a diagnosis of ADHD? The researcher used the five steps of the Information Integration Theory (IIT) by Anderson (1996) to inform the survey to find a teacher's perception of ADHD causality (see Figure 1.3).

Figure 1.3

Example of IIT for Teacher Perception Process

Explicit Stimulus: 18 DSM-5 Criteria	**Stimulus Evaluation: Two Value Judgements for Causality**	**Integration Function: Rate Strength**	**Response Evaluation: Check responses**	**Observed Response: Answers on Survey**
DSM-5: Inattention - a: Fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks or misses details, work is inaccurate). Will use all 18 DSM-5 criteria. Only #1 is shown above. *(Observed)*	Please indicate your level of agreement that the following behaviors are caused by: BIOLOGICAL factors: (e.g., neurological, biochemical, or anatomical abnormality, due to genetics, heredity, brain development, prenatal complications, a childhood stroke, a streptococcal infection, or a frontal lobe injury.) AND (Please check a box on each line). ENVIRONMENTAL factors: (e.g., home support, inconsistent discipline, incomplete authoritative relationships, anger, avoidance, limited relational satisfaction, low social class, severe marital discord, paternal criminality, maternal mental disorder, placement in out-of-home care, toxin exposure, or trauma.) *(Unobserved - yes/no)*	Determine the strength of disagreement (1-3) or agreement (4-6) individually for biological and environmental factors. *(Unobserved)*	Choose Likert scale choices and then review choices to ensure they accurately reflect perceptions. 1 = Strongly Disagree 2 = Disagree 3 = Partially Disagree 4 = Partially Agree 5 = Agree 6 = Strongly Agree *(Unobserved)*	Submit scores for the researcher to view. *(Observed)*

The explicit stimulus was derived from the 18 diagnostic criteria for ADHD provided in the American Psychiatric Association's (2013) *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5). The participants were asked to assign two causality value judgments for each stimulus/DSM-5 criterion; one value judgment was for biological causality, and the other value judgment was for environmental causality. Then, the participants were asked to assign a level of importance to their judgments of causality.

The researcher gathered the data via two, six-point Likert scales for each of the 18 DSM-5 criteria. The researcher labeled and ranked the Likert scale as follows: 1 = Strongly Disagree; 2 = Disagree; 3 = Partially Disagree; 4 = Partially Agree; 5 = Agree; and 6 = Strongly Agree. The participants did not see the numerals. The participants recorded their answers on a six-point Likert scale and to ensure accuracy, the participants were asked to review their choices before submission.

Using the Likert scale, the participants responded to the following prompt regarding each of the 18 DSM-5 criteria to determine their level of agreement for biological and environmental causality: *Please indicate your level of agreement for the cause of each behavior: BIOLOGY: (e.g., student has a neurological, biochemical, or anatomical abnormality, due to genetics, heredity, brain development, prenatal complications, a childhood stroke, a streptococcal infection, or a frontal lobe injury). ENVIRONMENT: (e.g., student impacted by poor home support, inconsistent discipline, incomplete authoritative relationships, anger, avoidance, limited relational satisfaction, low social class, severe marital discord, paternal criminality, maternal mental disorder, placement in out-of-home care, toxin exposure, or trauma).*

Survey Section Three

Section Three of the survey gathered data to answer the following two research questions: What biomedical interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD? What parent-provided interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD?

The researcher gathered data via a matrix with a six-point Likert scale. The researcher labeled and ranked the Likert scale as follows: 1 = Strongly Disagree; 2 = Disagree; 3 = Partially Disagree; 4 = Partially Agree; 5 = Agree; and 6 = Strongly Agree. Using the Likert scale, the participants responded to the following prompt: *Please indicate your level of agreement that the following interventions are effective for treating students with behaviors consistent with a diagnosis of ADHD.*

The interventions chosen to be listed were from Figures 1.4 and 1.5, which the researcher created by compiling data from many studies (Benzing & Schmidt, 2019; Brock et al., 2010; CDC, 2020; Center for Children and Families, (n.d.); Chimiklis et al., 2018; Cordier et al., 2018; DuPaul et al., 2011; Evertson & Emmer, 1982; Filcheck & McNeil, 2004; Hamilton & Astramovich, 2016; Jitendra et al., 2008; Kim et al., 2013; Lambez et al., 2020; Malekpour et al., 2014; Martinussen et al., 2011; Mautone et al., 2011; Norouzi et al., 2018; Pfiffner, 2011; Purdie et al., 2002; Sheppard, 2015; Swank & Smith-Adcock, 2018; Tyson, 2000; Wolraich et al., 2019) (see Figure 1.4).

Figure 1.4

Biomedical Interventions for ADHD

Biomedical Interventions
Medication can only be prescribed by medical professionals. It does not cure, but rather eases ADHD symptoms during the time it is active in the student's body.
Stimulants **Methylphenidate-Based** Side Effects: headache; decreased appetite; stomachache; nervousness; trouble sleeping; nausea; reduced spontaneity. Other Side Effects: slowing of growth in children; eyesight changes or blurred vision; heart-related problems; worsening of psychiatric problems; circulation problems. Methylphenidate (Adhansia XR, Aptensio XR, Concerta, Cotempla XR-ODT, Daytrana patch, Desoxyn, Jornay PM, Metadate, Methylin, Quillichew, Quillivant, & Ritalin) Dextromethylphenidate (Dexedrine Spansule, Focalin, & Mydayis) --- **Amphetamine-Based** - Side Effects: headache; trouble sleeping; circulation problem in fingers and toes; decreased appetite; nervousness; dizziness; diarrhea; constipation; mood changes; dry mouth; runny nose, nosebleed; itching rash, allergic reactions; increased tics; reduced spontaneity. Other side effects: slowing of growth in children; eyesight changes or blurred vision; heart-related problems; worsening of psychiatric problems. Mixed salts of Amphetamine (Adderall, Adzenys ER, Dyanavel SR, Evekeo, Procentra, & Zenzedi) Lisdexamfetamine (Vyvanse)
Norepinephrine Reuptake Inhibitor Side Effects: nervousness; sleep problems; fatigue; upset stomach; dizziness; dry mouth; severe liver injury; suicidal thoughts. Atomoxetine (Strattera)
Alpha Adrenergic Agents Side Effects: fatigue; drowsiness; dizziness; dry mouth; decreased appetite; increased appetite; constipation; irritability; low blood pressure. Guanfacine XR (Intuniv) Clonidine XR (Kapvay)
Antidepressants Side Effects: nausea; vomiting; dry mouth; headache; constipation; sweating; joint aches; sore throat; blurred vision; diarrhea; dizziness; raise in blood pressure; chest pain, fainting; ringing in the ears, fast heartbeat; mental/mood changes; tremors; weight loss/gain. Tricyclic: Imipramine, Amitriptyline, Desipramine, & Nortriptyline Nontricyclic: Bupropion & Monoamine Oxidase

Figure 1.5

Parent-Provided Interventions for ADHD

Parent-Provided Interventions
Parents often look for interventions that will not have the side effects caused by medications and that are cost-effective.
Micronutrient Supplements (Zinc; Iron; Magnesium; Vitamin B; Vitamin D; Omega-3 Fatty Acids)
Herbal supplements (French Maritime Pine Bark; Ginkgo Biloba; St. John's Wort; Caffeine; Ginseng; Valerian; Ningdong; Bacopa; & Passionflower)
Remove food dyes from the diet.
Remove food preservatives from the diet.
Remove extra sugar from the diet.
Remove sodas from the diet.
Few-Foods Diet (finds food allergens)
Increase protein intake.
Improve sleep schedule.
Use mindfulness activities.
Increase time outside.
Participate in therapies (neurofeedback; music; play; or psychological (talk) therapy.
Exercise.
Limit time on electronics.

Survey Section Four

Section Four of the survey gathered data to answer the following research question: What school-based interventions are most used by teachers for students identified as having behaviors consistent with a diagnosis of ADHD? The researcher gathered the data via a matrix with a six-point Likert scale. The researcher labeled and ranked the Likert scale as follows: 1 = Never: 0%; 2 = Rarely: 10%; 3 = Occasionally: 30%; 4 = Sometimes: 50%; 5 = Frequently: 70%; 6: Usually: 90%. Using the Likert scale, the participants responded to the following prompt: *Please indicate how often you use the following interventions for students with behaviors consistent with a diagnosis of ADHD.*

The interventions were chosen from Figure 1.6, which the researcher created by compiling data from numerous studies (Benzing & Schmidt, 2019; Brock et al., 2010; CDC, 2020; Center for Children and Families, (n.d.); Chimiklis et al., 2018; Cordier et al., 2018; DuPaul et al., 2011; Evertson & Emmer, 1982; Filcheck & McNeil, 2004; Hamilton & Astramovich, 2016; Jitendra et al., 2008; Kim et al., 2013; Lambez et al., 2020; Malekpour et al., 2014; Martinussen et al., 2011; Mautone et al., 2011; Norouzi et al., 2018; Pfiffner, 2011; Purdie et al., 2002; Sheppard, 2015; Swank & Smith-Adcock, 2018; Tyson, 2000; Wolraich et al., 2019).

Figure 1.6 categorizes the school-based interventions into five distinct categories. The categories are (1) Classroom Interventions; (2) Executive Functioning Interventions; (3) Physical Movement Interventions; (4) Behavior Interventions; and (5) Peer-Mediate Interventions.

Figure 1.6

School-Based Interventions for ADHD

School-Based Interventions			
Classroom Interventions			
Use visuals of acceptable talk time & level, such as a talking stick or traffic light.	Chunk long projects into several pieces with clear deadlines for each chunk.	Allow the student to use speech-to-text or text-to-speech.	Check student understanding by having them verbally summarize.
Allow the student a choice in how to show mastery of a concept.	Use a visual timer/alarm to help with time management.	Give more time for tests, assignments, & projects.	Use auditory cues as reminders for desired behaviors.
Pre-teach necessary skills, such as vocabulary.	Sit the student in an area with fewer distractions.	Take actions to promote the student-teacher relationship.	Post and follow basic classroom routines.
Decrease assignment length	Post rules & discuss daily	Tailor assignment to student's level.	Limit repetitive assignments
Executive Functioning Interventions			
Present learning objectives in at least two ways.	Start lessons with a verbal & visual summary of what students will be learning.	Allow the student to take a test or do work in a quieter environment.	Help students clearly connect new material to prior knowledge.
Teach the student how to self-monitor.	Allow the student to use privacy boards.	Allow the student to use technology to complete work.	Allow the student to use headphones.
Post a list of student materials for each lesson.	Write clear directions for all assignments.	Help students set goals for tests, assignments, & projects.	Summarize key points visually & verbally.
Provide organization tools: colored folders, notebook w/ dividers, planner, or an assignment book.	Focusing tools: guided notes, colored markers, mnemonics, & probing questions.	Review behavior expectations often, especially if changing working styles (group work to independent work).	Review take-home assignments and provide clear, written instructions.
Physical Movement Interventions			
Schedule breaks with purposeful movement.	Tailor activity length to student's age.	Refrain from removing recess as a punishment.	Allow students to stand to do work.
Sit the student where they will be least disruptive if they move or fidget.	Allow the student to move or fidget in a non-distracting, quiet way.	Actively engage the student in the learning process, versus passive involvement, limiting downtime.	Allow the student to have some type of seat that allows movement
Behavior Interventions			
Provide or refer the parent to training or support programs.	Use appropriate command language (clear, specific, & manageable).	Use daily report cards or some other kind of school-to-home communication.	Use a behavior chart or behavior contract
Use when/then or if/then contingencies.	Use response-cost programs (i.e.., token economy).	Use of time-out or loss of privileges as a natural consequence.	Use choice as a reward.
Use purposeful, frequent praise.	Ignore minor misbehavior	Provide opportunities to be successful in front of peers.	Use contingent positive reinforcement.
Peer-Mediated Interventions			
Provide specific instruction in social skills & other behavioral competencies, (sports & game rules)	Use social reinforcement through peer modeling & tutoring.	Support smooth transitions by using transition buddies & prompts	Provide opportunities for group or paired learning

Data Analysis

Pre-Existing Data

The researcher considered using the special education data from the school district to determine how many students within the district were receiving special education services due to meeting the state criteria for Other Health Impairment through demonstrating behaviors consistent with a diagnosis of ADHD. In addition, the researcher also considered using the data for students receiving 504 accommodations for a diagnosis of ADHD. However, these data sets excluded students who are not officially diagnosed with ADHD. They also excluded students who are officially diagnosed with ADHD but are not receiving school-based support. Therefore, since an unknown number of students would not be counted within these data sets, the researcher did not feel they would provide accurate information. Therefore, there was no pre-existing data to analyze.

Data Analysis Plan

The researcher analyzed the survey data in five distinct steps, focusing on answering each of the research questions. The survey was designed to provide data to answer each research question. Once the data was collected, the researcher performed a variety of data analysis tasks, which will be described in further detail.

Analysis for RQ #1

To answer the first research question, the researcher used the data gathered from Section Two of the survey and performed a descriptive analysis of the scores for biological causality and a descriptive analysis of the scores for environmental causality. Each of the 18 items was scored on a scale of one point to six points. Therefore, depending on their responses, each teacher received a score between 18 and 108 for their view of biological

causality. They received a separate score between 18 and 108 for their view of environmental causality. This score was then divided by the number 18 to convert to a Likert interpretation. The data were then analyzed to determine the mean and standard deviation of the teachers' view of biological causality and their view of environmental causality. To complete this step, the research ran an exploratory correlation test between the biological causality score and environmental causality score.

Analysis for RQ #2

The study's second research question asked: What biomedical interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD? Section Three had five items that addressed biomedical interventions. Each of the five items was scored on a scale of one point to six points. Therefore, depending on their responses, each teacher received a score between five and 30. This score was then divided by the number 5 to convert to a Likert interpretation. The data were then analyzed to determine the mean and standard deviation of the teachers' agreement with the use of biomedical interventions. A grouped frequency distribution was done for each Likert scale category to determine the teacher's level of agreement with the effectiveness of individual biomedical interventions. Using the percentage score for teachers who strongly agreed with each biomedical intervention (6 = Strongly Agree), the data were then presented in order from the most agreement to the least agreement.

Analysis for RQ #3

The study's third research question asked: What parent-provided interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD? Section Three had 14 items that addressed parent-

provided interventions. Each of the 14 items was scored on a scale of one point to six points. Therefore, depending on their responses, each teacher received a score between 14 and 84. This score was then divided by the number 14 to convert to a Likert interpretation. The data were then analyzed to determine the mean and standard deviation of the teachers' agreement with the use of parent-provided interventions. A grouped frequency distribution was done for each Likert scale category to determine the teacher's level of agreement with the effectiveness of individual parent-provided interventions. Using the percentage score for teachers who strongly agreed with each parent-provided intervention (6 = Strongly Agree), the data were then presented in order from the most agreement to the least agreement.

Analysis for RQ #4

To answer the fourth research question, the researcher used 54 items from Section Four that addressed school-based interventions. The items were divided into five subscales: (1) Classroom Interventions; (2) Executive Functioning Interventions; (3) Physical Movement Interventions; (4) Behavior Interventions; and (5) Peer-Mediate Interventions. A grouped frequency distribution was done for each Likert scale category to determine the teacher's overall use of individual school-based interventions. Using the percentage score for teachers who usually use each school-based intervention (6= usually: 90%), the data were presented from the most to least use.

The items were scored on a scale of one point to six points. Therefore, depending on their responses, each teacher received a score between 54 and 324. This score was then divided by the number 54 to convert to a Likert interpretation. The data were then analyzed to determine the mean and standard deviation of the teachers' use of all school-

based interventions. It was also analyzed to determine the mean and standard deviation of each of the five subscales.

Analysis for RQ #5

To answer the fifth, and final research question, the researcher ran six, bivariate correlation, two-tailed tests (Field, 2018). The teacher's causality score for each of the two views of causality was analyzed with each of their scores for the three intervention categories. These scores were determined by adding up each teacher's answers in each subscale and then dividing the total score by the number of items in the subscale. Then, the researcher ran six separate correlation tests, the first three using Biological Causality with each of the intervention categories and the last three using Environmental Causality with each of the intervention categories.

Findings Report

Once the study was completed and the data were analyzed, the researcher created a findings report with an explanation of how many participants completed the survey and if the recommended sample size was obtained. Then, using the alignment table for the study as a guide, the researcher systematically shared the statistical findings as they related to each research question. The main finding of interest to the researcher is if there was a statistically significant linear relationship between any two variables, and if so, what was the strength and direction of the relationship. Figure 1.7 provides a framework for the data analysis plan followed by the researcher.

Figure 1.7

Alignment Table for Data Analysis of Research Questions

Research Questions	Data Instrument/Scales	Data Analysis Process
To what extent do teachers perceive that biology and the environment interact in the causality of the symptoms in a student identified as having behaviors consistent with a diagnosis of ADHD?	Survey - Section Two: 1 = Strongly Disagree; 2 = Disagree; 3 = Partially Disagree; 4 = Partially Agree; 5 = Agree; 6 = Strongly Agree	Descriptive analysis of scores for biological causality. Descriptive analysis of scores for environmental causality. Grouped frequency distribution of data sets. Analysis of teacher view of biological causality and environmental causality (mean and standard deviation). Exploratory correlation tests between biological causality scores and environmental causality scores.
What biomedical interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD?	Survey - Section Three: 1 = Strongly Disagree; 2 = Disagree; 3 = Partially Disagree; 4 = Partially Agree; 5 = Agree; 6 = Strongly Agree	Grouped frequency distribution for each Likert scale category. Using the percentage score for teachers who strongly agreed with each biomedical intervention, the data will be presented in order from the most agreement to the least agreement. Analysis of teacher agreement with the use of biomedical interventions (mean and standard deviation).
What parent-provided interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD?	Survey - Section Three: 1 = Strongly Disagree; 2 = Disagree; 3 = Partially Disagree; 4 = Partially Agree; 5 = Agree; 6 = Strongly Agree	Grouped frequency distribution for each Likert scale category. Using the percentage score for teachers who strongly agreed with each parent-provided intervention, the data will be presented in order from the most agreement to the least agreement. Analysis of teacher agreement with the use of parent-provided interventions (mean and standard deviation).
What school-based interventions are most used by teachers for students identified as having behaviors consistent with a diagnosis of ADHD?	Survey - Section Four: 1 = Never; 2 = Rarely: 10% 3 = Occasionally: 30% 4 = Sometimes: 50% 5 = Frequently: 70% 6 = Usually: 90%	School-based interventions will be categorized into five categories: (1) Classroom Interventions; (2) Executive Functioning Interventions; (3) Physical Movement Interventions; (4) Behavior Interventions; and (5) Peer-Mediated Interventions. Grouped frequency distribution for each Likert scale category. Using the percentage score for teachers who reported to usually use each school-based intervention, the data will be presented in order from the most useful to the least. Analysis of teacher use of all school-based interventions and subscale scores (mean and standard deviation).
Is there a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality?	Biological Causality Score Environmental Causality Score Support of Biomedical Interventions Score Support of Parent-Provided Interventions Score Use of School-Based Interventions Score	Is there a linear relationship between two variables and if so, what is the strength and what is the direction? Correlation tests will be run using a teacher's subscale score in each causality area and e teacher's score for each intervention category: Biological Causality Score/Biomedical Interventions Biological Causality Score/Parent-Provided Interventions Biological Causality Score/School-Based Interventions Environmental Causality Score/Biomedical Interventions Environmental Causality Score/Parent-Provided Interventions Environmental Causality Score/School-Based Interventions

Efforts to Support Quality of Research

Ethics

Mertens (2020) stated, "Ethics in research should be an integral part of the research planning and implementation process, not viewed as an afterthought or a burden" (p. 13). To act ethically, the researcher avoided any unnecessary risks that could bring harm to the participant's status in the organization. The researcher also ensured the participants knew their participation was voluntary. The researcher received human subjects training through the Collaborative Institutional Training Initiative (see Appendix C). Before conducting any research, the researcher gained approval from the University of Missouri's Institutional Review Board (IRB) (see Appendix D). In addition, the researcher obtained permission from the school district (see Appendix E).

Risks

A risk to this study was that it had the potential to cause embarrassment to participants who either display, or who have family members who demonstrate behaviors consistent with a diagnosis of ADHD. Therefore, participant identities were protected by not asking teachers to provide their names or their specific job title.

Another ethical issue the researcher anticipated was the vulnerability of the students. The students were vulnerable because having behaviors consistent with a diagnosis of ADHD could potentially qualify them to receive special education services by meeting the state eligibility criteria for Other Health Impairment. Markham et al. (2012) stated "the greater the vulnerability of the community/author/ participant, the greater the obligation of the researcher to protect the community/author/ participant" (p.

4). The researcher addressed this issue by not having the teachers provide student names or any type of identifying information.

Content Validity

According to Fink (2017), "a reliable survey results in consistent information. A valid survey produces accurate information" (p. 11). Since the researcher desired the survey to be both reliable and valid, the conceptual framework described previously was used as a guide to ensure the researcher grounded the survey in the relevant literature. According to Fink (2017), a survey has content validity "if it contains a reasonable sample of facts, words, ideas, and theories commonly used when discussing or reading about [the topic]" (p. 78). To ensure the survey had content validity, the verbiage for the answer choices was based on the data found within the literature review and the DSM-5 criteria.

Generalizability

Gall et al. (2007) define generalizability as the extent to which findings in one study can be applied in another study or similar situation. To support generalizability, the researcher strictly adhered to the previous criteria described for the participants. In addition, the researcher worked diligently to obtain an appropriate sample size of 82. Onwuegbuzie et al. (2004) stated a sample size of 82 participants was the recommended sample size for a two-tailed test “for detecting moderate effect sizes with .80 statistical power at the 5% level of significance” (p. 288).

Limitations

The first limitation of this study was the use of convenience sampling, which limits the ability for the study to be generalized. Second, this study was conducted in a

primarily white, rural, public school district. Third, due to no pre-existing data, the survey results could not be triangulated. Fourth, the data about the use of environmental supports within the classroom was self-reported, with no system for ensuring fidelity.

Researcher's Positionality Statement

To be transparent, the researcher would like to offer a researcher's positionality statement. The researcher is currently a special education process coordinator, employed by the school district in which the study was conducted. She also holds administrative certification and occasionally serves in an administrative role. Before being a process coordinator, the researcher worked for the school district for six years as a special education teacher within a high needs/behavior classroom. Her primary teaching experience has been with students who have autism, are intellectually disabled, or wave other health impairments. In addition, she has two years of teaching experience in a general education classroom outside of the district.

The researcher is a white, non-disabled, married mother of four teenagers. Her youngest teen displays behaviors consistent with a diagnosis of ADHD but does not have a formal diagnosis. Her teen does not receive special education services, nor Title services. The researcher has observed how behaviors consistent with a diagnosis of ADHD have affected her teen's academic work quality, peer and adult relationships, and the ability to meet classroom behavioral expectations. She has also witnessed how common ADHD behaviors impact overall classroom learning for peers. The researcher holds a complex view of ADHD causality, believing ADHD symptoms have biological foundations, which can be exasperated through environmental triggers.

While she supports the appropriate use of biomedical interventions as an ADHD intervention and has witnessed their positive impact on other students, they are not an intervention she currently uses for her teen. Instead, she primarily uses parent-provided interventions, such as verbal cues, visuals, diet restrictions, video game limits, and structure to support her teen's needs. The researcher's purpose for doing this study is to help general education teachers better support students with behaviors consistent with a diagnosis of ADHD, thus helping all students learn more effectively.

Significance of the Study

Practice

Practitioners in education could benefit from knowing if there is a relationship between the interventions a teacher uses within the classroom for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality. If there is a relationship, the study will show that a change in perception about ADHD causality would change the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD. Practitioners could use the study's data as support for the need to design professional development about ADHD causality that is culturally relevant and applicable to the teachers' prior experiences with students who display characteristics consistent with a diagnosis of ADHD (Rock, 1985).

The expectation would be that after being given additional knowledge about ADHD causality, clarifying cultural misconceptions, and connecting the new knowledge to experiences, a teacher's perceptions should change to a more complex view of causality. This would enable them to make better intervention decisions. If the hypothesis

is null, and there is no relationship between a teacher's perception of ADHD causality and the interventions a teacher uses for students identified as having behaviors consistent with a diagnosis of ADHD, then practitioners would know to use strategies focused on changing a teacher's perceptions about ADHD causality would not be an effective strategy for improving school-based intervention decisions.

Scholarship

Scholarship in education could benefit from this study since it fills a gap in the literature concerning if a teacher's perception of ADHD causality impacts the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD. In addition, this study provides an opportunity to extend the research by duplicating the study in the future by using special education teachers or Title 1 interventionists instead of using general education teachers. Other possibilities for extending this study are to research if teachers who hold a complex view of causality are more effective in the classroom if teachers are using interventions with greater fidelity, or if using certain interventions helps to develop stronger student-teacher relationships.

Summary

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most studied psychiatric disorders, in conjunction with being the most prevalent pediatric health diagnosis. Symptoms of ADHD include academic struggles, behavioral problems, inattention, hyperactivity, and impulsivity. While it is estimated ADHD symptoms academically and socially affect 8% of American students, approximately only one-third of students who display behaviors consistent with a diagnosis of ADHD ever receive a

formal diagnosis. Regardless of their diagnostic status, students impacted by ADHD are most successful when they receive multidisciplinary interventions.

Research has shown parental support of different types of interventions depends on the parents' belief either biological or environmental factors caused their child's behaviors consistent with a diagnosis of ADHD. However, research has not yet shown a similar relationship between a teacher's beliefs and their use of interventions. Therefore, the purpose of this study was to determine if there is a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality.

SECTION TWO:

PRACTITIONER CONTEXT FOR THE STUDY

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is currently one of the most prevalent pediatric health diagnoses, with an estimated impact of almost a quarter of all school-age students (Tatlow-Golden et al., 2016). It is common for students who display characteristics common with a diagnosis of ADHD to struggle academically due to most students having deficits in the areas of executive functioning skills, working memory, organizational skills, time management, planning, social skills, and emotional regulation (Barkley & Fischer, 2011; Chacko et al., 2018). These struggles often result in increased classroom disruptions and lost teaching time (Stormont, 2001). Numerous interventions exist to support students who display characteristics common with a diagnosis of ADHD, but not all teachers utilize or support the full scope of interventions.

The purpose of this study is to determine if there is a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality. Using a conceptual framework that incorporated perceptions of ADHD causality, the broad knowledge base of interventions, and the relationship between belief and action, the researcher desired to determine if it is beneficial for teachers to be given professional development focused on ADHD causality. The target audience for the professional development module will be special education administrators in Missouri who have the capability to provide professional development within their districts.

The purpose of Section Two is to explain how equipping Missouri's special education administrators with the study-informed ADHD professional development intervention resources could ultimately lead to the distribution of the resources to special

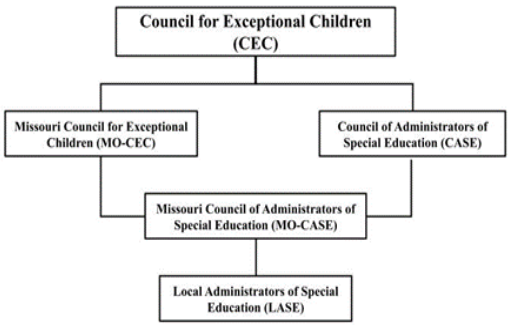
education professionals nationwide. The section will begin by providing background information for five distinct stratums of the Council for Exceptional Children. Then, a brief synopsis of networking research will be presented, followed by an explanation of the strategic networking plan to be used to promote the dissemination of the intervention resources. The section will conclude with a summary of the anticipated resources and outcomes.

Background of the Council for Exceptional Children

According to Loe & Feldman (2007), the educational support team for students who display behaviors consistent with a diagnosis of ADHD often includes a variety of participants, such as parents, health providers, support staff, related service providers, general education teachers, special education teachers, instructional-support specialists, special education administrators, building-level administrators, and district-level administrators. These roles are all represented within the educational association known as the Council for Exceptional Children (CEC). The following paragraphs will provide historical and present operating information for CEC and four of its associated units. In addition, the membership focus, values, responsibilities, and activities of each unit will be clarified. Figure 2.1 shows the structure of the units to be discussed (see Figure 2.1).

Figure 2.1

Structure of CEC to LASE



As seen in Figure 2.1, CEC is the parent, or national association. If CEC members live in Missouri, they automatically become members of the Missouri Council for Exceptional Children (MO-CEC). If CEC members choose to pay an additional fee and are employed as a K-12 special education administrator, they can join the Council of Administrators of Special Education (CASE). If a MO-CEC member is also a CASE member, they automatically become a member of the Missouri Council of Administrators of Special Education (MO-CASE). MO-CASE members are given the option to join one of the 19 regionally located Local Administrators of Special Education (LASE) groups.

Council for Exceptional Children

According to their website (https://exceptionalchildren.org), the "Council for Exceptional Children (CEC) is the largest international professional organization dedicated to improving the success of children and youth with disabilities and/or gifts and talents." The CEC works toward this improvement by advocating for government policies to support exceptional learners, setting standards for special educators, providing professional development, and aiding special education practitioners in obtaining needed resources. CEC's two strategic plan goals, adopted in October of 2019 are: "Educators will be highly competent professionals entrusted to provide quality instruction that will enable all students to pursue their full potential" and "CEC will have the capacity and capabilities to lead the field of special education in advocacy, standards, and professional learning and practice." CEC's three core values are visionary thinking, integrity, and inclusiveness.

CEC is in its 100th year of operation, having been founded in 1922 by the faculty and students who were attending the summer session of the Teachers College at

Columbia University. From 1941 to 1977, CEC merged with the Special Education Department of the National Education Association (NEA). However, CEC is now an autonomous organization with approximately 20,000 members. Membership consists of regular education teachers, special education teachers, retired teachers, administrators, researchers, college professors, college students, paraprofessionals, related service providers, and family members of students with exceptional learning needs.

CEC has local chapters or units in all 50 states, along with a unit in the District of Columbia, and five provincial units in Canada. When members pay to join CEC, they have a dual membership to the national organization, along with their appropriate state or provincial unit membership. In addition, CEC members have the option to pay additional fees to join one or more of the following 18 Special Interest Divisions:

- Council of Administrators of Special Education (CASE)
- Complex and Chronic Conditions: The Division for Physical, Health and Multiple Disabilities (CCC)
- Division for Research (CEC-DR)
- CEC Pioneers Division (CEC-PD)
- Council for Educational Diagnostic Services (CEDS)
- Division on Autism and Developmental Disabilities (DADD)
- Division of Visual and Performing Arts Education (DARTS)
- Division for Communication, Language, and Deaf/Hard of Hearing (DCD)
- Division on Career Development and Transition (DCDT)
- Division for Culturally and Linguistically Diverse Exceptional Learners (DDEL)
- Division of Emotional and Behavioral Health (DEBH)

- Division for Early Childhood (DEC)
- Division of International Special Education and Services (DISES)
- Division for Learning Disabilities (DLD)
- Division on Visual Impairments and Deaf-blindness (DVIDB)
- Innovations in Special Education Technology Division (ISET)
- The Association for the Gifted (TAG)
- Teacher Education Division (TED)

Missouri Council for Exceptional Children

According to their website (https://missouri.exceptionalchildren.org), the mission statement for the Missouri Council for Exceptional Children (MO-CEC) unit is to "advance the education of individuals with exceptionalities and to promote related educational, scientific, and charitable purposes." MO-CEC has six university-based student CEC chapters. In addition, all members have the option of joining one of the 18 Special Interest Divisions previously listed. Of interest to this research project is the Council of Administrators of Special Education (CASE).

Council of Administrators of Special Education

According to their website (https://www.casecec.org), the Council of Administrators of Special Education (CASE) is a group of administrators who are "dedicated to the enhancement of the worth, dignity, potential, and uniqueness of each individual in society." The mission of CASE is to "provide leadership and support to members by shaping policies and practices that impact the quality of education." The following eight committees work towards this mission: (1) Finance; (2) Membership; (3) Policy and Legislation; (4) Product Review; (5) Professional Development;

(6) Publications, Research, Technology, and Communications; and (7) Unit Development. The Unit Development committee's responsibility is to support and oversee the operation of the state and provincial CASE units, such as the unit in Missouri discussed next.

Missouri Council of Administrators of Special Education

The Missouri CASE unit is entitled the Missouri Council of Administrators of Special Education (MO-CASE). MO-CASE began in 1972 and its headquarters are in Jefferson City, Missouri. According to its website (https://www.mo-case.org), MO-CASE is "dedicated to the professional development and support of administrators of special education within Missouri's educational settings." According to their 2020-2022 strategic plan, the four goals of MO-CASE are focused on leadership, advocacy, support, and education.

The primary activities of MO-CASE are distributing a quarterly newsletter, holding a fall and spring conference, and providing up to five, $1,000 scholarships to students pursuing a degree in special education. In addition, MO-CASE has a partnership with the Missouri Department of Elementary and Secondary Education (DESE) to provide the Administrator Mentoring Program (AMP). This program pairs new special education directors with veteran directors for two years. Another avenue of mentorship provided through MO-CASE are the Local Administrators of Special Education (LASE) groups.

Local Administrators of Special Education

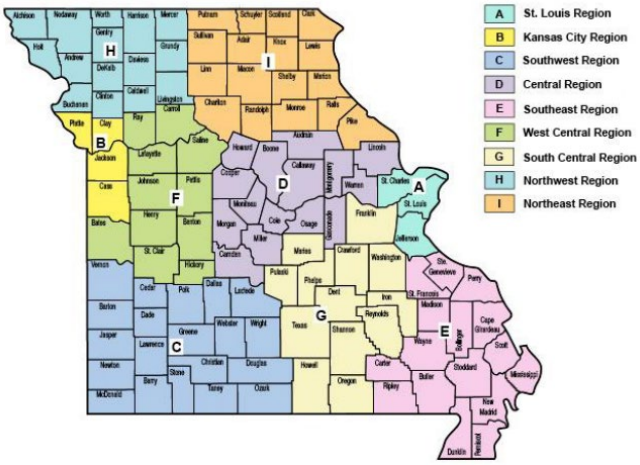
Missouri has 19 regionally located Local Administrators of Special Education (LASE) groups. LASE groups generally meet monthly and provide an opportunity for

professional collaboration. Members of the LASE groups include special education executive directors, special education assistant directors, special education process coordinators, and any other special education, K-12 employee that is serving in an administrative role for their district. Information at the monthly meetings consists of relevant professional development presentations and updates from the appropriate regional professional development or compliance representatives.

Missouri is divided into nine distinct regions, each served primarily by the local Regional Professional Development Center (RPDC). However, school districts are allowed to access resources from any of the RPDC as needed, and it is not uncommon for members of one region to attend training offered in another region. While LASE membership is primarily connected to a single regional group, collaboration is encouraged between the regional units. Figure 2.2 shows the location of the LASE groups within Missouri, based on their letter designation, (see Figure 2.2).

Figure 2.2

Missouri LASE Groups by Region, 2021-2022



Note. From *MO LASE GROUPS 2021_2022.pdf,* by MO-CASE, 2010, https://www.mo-case.org/resources/Documents/MO%20LASE%20 GROUPS%202021_2022.pdf.

The following list indicates the location of the LASE groups and how many LASE groups are located within these regions:

- A: RPDC #8, St. Louis, 3 LASE groups
- B: RPDC #3, Kansas City, 2 LASE groups
- C: RPDC #7, Southwest-Springfield, 2 LASE groups
- D: RPDC #2, Central-Hearth of Missouri, 3 LASE groups
- E: RPDC #1, Southeast-Cape Girardeau, 1 LASE group
- F: RPDC #9, West Central-Warrensburg, 1 LASE group
- G: RPDC #6, South Central-Rolla, 3 LASE groups
- H: RPDC #5, Northwest-Marysville, 2 LASE groups
- I: RPDC #4, Northeast-Kirksville, 1 LASE group.

Networking with the CEC-Affiliated Special Education Professionals

According to Haythornthwaite and De Laat (2010), networked learning is an emerging process where people develop a web or social infrastructure of contacts to increase their knowledge base. Educational associations, such as CEC, often offer this type of networked learning. Members within CEC can choose to network with special education teachers in a variety of settings. Networking can happen within their building, throughout their district, within their community, across their state, or nationwide. According to research "networked learning puts the emphasis on the learner and tries to maximize the network in which this person navigates in support of their learning, whether

this learning is personally driven, collaborative, or collective" (Hanraetsa et al., 2011, p. 86).

Relationships fostered within these networks are often called "ties." Ties can be weak or strong. According to Granovetter (1973), "weak ties are more likely to link members of different small groups than are strong ones, which tend to be concentrated within particular groups" (p. 1376).

The researcher has begun to form weak ties with various members of the 19 regionally located LASE groups. Through these weak ties, knowledge from this study will be shared by the researcher with the LASE members. The intent is for the LASE members to share the study's knowledge with their strong ties. An additional desire is for the LASE members to share the resources with their ties at the national unit level. Further, the researcher will seek out opportunities to present the study's findings at regional, state, or national CEC gatherings.

Research Implications for the CEC-Affiliated Special Education Professionals

According to Easton (2015), the most effective and well-received professional development comes from professionals connected within a teacher's district. In addition, research also supports the positive impact of professional collaboration and mentoring relationships linked to professional development activities (Darling-Hammond et al., 2009). Therefore, using the information gained from this study, the researcher will equip the CEC-affiliated special education administrators with the resources needed to provide effective professional development to mixed groups of regular and special education teachers. An integral piece of this professional development will be opportunities for collaboration, along with a mechanism for pairing teachers who are struggling with the

impacts caused by behaviors common to ADHD with mentor teachers who have previous success using research-based interventions.

Anticipated Resources

The researcher believes in the validity and importance of the resources; it is her job to also convince other educational practitioners of the resources' worth. To accomplish this, the researcher worked to make the resources accurate, visually appealing, and efficient (Rylands, 2016). In addition, the resources were intentionally wordsmithed to garner the most interest, such as using consensus language to unite the practitioners.

According to Lee and Kronrod (2020), consensus language "can be highly persuasive because it implies general agreement about an idea or behavior, which in turn is suggestive of the validity of that idea or behavior" (p. 354). In this situation, it is beneficial the researcher does not hold strong ties to many of the special education administrators because research has shown "when using consensus language, weak ties are perceived as referring to a broader (i.e., larger, and possibly more diverse) population than strong ties, which can influence actual behaviors and decisions because they influence perceptions of validity" (Lee & Kronrod, 2020, pp. 368-369).

With the above guidance in mind, the researcher created a succinct professional development module for special education administrators to help improve practice as it relates to the study's findings concerning students with behaviors consistent with ADHD. It consists of a Google Slide presentation, an outline of the presentation, and appropriate handouts.

Anticipated Outcomes

According to research, effective professional development can significantly improve student learning outcomes along with improving teacher morale and retention rates (Fletcher-Wood & Zuccollo, 2020). Students with improved success at school often experience improved social-emotional health and family relationships. Appropriate communication with families can foster a stronger partnership. In addition, the proposed professional development module can be used as an ongoing resource for the school-based intervention teams, which can facilitate decreased instructional disruptions, behavioral referrals, absences, and dropouts.

Summary

The researcher desires to equip Missouri's special education administrators with a professional development module consisting of study-informed ADHD resources. The Council for Expectational Children was chosen as the practitioner context due to its multi-tiered structure and alignment to this study's topic. Strategic networking ties will enable the researcher to connect with Missouri-based special education practitioners, along with providing access to special education practitioners nationwide. The anticipated outcomes of this study are improved student learning, increased teacher morale and retention, strengthen school-family partnerships, and enriched tiered intervention programs.

SECTION THREE:

SCHOLARLY REVIEW FOR THE STUDY

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is a "childhood-onset neurodevelopmental disorder characterized by developmentally inappropriate levels of inattention, hyperactivity, and/or impulsivity, along with pervasive and significant functional impairment" (Ahmann, 2017, p. 121). Symptoms consistent with a diagnosis of ADHD impact approximately 8.2% of American children (Danielson et al., 2018). Males are more than twice as likely as females to show characteristics consistent with an ADHD diagnosis (David, 2013). ADHD symptoms cause academic struggles, behavioral problems, inattention, hyperactivity, and impulsivity (American Academy of Pediatrics, 2011). These struggles occur because students displaying behaviors consistent with an ADHD diagnosis often have deficits in the areas of executive functioning skills, working memory, organizational skills, time management, and planning (Barkley & Fischer, 2011; Chacko et al., 2018).

In addition, researchers believe affected students are at a greater risk for comorbid psychiatric problems, such as conduct problems, substance abuse, and mood disorders (Levine & Anshel, 2011). School-based concerns for students exhibiting behaviors consistent with a diagnosis of ADHD include lower grades, substandard scores on standardized tests, referral for special education services, decreased expectations from teachers, higher absenteeism rates, higher retention rates, and underdeveloped social skills (DuPaul et al., 2011).

Problem and Purpose of Study

There is no unanimous agreement on which type of intervention is most effective in improving classroom outcomes for students affected by ADHD, nor does research

show the reasoning behind a teacher's choice of interventions (Hall & Gushee, 2002; Rajeh et al., 2017). The problem of practice addressed in this study is while research supports the need for using interventions to improve classroom performance for students who exhibit behaviors consistent with a diagnosis of ADHD, there is a gap in the literature because it does not show if there is a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality. The purpose of this study was to determine if there is a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality.

Limitations of the Literature Review

This study did not address the relationship between a teacher's attitude towards students with characteristics consistent with a diagnosis of ADHD and a teacher's choice of interventions (Anderson et al., 2012; Dort et al., 2020; Ghanizadeh et al., 2006; Johnston et al., 2005; Kwasman et al., 1995; Lebowitz et al., 2016; Liang & Gao, 2016). Nor did it address the relationship between teacher knowledge and teacher choice of interventions (Mulholland, 2016; Vereb & DiPerna, 2004; Zentall & Javorsky, 2007). In addition, gender, ethnic, and socioeconomic differences were not a focus of this study (Bussing et al., 1998; Chen et al., 2008; Dong et al., 2020; Gould et al., 2018; Walton et al., 2014; Wood et al., 2009).

Blueprint of the Literature Review

The literature review will begin by defining the behaviors consistent with a diagnosis of ADHD. It will then explore the influence the behaviors consistent with a diagnosis of ADHD have on an affected child, their family, teacher, and peers. Next, the researcher will introduce the conceptual framework of the study.

ADHD causality, the first component of the conceptual framework, will support the first research question: To what extent do teachers perceive biology and the environment interact in the causality of the symptoms in a student identified as having behaviors consistent with a diagnosis of ADHD? Within the causality section, the researcher will examine the nature versus nurture debate, along with theories for both biological and environmental causality.

Next, the second component of the conceptual framework, ADHD interventions, will support the next three research questions: What biomedical interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD? What parent-provided interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD? What school-based interventions are most used by teachers for students identified as having behaviors consistent with a diagnosis of ADHD? The intervention section will start with a sample of the inconsistent data found within the research on ADHD interventions. It will then examine common biomedical, parent-provided, and school-based interventions.

The literature review will summarize the most effective interventions. Research showing the need for increased teacher training will follow, supported by a discussion of

the misconceptions affecting teacher effectiveness. The intervention section will conclude by clarifying how teachers currently use interventions in their practice.

Finally, the literature review will examine perception, which is the last conceptual framework component. Developing an understanding of perception supports the fifth research question: Is there a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality? The perception section will begin by defining perception and an overview of perception creation. Then, the literature review will briefly explain the Information Integration Theory (Anderson, 1996), followed by a summary of how culture can affect perception. The perception section will conclude with a discussion of how perception affects a person's actions. A summary of the key points will draw the literature review to a close.

Defining Behaviors Consistent with a Diagnosis of ADHD

The supposition of ADHD prevalence ranges from 1% to 26%, with estimates of approximately two-thirds of students who exhibit behaviors consistent with a diagnosis of ADHD will never receive a formal diagnosis (Tatlow-Golden et al., 2016). In addition, there are students with an official diagnosis of ADHD who do not receive academic support. Therefore, to consider many undiagnosed students, along with diagnosed students who are not receiving academic support, for this study, affected students will be those with behaviors consistent with a diagnosis of ADHD, regardless of their diagnostic status or if they are receiving school-based support.

The parameters used are the following diagnostic criteria for ADHD from the American Psychiatric Association's (2013) *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5):

> (1) Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks or misses details, work is inaccurate); (2) Often has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading); (3) Often does not seem to listen when spoken to directly (e.g., mind seems elsewhere, even in the absence of any obvious distraction); (4) Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., starts tasks but quickly loses focus and is easily sidetracked); (5) Often has difficulty organizing tasks and activities (e.g., difficulty managing sequential tasks; difficulty keeping materials and belongings in order; messy, disorganized work; has poor time management; fails to meet deadlines); (6) Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers); (7) Often loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones); (8) Is often easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts); (9) Is often forgetful in daily activities (e.g., doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments); (10) Often fidgets with or taps hands or feet or squirms in

seat; (11) Often leaves seat in situations when remaining seated is expected (e.g., leaves his or her place in the classroom, in the office or other workplace, or in other situations that require remaining in place); (12) Often runs about or climbs in situations where it is inappropriate (Note: In adolescents or adults, may be limited to feeling restless); (13) Often unable to play or take part in leisure activities quietly; (14) Is often "on the go" acting as if "driven by a motor" (e.g., is unable to be or uncomfortable being still for an extended time, as in restaurants, meetings; may be experienced by others as being restless or difficult to keep up with); (15) Often talks excessively; (16) Often blurts out an answer before a question has been completed (e.g., completes people's sentences; cannot wait for a turn in conversation); (17) Often has trouble waiting his/her turn (e.g., while waiting in line); and (18) Often interrupts or intrudes on others (e.g., butts into conversations, games, or activities; may start using other people's things without asking or receiving permission; for adolescents and adults, may intrude into or take over what others are doing). (pp. 17-19)

The researcher used these criteria because Garcia Rosales et al. (2015) found "all 18 DSM-V items contributed significantly and independently to the clinical diagnosis of ADHD" (p. 1335). In addition, a study by Abramov et al. (2019) found there was a correlation "between the biological-based classifier and the DSM outputs for the classification of subjects as either ADHD or not. This result suggests that the DSM clinically describes a biological condition, supporting its validity for ADHD diagnostics" (p. 7074-1).

For a clinical diagnosis of ADHD, it is unnecessary for students to display all 18 characteristics. The DSM-5 diagnostic criteria for Attention Deficit Hyperactivity Disorder are for the child to display at least six characteristics for at least six months before age 12, and a comorbid condition cannot cause the characteristics. In addition, characteristics need to be seen across settings. Further, behavioral characteristics need to be negatively affecting the child within the school, family, and social settings (DSM-5).

Consequences from Behaviors Consistent with a Diagnosis of ADHD

Students with behaviors consistent with a diagnosis of ADHD often display characteristics which negatively impact family and peer relationships (Tarver et al., 2014). In addition, research has found not treating ADHD can lead to dangerous consequences (Clarke, 2011). Dekkers et al. (2016) found impacted students often put themselves in danger by making risky decisions.

However, some researchers hold a positive view of ADHD, viewing the behaviors consistent with a diagnosis of ADHD as "ideal behaviors for ambitious, hardworking American people who want to compete and to get ahead in the capitalist global economic system" (Clarke, 2011, p. 626). Instead of viewing the behaviors as needing management or medication, they view the behaviors as normal, masculine behaviors that are naughty, but humorous, and do not view ADHD as an actual condition (Clarke, 2011; Sherman, 2015). However, most research supports ADHD as a genuine condition, causing negative consequences to the affected child, their family, their teachers, and their peers (Collett & Gimpel, 2004; Sayal et al., 2006; Zoromski et al., 2020).

Consequences of ADHD on the Affected Child

It is common for students with behaviors consistent with a diagnosis of ADHD to

struggle academically (DuPaul et al., 2011). Research shows 56% of students impacted with symptoms common to a diagnosis of ADHD will need some type of academic tutoring, 30% will be retained at least one grade, up to 40% will be placed in special education, and overall, they will be more likely than non-impacted peers to develop a dependence on drugs or alcohol, to experience greater mental health challenges, and to have worse post-secondary educational success (Murphey et al., 2002). Becker et al. (2020) found up to 63% of students who have behaviors consistent with a diagnosis of ADHD struggle academically because of having a sluggish cognitive tempo (SCT) which "includes symptoms of slowness, mental confusion, excessive daydreaming, apathy, and drowsiness or sleepiness" (p. 575).

Students affected by ADHD have extreme emotions that can change quickly, often appearing to be on a roller coaster ride of emotions. "When happy, they tend to be so happy that people are disrupted. When unhappy, they tend to be so unhappy that people are equally disrupted" (Goldstein & Naglieri, 2008, p. 863). In addition, students with behaviors consistent with a diagnosis of ADHD often suffer poor self-esteem, depression, peer rejection, anxiety, and worry (Collett & Gimpel, 2004; Volpe et al., 1999).

One reason for their low self-esteem is students affected by ADHD often overestimate how well they will do on challenging tasks and when they fail, they become easily frustrated and struggle to stay emotionally regulated (Milich, 1994). Because of their elevated and disruptive emotional response to failure, it is common for caregivers of students affected by ADHD to allow students to quit or take breaks from challenging activities. However, Rucklidge and Kaplan (2000) stated learned helplessness comes

from a student repeatedly failing and not being challenged to persevere. A study by Kaidar et al. (2003) showed "prior experiences of failure (e.g., doing badly on a test, getting rejected by peers) influenced the type of attributions children make when faced with failure, which in turn affected future experiences, outcomes, and ultimately, self-perceptions" (p. 100).

Researchers encourage parents and teachers to provide support to the affected child during frustrating tasks instead of excusing the child from the challenging activity. If the student affected by behaviors consistent with a diagnosis of ADHD does not learn how to handle their frustrations appropriately and does not recognize their ability to complete challenging tasks, they are at risk of viewing their behaviors as being out of their control and can become hopeless and less willing to work towards changes (Kaidar et al., 2003).

Another reason for low self-esteem in students who display behaviors consistent with a diagnosis of ADHD is they have egocentric worldviews and delays in the development of perspective-taking (Marton et al., 2009). These delays lead to students being excluded from social activities, facing peer rejection, being friendless, being deprived of social experiences, lacking social support, having relationship problems, creating non-reciprocal friendships, suffering from peer victimization, taking part in antisocial behavior, and experiencing conflict (Mrug et al., 2012). Further, compared to impacted males, females with behaviors consistent with a diagnosis of ADHD struggle with setting relational boundaries and "overall have an earlier onset of sexual activity, more sexual partners, and an increased risk of contracting sexually transmitted infections or having an unplanned pregnancy" (Young et al., 2020, p.21).

Consequences of ADHD on the Affected Child's Family

According to Markel & Wiener (2014), "the presence of ADHD in an adolescent is associated with an angrier and conflicted pattern of family communications than that encountered in normative families" (p. 40). Familial arguments often center on time and money management, school and achievement issues, lying, and defiance (Markel & Wiener, 2014). Because of these issues and similar disputes, parents of children who show characteristics consistent with a diagnosis of ADHD experience high levels of stress, which impacts the parent-child relationship, parental intimate relationships, and parental workplace relationships (Russell et al., 2019).

Parents with affected children often describe their homes as being chaotic, messy, and in constant conflict (Corcoran, 2016). To diffuse familial tensions, Grogan and Weitzman (2015) recommended instead of taking an authoritarian role, parents should act as coaches. They recommend the use of a 12-step plan to help the child become more self-aware, improve their organizational skills, guide them through how to be accountable for their actions, and design a plan to build behavioral inhibition skills. In addition, since students with behaviors consistent with a diagnosis of ADHD often have negative parental relationships, studies recommend the use of mentorship programs. Haft et al. (2019) found that compared to students not mentored, students who "participated in mentoring significantly increased in self-esteem and decreased in depression after participating in the program and were protected from declines in interpersonal relations" (p. 326).

Parents with children who show characteristics consistent with a diagnosis of ADHD often feel judged, isolated, angry, guilty, and powerless (Corcoran et al., 2017;

dosReis et al., 2010; Singh, 2004). Parents' willingness to seek resources or allow treatment for their affected child decreases if these types of negative feelings result from the interactions parents have with their child's doctor or another member of the care team (Taylor & Antshel, 2021).

In addition, some parents struggle to advocate for their children because it is common for parents with affected children to experience mental health problems (Lesesne et al., 2003). Further, a history of drug abuse can be common in parents who have children who show behaviors consistent with a diagnosis of ADHD. Unfortunately, it is common for medications prescribed to treat an affected child's symptoms to be used illegally, especially stimulants (Clarke, 2011).

Consequences of ADHD on the Affected Child's Teacher and Peers

Research shows behaviors consistent with a diagnosis of ADHD disrupt classroom instruction, contribute to lost teaching time, and impede social relationships (Stormont, 2001). Therefore, teachers spend substantially more time and attention supporting the behaviors of affected students (Atkinson et al., 1997). While students with behaviors consistent with a diagnosis of ADHD can negatively affect their peers' academic progress, their presence in the classroom can also initiate the use of classroom-wide interventions, thus benefiting all students (Harlacher et al., 2006). This benefit is often overlooked because of the disruptive nature of students affected by ADHD.

Research has found a third of teachers have negative attitude towards students with behaviors consistent with a diagnosis of ADHD (Dort et al., 2020b; Kos et al., 2006). Due to fatigue and frustration with their behaviors, teachers tend to increase the punitive consequences for students impacted by ADHD, which decreases the students'

desire to improve disruptive behaviors. According to Lasko (2020), “consistently being punished begins a break-down of the student-teacher relationship, until the student does not feel a sense of belonging, success, and safety in the classroom” (p. 30).

Since students with behaviors consistent with a diagnosis of ADHD often have contentious interactions with their teachers, Hamilton and Astramovich (2016) recommended conflict resolution training for both the affected student and their teacher. Some teachers are resistant to attending conflict resolution training, believing with time, they will learn how to support students with behaviors consistent with ADHD. This belief stems from research supporting the belief teacher effectiveness improves with experience (Kini & Podolsky, 2016).

However, Weyandt et al. (2009) found having experience working with students with behaviors consistent with a diagnosis of ADHD did not improve teacher knowledgeability about ADHD. Nor did experience improve teacher effectiveness when choosing interventions. Knowing the challenging nature of teaching students affected by ADHD and recognizing teaching them does not get easier with time, it is not surprising educators have cited the behaviors consistent with a diagnosis of ADHD as contributing factors for teacher burnout (Aloe et al., 2014; Greene et al., 2002; Zoromski et al., 2020).

Students with behaviors consistent with a diagnosis of ADHD also struggle with peer relationships due to having lower social cognition skills than non-affected peers, (Uekermann et al., 2010). Inattention results in impaired social perception, such as missing emotional and nonverbal cues (Semrud-Clikeman et al., 2010). In addition, peers often avoid students with behaviors consistent with a diagnosis of ADHD because of

their inability to play fair, their unpredictable emotions, whining, bossiness, refusal to follow rules, and their refusal to help with challenging tasks (Mrug et al., 2007).

The research found most students with behaviors consistent with a diagnosis of ADHD are not only aware of how their peers view them, but also personally "view their behaviors as uncontrollable, embarrassing, and bothersome to others" (Wiener & Daniels, 2016, p. 235). A study by Varma and Wiener (2020) showed girls view themselves in a more negative light than boys. To develop more positive interactions between students who display behaviors consistent with a diagnosis of ADHD and their non-affected peers, McMenamy et al. (2005) recommended teachers should provide opportunities for whole-class discussions about how the students view ADHD and what behaviors are, or are not, within the control of affected students.

Summary of the Consequences of ADHD

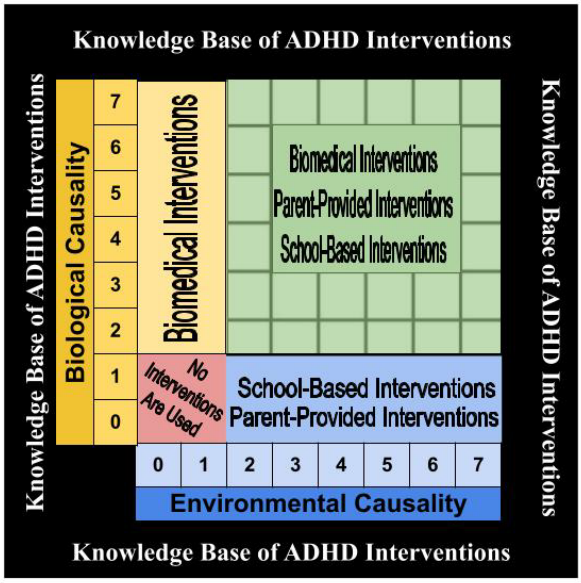
Behaviors consistent with a diagnosis of ADHD impact students academically, socially, and emotionally. Impacted students often recognize how their behavior is affecting their progress in these areas and understand the expectations of teachers, peers, and parents. However, they consistently struggle to act appropriately in times of stress, excitement, or boredom. Goldstein and Naglieri (2008) described ADHD as a "disorder of inadequate response inhibition, a problem of performance (not skills) and of inconsistency (not inability)" (p. 861). Students affected by ADHD need to have interventions in place to support their lack of response inhibition. This skill will provide the opportunity to lower personal stress, along with lowering the stress levels within the students' family and school environments.

Conceptual Framework of Study

Three components guided the conceptual framework of this study. First, the study focused on how a person views or perceives the role of biological and environmental factors in the causality of the behaviors consistent with a diagnosis of ADHD. Second, the study explored the broad knowledge base of biomedical, parent-provided, and school-based interventions available to support students affected by ADHD. Third, the study examined the supporting research for the relationship between a person's perception of causality and their subsequent actions. By combining a person's view of ADHD causality, the available ADHD interventions, and the knowledge of how perception affects action in a united lens, the conceptual framework proposed a person's perception of ADHD causality impacts their access to the full range of interventions available to support students who display behaviors consistent with a diagnosis of ADHD (see Figure 3.1).

Figure 3.1

Impact of Causality on Intervention Options



When a person believes in only a single ADHD causation, they hold a simple view of causality. Since research shows beliefs impact behavior, the conceptual framework proposes their simplified belief system limits their ability to choose interventions. Thus, they have constrained their access to the complete range of interventions shown to support students who display behaviors consistent with a diagnosis of ADHD.

When a person can accept causal effects from both biological and environmental factors, they hold a complex view of causality. The conceptual framework proposes their complex belief system expands their ability to choose interventions. Thus, they do not limit their access to the complete range of research-based interventions used to support students who display behaviors consistent with a diagnosis of ADHD.

Conceptual Framework Component #1: Causality

Even though ADHD is one of the most studied psychiatric disorders in America, according to Thapar et al. (2012), researchers have not yet determined "the single cause of ADHD and exposure to a risk factor does not necessarily result in disorder" (p. 260). The Merriam-Webster dictionary defines causality as "the relation between a cause and its effect." So, a person's view of ADHD causality refers to what they believe is causing the behaviors consistent with a diagnosis of ADHD.

A simple, biological view of ADHD causality is believing only natural factors, such as aspects of a student's body or life processes, are causing the behaviors consistent with a diagnosis of ADHD. However, a simple environmental view of ADHD causality is believing only factors surrounding the student through their upbringing or nurturing are causing the behaviors consistent with a diagnosis of ADHD. Finally, when one believes

an interaction between environmental and biological factors is causing the behaviors, they hold a complex view of ADHD causality (Dryer et al., 2006).

Nature versus Nurture Debate

For over 2,000 years, scholars have debated whether genes or experiences have a greater impact on human development (Moore, 2003). However, it was not until 1869 that Francis Galton coined the term "nature versus nurture" (Bynum, 2002). The question driving the nature versus nurture debate deals with the diametric views of whether human behavior is primarily because of influences from inherited/genetic/biological causes or shaped by learned/acquired/environmental influences. Before advances in genomics, specifically in gene-environmental interactions, polarizing views on nature versus nurture were common (Traynor & Singleton, 2010). However, it is now rare to find someone with a simplified view who believes either nature or nurture in isolation is entirely responsible for human behaviors or traits (Moore, 2003).

Many researchers have posited a relationship between human behaviors, responses to stimuli, and an inherited gene (Caspi et al., 2002; Pluess, 2017; Turkheimer & Waldron, 2000). These researchers believe certain genes predispose some people to have behaviors triggered by environmental occurrences, whereas those without a particular gene do not respond to environmental triggers in the same way. Pluess (2017) found "people characterized by genetic vantage sensitivity are significantly more likely to respond favorably to positive and supportive exposures, whereas those without such a genetic propensity are more likely to be resistant to the positive effects of beneficial environmental influences" (p. 47). In addition, Immordino-Yang et al. (2019) found everyday interactions critically impact brain development, stating "just as a garden grows

differently in different climates and with different plants, styles of gardening, and use, a person's brain develops differently depending on age, predispositions, priorities, experiences, and environment" (p. 186).

Causality Due to Effects of Biology/Nature

A biological perception of ADHD is believing the source of ADHD symptoms is because of a neurological, biochemical, or anatomical abnormality (Boon, 2020; Bradstreet et al., 2010). Specifically, researchers believe affected students have a "dysfunction in the frontal region of the brain, an area thought to be responsible for inhibition and attentional control" (Graham, 2008, p. 85). According to Quinn and Lynch (2016), "there is a broad consensus among international experts and organizations that ADHD is a genuine neurodevelopmental disorder based on empirical research" (p. 59). Boon (2020) found "individuals with ADHD have distinct anatomical brain differences compared to controls and important functional differences in mental processing" (p. 547). In addition, other biological events cause behaviors consistent with a diagnosis of ADHD, such as a traumatic brain injury, a childhood stroke, or a streptococcal infection (Livingstone et al., 2016). Further, studies found a significant association between prenatal opioid exposure and ADHD (Schwartz et al., 2021).

Rowland et al. (2018) found approximately 50% of students with behaviors consistent with a diagnosis of ADHD also have a parent with behaviors consistent with a diagnosis of ADHD. This points to the probability of ADHD being an inherited condition. Research shows parents who have children with characteristics consistent with a diagnosis of ADHD are the strongest proponents of a biological explanation for ADHD causality.

Affected parents cite genetic factors or chemical imbalances as the causal factors and many feel the behaviors consistent with a diagnosis of ADHD are outside of the control of the parent or the child (Bowen et al., 1991; Collett & Gimpel, 2004; Dryer et al., 2006; Johnston et al., 2006; Kwasman et al., 1995). A study by Lebowitz et al. (2016) showed those who believe in a biological cause for ADHD view the symptoms consistent with a diagnosis of ADHD as less treatable than if an environmental factor caused the symptoms.

Causality Due to Effects of Environment/Nurture

The researcher defines an environmental perception of ADHD causality as being socially constructed by experiences in the child's environment, such as poor home support. Examples of factors within a weak home environment are as follows: inconsistent discipline; incomplete authoritative relationships; food insecurity; anger; avoidance; and limited relational attachment and satisfaction (Bunford et al., 2015; San Mauro Martín et al., 2018). While poor home support is the most cited environmental trigger, according to a study by Østergaard et al. (2016), four of Rutter's indicators of adversity (low social class, severe marital discord, paternal criminality, maternal mental disorder, and placement in out-of-home care) can predict ADHD, with placement in out-of-home care being the strongest predictor.

However, Crea et al. (2014) found placement in out-of-home care does not guarantee a diagnosis of ADHD because the "risk of ADHD symptomatology posed to children adopted from foster care may be buffered by strong family cohesion and adaptability" (p. 859). In contrast, Stevens et al. (2019) associated higher levels of inattention, hyperactivity, impulsivity, depression, anxiety, and stress with homes with

permissive parenting. While many researchers have found the environment affects behaviors consistent with a diagnosis of ADHD, Livingstone et al. (2016) found "the environmental factors contributing to ADHD were transient, lasting no more than a year" (p. 1497).

Research shows most parents with children not affected by ADHD believe environmental factors connected to the child's home environment cause behaviors consistent with a diagnosis of ADHD (Dryer et al., 2006). In addition, a study by Walker and Plomin (2005) showed most teachers felt the environment affected student behaviors more than it affected their personality, intelligence, learning, and mental illness.

Besides the previously listed environmental triggers, additional examples of hypothesized environmental factors are: inappropriate levels of exposure to electronic media and fluorescent lighting, early-life food allergies, being socioeconomically disadvantaged, having a poor diet, fluoridated water, trauma, and exposure to toxins, such as lead, tobacco smoke, phthalates, manganese, perfluorochemicals, pyrethroid pesticides, and polycyclic aromatic hydrocarbons (David, 2013; Hong et al., 2015; Jiang et al., 2018; Kwasman et al., 1995; Malin & Till, 2015; Polańska et al., 2012; Roskam et al., 2014; Russell et al., 2016; San Mauro Martín et al., 2018; Schullehner et al., 2020; Wagner-Schuman et al., 2015). Other studied suspected factors that have not shown causality are traffic noise, maternal intake of acetaminophen, and the role of visfatin (Dursun et al., 2021; Saad et al., 2016; Zijlema et al., 2021).

Summary of ADHD Causality

Most research supports the complex view of ADHD causality, which maintains behaviors consistent with a diagnosis of ADHD are because of the interdependence and

mutual influence of both biological and environmental factors (Plomin et al., 1994; Robinson, 2004). Therefore, it is not unusual for people who hold a biological perception of ADHD causality to recognize environmental influences. For instance, in a study by Tatlow-Golden et al. (2016), 77% of general practitioners believed in biological, neurological, or related factors for ADHD causality, but almost all of them also cited environmental causes, such as ineffective discipline, chaotic families, discord, and drug abuse.

Thapar et al. (2013) believed genetics and environmental events interact in a student's presentation of ADHD symptoms and stated, "inherited risks can contribute not only directly, but are also likely to operate by increasing the likelihood of exposure to environmental adversity and altering sensitivity to environmental risks and protective factors" (p. 11). Pozzi-Monzo (2012) stated behaviors consistent with a diagnosis of ADHD are a combination of "genetic, constitutional influences-not to be confused with genetically transmitted characteristics, which follow the mathematical proportion of Mendelian laws-[that] intermingle with environmental factors and influence each other in inextricable ways" (p. 58).

While researchers cannot agree on a single ADHD causality, simply having a view of causality acknowledges ADHD as an actual condition, and not just normal, childhood behavior. Research has found it is extremely important for teachers to hold some type of view of ADHD causality, regardless of their view. When teachers do not recognize ADHD as a genuine condition, their "failure to admit the validity of ADHD creates a major obstacle to the development of educational interventions for the condition" (Cooper, 2008, p. 467).

Conceptual Framework Component #2: Interventions

While the literature supports a myriad of interventions, there exists no unanimous agreement on which type of intervention is most effective in improving classroom outcomes (Hall & Gushee, 2002; Rajeh et al., 2017). Inconsistent research exists on the perception of medication's effectiveness. However, there are research studies supporting medication as the most effective treatment for behaviors consistent with a diagnosis of ADHD (Glass & Wegar, 2000; Klassen et al., 1999).

However, Curtis et al. (2006) found teachers "prefer behavioral and educational interventions." Inconsistent research exists on medication's effectiveness in improving affected students' academic skills. Keilow et al. (2018) found medication improves the academic performance of affected students, while Kortekaas-Rijlaarsdam et al. (2018) showed no long-term improvements. Further, inconsistent research also exists concerning the use of sensory integration therapy for students who display behaviors consistent with a diagnosis of ADHD. Macphee et al. (2019) found weighted vests and stability balls did not improve behaviors or academics, while Fedewa et al. (2015) found stability balls showed a positive impact.

Because of these examples, along with other inconsistent research concerning sensory integration therapy (SIT), the American Academy of Pediatrics (2012) warned not to use SIT as a primary treatment for students displaying behaviors consistent with a diagnosis of ADHD. The inconsistent research may be because of the heterogeneous way ADHD symptoms present regarding behaviors and severity. However, some studies have been able to identify subgroups who share common characteristics. Researchers have called for "future research to allocate greater resources to understanding biologically

more homogeneous subgroups of ADHD, that hold the potential to facilitate the development of more tailored intervention strategies in ADHD" (Luo et al., 2019, p. 7).

Biomedical Interventions

The biomedical model provides the foundation for biomedical interventions. According to Deacon (2013), "the biomedical model posits that mental disorders are brain diseases and emphasizes pharmacological treatment to target presumed biological abnormalities" (p. 846). Medicalization describes the action of looking at social or behavioral issues as symptoms of a medical disorder and treating those symptoms with pharmaceuticals (Sherman, 2015). Medicalization of ADHD occurred in the United States in the 1960s (Conrad & Bergey, 2014). It is important to note ADHD is a cluster of symptoms managed through medication; it is not a curable disease (Goldstein & Naglieri, 2008). In addition, medication as an intervention is only effective for the time it is within the child's body (Graham, 2008).

DuPaul and Stoner (2014) found stimulants improve attention, decrease impulsivity, and reduce task-irrelevant motor activity for students with behaviors consistent with a diagnosis of ADHD. However, stimulants improve cognitive functioning, motor restlessness, and impulse control for all students (Rapoport & Inoff-Germain, 2002). Finally, regardless of a teacher's view on stimulants, teachers cannot use biomedical interventions without parental permission. However, teachers can support the use of biomedical interventions by taking proactive steps to ensure medication compliance for any doses within the school hours (Hamilton & Astramovich, 2016).

The most prescribed medications are stimulants, such as methylphenidate (Adhansia XR, Aptensio XR, Concerta, Cotempla XR-ODT, Daytrana patch, Desoxyn,

Jornay PM, Metadate, Methylin, Quillichew, Quillivant, and Ritalin); dextromethylphenidate (Dexedrine Spansule, Focalin, and Mydayis); amphetamine (Adderall, Adzenys ER, Dyanavel SR, Evekeo, Procentra, and Zenzedi); and lisdexamfetamine (Vyvanse) (CDC, 2020; Sarris et al., 2011). When stimulants are ineffective or even harmful, psychologists may prescribe tricyclic antidepressants (Imipramine, Amitriptyline, Desipramine, and Nortriptyline); non-tricyclic antidepressants (Bupropion and Monoamine Oxidase); norepinephrine reuptake inhibitors (Strattera); and alpha-adrenergic agents (Guanfacine XR-Intuniv and Clonidine XR-Kapvay) (CDC, 2020; Sarris et al., 2011).

The primary reason cited for not using medication as an intervention is the risk of side effects (Johnston et al., 2005). Side effects of methylphenidate-based stimulants are as follows: headache, decreased appetite, stomachache, nervousness, trouble sleeping, nausea, reduced spontaneity, slowing of growth in children, eyesight changes or blurred vision, heart-related problems, worsening of psychiatric problems, and circulation problems (Barkley et al., 1990; CDC, 2020).

Side effects of amphetamine-based stimulants are as follows: headache, trouble sleeping, circulation problems in fingers and toes, decreased appetite, nervousness, dizziness, diarrhea, constipation, mood changes, dry mouth, runny nose, nosebleed, itching rash, allergic reactions, increased tics, and reduced spontaneity. Other side effects are as follows: slowing of growth in children, eyesight changes or blurred vision, heart-related problems, and worsening of psychiatric problems (CDC, 2020; Cerrillo-Urbina et al., 2018).

Side effects of norepinephrine reuptake inhibitors are as follows: nervousness, sleep problems, fatigue, upset stomach, dizziness, dry mouth, severe liver injury, and suicidal thoughts (CDC, 2020). Side effects of alpha-adrenergic agents are as follows: fatigue, drowsiness, dizziness, dry mouth, decreased appetite, increased appetite, constipation, irritability, and low blood pressure (CDC, 2020).

A literature review of the medications used as biomedical interventions for ADHD would not be complete without a discussion concerning the role of pharmaceutical companies. Mitchell and Read (2012) found the pharmaceutical industry intentionally uses the internet to boost public opinion toward a biological view of ADHD causality and the use of medications. Sherman (2015) stated, "as medicine becomes increasingly privatized and commercialized, our understanding of what constitutes health is increasingly conditioned by commercial and market interests" (p. 2183). He warned, "the growing phenomenon of ADHD is part of a process of medicalization, but one in which the meaning of health is yoked to the production and consumption of pharmaceutical products" (Sherman, 2015, p. 2184). In addition, several key players have disclosed financial connections with pharmaceutical companies.

For instance, of the task force members who created the DSM-5 diagnostic criteria for ADHD, 78% reported having ties to the pharmaceutical industry (Cosgrove & Krimsky, 2012). These ties have the potential to be very profitable, with about four million children currently being prescribed medications to treat behaviors consistent with a diagnosis of ADHD (Sherman, 2015). In addition, the cost of medication is increasing as much as fourfold because of the addition of long-acting formulations (Scheffler et al.,

2007). Further, to promote their product through clinical trials, it is common for pharmaceutical companies to sponsor research studies (Quinn & Lynch, 2016).

Due to hidden agendas and divided interests, parents must seek reliable information about the use of medication as an intervention for treating behaviors consistent with a diagnosis of ADHD. Caregivers need to weigh the potential benefits of giving their child medication against a realistic view of the risks posed by the side effects (Scheffler et al., 2007).

Parent-Provided Interventions

Some parents choose to use parent-provided interventions to avoid the side effects caused by medications prescribed for ADHD. In addition, parent-provided interventions are often far more cost effective than medications (Sarris, 2011). Researchers do not consider many parent-provided interventions research-based because they either have tiny amounts of data to support their claims of effectiveness, or the data are inconsistent. Parent-provided interventions include items as follows: Omega-3, Zinc, Oral Iron, Ginkgo, French Maritime Pine Bark (FMPB), St. John's Wort, and Ningdong (Hall & Gushee, 2002; Rodríguez et al., 2019).

In addition, studies showed the exclusion of artificial food coloring has small beneficial effects on behaviors consistent with a diagnosis of ADHD (Sonuga-Barke et al., 2013). Pelsser et al. (2017) saw behavioral improvements after using the few-foods diet as a short-term diagnostic tool to identify foods to remove from the diet of a child with behaviors consistent with a diagnosis of ADHD. Further, researchers have observed small amounts of behavioral improvements through changes in nutrition, such as removing sugar and artificial ingredients and increasing protein, adjusting sleep patterns,

and limiting time on technology and media (Lambez et al., 2020; Purdie et al., 2002). In addition, limited data exist to support the use of cardio-based physical exercise, mindfulness exercises, and yoga (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n. d.); Chimiklis et al., 2018; Lambez et al., 2020; Sheppard, 2015). There is inconsistent data concerning the effectiveness of the following interventions: playing board games, neurofeedback therapy, music therapy, play therapy, and psychological (talk) therapy (Brock et al., 2010; Center for Children and Families, (n. d.); DuPaul et al., 2011; Lambez et al., 2020; Noda et al., 2019; Norouzi et al., 2018; Pfiffner, 2011; Purdie et al., 2002; Swank & Smith-Adcock, 2018).

School-Based Interventions

Psychosocial interventions, such as school-based interventions, focus on using "non-medicinal means to alter a person's behaviors and relationships with society in order to reduce the impact of the person's disorder or condition" (*Psychosocial intervention: Definition & examples,* 2017). According to Tresco et al. (2010), "hallmarks of effective psychosocial intervention are consistency, immediacy, and specificity of implementation, and saliency of consequences" (p. 73). This means teachers need to use targeted school-based interventions, implemented consistently across multiple environments, with immediate, meaningful feedback.

Some researchers feel preventative measures are the best psychosocial interventions to change a possible ADHD diagnosis trajectory. Linnet et al. (2003) recommended prenatal interventions, such as pregnant women avoiding cigarette smoke and high levels of stress. In addition, Bilgin et al. (2020) advocated for early intervention programs to help parents reduce infant crying and improve sleeping and feeding problems

in infants. This is because studies have shown all three issues increase the likelihood of infants developing attention disorders. A study by Halperin et al. (2012) found evidence that environmental stimulation and physical exercise in preschool children cause "improvements in neuropsychological functioning [and] may translate into reduced ADHD symptom severity and impairment" (p. 538).

A plethora of research supports the use of school-based interventions to support affected students (Evertson & Emmer, 1982; Simonsen et al., 2008). Researchers recommend the use of the following classroom interventions: changing a student's seat to move away from distractions, clarifying and repeating instructions, providing breaks, allowing more time, shortening assignments, tailoring assignments to the student's level, following a basic classroom routine, deconstructing tasks, using timers, providing non-verbal supports, using auditory reminder cues, posting visual prompts, focusing on relationship building, using pre-teaching skills, posting and reviewing rules often, allowing the student to use speech-to-text or text-to-speech, allowing the student a choice in how to show mastery, smoothly transitioning between activities, and limiting repetitive assignments (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n. d.); DuPaul et al., 2011; Evertson & Emmer, 1982; Jitendra et al., 2008; Martinussen et al., 2011; Purdie et al., 2002; Tyson, 2000; Wolraich et al., 2019).

Executive functioning interventions are like classroom interventions because they support the student's academic functioning. However, executive functioning interventions focus primarily on supporting the areas of attention, focus, organization, planning, task initiation, task completion, and self-management. Harrison et al. (2019) found interventions using self-regulating strategy development and self-management are

highly effective. Executive functioning interventions include the following: allowing the student to work in a quieter environment, permitting the student to wear headphones, encouraging the student to use a privacy board, using focusing tools, such as guided notes, different color markers, mnemonics, or probing questions, helping the student to clearly connect new material to prior knowledge, using an assignment notebook, using color-coded folders, teaching goal-setting, using a planner, and teaching self-monitoring skills (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n. d.); DuPaul et al., 2011; Hamilton & Astramovich, 2016; Martinussen et al., 2011). Studies show that computer-assisted instruction can also be useful for strengthening executive functioning skills and for skill acquisition and reinforcement (Benzing & Schmidt, 2019; Brock et al., 2010; CDC, 2020; Center for Children and Families, (n. d.); DuPaul et al., 2011).

In addition, research shows allowing physical movement in the classroom is effective. Examples of physical movement interventions include the following: scheduling purposeful movement breaks, providing a seat that allows movement, allowing a student to stand to work, allowing movement or fidgets, refraining from using the removal of recess as a punishment, tailoring activities to a student's age, and having the student actively involved in the learning process compared to being passively involved (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n. d.); Chimiklis et al., 2018; Lambez et al., 2020; Sheppard, 2015).

Research also supports the use of behavior interventions, such as reinforcement strategies or consequence-based approaches (DuPaul & Power, 2000). Reinforcement behavior strategies include the following: using praise, practicing social reinforcement, offering choice as a reward, instilling a token economy, using contingent positive

reinforcement, ignoring minor misbehavior, and allowing opportunities for the student to be successful in front of their peers (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n. d.); DuPaul et al., 2011; Filcheck & McNeil, 2004; Martinussen et al., 2011; Purdie et al., 2002).

Examples of consequence-based behavior strategies include the following: using response cost strategies, employing planned ignoring, having the student lose privileges as the result of natural consequences, using behavioral contracts or charts, teaching when/then contingencies, practicing time-out, and adopting appropriate command language that is clear, specific, and manageable (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n. d.); DuPaul et al., 2011; Purdie et al., 2002).

Collet and Gimpel (2004) supported the use of the above strategies, stating "cognitive and behavioral strategies that help children connect positive outcomes with their own efforts might be helpful in preventing or ameliorating the deficits in self-esteem that are often seen in this population" (p. 193). Behavior interventions are the most difficult interventions to implement with fidelity because of their labor-intensive nature (Johnston et al., 2006). Also, they can frustrate users because they do not generalize across settings (Russell et al., 2019).

Strong collaborative school and family relationships also provide behavior support. Research supports the use of school/home collaboration interventions, such as the following strategies: using a communication notebook, using a daily report card, providing clearly written instructions on take-home assignments, and scheduling parent/teacher conferences (Brock et al., 2010; CDC, 2020; Center for Children and

Families, (n. d.); DuPaul et al., 2011; Kim et al., 2013; Malekpour et al., 2014; Mautone et al., 2011).

In addition, support for the home environment can come through the following resources: providing education on appropriate discipline strategies, connecting parents to agencies that can provide marriage, substance abuse, and budgeting support, and providing the family with essential items (Brock et al., 2010; Center for Children and Families, (n. d.); Lambez et al., 2020; Purdie et al., 2002). Further, teachers should encourage parents to provide opportunities for their children to take part in therapies, such as cognitive behavior therapy and group social therapy (Brock et al., 2010; Center for Children and Families, (n. d.); DuPaul et al., 2011; Lambez et al., 2020; McCarty et al., 2015; Norouzi et al., 2018; Pfiffner, 2011; Purdie et al., 2002; Swank & Smith-Adcock, 2018).

Students who display behaviors consistent with a diagnosis of ADHD often struggle with peer relationships. Therefore, it is important to use peer-mediated interventions, such as the following: peer-tutoring, setting up group or paired learning, using transition buddies, sitting the student next to a role model, using peer modeling, and providing specific instruction in social skills and other behavioral competencies peers consider important, such as sports and game rules (Brock et al., 2010; CDC, 2020; Center for Children and Families, (n. d.); Cordier et al., 2018; DuPaul et al., 2011).

In addition, when done through structured, positive, teachable moments, cognitive-behavioral social skills training is extremely effective because students affected by ADHD struggle to generalize their learning (Mrug et al., 2001). Researchers also

recommended for caregivers to provide students opportunities in additional settings to make friends, such as after-school programs or church youth groups (Mrug et al., 2001).

Multidisciplinary Approach

Research overwhelmingly shows behaviors associated with ADHD are best targeted through multidisciplinary approaches that use a combination of medical, psychosocial, and academic interventions (Curtis et al., 2013; Dryer et al., 2006; Gaastra et al., 2016; Goldstein & Naglieri, 2008; Levine & Anshel, 2011; Sibley et al., 2016). The actions of parents with students with behaviors consistent with a diagnosis of ADHD also support the multidisciplinary approach, with most parents using both behavior management and medication interventions, rating the combined effect as above average (Johnston et al., 2005).

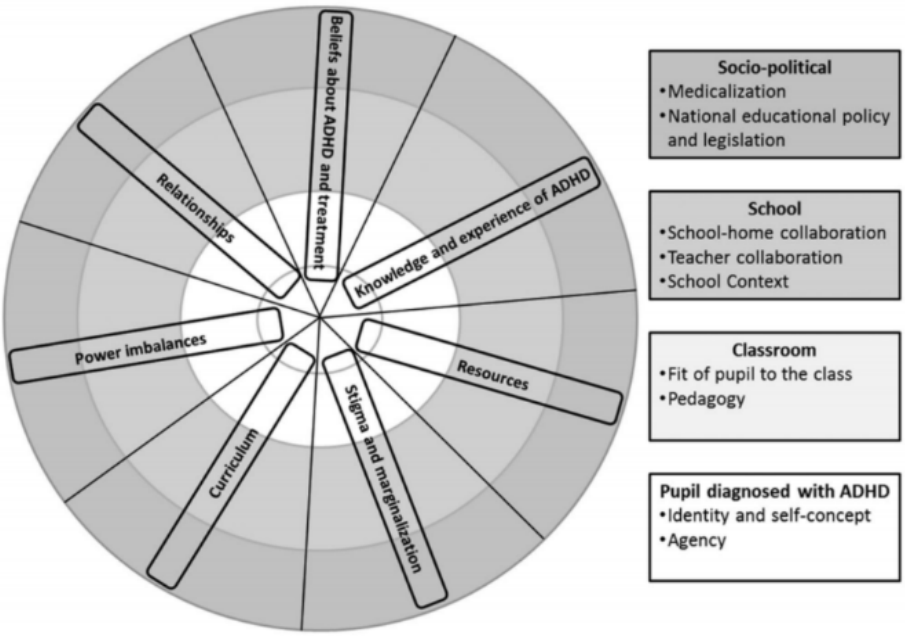
Antshel et al. (2011) documented the need for a multidisciplinary approach, showing even after medication treated the core ADHD symptoms of inattention, hyperactivity, and impulsivity, students with behaviors consistent with a diagnosis of ADHD continued to struggle with executive functioning and emotional regulation. Studies have also shown it matters the order of usage of multidisciplinary interventions because treatment plans beginning with behavioral interventions instead of medications are more impactful, along with being more cost-effective (Page et al., 2016; Pelham et al., 2016). Further, the involvement of therapists is a helpful piece of the multidisciplinary approach, whether the students access the therapy in-person or through virtual sessions (McCarty et al., 2015).

For the multidisciplinary approach to be successful, it is essential for school personnel to be involved in the process. This way, they can teach intentional lessons to

the students to help them improve their attentional skills, higher order thinking skills, and reasoning skills (Cains, 2000). School-based interventions have an even higher chance of success if there is a positive cooperative relationship between the teacher and the student's parent(s) (Power et al., 2012). Further, researchers recommend school-based interventions include "both proactive (i.e., antecedent-based) and reactive (i.e., consequence-based) behavioral interventions" (DuPaul et al., 2011, p. 40). A well-organized and implemented multidisciplinary plan can provide interventions at four distinct levels, as shown in Figure 3.2 (see Figure 3.2).

Figure 3.2

Four Levels of Interventions for ADHD



Note. From "Non-Pharmacological Interventions for ADHD in School Settings: An Overarching Synthesis of Systematic Reviews," by D. A. Moore, M. Richardson, R. Gwernan-Jones, J. Thompson-Coon, K. Stein, M. Rogers, R. Garside, S. Logan, and T. J. Ford, 2019, *Journal of Attention Disorders, 23*(3), pp. 220-233.

Use of Functional Behavior Assessments

A Functional Behavior Assessment (FBA) is a set of procedures used to determine what events, emotions, rewards, activities, or other factors consistently drive a student's undesirable behavior (Miller & Lee, 2013). Moreno et al. (2014) further define an FBA as "an investigative process that collects and examines various types of data and environmental information to develop a working understanding of the reason a student would demonstrate a challenging behavior" (p. 59).

An FBA normally consists of three stages: indirect data collection, direct data collection, and a period where teachers are testing their behavior intervention strategies based upon a hypothesis made from the information gathered through the data-collection stages (Barnhill, 2005). While these three stages are the general, normative process for an FBA, researchers do not agree on a single definitive definition or process. In fact, as Johnson et al. (2019) pointed out "the use of FBA is written into federal and state legislation, but largely without specific definitions of practices associated with this method" (p. 374).

When an FBA is well-grounded within the principles of Applied Behavior Analysis (ABA), studies have shown it can inform successful intervention choices, resulting in significant changes in student behavior (Johnson et al., 2019). Studies have also shown ABA-informed Function-Based-Interventions strategically decrease behaviors across environments for students who display behaviors consistent with a diagnosis of ADHD (Miller & Lee, 2013; Stahr et al., 2006). Concerning ADHD-impacted students who are culturally and linguistically diverse, Moreno et al. (2014) stated the "FBA process can be tailored to meet the needs of the more diverse student population and

access a better cultural understanding for students from CLD backgrounds, which can be used to better distinguish between cultural differences and genuine disability indicators" (p. 66).

Not all researchers agree there is a benefit to using an FBA to inform intervention choices. According to a study done by Gresham et al. (2004), while many behavior analysts have considered FBAs and positive behavioral supports a best practice for over thirty years, only 52% of the interventions they studied used information provided by an FBA. Further, several studies have shown interventions that did use FBA-provided information did not prove to be more effective than the interventions that did not use FBA-provided information (Bruni et al., 2017; Gresham et al., 2004).

One reason teachers may not commonly use an FBA when addressing behaviors common with a diagnosis of ADHD is these behaviors are often seen as disruptive, but not dangerous. Therefore, the school's limited resources are "reserved for more complex cases that do not respond to typically recommended school interventions" (Bruni et al., 2017, p. 365). Other reasons teachers may not choose to use an FBA is their lack of knowledge in the process, their lack of confidence in how to perform an FBA, and their lack of trust in the FBA's usefulness (Oakes et al., 2018).

Lack of Teacher Training for ADHD Interventions

It is common for students who exhibit characteristics consistent with a diagnosis of ADHD to display different behaviors in various environments (Dryer et al., 2006). Studies have shown the school environment aggravates the behaviors consistent with a diagnosis of ADHD. This happens for the following reasons: schools place higher cognitive expectations on students, delays in the student's language development increase

the student's frustration levels, the student's learning disabilities impact their success, the student's educational deficits embarrass them, classroom teaching techniques are sometimes abrasive or ineffective, task difficulty can be too high or too low, and student boredom downplays the need for focused attention (David, 2013; Kwasman et al., 1995).

Armstrong (1996) advocated against rating students on a scale of how hyper they are because a "child may be a 5 on "fidgetiness" in some contexts (during worksheet time, for example) and a 1 at other times (during recess, during motivating activities, and at other highly stimulating times of the day)" (p. 425). DuPaul & Jimerson (2014) stated teachers "are often on the 'front lines' with respect to recognizing when students may be having difficulties with ADHD and attempting to address behavioral, academic, and social deficits in a comprehensive fashion" (p. 380).

With teachers in such a critical position, they need to select or support interventions proven effective and avoid those that produce mediocre or even harmful results (Vereb & DiPerna, 2004). However, West et al. (2005) found teachers know more about the causality of ADHD than they do about interventions. Soroa et al. (2016) found most teachers' knowledge of ADHD comes from informal training, rather than formal instruction. Further, teachers in non-Western countries, such as Iran, receive virtually no training concerning ADHD interventions (Ghanizadeh et al., 2006). A consensus of the research supports teachers do not feel adequately trained concerning ADHD or how to address the behaviors consistent with a diagnosis of ADHD (Mayer & Phillips, 2012; Snider et al., 2003; Soroa et al., 2013).

Misconceptions that Impact the Use of Interventions

The research found it is common for teachers to hold misconceptions about ADHD that negatively affect their use of appropriate interventions (Rinn & Nelson, 2009). A major misconception is about the number of students affected by ADHD. Finding almost three-quarters of teachers label an inordinate portion of their students as having ADHD, Glass and Wegar (2000) suggested the need for teachers to be trained in how to differentiate between normal childhood behaviors and behaviors consistent with a diagnosis of ADHD.

Another misconception is some students' ADHD behaviors are too severe to be supported by classroom interventions. Research shows teachers who believe their intervention efforts will be ineffective are, in fact, ineffective. Effective teachers are the teachers who believe the right interventions can lead to student success (Coles et al., 2015).

A third misconception teachers hold is only a stringent classroom management style is effective for supporting behaviors consistent with a diagnosis of ADHD. However, research supports the use of both structure and flexibility when enacting student interventions. Russell et al. (2019) recommended for teachers to "offer the child flexibility and choice in which behavior management strategy they use, but then provide structured and consistent expectations when implementing this with the child" (p. 24).

A final misconception is all students affected by characteristics common to a diagnosis of ADHD will be low academic achievers (Weyandt et al., 2009). This misconception does not consider the effectiveness of interventions, nor the similarities

between behaviors consistent with a diagnosis of ADHD and the behaviors often observed in gifted students (Rinn & Nelson, 2009).

Teacher Use of Interventions

According to DuPaul & Jimerson (2014), "there is a significant gap between the services for students with ADHD that have been documented as efficacious for students with ADHD and the actual services that these students receive in schools" (p. 383). Experts can recommend a specific classroom intervention, but its use is ultimately up to the teacher, thus affecting the intervention's effectiveness (Wickstrom et al., 1998). According to Vereb & DiPerna (2004), the following factors impact a teacher's willingness to implement an intervention: an intervention's intrusiveness, the time requirements for implementation, if the intervention is praise-based or consequence-based, the teacher's level of comfort and knowledge about the intervention, the targeted student's age, and the severity of the student's behavior.

In addition, if teachers feel the behaviors consistent with a diagnosis of ADHD are out of a student's control, they are more willing to try certain interventions than if they feel the behaviors are within a student's control (Mikami et al., 2019). Because of the numerous factors impeding the implementation of ADHD interventions, it is not surprising that Moore et al. (2017) found teachers do not consistently use proven, effective ADHD interventions, but instead use impromptu, general classroom strategies (Abikoff, 2009; Pfiffner et al., 2021). Further, Hart et al. (2017) found while educational and behavioral expectations increase as students increase grade levels, teacher use of universal classroom interventions and targeted interventions decreases, thus removing support when it is most needed.

To remedy the inconsistency in how teachers use interventions, schools have attempted to increase teachers' knowledge about ADHD through professional development. However, research does not show a relationship between increasing teachers' knowledge of general ADHD facts and their use of interventions (Dort et al., 2020). Wiener and Daniels (2016) showed change needed to occur in the teacher's attitudes towards impacted students. In their study, students affected by ADHD asked their teachers to "ask them how they learn best; be empathic, tolerant, and accepting; and realize that their actions are not their fault and that they do try to make an effort, even if it does not appear that way" (Wiener & Daniels, 2016, p. 578). Recognizing change will not come through a quick fix, Coles et al. (2015) stated "knowledge, skills, and beliefs may facilitate or impede implementation integrity, all three factors may be malleable in consultation, and changes in all three factors may be necessary for some teachers to achieve adequate improvements in classroom management" (p. 46).

Summary of ADHD Interventions

Researchers have completed multiple studies to determine the effectiveness of interventions for students with behaviors consistent with a diagnosis of ADHD. However, according to Dong et al. (2020), "additional research is also needed to identify best practices when engaging multiple stakeholders across school, clinical, and family settings to ensure effective collaboration, communication, and uptake of practices" (p. 8). No single study has yet to produce a comprehensive list of interventions. In their review of non-medical interventions, Trout et al. (2007) found "there is a pressing need for systematic research on non-medication interventions aimed at improving the academic outcomes of children and youth with ADHD" (p. 223). Because there is no officially

compiled list of interventions, the researcher created Figure 3.3, Figure 3.4, and Figure 3.5 by combining the input of numerous studies (Benzing & Schmidt, 2019; Brock et al., 2010; CDC, 2020; Center for Children and Families, (n. d.); Chimiklis et al., 2018; Cordier et al., 2018; DuPaul et al., 2011; Evertson & Emmer, 1982; Filcheck & McNeil, 2004; Hamilton & Astramovich, 2016; Jitendra et al., 2008; Kim et al., 2013; Lambez et al., 2020; Malekpour et al., 2014; Martinussen et al., 2011; Mautone et al., 2011; Norouzi et al., 2018; Pfiffner, 2011; Purdie et al., 2002; Sheppard, 2015; Swank & Smith-Adcock, 2018; Tyson, 2000; Wolraich et al., 2019.)

Figure 3.3 lists the biomedical interventions. These are various medications prescribed by medical professionals to treat the symptoms of ADHD. They do not cure ADHD, but rather ease ADHD symptoms while active in the body (see Figure 3.3.). Figure 3.4 lists the parent-provided interventions. These normally have fewer side effects and are far most cost-effective than biomedical interventions, (see Figure 3.4). Figure 3.5 lists school-based interventions, categorized into five categories: (1) Classroom Interventions; (2) Executive Functioning Interventions; (3) Physical Movement Interventions; (4) Behavior Interventions; and (5) Peer-Mediate Interventions.

The classroom interventions are woven into the structure of the classroom. The executive functioning interventions focus on supporting the areas of attention, focus, organization, planning, task initiation, task completion, and self-management. The physical movement interventions allow the student increased opportunities for activity. The behavior interventions include reinforcement, consequence-based, and collaborative behavior strategies. The peer-mediated interventions integrate peer relationships (see Figure 3.5).

Figure 3.3

Biomedical Interventions for ADHD

Biomedical Interventions
Medication can only be prescribed by medical professionals. It does not cure, but rather eases ADHD symptoms during the time it is active in the student's body.
Stimulants **Methylphenidate-Based** Side Effects: headache; decreased appetite; stomachache; nervousness; trouble sleeping; nausea; reduced spontaneity. Other Side Effects: slowing of growth in children; eyesight changes or blurred vision; heart-related problems; worsening of psychiatric problems; circulation problems. Methylphenidate (Adhansia XR, Aptensio XR, Concerta, Cotempla XR-ODT, Daytrana patch, Desoxyn, Jornay PM, Metadate, Methylin, Quillichew, Quillivant, & Ritalin) Dextromethylphenidate (Dexedrine Spansule, Focalin, & Mydayis) --- **Amphetamine-Based** - Side Effects: headache; trouble sleeping; circulation problem in fingers and toes; decreased appetite; nervousness; dizziness; diarrhea; constipation; mood changes; dry mouth; runny nose, nosebleed; itching rash, allergic reactions; increased tics; reduced spontaneity. Other side effects: slowing of growth in children; eyesight changes or blurred vision; heart-related problems; worsening of psychiatric problems. Mixed salts of Amphetamine (Adderall, Adzenys ER, Dyanavel SR, Evekeo, Procentra, & Zenzedi) Lisdexamfetamine (Vyvanse)
Norepinephrine Reuptake Inhibitor Side Effects: nervousness; sleep problems; fatigue; upset stomach; dizziness; dry mouth; severe liver injury; suicidal thoughts. Atomoxetine (Strattera)
Alpha Adrenergic Agents Side Effects: fatigue; drowsiness; dizziness; dry mouth; decreased appetite; increased appetite; constipation; irritability; low blood pressure. Guanfacine XR (Intuniv) Clonidine XR (Kapvay)
Antidepressants Side Effects: nausea; vomiting; dry mouth; headache; constipation; sweating; joint aches; sore throat; blurred vision; diarrhea; dizziness; raise in blood pressure; chest pain, fainting; ringing in the ears, fast heartbeat; mental/mood changes; tremors; weight loss/gain. Tricyclic: Imipramine, Amitriptyline, Desipramine, & Nortriptyline Nontricyclic: Bupropion & Monoamine Oxidase

Figure 3.4

Parent-Provided Interventions for ADHD

Parent-Provided Interventions
Parents often look for interventions that will not have the side effects caused by medications and that are cost-effective.
Micronutrient Supplements (Zinc; Iron; Magnesium; Vitamin B; Vitamin D; Omega-3 Fatty Acids)
Herbal supplements (French Maritime Pine Bark; Ginkgo Biloba; St. John's Wort; Caffeine; Ginseng; Valerian; Ningdong; Bacopa; & Passionflower)
Remove food dyes from the diet.
Remove food preservatives from the diet.
Remove extra sugar from the diet.
Remove sodas from the diet.
Few-Foods Diet (finds food allergens)
Increase protein intake.
Improve sleep schedule.
Use mindfulness activities.
Increase time outside.
Participate in therapies (neurofeedback; music; play; or psychological (talk) therapy.
Exercise.
Limit time on electronics.

Figure 3.5

School-Based Interventions for ADHD

School-Based Interventions			
Classroom Interventions			
Use visuals of acceptable talk time & level, such as a talking stick or traffic light.	Chunk long projects into several pieces with clear deadlines for each chunk.	Allow the student to use speech-to-text or text-to-speech.	Check student understanding by having them verbally summarize.
Allow the student a choice in how to show mastery of a concept.	Use a visual timer/alarm to help with time management.	Give more time for tests, assignments, & projects.	Use auditory cues as reminders for desired behaviors.
Pre-teach necessary skills, such as vocabulary.	Sit the student in an area with fewer distractions.	Take actions to promote the student-teacher relationship.	Post and follow a basic classroom routines.
Decrease assignment length	Post rules & discuss daily	Tailor assignment to student's level.	Limit repetitive assignments
Executive Functioning Interventions			
Present learning objectives in at least two ways.	Start lessons with a verbal & visual summary of what students will be learning.	Allow the student to take a test or do work in a quieter environment.	Have students clearly connect new material to prior knowledge.
Teach the student how to self-monitor.	Allow the student to use privacy boards.	Allow the student to use technology to complete work.	Allow the student to use headphones.
Post a list of student materials for each lesson.	Write clear directions for all assignments.	Help students set goals for tests, assignments, & projects.	Summarize key points visually & verbally.
Provide organization tools: colored folders, notebook w/ dividers, planner, or an assignment book.	Focusing tools: guided notes, colored markers, mnemonics, & probing questions.	Review behavior expectations often, especially if changing working styles (group work to independent work).	Review take-home assignments and provide clear, written instructions.
Physical Movement Interventions			
Schedule breaks with purposeful movement.	Tailor activity length to student's age.	Refrain from removing recess as a punishment.	Allow students to stand to do work.
Sit the student where they will be least disruptive if they move or fidget.	Allow the student to move or fidget in a non-distracting, quiet way.	Actively engage the student in the learning process, versus passive involvement, limiting downtime.	Allow the student to have some type of seat that allows movement
Behavior Interventions			
Provide or refer the parent to training or support programs.	Use appropriate command language (clear, specific, & manageable).	Use daily report cards or some other kind of school-to-home communication.	Use a behavior chart or behavior contract
Use when/then or if/then contingencies.	Use response-cost programs (i.e.., token economy).	Use of time-out or loss of privileges as a natural consequence.	Use choice as a reward.
Use purposeful, frequent praise.	Ignore minor misbehavior	Provide opportunities to be successful in front of peers.	Use contingent positive reinforcement.
Peer-Mediated Interventions			
Provide specific instruction in social skills & other behavioral competencies, (sports & game rules)	Use social reinforcement through peer modeling & tutoring.	Support smooth transitions by using transition buddies & prompts	Provide opportunities for group or paired learning

Conceptual Framework Component #3: Perception

The Merriam-Webster dictionary defines perception as "the way you think about or understand someone or something." It is common for perception to be confused with knowledge, when in fact, knowledge is a segment within perception. A definition broadly accepted is knowledge is justified true belief (Bolisani & Bratianu, 2018). Ou (2017) defined perception as a three-step process of selecting, organizing, and interpreting information. A teacher can present two people with the same justified true belief and yet each person can hold differing perceptions due to individualized variants in the selection, organization, and interpretation of information. According to Ou (2017), "it is people's values, attitudes or motives (the psychological dimension) rather than their sensory organs (the physical dimension) that determine what stimuli will attract people's attention and hence receive meanings" (p. 20).

While researchers have attempted to change perception by increasing general knowledge, they have failed in these attempts. This is because according to Rock (1985), increasing one's propositional, or fact-based knowledge does not automatically affect perception. Rather, "knowledge in the form of stored representations of past visual experience can affect perception in various ways [such as] enabling recognition and interpretation to occur" (Rock, 1985, p. 3).

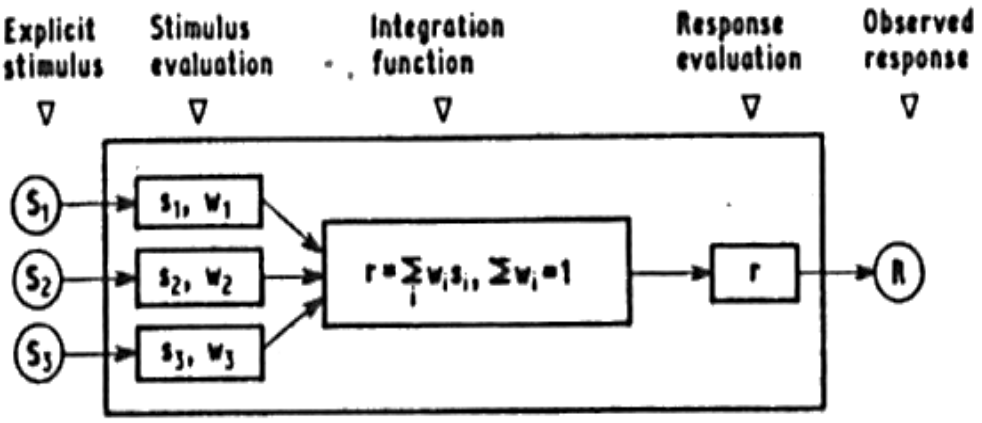
Anderson's Information Integration Theory

To study the nature of how people perceive each other, the making of social judgments, and the formation of perception in social situations, Shanteau and Nagy (1984) adapted the Information Integration Theory (IIT) from Anderson (1971). The basic premise of IIT is that "human judgments (including judgments that are made about

other people) are the outcome of evaluating and combining information about the judged objects (persons)" (Shanteau & Nagy, 1984, p. 49). IIT contains a mixture of observable and unobservable steps. The observable steps are explicit stimulus and observed response. The unobservable steps are stimulus evaluation, integration function, and response evaluation. Figure 3.6 depicts the processes of the Information Integration Theory (see Figure 3.6).

Figure 3.6

Diagram of Information Integration Theory



Note. From "Information Integration in Person Perception: Theory and Application," by J. Shanteau and G. F. Nagy, in M. Cook (Ed.), *Person Perception (Psychology in Progress),* pp. 48-86, Routledge.

During the explicit stimulus step, the participant observes external stimuli. Then, the participant moves into step two, which is where they evaluate the stimuli and assign value judgments on what they observed (Shanteau & Nagy, 1984). Simultaneously, the participant designates a level of importance to each judgment. During the third step, the integration function of IIT, the participant integrates their value judgments with their

designation of importance. They then move into the fourth step, response evaluation, at which time they formulate a mental response to the stimuli. The last step is to provide a verbal or nonverbal observed response. Teachers move through the five steps of the IIT process as they observe the behaviors of affected students, assign value judgments and importance to those behaviors, and then form a mental response they ultimately communicate to the student.

How Culture Can Impact Perception

Increasing teachers' knowledge of general ADHD facts does not increase their effectiveness in using ADHD interventions (Dort et al., 2020). A plausible explanation for this is if new knowledge cannot connect with experiences or beliefs, learners will not interpret it as important, and it will not affect perception. Further, the creation of individualized meaning happens as interpreting new knowledge occurs through a cultural lens. For instance, in India, despite parents being given information about ADHD biological causality, because of the cultural stigma against mental illness, it is common for parents to reject any biological explanation for ADHD causality (David, 2013). Parents from China are also likely to reject any biological explanations for ADHD, not because of a cultural stigma against mental illness, but because of the cultural ideology that effort can overcome innate factors (Tang, 1998).

Culture can also act as a barrier to predictable correlations between perception and action. In the study by Carlson et al. (2006), most teachers from the United States and Sweden both expressed a biological perception of ADHD causality, viewing it as a result of a genetic predisposition. American teachers supported their biological perception by supporting the use of stimulants, while Swedish teachers did not support

the use of stimulants, instead preferring behavioral interventions. The Swedish teachers' distrust of a medication-based intervention mirrored their country's culturally-based negative view of stimulants (Gillberg, 1997).

How Perception Can Impact Action

While culture can be a barrier to predictable correlations between perception and action when studying people from diverse cultures, a study by Furnham and Sarwar (2011) found persons from similar cultures demonstrated "predictable correlations between beliefs about cause and treatments" (p. 301). Research shows people who encounter a person with behaviors consistent with a diagnosis of ADHD often hold beliefs for what is causing the behaviors and their beliefs impact the way they interact with the affected person (Lebowitz et al., 2016; Na & Mikami, 2018).

Moore et al. (2019) found a teacher's perception of ADHD causality, whether biological or environment, could negatively affect the type of interventions they used to support a student with behaviors consistent with a diagnosis of ADHD, stating:

> Either attribution might neglect other potentially important factors that may be present at the pupil, classroom, school, and socio-political levels that could aggravate ADHD symptoms. This can confine the focus of interventions to the individual with ADHD, and exclude consideration of change at school, such as teaching staff, peer relationships, and the school environment. (p. 222)

In addition, while their study focused on autism instead of ADHD, Khasakhala and Galava (2016) determined there was a relationship between a teacher's perception of the causes of challenging behavior and the teacher's choice of behavior management strategies. Further, Lebowitz et al. (2016) showed having a biological view of causality

positively affects adults' attitude toward children who display behaviors consistent with a diagnosis of ADHD. Finally, research shows even children hold predetermined beliefs that affect their choices when interacting with peers with behaviors consistent with a diagnosis of ADHD (Na & Mikami, 2018).

A student who displays behaviors consistent with a diagnosis of ADHD also holds their own personal perception of what is causing their behaviors. Emilsson et al. (2020) found personality traits, in particular antagonism, strongly impact how students perceive their diagnosis of ADHD. Their perception of their ADHD diagnosis ultimately impacts their belief in the effectiveness of medication or other interventions.

Research also provides data to support a relationship between parental perceptions of ADHD causality and the intervention the parent uses for their affected child (Johnston et al., 2005). For example, parents often choose to use medication if they believe biological factors cause ADHD, while parents often choose behavior management interventions if they believe environmental factors cause ADHD. The study by Shah et al. (2018) showed it is beneficial for teachers to know the parents' perception of ADHD causality so the teacher can develop and provide ADHD interventions that will not conflict with the parents' psycho-social etiological models, which would ultimately lead to them not following the interventions as designed.

Summary of Perception

Perception is a three-step process of selecting, organizing, and interpreting information. Everyone's prior knowledge, experiences, and culture impact the way they select, organize, and assign meaning to novel information. Perception is also a foundational piece to the decision-making process and subsequent actions. Therefore, if

one desires to change actions and how decisions are being made, they need to focus on strategies to change perception. These strategies need to focus on using prior knowledge, previous experiences, and culturally appropriate methods to assign new meaning to the provided information.

Summary

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most studied psychiatric disorders, in conjunction with being the most prevalent pediatric health diagnoses. Symptoms of ADHD include academic struggles, behavioral problems, inattention, hyperactivity, and impulsivity. Researchers estimate ADHD symptoms academically and socially affect 8% of American students. However, approximately only one-third of students who display behaviors consistent with a diagnosis of ADHD ever receive a formal diagnosis. Behaviors consistent with a diagnosis of ADHD impact students academically, socially, and emotionally. Students affected by ADHD need to have interventions in place to support them across environments.

The exact cause of ADHD is still unknown, but most research supports the complex view of ADHD causality, which maintains behaviors consistent with a diagnosis of ADHD are because of the interdependence and mutual influence of both biological and environmental factors. Research has found it is extremely important for teachers to hold some type of view of ADHD causality, regardless of their view, because having a view of causality assigns validity to ADHD as a genuine condition. Researchers have completed multiple studies to determine the effectiveness of interventions for students with behaviors consistent with a diagnosis of ADHD, yet no single study has yet to produce a comprehensive list of interventions. Regardless of their diagnostic status, students who

display behaviors consistent with a diagnosis of ADHD are most successful when they receive multidisciplinary interventions.

Research has shown parental choice of specific ADHD interventions largely depends on the parents' belief that either biological or environmental factors are causing their child's ADHD symptoms. However, research has not yet shown a similar relationship between a teacher's beliefs and their actions. This literature review explores the possibility of this relationship based upon a three-dimensional conceptual framework built upon: (1) biological and environmental perceptions of ADHD causality; (2) the broad knowledge base of available ADHD interventions; and (3) supporting research for the relationship between a person's perception of causality and their subsequent actions.

SECTION FOUR:

CONTRIBUTION TO PRACTICE

Plan for Dissemination of Practitioner Contribution

The researcher is in the process of forming weak ties with various members of the 19 regionally located groups of Missouri Local Administrators of Special Education (LASE). These statewide weak ties are with special education administrators who can influence the professional development offered within their districts. The researcher will first offer to present the professional development module at one of the LASE meetings, either in-person or through a virtual platform. The researcher will then provide the special education administrators with the resources needed to duplicate the professional development presentation. The professional development module will be provided free of charge and will be disseminated electronically. The intent is for the LASE members to use the module to improve their teachers' classroom practice by ensuring teachers understand how to implement school-based interventions with fidelity, provide specific expectations for how teachers should respond to parent inquiries about medication, and communicate the desired procedure for suggesting home-based interventions.

Professional Development Module Pieces

Following is the professional development module entitled, "No-Cost Strategies to Prevent the High Cost of ADHD: We Can't Afford to Not Pay Attention!" The module consists of a Google Slide presentation, an outline of the presentation, and five handouts. The first handout has three ways to improve practice. The second handout provides various resources to support fidelity. The third handout is a chart of school-based interventions. The fourth handout is a chart of biomedical interventions. The fifth handout is a chart of parent-provided interventions.

Rationale

According to Easton (2015), the most effective and well-received professional development comes from professionals connected within a teacher's district, such as a special education administrator. In addition, research also supports the positive impact of professional collaboration and mentoring relationships linked to professional development activities (Darling-Hammond et al., 2009). Therefore, using the information gained from this study, the researcher will equip the LASE members with the resources needed to provide effective professional development to mixed groups of regular and special education teachers within their individual districts.

An integral piece of this professional development will be opportunities for collaboration. One proposed collaborative group could be a group of regular education and special education professionals, a second group could be experienced professionals with novice professionals, and a third group could be professionals who display effective, flexible classroom management styles with professionals who display ineffective, stringent classroom management styles.

Further Resources

Outline of Presentation

No-Cost Strategies for the High Cost of ADHD: We Can't Afford to Not Pay Attention!

I. ***Slide 1:*** Welcome – Introduce yourself and go over any housekeeping issues. Briefly introduce the presentation and what you will be covering.

II. ***Slide 2:*** Icebreaker

a. Participants should be intentionally placed within mixed groups. This can be done ahead of time, or as an activity itself by placing symbols on participants' name tags they must match to a table. These groups could be:

A. Regular education and special education professionals (OR)

B. Experienced professionals with novice professionals (OR)

C. Professionals who display effective, flexible classroom management styles with professionals who display ineffective, stringent classroom management styles (OR)

D. The mix best suiting a district's needs

b. ***Slide 3:*** Have the participants do an activity that requires short-term memory, such as a memory game, a sequence of items, a clapping game, etc. Flexible choice of activity.

c. ***Slide 4 & 5:*** Have participants quickly solve two different types of problems that require processing, (i.e., long division math word problem (no calculator), analyze poem, high-order inferencing, etc.). Flexible

choice of activity. Teams will complete tasks, compare answers, and explain processing.

d. ***Slide 6:*** Have the team members try to remember the end-goal of the first memory activity, such as telling the sequence of the memory game colors. Have teams discuss the strategies they would have used to remember the sequence, had they known they needed to retain the information.

III. ***Slide 7***: Overview of Presentation – Briefly go over what you'll be covering in the presentation and why it's important. Topics include the following: ADHD Defined; *Who* ADHD impacts; *Where* we see the greatest impacts; *What* causes ADHD; *Why* what teachers believe about ADHD causality matters; and *How* that helps us improve our practice.

a. ***Slide 8:*** ADHD Defined

A. ***Slide 9:*** Attention Deficit Hyperactivity Disorder (ADHD) is a "childhood-onset neurodevelopmental disorder characterized by developmentally inappropriate levels of inattention, hyperactivity, and/or impulsivity, along with pervasive and significant functional impairment" (American Psychiatric Association, 2013)

B. ***Slide 10:*** Disorder of inadequate response inhibition, a problem of performance (not skills) and of inconsistency (not inability) (Goldstein & Naglieri, 2008).

C. ***Slide 11:*** Some researchers view ADHD as an epidemic and dub it as the most prevalent health diagnosis for school-age children (Thyagarajan, 2016).

D. ***Slide 12:*** Diagnosed or undiagnosed, throughout this training, the impacted students are the students who often make careless mistakes, have difficulty sustaining attention, do not seem to listen when spoken to, do not follow through on instructions, have difficulty with organization, they lose their stuff, they are forgetful, fidgety, out of their seat, running or climbing when it is inappropriate, they are unable to play quietly, struggle to wait their turn, talk excessively, blurt out, interrupt others, and are on an emotional roller coaster.

b. ***Slide 13***: Who ADHD Impacts

A. ***Slide 14:*** Student, Parents, Teachers

1. Student: at risk for conduct problems, substance abuse, mood disorders, poor self-esteem, depression, peer rejection, anxiety, and worry.
2. Parents of Impacted Student: experience high levels of stress, home often chaotic, messy, and in constant conflict; feel judged, isolated, angry, guilty, and powerless
3. Teachers of Impacted Student: experience disrupted classroom instruction and have cited behaviors consistent with a diagnosis of ADHD are a contributing factor for teacher burnout.

c. ***Slide 15:*** Where is the impact?

1. ***Slide 16:*** School Environment:

2. Studies have shown the school environment aggravates the behaviors consistent with a diagnosis of ADHD (David, 2013).
3. Impacted students often have deficits in the areas of executive functioning skills, working memory, organizational skills, time management, and planning.

B. ***Slide 17:*** Impacted students often have lower grades, substandard scores on standardized tests, referral for special education, decreased expectations from teachers, higher absenteeism rates, higher retention rates, and underdeveloped social skills.

d. ***Slide 18:*** What causes ADHD?

A. ***Slide 19:*** Various Theories

1. Nature/Biological Causes - a neurocognitive condition evidenced by biological abnormalities that cause behavioral symptoms. Aspects of a student's body or life processes are causing the behaviors consistent with a diagnosis of ADHD.
2. Nurture/Environmental Causes - a child's environment causes it. The factors surrounding the student through their upbringing or nurturing are causing the behaviors.
3. Despite being one of the most studied psychiatric disorders, the exact cause of ADHD is still unknown (Thapar et al., 2012).

4. Most of the research supports the complex view, holding behaviors consistent with a diagnosis of ADHD are because of the interdependence and mutual influence of both factors.

e. ***Slide 20:*** Why what teachers believe about ADHD causality matters and how that helps us improve our practice.

A. ***Slide 21:*** School-Based Interventions

1. Teachers believe they support the use of classroom interventions, but only 48% of the school-based interventions are reported as being used in an effective manner (below 60-80%). (The IRIS Center. (2014). Evidence-based practices (part 3): Evaluating learner outcomes and fidelity. Retrieved from https://iris.peabody.vanderbilt.edu/module/ebp_03/)
2. Four steps for developing a direct observation system: (1) Create a detailed list or task analysis of the intervention. (2) Define the components of the treatment in observational terms. (3) Rate the occurrence and nonoccurrence of each treatment component to calculate a percentage of treatment integrity. (4) Graph the integrity and outcome data over time.

B. ***Slide 22:*** Biological Perception and Biomedical Interventions

1. The stronger a teacher perceives biology as being a factor in the causation of behaviors consistent with a diagnosis of ADHD, the stronger their support will become for the use of biomedical interventions (or the opposite reaction).
2. Follow district/school expectations for how teachers should respond to parent inquires pertaining to the use of medication. (1) Don't make recommendations or suggestions for medication. (2) Provide data, not opinions, of what you observe in the classroom. (3) Save filling out protocols for an "average" day.

C. ***Slide 23:*** Environmental Perception & Parent-Provided Interventions

1. The stronger a teacher perceives the student's home environment as being a factor in the causation of behaviors consistent with a diagnosis of ADHD, the stronger their support will become for parent-provided interventions.
2. Follow district/school procedures for suggesting home-based changes: (1) Designate a point-person (counselor, principal, nurse, homeroom teacher, etc.) to foster relationships. (2) Be culturally sensitive of home-based practices. (3) Offer general suggestions through newsletters. (4) Establish trusted communication lines.

f. ***Slide 24:*** Summary

A. Use interventions with fidelity.

B. Establish a clear procedure for responding to medication-related questions.

C. Establish a clear procedure for addressing home-based changes.

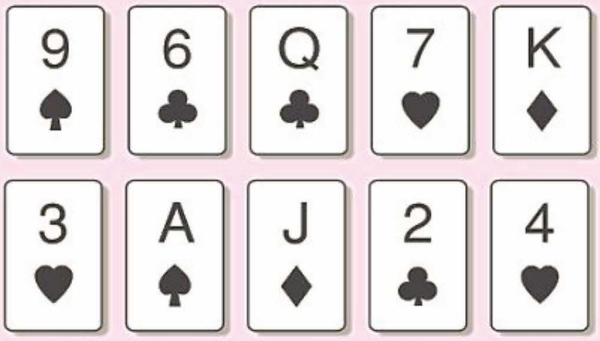
g. ***Slide 25***: Questions?

h. ***Slide 26:*** References


No-Cost Strategies to Prevent the High Cost of ADHD:
We Can't Afford to Not Pay Attention!


Icebreaker

THE PLAYING CARD TEST



TAKE three minutes to study these ten playing cards, then try to repeat the exact sequence in your notebook. Score one point for each card you can recall before a mistake is made.

Add up your scores to arrive at a total.

Maximum points: 10, Untrained: 3+, Improver: 5+, Master: 7+

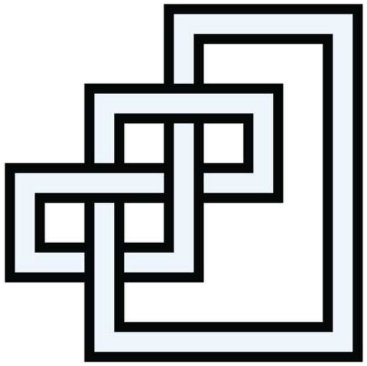
If your score is above the Improver range, then you have great memory potential. Don't worry if your score is below the Untrained range — try some of my memory techniques and you should notice impressive progress straight away.

Attendance at the National Typewriter Show has been decreasing each year. It was 2,000 in 2011; 1,750 in 2012; 1,500 in 2013; and 1,250 in 2014. If the drop-off continues at the same rate, in what year will NO ONE attend anymore?

Resource, "140 Challenging Daily Math WARM-UPS" found at www.teacherspayteachers.com/Store/We-Are-Builders

1 minute to solve
2 minutes to discuss

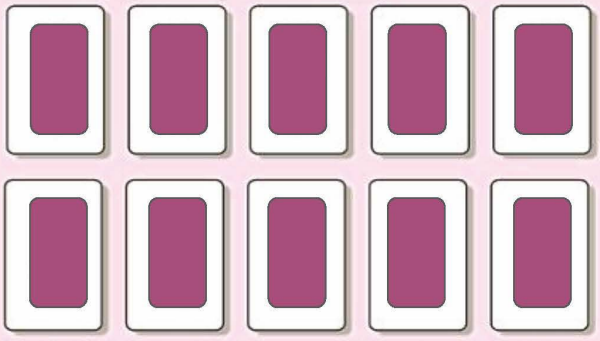
A rectangle is 7 inches by 11 inches (7” x 11”). A square has the same perimeter. What is the area of that square?



Resource, “140 Challenging Daily Math WARM-UPS” found at www.teacherspayteachers.com/Store/We-Are-Builders

1 minute to solve
2 minutes to discuss

THE PLAYING CARD TEST



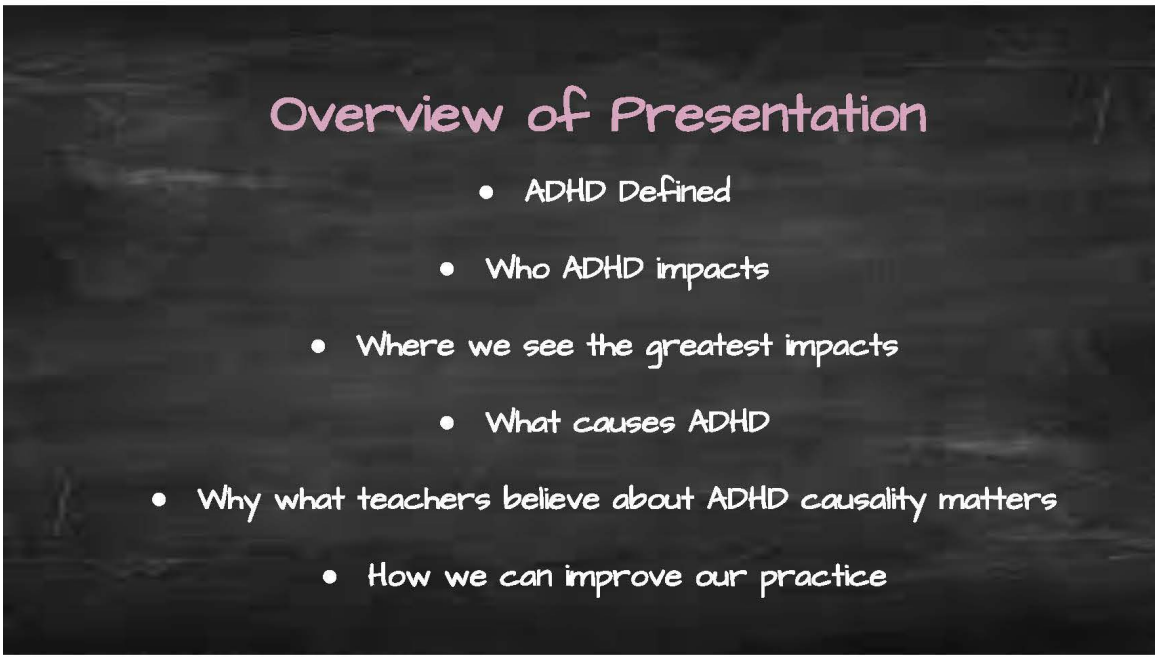
TAKE three minutes to study these ten playing cards, then try to repeat the exact sequence in your notebook. Score one point for each card you can recall before a mistake is made.

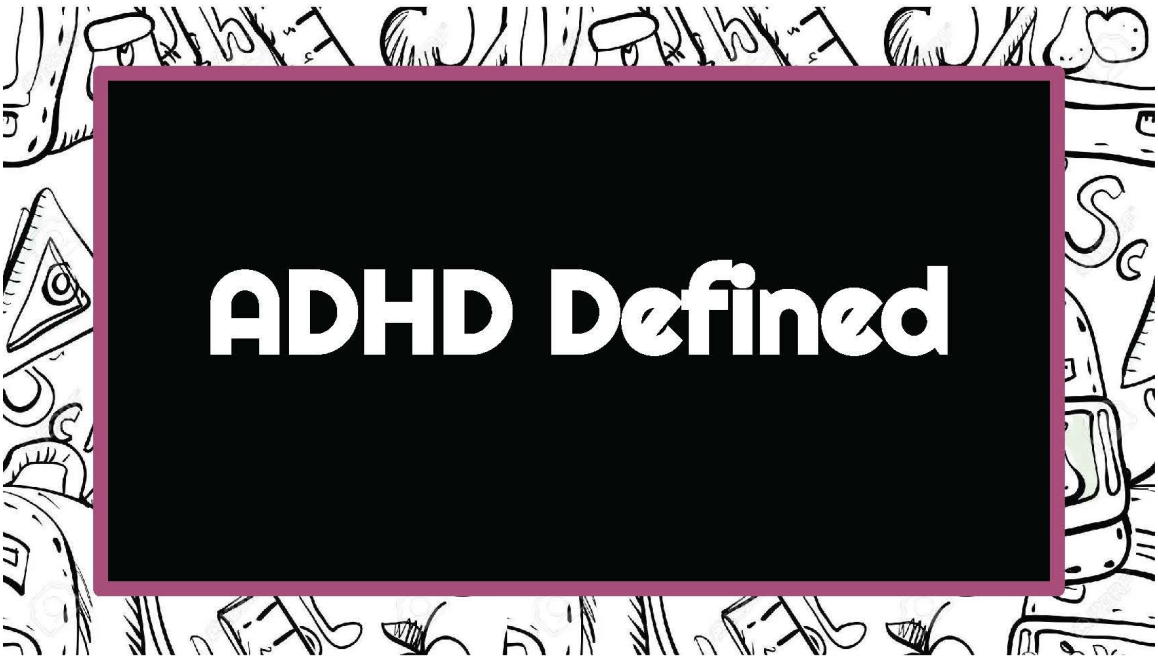
Add up your scores to arrive at a total.

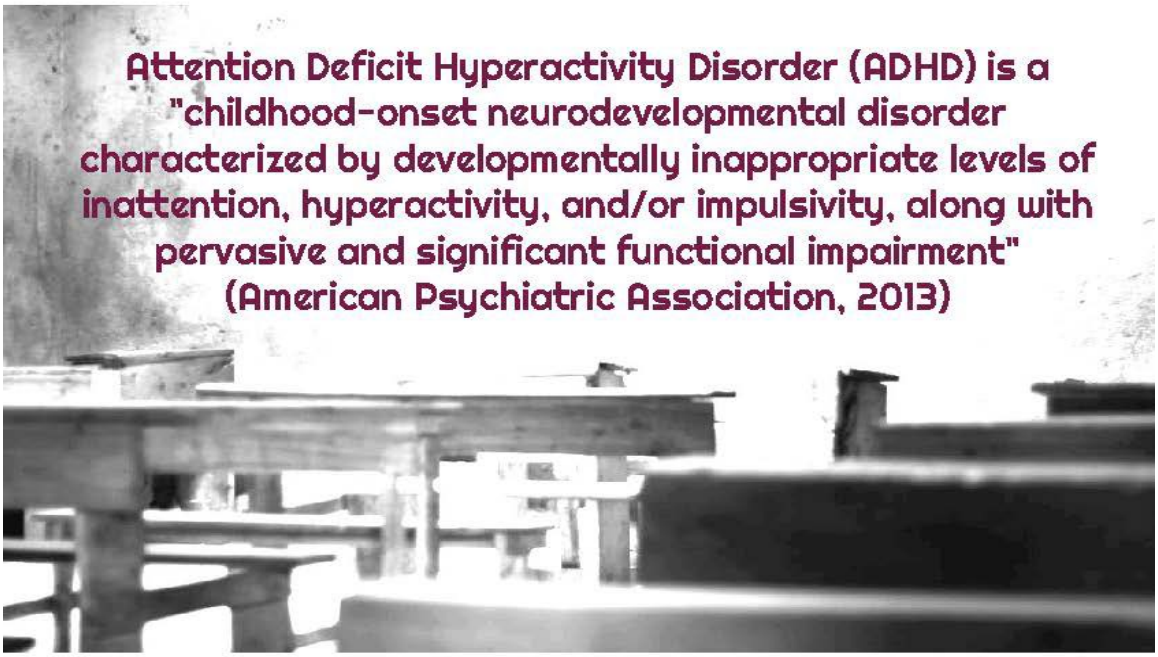
Maximum points: 10, Untrained: 3+, Improver: 5+, Master: 7+

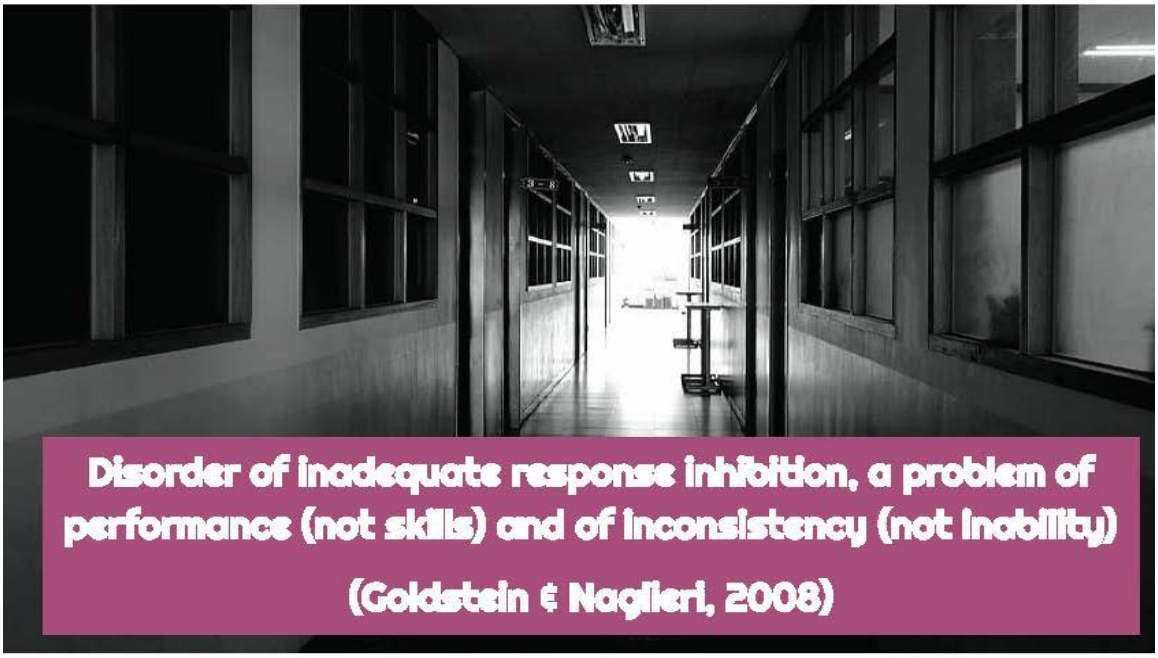
If your score is above the Improver range, then you have great memory potential. Don’t worry if your score is below the Untrained range — try some of my memory techniques and you should notice impressive progress straight away.

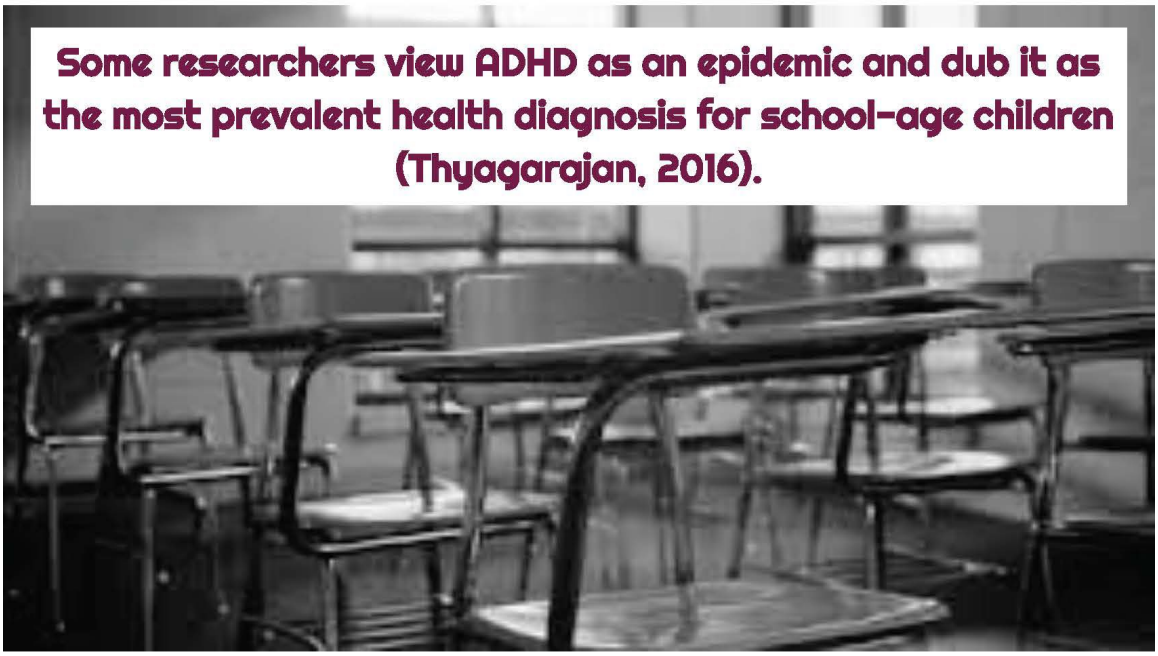
What was the order?


Overview of Presentation
• ADHD Defined
• Who ADHD impacts
• Where we see the greatest impacts
• What causes ADHD
• Why what teachers believe about ADHD causality matters
• How we can improve our practice

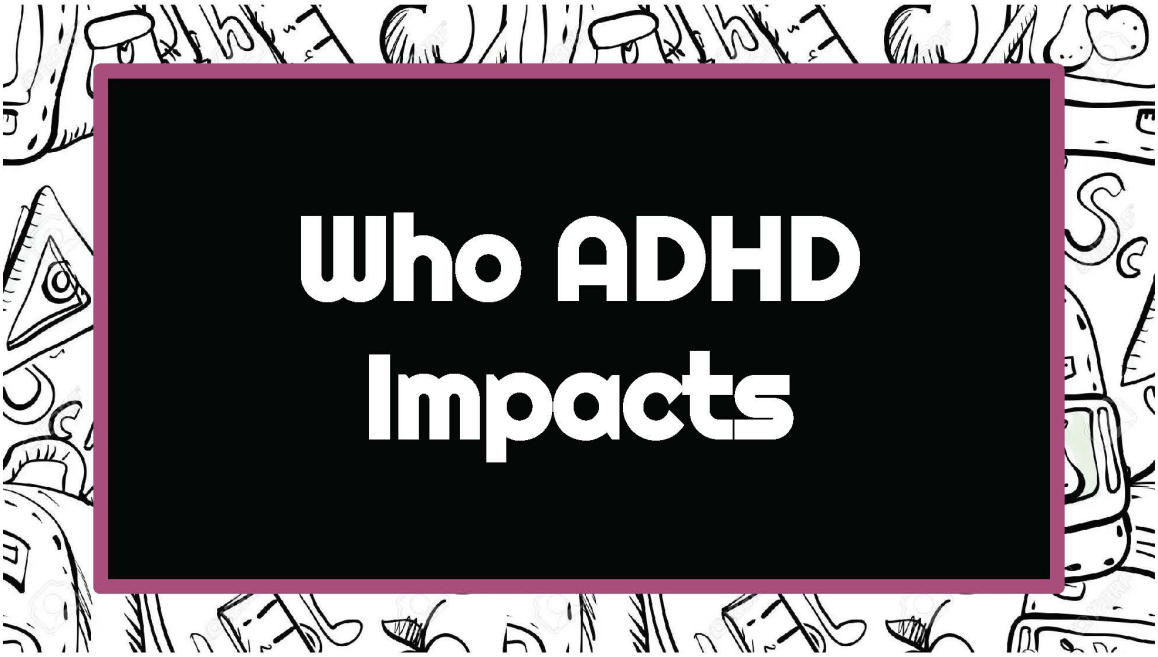

ADHD Defined


Attention Deficit Hyperactivity Disorder (ADHD) is a "childhood-onset neurodevelopmental disorder characterized by developmentally inappropriate levels of inattention, hyperactivity, and/or impulsivity, along with pervasive and significant functional impairment" (American Psychiatric Association, 2013)


Disorder of inadequate response inhibition, a problem of performance (not skills) and of inconsistency (not inability)
(Goldstein & Naglieri, 2008)

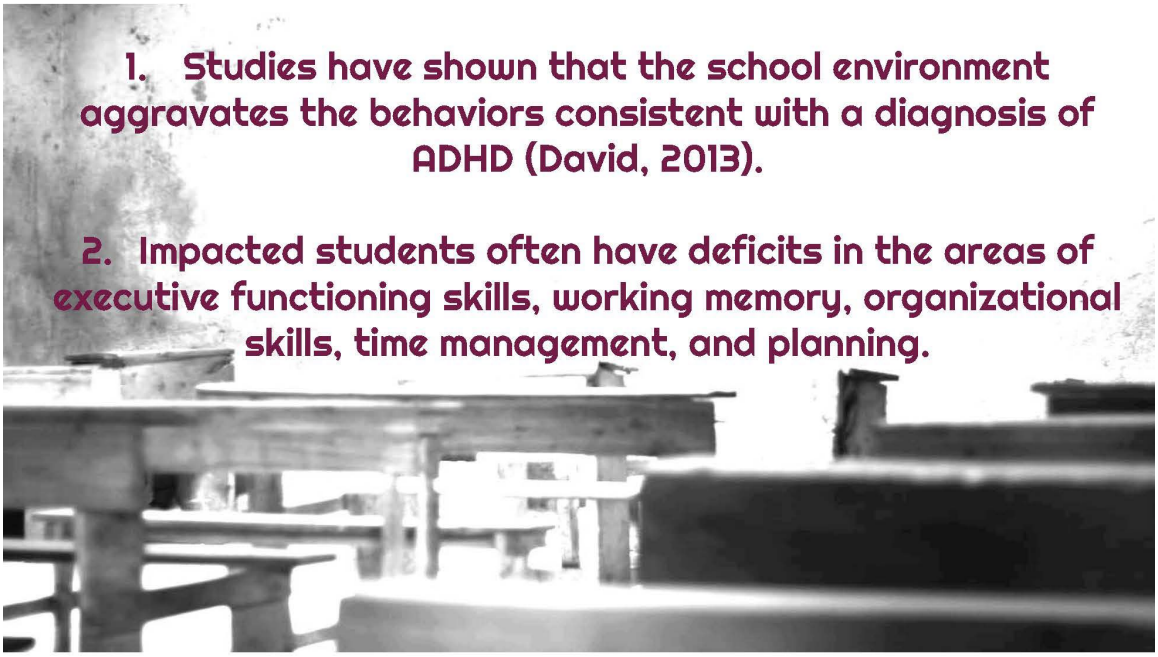


Diagnosed or undiagnosed, throughout this training, the impacted students are the students who often make careless mistakes, have difficulty sustaining attention, do not seem to listen when spoken to, do not follow through on instructions, have difficulty with organization, they lose their stuff, they are forgetful, fidgety, out of their seat, running or climbing when it is inappropriate, they are unable to play quietly, struggle to wait their turn, talk excessively, blurt out, interrupt others, and are on an emotional roller coaster.



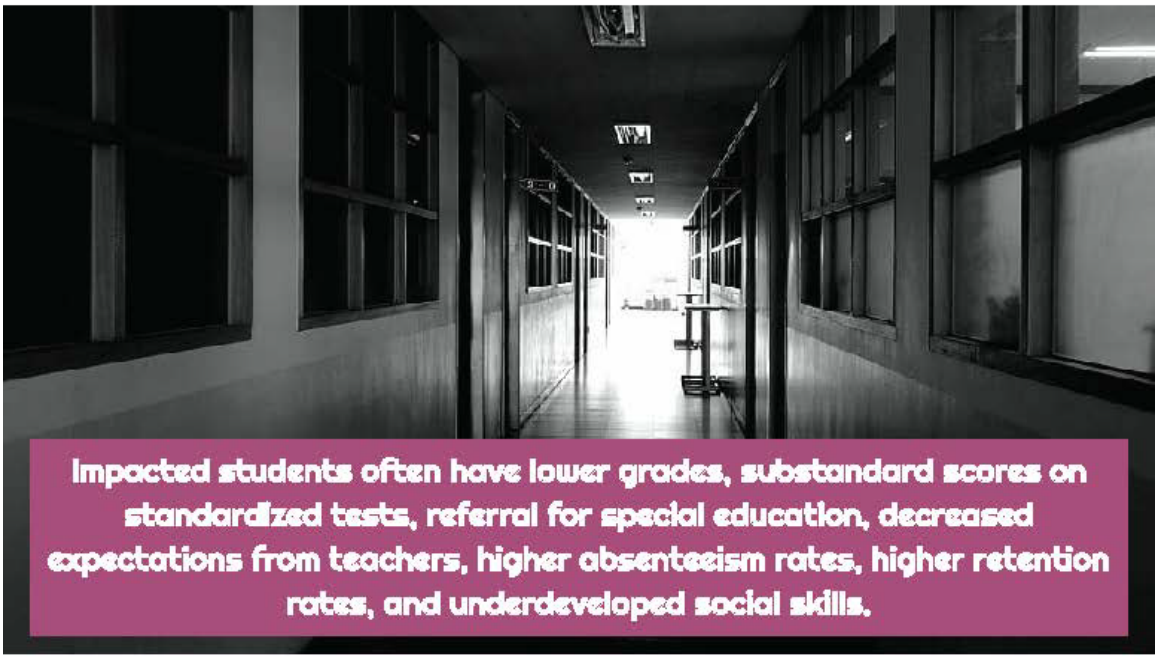
- Student: At risk for conduct problems, substance abuse, mood disorders, poor self-esteem, depression, peer rejection, anxiety, and worry
- Parents of Impacted Student: experience high levels of stress, home often chaotic, messy, and in constant conflict; feel judged, isolated, angry, guilty, and powerless
- Teachers of Impacted Student: experience disrupted classroom instruction and have cited those behaviors consistent with a diagnosis of ADHD are a contributing factor for teacher burnout

Where we see the greatest impacts.



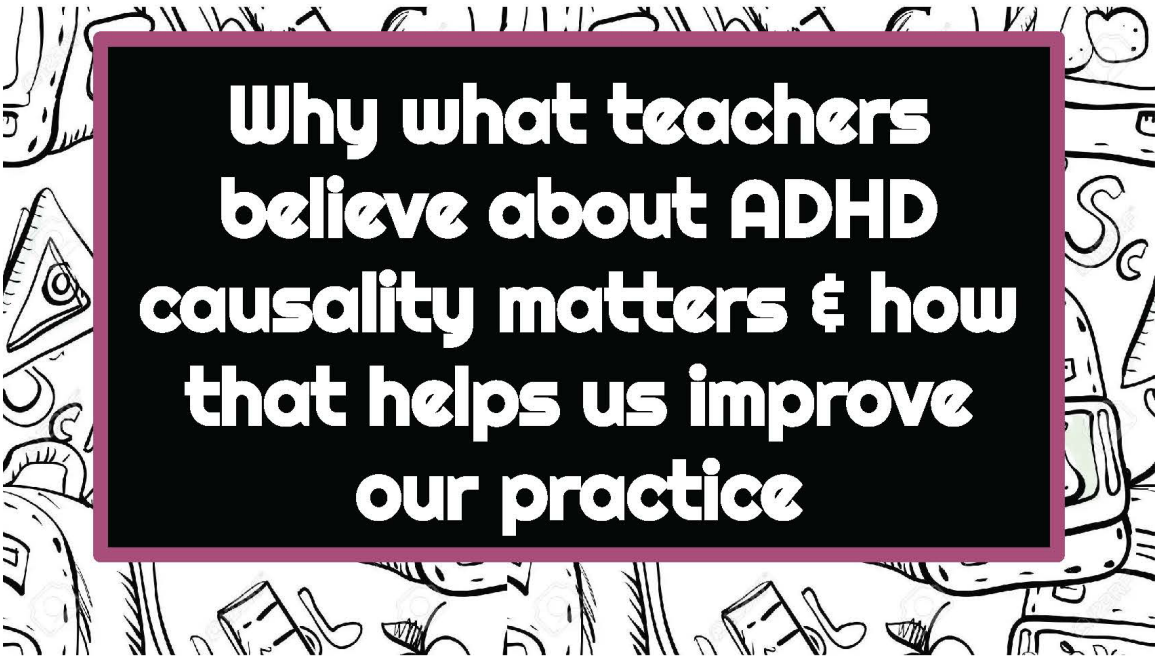
1. Studies have shown that the school environment aggravates the behaviors consistent with a diagnosis of ADHD (David, 2013).

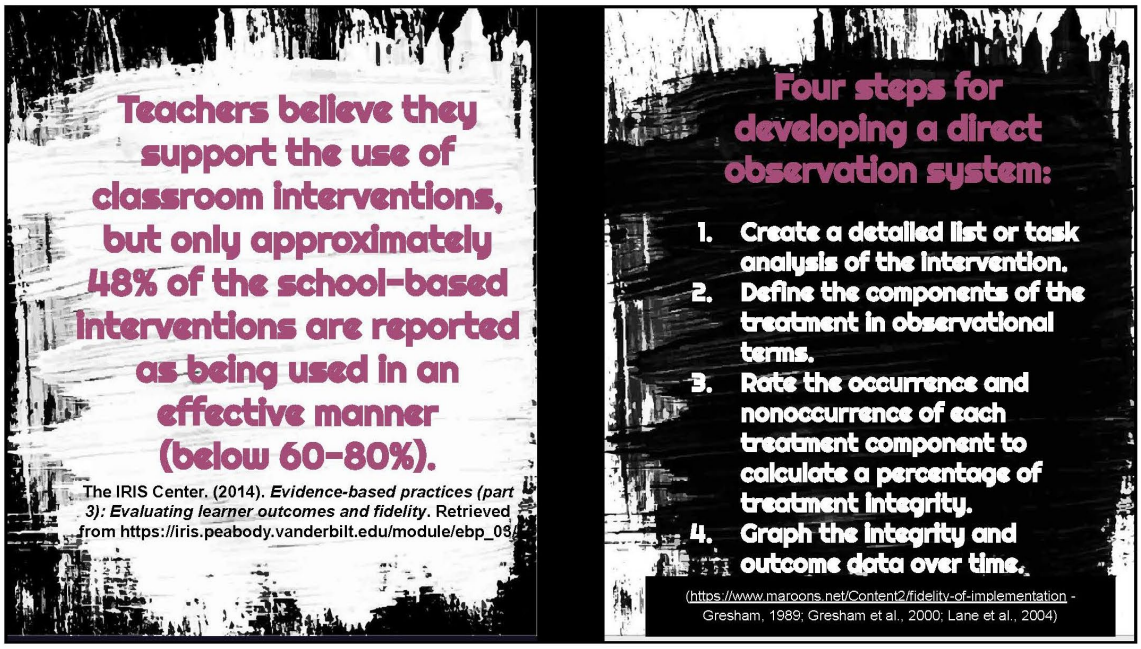
2. Impacted students often have deficits in the areas of executive functioning skills, working memory, organizational skills, time management, and planning.

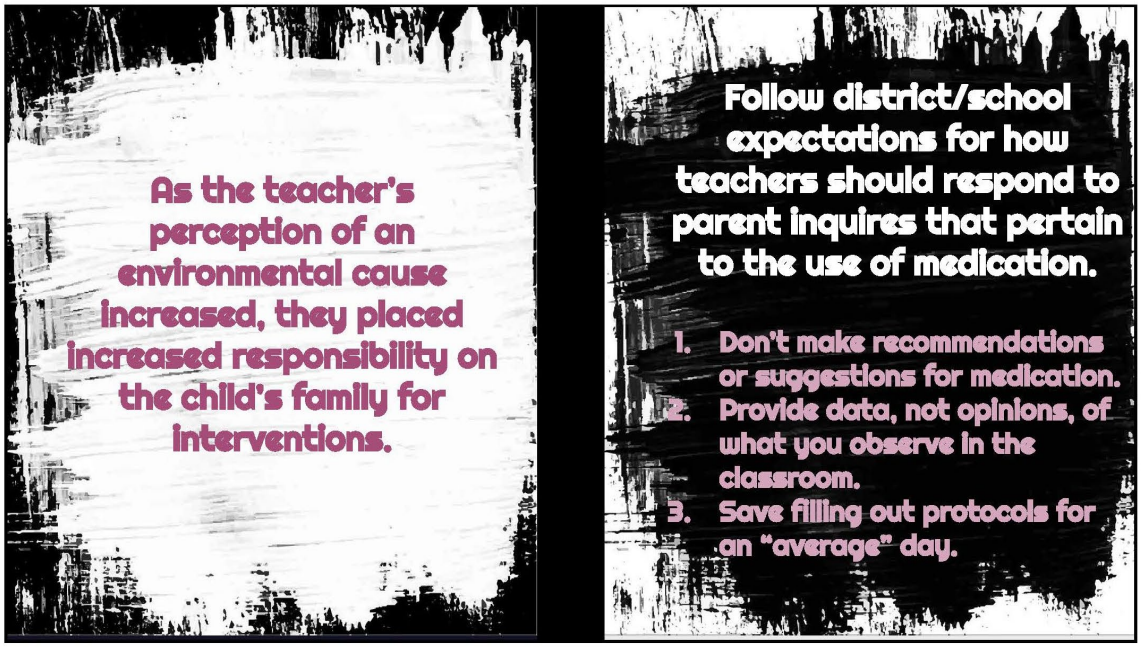


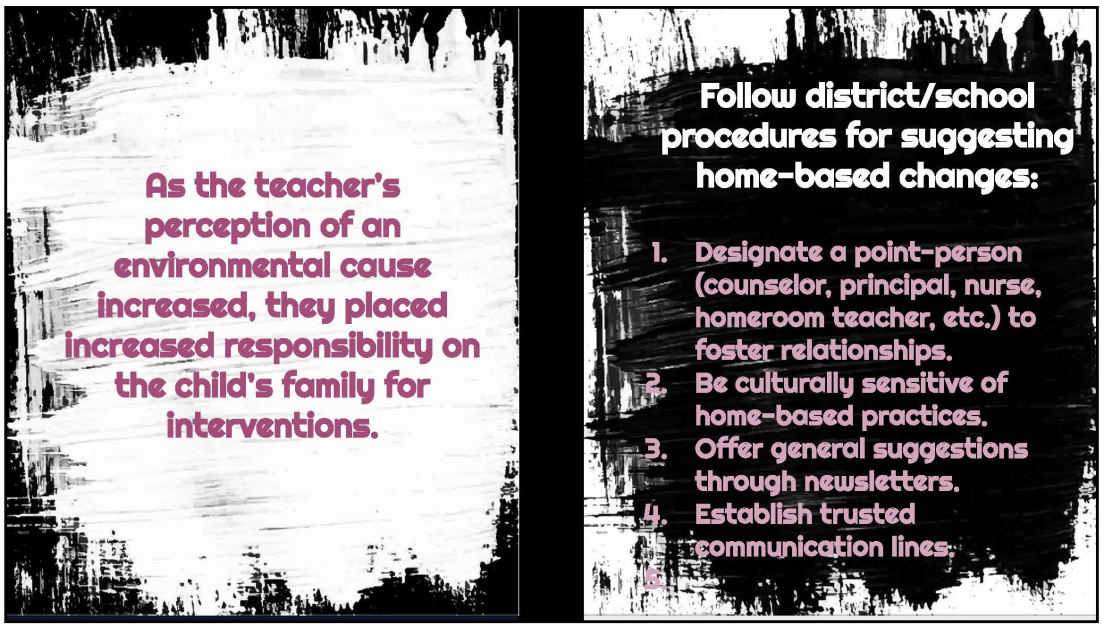
What Causes ADHD

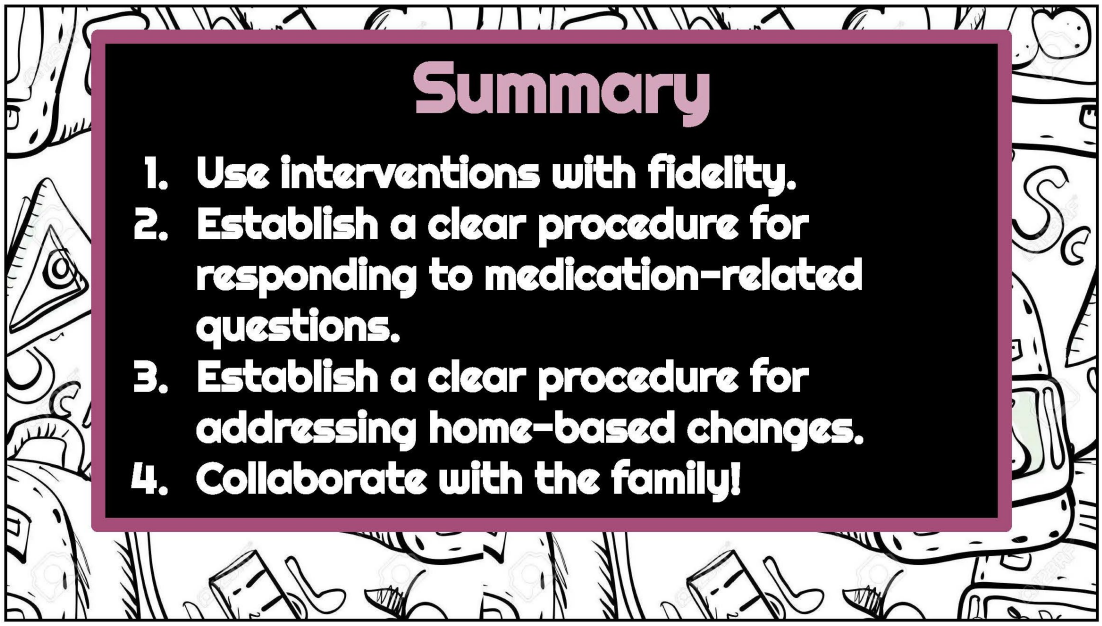
- Nature/Biological Causes - A neurocognitive condition evidenced by biological abnormalities that cause behavioral symptoms. Aspects of a student's body or life processes are causing the behaviors consistent with a diagnosis of ADHD.
- Nurture/Environmental Causes - A child's environment causes it. The factors surrounding the student through their upbringing or nurturing are causing the behaviors.
- Despite being one of the most studied psychiatric disorders, the exact cause of ADHD is still unknown (Thapar et al., 2012).
- Most of the research supports the complex view - an interdependence and mutual influence of both factors.

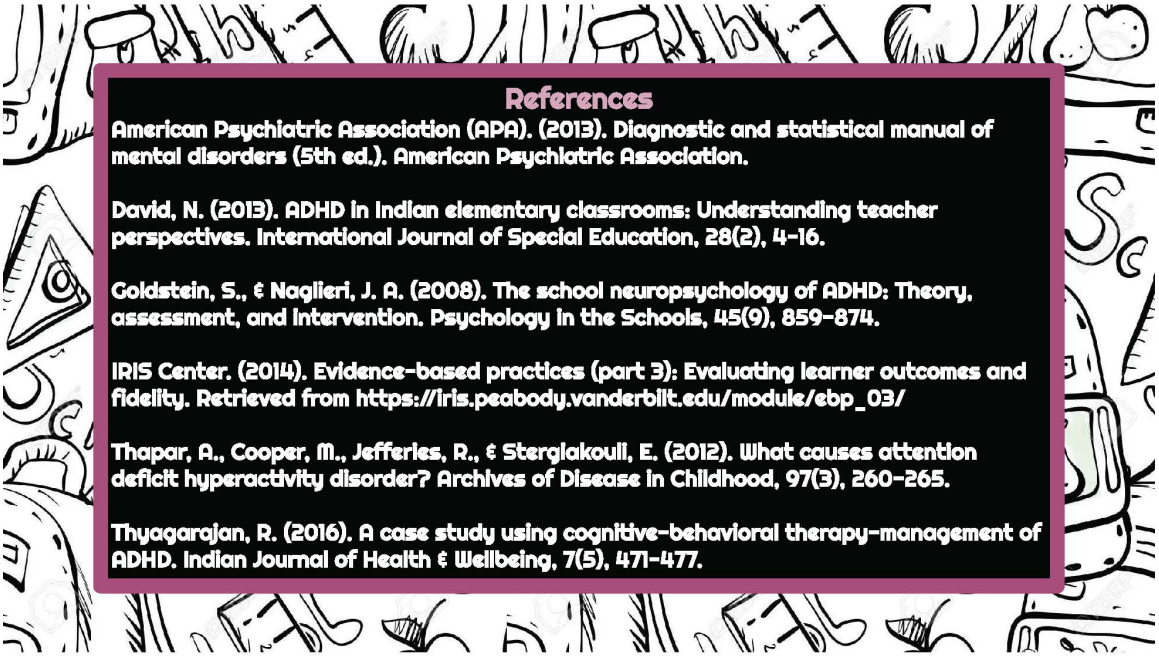



Teachers believe they support the use of classroom interventions, but only approximately 48% of the school-based interventions are reported as being used in an effective manner (below 60-80%).
The IRIS Center. (2014). Evidence-based practices (part 3): Evaluating learner outcomes and fidelity. Retrieved from https://iris.peabody.vanderbilt.edu/module/ebp_03/
Four steps for developing a direct observation system:
1. Create a detailed list or task analysis of the intervention.
2. Define the components of the treatment in observational terms.
3. Rate the occurrence and nonoccurrence of each treatment component to calculate a percentage of treatment integrity.
4. Graph the integrity and outcome data over time.
(https://www.maroons.net/Content2/fidelity-of-implementation - Gresham, 1989; Gresham et al., 2000; Lane et al., 2004)


As the teacher's perception of an environmental cause increased, they placed increased responsibility on the child's family for interventions.
Follow district/school expectations for how teachers should respond to parent inquires that pertain to the use of medication.
1. Don't make recommendations or suggestions for medication.
2. Provide data, not opinions, of what you observe in the classroom.
3. Save filling out protocols for an "average" day.


As the teacher's perception of an environmental cause increased, they placed increased responsibility on the child's family for interventions.
Follow district/school procedures for suggesting home-based changes:
1. Designate a point-person (counselor, principal, nurse, homeroom teacher, etc.) to foster relationships.
2. Be culturally sensitive of home-based practices.
3. Offer general suggestions through newsletters.
4. Establish trusted communication lines.
5.


Summary
1. Use interventions with fidelity.
2. Establish a clear procedure for responding to medication-related questions.
3. Establish a clear procedure for addressing home-based changes.
4. Collaborate with the family!



References

American Psychiatric Association (APA). (2013). Diagnostic and statistical manual of mental disorders (5th ed.). American Psychiatric Association.

David, N. (2013). ADHD in Indian elementary classrooms: Understanding teacher perspectives. International Journal of Special Education, 28(2), 4-16.

Goldstein, S., & Naglieri, J. A. (2008). The school neuropsychology of ADHD: Theory, assessment, and intervention. Psychology in the Schools, 45(9), 859-874.

IRIS Center. (2014). Evidence-based practices (part 3): Evaluating learner outcomes and fidelity. Retrieved from https://iris.peabody.vanderbilt.edu/module/ebp_03/

Thapar, A., Cooper, M., Jefferies, R., & Stergiakouli, E. (2012). What causes attention deficit hyperactivity disorder? Archives of Disease in Childhood, 97(3), 260-265.

Thyagarajan, R. (2016). A case study using cognitive-behavioral therapy-management of ADHD. Indian Journal of Health & Wellbeing, 7(5), 471-477.

How to Improve Practice Handout

Fidelity Handout

Four steps for developing a direct observation system

(https://www.maroons.net/Content2/fidelity-of-implementation - Gresham, 1989; Gresham et al., 2000; Lane et al., 2004)

1. Create a detailed list or task analysis of the intervention.
2. Define the components of the treatment in observational terms.
3. Rate the occurrence and nonoccurrence of each treatment component to calculate a percentage of treatment integrity.
4. Graph the integrity and outcome data over time.

National Center on Intensive Intervention Resources

Student Intervention Implementation Log:
https://intensiveintervention.org/sites/default/files/DBI_Weekly_Log_508.pdf

Intensive Intervention Meeting Checklist
https://intensiveintervention.org/sites/default/files/Intensive_Intervention_Meeting_Checklist.pdf

Student Level Plan Fidelity Checklist
https://intensiveintervention.org/sites/default/files/Implement_Review_Log_508.pdf

DBI Implementation Interview
https://intensiveintervention.org/sites/default/files/DBI_ImplemenInterview_2015.pdf

DBI Implementation Rubric
https://intensiveintervention.org/sites/default/files/DBI_ImplemenRubric_2015.pdf

RTI Action Network

Treatment Integrity Protocols
http://www.rtinetwork.org/getstarted/evaluate/treatment-integrity-protocols

IRIS Center

Monitoring Fidelity of Implementation
https://iris.peabody.vanderbilt.edu/module/ebp_03/cresource/q3/p06/

School-Based Interventions			
Classroom Interventions			
Use visuals of acceptable talk time & level, such as a talking stick or traffic light.	Chunk long projects into several pieces with clear deadlines for each chunk.	Allow the student to use speech-to-text or text-to-speech.	Check student understanding by having them verbally summarize.
Allow the student a choice in how to show mastery of a concept.	Use a visual timer/alarm to help with time management.	Give more time for tests, assignments, & projects.	Use auditory cues as reminders for desired behaviors.
Pre-teach necessary skills, such as vocabulary.	Sit the student in an area with fewer distractions.	Take actions to promote student-teacher relationship.	Post and follow a basic classroom routines.
Decrease assignment length	Post rules & discuss daily	Tailor assignment to student's level.	Limit repetitive assignments
Executive Functioning Interventions			
Present learning objectives in at least two ways.	Start lessons with verbal & visual summary of what students will be learning.	Allow the student to take a test or do work in a quieter environment.	Help student to clearly connect new material to prior knowledge.
Teach the student how to self-monitor.	Allow the student to use privacy boards.	Allow the student to use technology to complete work.	Allow the student to use headphones.
Post a list of student materials for each lesson.	Write clear directions for all assignments.	Help student set goals for tests, assignments, & projects.	Summarize key points visually & verbally.
Provide organization tools: colored folders, notebook w/ dividers, planner, or an assignment book.	Focusing tools: guided notes, colored markers, mnemonics, & probing questions.	Review behavior expectations often, especially if changing working styles (group work to independent work).	Review take-home assignments and provide clear, written instructions.
Physical Movement Interventions			
Schedule breaks with purposeful movement.	Tailor activity length to student's age.	Refrain from removing recess as a punishment.	Allow student to stand to do work.
Sit the student where they will be least disruptive if they move or fidget.	Allow the student to move or fidget in a non-distracting, quiet way.	Actively engage the student in the learning process, versus passive involvement, limiting down time.	Allow the student to have some type of seat that allows movement
Behavior Interventions			
Provide or refer the parent to training or support programs.	Use appropriate command language (clear, specific, & manageable).	Use daily report cards or some other kind of school-to-home communication.	Use a behavior chart or behavior contract
Use when/then or if/then contingencies.	Use response-cost programs (i.e.., token economy).	Use of time-out or loss of privileges as a natural consequence.	Use choice as a reward.
Use purposeful, frequent praise.	Ignore minor misbehavior	Provide opportunities to be successful in front of peers.	Use contingent positive reinforcement.
Peer-Mediated Interventions			
Provide specific instruction in social skills & other behavioral competencies, (sports & game rules)	Use social reinforcement through peer modeling & tutoring.	Support smooth transitions by using transition buddies & prompts	Provide opportunities for group or paired learning

Biomedical Interventions

Medication can only be prescribed by medical professionals. It does not cure, but rather eases ADHD symptoms during the time it is active in the student's body.

Stimulants

Methylphenidate-Based Side Effects: headache; decreased appetite; stomachache; nervousness; trouble sleeping; nausea; reduced spontaneity. Other Side Effects: slowing of growth in children; eyesight changes or blurred vision; heart-related problems; worsening of psychiatric problems; circulation problems.

Methylphenidate (Adhansia XR, Aptensio XR, Concerta, Cotempla XR-ODT, Daytrana patch, Desoxyn, Jornay PM, Metadate, Methylin, Quillichew, Quillivant, & Ritalin) Dextromethylphenidate (Dexedrine Spansule, Focalin, & Mydayis)

Amphetamine-Based - Side Effects: headache; trouble sleeping; circulation problem in fingers and toes; decreased appetite; nervousness; dizziness; diarrhea; constipation; mood changes; dry mouth; runny nose, nosebleed; itching rash, allergic reactions; increased tics; reduced spontaneity. Other side effects: slowing of growth in children; eyesight changes or blurred vision; heart-related problems; worsening of psychiatric problems.

Mixed salts of Amphetamine (Adderall, Adzenys ER, Dyanavel SR, Evekeo, Procentra, & Zenzedi)
Lisdexamfetamine (Vyvanse)

Norepinephrine Reuptake Inhibitor

Side Effects: nervousness; sleep problems; fatigue; upset stomach; dizziness; dry mouth; severe liver injury; suicidal thoughts.

Atomoxetine (Strattera)

Alpha Adrenergic Agents

Side Effects: fatigue; drowsiness; dizziness; dry mouth; decreased appetite; increased appetite; constipation; irritability; low blood pressure.

Guanfacine XR (Intuniv)
Clonidine XR (Kapvay)

Antidepressants

Side Effects: nausea; vomiting; dry mouth; headache; constipation; sweating; joint aches; sore throat; blurred vision; diarrhea; dizziness; raise in blood pressure; chest pain, fainting; ringing in the ears, fast heartbeat; mental/mood changes; tremors; weight loss/gain.

Tricyclic: Imipramine, Amitriptyline, Desipramine, & Nortriptyline

Nontricyclic: Bupropion & Monoamine Oxidase

Parent-Provided Interventions
Parents often look for interventions that will not have the side effects caused by medications and that are cost-effective.
Micronutrient Supplements (Zinc; Iron; Magnesium; Vitamin B; Vitamin D; Omega-3 Fatty Acids)
Herbal supplements (French Maritime Pine Bark; Ginkgo Biloba; St. John's Wort; Caffeine; Ginseng; Valerian; Ningdong; Bacopa; & Passionflower)
Remove food dyes from the diet.
Remove food preservatives from the diet.
Remove extra sugar from the diet.
Remove sodas from the diet.
Few-Foods Diet (finds food allergens)
Increase protein intake.
Improve sleep schedule.
Use mindfulness activities.
Increase time outside.
Participate in therapies (neurofeedback; music; play; or psychological (talk) therapy.
Exercise.
Limit time on electronics.

SECTION FIVE:

CONTRIBUTION TO SCHOLARSHIP

Target Journal

The researcher chose the peer-reviewed, academic journal, *Remedial and Special Education (RASE),* as the journal to which the researcher will submit a manuscript. *RASE* is published by SAGE Publishing, a publisher of over 1,000 journals.

Rationale

The researcher chose *RASE* because it has a multidisciplinary audience and allowed for the practical application of the study's findings. She felt the following statement, found on Sage Publishing's website (https://journals.sagepub.com/home/rse), demonstrated the traits she was looking for: "*Remedial and Special Education (RASE)* offers interdisciplinary articles that bridge the gap between theory and practice involving the education of individuals for whom typical instruction is not effective." The usefulness of the manuscript was again supported within the *RASE* author guidelines where it stated, "manuscripts should have clear and explicit implications for educational practice" (see Appendix E). In addition, *RASE* accepts correlational studies.

Plan for Submission

The researcher's plan for submission is based on the *RASE* author guidelines. When ready to submit the manuscript, the researcher will submit it electronically at https://mc.manuscriptcentral.com/rase. According to the guidelines, within 90 days of submission at least two evaluators will review the manuscript and an editor will make an editorial decision to: accept, accept pending revisions, request a revision subject to re-review, or reject. If the researcher receives a decision of "accept pending revisions" or "request a revision subject to re-review," she will resubmit the manuscript. If she receives a decision of "reject" the process will cease.

Submission-Ready Journal Article

Separate File Title Page

Article Title

TEACHER PERCEPTIONS OF ADHD CAUSALITY: IMPLICATIONS FOR EDUCATIONAL LEADERS

Names of All Authors

Corbyn Bartels and Cynthia MacGregor.

Author Affiliations

Missouri State University; University of Missouri-Columbia

Complete Mailing Address for Contact Author

Dr. Corbyn Bartels, 575 South Carriage Crossing, Nixa, MO 65714

Email Address for All Authors

Dr. Corbyn Bartels: CorbynMarieBartels@gmail.com

Dr. Cynthia MacGregor: CMacgregor@missouristate.edu

Manuscript

TEACHER PERCEPTIONS OF ADHD CAUSALITY: IMPLICATIONS FOR EDUCATIONAL LEADERS

Abstract

Students who exhibit behaviors commonly associated with Attention Deficit Hyperactivity Disorder (ADHD) are at risk for academic struggles and impaired relationships, often needing targeted interventions to be successful. While research supports the need for using interventions to improve classroom performance for students impacted by ADHD, it does not show if there is a relationship between the interventions a teacher uses or believes are effective and a teacher's perception of ADHD causality. Therefore, this study examined if there was a relationship. The data showed when a teacher feels something in the student's body is causing symptoms of ADHD, they are more willing to provide school-based supports. The data also showed when a teacher feels the child has more of a choice in their behaviors, the teacher is less likely to provide school-based supports. The data also showed that as the teacher's perception of a biological cause increased, they assumed more responsibility in providing interventions for the student. In addition, as the teacher's perception of an environmental cause increased, they placed increased responsibility on the child's family for interventions. Administrators can best support students impacted by ADHD by being proactive in advocating for stronger family and community partnerships and ensuring school-based interventions are being used with fidelity.

Keywords: Attention Deficit Hyperactivity Disorder; ADHD; causality; perception; interventions; DSM-5

Article

Attention Deficit Hyperactivity Disorder (ADHD) is a "childhood-onset neuro-developmental disorder characterized by developmentally inappropriate levels of inattention, hyperactivity, and/or impulsivity, along with pervasive and significant functional impairment" (Ahmann, 2017, p. 121). ADHD symptoms impact 8.2% of U.S. children (Danielson et al., 2018). Students displaying behaviors consistent with an ADHD diagnosis often have deficits in executive functioning skills, working memory, organizational skills, time management, and planning (Barkley & Fischer, 2011).

Some researchers view ADHD as an epidemic and dub it as the most prevalent health diagnosis for school-age children (Thyagarajan, 2016). Researchers believe affected students are at a greater risk for comorbid psychiatric problems, such as conduct problems, substance abuse, and mood disorders (Levine & Anshel, 2011). School-based concerns for students exhibiting behaviors consistent with a diagnosis of ADHD include lower grades, substandard scores on standardized tests, referral for special education, decreased expectations from teachers, higher absenteeism rates, higher retention rates, and underdeveloped social skills (DuPaul et al., 2011).

Consequences from Behaviors Consistent with a Diagnosis of ADHD

Along with academic concerns, students with behaviors consistent with a diagnosis of ADHD often display characteristics which negatively impact family and peer relationships (Tarver et al., 2014). In addition, they also often suffer poor self-esteem, depression, peer rejection, anxiety, and worry (Collett & Gimpel, 2004).

One reason for low self-esteem in students affected by ADHD is they often overestimate how well they will do on challenging tasks and when they fail, they become

easily frustrated and struggle to stay emotionally regulated (Milich, 1994). Another reason for low self-esteem in students who display behaviors consistent with a diagnosis of ADHD is they have egocentric worldviews and delays in their development of perspective-taking (Marton et al., 2009). Peers often avoid students with behaviors consistent with a diagnosis of ADHD because of their inability to play fair, their unpredictable emotions, whining, bossiness, refusal to follow rules, and their refusal to help with challenging tasks (Mrug et al., 2007).

According to Markel & Wiener (2014), families of a student with symptoms of ADHD often have arguments about time and money management, school and achievement issues, lying, and defiance. Parents of impacted students often feel judged, isolated, angry, guilty, and powerless (Corcoran et al., 2017; 2010; Singh, 2004). A parent's willingness to seek resources for their child decreases if these types of negative feelings result from interactions with their child's care team (Taylor & Antshel, 2021).

Research shows teachers spend a substantial amount of time and attention supporting the behaviors of students who display behaviors common with ADHD (Atkinson et al., 1997). Weyandt et al. (2009) found having experience working with students with behaviors consistent with a diagnosis of ADHD did not automatically improve teacher knowledgeability about ADHD; nor did experience improve teacher effectiveness when choosing interventions. Educators have cited ADHD behaviors as contributing factors for teacher burnout (Aloe et al., 2014; Greene et al., 2002).

ADHD Causality

Even though ADHD is one of the most studied psychiatric disorders in America, according to Thapar et al. (2012), researchers have not yet determined "the single cause

of ADHD and exposure to a risk factor does not necessarily result in disorder" (p. 260). The Merriam-Webster dictionary defines causality as "the relation between a cause and its effect." So, perception of ADHD causality refers to what is believed to be the cause.

A biological perception of ADHD causality is believing the source of ADHD symptoms is a neurological, biochemical, or anatomical abnormality (Boon, 2020; Bradstreet et al., 2010). Some researchers believe affected students have a "dysfunction in the frontal region of the brain, an area thought to be responsible for inhibition and attentional control" (Graham, 2008, p. 85). According to Quinn and Lynch (2016), "there is a broad consensus among international experts and organizations that ADHD is a genuine neurodevelopmental disorder based on empirical research" (p. 59). In addition, other biological events are also believed to cause behaviors consistent with a diagnosis of ADHD, such as a traumatic brain injury, a childhood stroke, or a streptococcal infection (Livingstone et al., 2016).

An environmental perception of ADHD causality is believing symptoms of ADHD are socially constructed by experiences in the student's environment, such as poor home support. Other examples include inconsistent discipline, incomplete authoritative relationships, food insecurity, anger, avoidance, and limited relational attachment and satisfaction (Bunford et al., 2015; San Mauro Martín et al., 2018).

The Need for Interventions

Research shows ADHD behaviors disrupt classroom instruction, contribute to lost teaching time, and impede social relationships (Stormont, 2001). It is the responsibility of the teacher to select effective interventions. Therefore, it is necessary to train teachers in

the use of effective interventions since "teacher preparation and certification are by far the strongest correlates of student achievement" (Darling-Hammond, 2000, p. 1).

Research supports school-based interventions such as improving classroom structure, implementing executive functioning supports, allowing for purposeful physical movement, following behavior management strategies, providing parent education, and using peer-mediated interventions along with teaching cognitive-behavioral social skills training (Benzing & Schmidt, 2019; Brock et al., 2010; DuPaul & Power, 2000; Evertson & Emmer, 1982; Harrison et al., 2019; Mrug et al., 2012; Pfiffner, 2011).

Research also supports the use of biomedical interventions, such as stimulants, antidepressants, norepinephrine reuptake inhibitors, and alpha-adrenergic agents (Sarris et al., 2011).To avoid the side effects caused by medications and to reduce the cost of interventions, some parents provide non-researched based parent-provided interventions such as micronutrient supplements, herbs, dietary changes, improved sleep schedules, mindfulness activities, exercise, increasing time outdoors, and limiting time on electronics (Brock, 2010; Hall & Gushee, 2002; Lambez et al., 2020).

Problem and Purpose of the Study

There is no unanimous agreement on which type of intervention is most effective in improving classroom outcomes for students impacted by ADHD, nor does research show the definitive reasoning behind teachers' choice of interventions (Hall & Gushee, 2002). Therefore, the problem of practice addressed in this study is that while research supports the need for using interventions to improve classroom performance for students who exhibit behaviors consistent with a diagnosis of ADHD, there is a gap in the literature because it does not show if there is a relationship between the interventions a

teacher uses or believes are effective for students impacted by ADHD and a teacher's perception of ADHD causality. Therefore, the purpose of this study was to determine if there is a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality.

Research Questions

The research questions guiding this study are as follows: 1.) To what extent do teachers perceive biology and the environment interact in the causality of the symptoms in a student identified as having behaviors consistent with a diagnosis of ADHD? 2.) What biomedical interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD? 3.) What parent-provided interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD? 4.) What school-based interventions are most used by teachers for students identified as having behaviors consistent with a diagnosis of ADHD? 5.) Is there a relationship between the interventions a teacher uses or believes are effective for students identified as having behaviors consistent with a diagnosis of ADHD and a teacher's perception of ADHD causality?

Design of the Study

Methodology

The study used a quantitative correlational research design, which is a non-manipulation study. According to Rumrill (2004), "non-manipulation studies examine the strength or magnitude of association among variables, but no attempt is made to infer

causality within an individual study" (p. 255). The study did not add interventions as it examined if a correlation existed between teacher practices and perceptions of causality.

Setting

The researcher conducted the study within a public school district in southwestern Missouri that serves three counties and approximately 6,400 students. The school district has one main high school and an alternative high school for at-risk students. There is one junior high school, two intermediate schools, and five elementary schools. The school district averages a 92% graduation rate. Approximately 87% of students report as white, and 29.8% are eligible to take part in the Free or Reduced Lunch Program. The student-to-teacher ratio is 19:1, and the teacher three-year retention rate is 66.2%.

Sampling Method and Participants

The researcher used “convenience sampling.” According to Patton (2002), “convenience sampling” means persons taking part in the study were chosen because they were readily available. To conduct the convenience sampling, the researcher obtained permission from the superintendent to conduct the survey within the school district. Once the study’s IRB was approved, the researcher contacted each building’s principal to inform them of the study’s purpose. The researcher sent an introductory email to each building principal, who then forwarded it to their staff. The email introduced the researcher, outlined the purpose of the study, provided the Informed Consent, and provided a digital copy of the survey. The email also notified the recipients they would be receiving a printed copy of the Informed Consent, a printed survey, and an envelope addressed to the researcher. Of the total number of surveys returned, only three were completed digitally. All other participants returned paper surveys.

Participant criteria were as follows: (a) employed by NPS; (b) certified general education teacher (not special education); (c) have at least one year of teaching experience; (d) currently teaching in a general education classroom setting (not a special education classroom or intervention room); and (e) have at least one student who displays behaviors consistent with a diagnosis of ADHD, with or without a diagnosis (academic struggles or behavioral problems due to inattention, hyperactivity, and/or impulsivity).

To ensure all participants understood what was meant by "behaviors consistent with a diagnosis of ADHD," a clarifying paragraph was provided within the informed consent based on the diagnostic criteria for ADHD found in the American Psychiatric Association's (2013) *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5). The paragraph clarified it was not necessary for students to have an official diagnosis of ADHD to be considered having behaviors consistent with ADHD.

Data Collection Tools and Procedures

The researcher developed the data collection instrument, which was a survey. According to Merriam and Tisdell (2016), surveys are "intended to systematically describe the facts and characteristics of a given phenomenon" (p. 5). The instrument aimed to determine a teacher’s perception of ADHD causality and what interventions teachers use or believe are effective for students identified as having behaviors consistent with a diagnosis of ADHD.

Survey Section One

Section One of the survey asked the participant to identify the level they currently teach (elementary, intermediate, junior high, high school) and their number of years of teaching experience (2-3, 4-6, 7-9, 10+). In addition, the participant was asked to

acknowledge receipt and understanding of the Informed Consent. The last question of Section One was for the participant to confirm they met the participant criteria.

Survey Section Two

Section Two of the survey gathered data to answer the research question: To what extent do teachers perceive biology and the environment interact in the causality of the symptoms in a student identified as having behaviors consistent with a diagnosis of ADHD? The participant was asked to assign two causality value judgments for each stimuli/DSM criterion. One value judgment was for biological causality and the other value judgment was for environmental causality. Then, the participant was asked to assign a level of importance to their judgments of causality using a six-point Likert scale. The researcher labeled and ranked the Likert scale as follows: 1 = Strongly Disagree; 2 = Disagree; 3 = Partially Disagree; 4 = Partially Agree; 5 = Agree; and 6 = Strongly Agree. The participants did not see the numerals.

Using the Likert scale, the participants responded to the following prompt regarding each of the 18 DSM-5 criteria to determine their level of agreement for biological and environmental causality: *Please indicate your level of agreement for the cause of each behavior: BIOLOGY: (e.g., student has a neurological, biochemical, or anatomical abnormality, due to genetics, heredity, brain development, prenatal complications, a childhood stroke, a streptococcal infection, or a frontal lobe injury). ENVIRONMENT: (e.g., student impacted by poor home support, inconsistent discipline, incomplete authoritative relationships, anger, avoidance, limited relational satisfaction, low social class, severe marital discord, paternal criminality, maternal mental disorder, placement in out-of-home care, toxin exposure, or trauma).* The scores assigned to each

of the 18 DSM-5 diagnostic criteria were summed for each participant to determine a final score for biological causality and a separate final score for environmental causality.

Survey Section Three

Section Three of the survey gathered data to answer the following two research questions: 1.) What biomedical interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD? 2.) What parent-provided interventions do teachers most commonly feel are effective for students identified as having behaviors consistent with a diagnosis of ADHD?

Five items within Section Three of the survey addressed the biomedical interventions shown in Figure 5.1. Fourteen items from Section Three of the survey addressed the parent-provided interventions shown in Figure 5.2. Figure 5.1 and Figure 5.2 were created by the researcher by compiling data from various studies (Benzing & Schmidt, 2019; Brock, 2010; CDC, 2020; Chimiklis et al., 2018; DuPaul et al., 2011; Evertson & Emmer, 1982; Filcheck & McNeil, 2004; Hamilton & Astramovich, 2016; Lambez et al., 2020; Malekpour et al., 2014; Martinussen et al., 2011; Mautone et al., 2011; Norouzi et al., 2018; Pfiffner, 2011; Purdie et al., 2002; Sheppard, 2015). Using the same Likert scale as Section Two, the participants responded to the following prompt: *Please indicate your level of agreement that the following interventions are effective for treating students with behaviors consistent with a diagnosis of ADHD.*

Survey Section Four

Section Four of the survey gathered data to answer the research question: What school-based interventions are most used by teachers for students identified as having

behaviors consistent with a diagnosis of ADHD? The researcher gathered the data via a matrix with a six-point Likert scale. The researcher labeled and ranked the scale points as follows: 1 = Never: 0%; 2 = Rarely: 10%; 3 = Occasionally: 30%; 4 = Sometimes: 50%; 5 = Frequently: 70%; 6: Usually: 90%. The participants did not see the ranking numerals. Using the Likert scale, the participants responded to the following prompt: *Please indicate how often you use the following interventions for students with behaviors consistent with a diagnosis of ADHD.* The school-based interventions chosen to be listed on the survey were from Figure 5.3, which the researcher created by compiling data from the same sources as Figures 5.1 and 5.2.

Data Analysis Plan

Analysis for RQ #1

To answer the first research question, the researcher used the data gathered from Section Two of the survey and performed a descriptive analysis of the scores for biological causality and a descriptive analysis of the scores for environmental causality. Each of the 18 items was scored on a scale of one point to six points. Therefore, depending on their responses, each teacher received a score between 18 and 108 for their view of biological causality. They received a separate score between 18 and 108 for their view of environmental causality. This score was then divided by the number 18 to convert to a Likert interpretation. The data were then analyzed to determine the mean and standard deviation of the teachers' view of biological causality and their view of environmental causality. To complete this step, the researcher ran an exploratory correlation test between the biological causality score and environmental causality score.

Analysis for RQ #2

To answer the second research question, the researcher used five items from Section Three that addressed biomedical interventions. Each of the five items was scored on a scale of one point to six points. Therefore, depending on their responses, each teacher received a score between five and 30. This score was then divided by the number 5 to convert to a Likert interpretation. The data were then analyzed to determine the mean and standard deviation of the teachers' agreement with the use of biomedical interventions. A grouped frequency distribution was done for each Likert scale category to determine the percentage of teacher agreement with the effectiveness of individual biomedical interventions. Using the percentage score for teachers who strongly agreed with each biomedical intervention (6 = Strongly Agree), the data were then presented in order from the most agreement to the least agreement.

Analysis for RQ #3

To answer the third research question, the researcher used 14 items from Section Three that addressed parent-provided interventions. Each of the 14 items was scored on a scale of one point to six points. Therefore, depending on their responses, each teacher received a score between 14 and 84. This score was then divided by the number 14 to convert to a Likert interpretation. The data were then analyzed to determine the mean and standard deviation of the teachers' agreement with the use of parent-provided interventions. A grouped frequency distribution was done for each Likert scale category to determine the teacher's level of agreement with the effectiveness of individual parent-provided interventions. Using the percentage score for teachers who strongly agreed with

each parent-provided intervention (6 = Strongly Agree), the data were then presented in order from the most agreement to the least agreement.

Analysis for RQ #4

To answer the fourth research question, the researcher used 54 items from Section Four that addressed school-based interventions. The items were divided into five subscales: (1) Classroom Interventions; (2) Executive Functioning Interventions; (3) Physical Movement Interventions; (4) Behavior Interventions; and (5) Peer-Mediate Interventions. A grouped frequency distribution was done for each Likert scale category to determine the teacher's overall use of individual school-based interventions. Using the percentage score for teachers who usually use each school-based intervention (6= Usually: 90%), the data were presented from the most to least use.

The items were scored on a scale of one point to six points. Therefore, depending on their responses, each teacher received a score between 54 and 324. This score was then divided by the number 54 to convert to a Likert interpretation. The data were then analyzed to determine the mean and standard deviation of the teachers' use of all school-based interventions. It was also analyzed to determine the mean and standard deviation of each of the five subscales.

Analysis for RQ #5

To answer the fifth, and final research question, the researcher ran six, bivariate correlation, two-tailed tests (Field, 2018). The teacher's causality score for each of the two views of causality was analyzed with each of their scores for the three intervention categories. These scores were determined by adding up each teacher's answers in each subscale and then dividing the total score by the number of items in the subscale. Then,

the researcher ran six separate correlation tests, the first three using Biological Causality with each of the intervention categories and the last three using Environmental Causality with each of the intervention categories.

Findings

Participants

There were 312 eligible participants. The total number of participants who returned surveys was 90, which is a return rate of approximately 29%. However, eight of those surveys were unable to be used due to either the participant not meeting the study's criteria or the survey containing unanswered items. The total number of useable surveys was 82. There was an almost equal representation of responses from teachers across the grade leveling groups. From the elementary level, grades kindergarten to fourth, 30 surveys were returned, which was 37% of the total usable surveys. From the intermediate and junior high level, grades fifth to eighth, 24 surveys were returned, which was 29% of the total usable surveys. From the high school level, grades ninth through twelfth, 28 surveys were returned, which was 34% of the total usable surveys. While the surveys provided an approximately equal representation of input from each grade level grouping, there was not equal representation shown across teaching experience levels. Teachers with more than ten years of experience returned 52 surveys, or 64%.

Research Question Number One

The minimum score obtained in the biological causality data set was 42 and the maximum score obtained was 108. Five participants received a score of 108, indicating they strongly agreed biology was a cause of all 18 DSM-5 criteria items. Overall,

teachers' belief in biology being a cause of behaviors commonly associated with ADHD fell in the middle between partially agree and agree (M = 4.56, SD = .72).

The minimum score obtained in the environmental causality data set was 18 and the maximum score was 108. Four participants received a score of 108, indicating they strongly agreed the environment was a cause of all 18 DSM-5 criteria items. Overall, teachers partially agreed that the environment was a cause of behaviors commonly associated with ADHD (M = 4.21, SD = .91). The researcher analyzed the means of the participants' perceptions of causality using a Paired Sample T-Test. When comparing means, the data showed there was no significant difference between means (p=.062).

Research Question Number Two

The minimum score obtained in the biomedical interventions data set was 8 and the maximum score obtained was 25. Zero participants agreed all the biomedical interventions are effective. Overall, teachers partially agreed that biomedical interventions are effective for treating behaviors consistent with a diagnosis of ADHD (M = 3.81, SD = .76). As shown in Table 5.1, an analysis of the five biomedical interventions showed the most agreement was for the use of amphetamine-based stimulants. The least amount of agreement was for the use of alpha-adrenergic agents.

Research Question Number Three

The minimum score obtained in the parent-provided interventions data set was 18 and the maximum score obtained was 78. Zero participants agreed all the parent-provided interventions are effective. Overall, teachers' belief that parent-provided interventions are effective for treating behaviors consistent with a diagnosis of ADHD fell in the middle between partially agree and agree (M = 4.50, SD = .68). As shown in Table 5.2, a

descriptive analysis for the 14 parent-provided interventions showed the intervention with the highest score for Strongly Agree was for limiting time on electronics. However, when the percentage amounts were added together for Agree and Strongly Agree, the intervention with the most support was improving a child's sleep schedule. The intervention of having the child use mindfulness activities had the same score as limiting the child's time on electronics. The least amount of agreement was for the use of herbal supplements.

Research Question Number Four

The minimum score obtained in the school-based interventions data set was 158 and the maximum score obtained was 314. Zero participants agreed all the school-based interventions are effective. Overall, teachers reported they use school-based interventions about 50% of the time, or sometimes, to support behaviors consistent with a diagnosis of ADHD ($M = 4.24$, $SD = .65$). As shown in Table 5.3, a descriptive analysis of the 54 school-based interventions showed the most used school-based intervention was for taking actions to promote the student-teacher relationship. The least used school-based intervention was providing or referring the parent to training or support programs.

Table 5.3 is separated into five subscales. The categories are: (1) Classroom Interventions; (2) Executive Functioning Interventions; (3) Physical Movement Interventions; (4) Behavior Interventions; and (5) Peer-Mediate Interventions. The interventions within each subscale are ordered from the most amount of use to the least amount of use. The subscale with the highest reported use was physical movement, which teachers reported they use about 70% of the time, or frequently ($M = 4.73$, $SD = .88$). The subscale with the lowest reported use was behavior interventions, which teachers reported

they use just under 50% of the time, or sometimes (M = 3.99, SD = .84). Teachers reported they use peer-mediated interventions (M = 4.47, SD = .75), executive functioning interventions (M = 4.44, SD = .73), and classroom interventions (M = 4.43, SD = .69) between 50% and 70% of the time, or in the middle between sometimes and frequently. Table 5.4 provides a descriptive analysis of the study's variables.

Research Question Number Five

To determine if a relationship existed between a participant's biological score of causality and their environmental score of causality, the researcher first verified if the data met the assumptions of a parametric test (Field, 2018). The only assumption met was that of equal variance. The other three assumptions were not met. First, normality was not met due to the environmental causality data not showing normal distribution. Second, the study used convenience sampling instead of random sampling, so independence was not met. Third, outliers existed, three in the environmental causality data and one in the biological causality data. Since the data did not meet the assumptions of the parametric test, the researcher used Spearman's correlation (Field, 2018). To determine if there was a positive, negative, or no relationship between variables, all correlations were computed as two-tailed tests (Field, 2018) and were bivariate.

Spearman's correlation indicated there was a strong, negative correlation between the participants' scores for biological causality and their scores for environmental causality, (r(82) = -.99, p = <.001). Therefore, the data shows the stronger a teacher's perception of ADHD behaviors being caused by a biological cause increases, their perception of ADHD behaviors being caused by an environmental cause decreases.

Biological Causality. Due to the data not showing normal distribution, Spearman's correlation was computed to assess the relationship between the participants' scores for biological causality and their scores for biomedical interventions. There was a statistically significant, strong, negative correlation between the variables, ($r(82) = -.99$, $p = <.001$). There was a significant, strong, negative correlation between the participants' scores for biological causality and their scores for parent-provided interventions ($r(82) = -.99$, $p = <.001$). There was a significant, strong, positive correlation between the participants' scores for biological causality and their scores for school-based interventions, ($r(82) = .99$, $p = <.001$).

Environmental Causality. Due to the data not showing normal distribution, Spearman's correlation was computed to assess the relationship between the participants' scores for environmental causality and their scores for biomedical interventions. There was a statistically significant, strong, positive correlation between the variables, ($r(82) = .99$, $p = <.001$). There was a significant, strong, positive correlation between the participants' scores for environmental causality and their scores for parent-provided interventions, ($r(82) = .99$, $p = <.001$). There was a significant, strong, negative correlation relationship between the participants' scores for environmental causality and their scores for school-based interventions. ($r(82) = -.99$, $p = .<.001$).

Efforts to Support Quality of Research

Ethics

Mertens (2020) stated, "Ethics in research should be an integral part of the research planning and implementation process, not viewed as an afterthought or a burden" (p. 13). To act ethically, the researcher avoided any unnecessary risks that could

bring harm to the participant's status in the organization. The researcher also ensured the participants knew their participation was voluntary. The researcher has received human subjects training through the Collaborative Institutional Training Initiative. Prior to conducting any research, the researcher gained approval from the University of Missouri's Institutional Review Board (IRB). In addition, the researcher obtained written permission from the school district.

Risks

A risk to this study was that it had the potential to cause discomfort to participants who either display, or who have family members who demonstrate behaviors consistent with a diagnosis of ADHD. Therefore, participant identities were protected by not asking teachers to provide their names or their specific job title.

Generalizability

Gall et al. (2007) defined generalizability as the extent to which findings in one study can be applied in another study or similar situation. To support generalizability, the researcher strictly adhered to the previous criteria described for the participants. In addition, the researcher worked diligently to obtain an appropriate sample size of 82. Onwuegbuzie et al. (2004) stated a sample size of 82 participants is the recommended sample size for a two-tailed test "for detecting moderate effect sizes with .80 statistical power at the 5% level of significance" (p. 288).

Limitations

The first limitation of this study is the use of convenience sampling, which limits the ability for the study to be generalized. Second, this study was conducted in a primarily white, rural, public school district. Third, due to no pre-existing data, the survey

results could not be triangulated. Fourth, the data concerning the use of environmental supports within the classroom was self-reported, with no system for ensuring fidelity.

Implications for Policy and Practice

The data showed as a teacher's perception of ADHD symptoms being caused by a biological factor increased, their use of school-based interventions increased. This means when a teacher feels something in the student's body is causing symptoms of ADHD, they are more willing to provide school-based supports. The data also showed that as the teacher's perception of a biological cause increased, their support of biomedical and parent-provided interventions decreased. These teachers are taking on the full responsibility of providing interventions for their students and are most likely not working as a team with the child's pediatrician or with family supports. Administrators can best support students impacted by ADHD by being proactive in advocating for stronger family and community partnerships.

The data also showed as a teacher's perception of ADHD symptoms being caused by a environmental factor increased, their use of school-based interventions decreased. This means as a teacher feels the child has more of a choice in their behaviors, they are less likely to provide school-based supports. In addition, these teacher's support of biomedical and parent-provided interventions increased, and they are most likely putting the full responsibility of providing interventions for their students on the family. Administrators can best support students with symptoms of ADHD by ensuring school-based interventions are being used consistently.

Knowing perceptions of causality strongly impact how teachers use school-based interventions, administrators need to provide training to expand their staff's view of

causality. Training on the benefit of school-based interventions for all students should also be given. In addition, it would be beneficial for administrators to focus on supporting teachers in their use of school-based interventions and perform fidelity checks to ensure the teacher's reported use of interventions matches their actual use.

Discussion

Three components guided the conceptual framework of this study. First, the study focused on how a person perceives the role of biological and environmental factors in the causality of the behaviors consistent with a diagnosis of ADHD. Second, the study explored the broad knowledge base of biomedical, parent-provided, and school-based interventions available to support students affected by ADHD. Third, the study examined the supporting research for the relationship between a person's perception of causality and their subsequent actions. Viewing these three components through a united lens, the conceptual framework proposed that a person's perception of ADHD causality impacts their access to the full range of interventions available to support students who display behaviors consistent with a diagnosis of ADHD (see Figure 5.4).

The first component of the study focused on ADHD causality. A simple, biological view of ADHD causality is believing only natural factors, such as aspects of a student's body or life processes, are causing the behaviors consistent with a diagnosis of ADHD. A simple environmental view of ADHD causality is believing only factors surrounding the student through their upbringing or nurturing are causing the behaviors consistent with a diagnosis of ADHD. The findings indicated five participants held a simple biological view of causality and four participants held a simple environmental view of causality. This supports the study by Moore (2003) where it was indicated that it

is now rare to find someone with a simplified view who believes either nature or nurture in isolation is entirely responsible for human behaviors or traits.

When one believes an interaction between environmental and biological factors is causing the behaviors, they hold a complex view of ADHD causality (Dryer et al., 2006). Most research supports the complex view of ADHD causality, which maintains behaviors consistent with a diagnosis of ADHD are because of the interdependence and mutual influence of both biological and environmental factors (Plomin et al., 1994; Pozzi-Monzo, 2012; Robinson, 2004; Tatlow-Golden et al., 2016; Thapar et al., 2013). The findings also support the complex view of ADHD causality, showing teachers' belief in biology being a cause of behaviors commonly associated with ADHD fell in the middle between partially agree and agree they partially agreed that the environment was a contributing factor.

The second component of the study focused on ADHD interventions. While some studies have supported medication as the most effective treatment for behaviors consistent with a diagnosis of ADHD (Glass & Wegar, 2000; Klassen et al., 1999), the findings indicated teachers hold the least amount of agreement with the use of biomedical interventions. Teachers indicated the most agreement with the use of parent-provided interventions, with limiting the child's time on electronics the intervention with the most agreement. This agreement is supported by the studies by Lambez et al. (2020) and Purdie et al. (2002), which reported behavioral improvements for students with ADHD when their time on technology and media was limited.

Concerning the use of interventions, the findings indicated teachers reported they use school-based interventions about 50% of the time. The subscale with the highest

reported use was physical movement, which teachers reported they use about 70% of the time. This intervention category was supported by Halperin et al. (2012). The subscale with the lowest reported use was behavior interventions, which teachers reported they use just under 50% of the time. Research shows behavior interventions are the most difficult interventions to implement with fidelity because of their labor-intensive nature (Johnston et al., 2006). Also, they can frustrate users because they do not generalize across settings (Russell et al., 2019).

The third component of the study focused on a person's perception of causality and their subsequent actions. Research has shown persons from similar cultures demonstrated "predictable correlations between beliefs about cause and treatments" (Furnham & Sarwar, 2011, p. 301). One relationship found was a statistically significant, strong, negative correlation between the participants' scores for biological causality and their scores for biomedical interventions. The negative correlation was opposite of the findings in a study done by Johnston et al. (2005) that explored the relationship between parental perceptions of ADHD and their use of medication. In addition, the data showed a statistically significant, strong, positive correlation between the participants' scores for environmental causality and their support for parent-provided interventions. Teachers need to be careful in their approach to recommending parent-provided interventions since studies have shown parents with children who show characteristics consistent with a diagnosis of ADHD often feel judged, isolated, angry, guilty, and powerless (Corcoran et al., 2017; dosReis et al., 2010; Singh, 2004). Their willingness to seek resources or allow treatment for their affected child decreases if these types of negative feelings result from the interactions parents have with their child's teacher (Taylor & Antshel, 2021).

Implications for Future Research

Fellow scholars can further this study by categorizing the intervention categories into subsets and exploring if stronger relationships exist directly linked to each common subgroup. In addition, scholarship could benefit by furthering the study by collecting data on the use of interventions through observational fidelity checks instead of having it be self-reported. Finally, the study could be extended by fellow researchers exploring how effective the teachers are based on their use of school-based interventions.

Conclusion

The data showed when a teacher feels something in the student's body is causing symptoms of ADHD, they are more willing to provide school-based supports. The data also showed when a teacher feels the child has more of a choice in their behaviors, the teacher is less likely to provide school-based supports. The data also showed that as the teacher's perception of a biological cause increased, they assumed more responsibility in providing interventions for the student. In addition, as the teacher's perception of an environmental cause increased, they placed increased responsibility on the child's family for interventions. Administrators can best support students impacted by ADHD by being proactive in advocating for stronger family and community partnerships and ensuring school-based interventions are being used with fidelity.

Journal Article References

Ahmann, E. (2017). Interventions for ADHD in children and teens: A focus on ADHD coaching. *Pediatric Nursing*, *43*(3), 121-131.

Aloe, A. M., Shisler, S. M., Norris, B. D., Nickerson, A. B., & Rinker, T. W. (2014). A multivariate meta-analysis of student misbehavior and teacher burnout. *Educational Research Review*, *12*, 30-44.

American Psychiatric Association (APA). (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association.

Atkinson, I. M., Robinson, J. A., & Shute, R. H. (1997). Between a rock and a hard place: An Australian perspective on education of children with ADHD. *Educational and Child Psychology, 14*, 21-30.

Barkley, R. A., & Fischer, M. (2011). Predicting impairment in major life activities and occupational functioning in hyperactive children as adults: Self-reported executive function (EF) deficits versus EF tests. *Developmental Neuropsychology*, *36,* 137-161.

Benzing, V., & Schmidt, M. (2019). The effect of exergaming on executive functions in children with ADHD: A randomized clinical trial. *Scandinavian Journal of Medicine & Science in Sports, 29*(8), 1243-1253.

Boon, H. J. (2020). What do ADHD neuroimaging studies reveal for teachers, teacher educators, and inclusive education? *Child & Youth Care Forum, 49*(4), 533-561.

Bradstreet, J. J., Smith, S., Baral, M., & Rossignol, D. A. (2010). Biomarker-guided interventions of clinically relevant conditions associated with autism spectrum disorders and attention deficit hyperactivity disorders. *Alternative Medicine Review*, *15*(1), 15-32.

Brock, S., Grove, B., & Searls, M. (2010). *ADHD: Classroom interventions.* Semantic Scholar.

Bunford, N., Evans, S., & Wymbs, F. (2015). ADHD and emotion dysregulation among children and adolescents. *Clinical Child & Family Psychology Review*, *18*(3), 185-217.

CDC - Centers for Disease Control and Prevention. National Resource Center on ADHD: A Program of CHADD. (2020). *ADHD fact sheets & infographics.* CHADD.

Chimiklis, A. L., Dahl, V., Spears, A. P., Goss, K., Fogarty, K., & Chacko, A. (2018). Yoga, mindfulness, and meditation interventions for youth with ADHD: Systematic review and meta-analysis. *Journal of Child & Family Studies, 27*(10), 3155-3168.

Collett, B. R., & Gimpel, G. A. (2004). Maternal and child attributions in ADHD versus non-ADHD populations. *Journal of Attention Disorders, 7*(4), 187-196.

Corcoran, J., Schildt, B., Hochbrückner, R., & Abell, J. (2017). Parents of children with attention deficit/hyperactivity disorder: A meta-synthesis, part 1. *Child and Adolescent Social Work Journal, 34*(4), 281-335.

Danielson, M. L., Bitsko, R. H., Ghandour, R. M., Holbrook, J. R., Kogan, M. D., & Blumberg, S. J. (2018). Prevalence of parent-reported ADHD diagnosis and associated treatment among U.S. children and adolescents, 2016. *Journal of Clinical Child and Adolescent Psychology, 47*(2), 199-212.

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy.

dosReis, S., Barksdale, C. L., Sherman, A., Maloney, K., & Charach, A. (2010). Stigmatizing experiences of parents of children with a new diagnosis of ADHD. *Psychiatric Services, 61*(8), 811-816.

Dryer, R., Kiernan, M., & Tyson, G. (2006). Implicit theories of the characteristics and causes of attention-deficit hyperactivity disorder held by parents and professionals in the psychological, educational, medical, and allied health fields. *Australian Journal of Psychology, 58*(2), 79-92.

DuPaul, G. J., & Power, T. J. (2000). Educational interventions for students with attention-deficit disorders. In T. E. Brown (Ed.), *Attention-deficit disorders and comorbidities in children, adolescents, and adults* (pp. 607-635). American Psychiatric Press.

DuPaul, G., Weyandt, L., & Janusis, G. (2011). ADHD in the classroom: Effective intervention strategies. *Theory into Practice*, *50*(1), 35-42.

Evertson, C., & Emmer, E. (1982). Effective management at the beginning of the school year in junior high classes. *Journal of Educational Psychology, 74*, 485-498.

Field, A. (2018). *Discovering statistics using IBM SPSS statistics*. Sage Publications.

Filcheck, H. A., & McNeil, C. B. (2004). The use of token economies in preschool classrooms: Practical and philosophical concerns. *Journal of Early and Intensive Behavior Intervention, 1*(1), 94-104.

Furnham, A., & Sarwar, T. (2011). Beliefs about attention-deficit hyperactivity disorder. *Counselling Psychology Quarterly, 24*(4), 301-311.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction.* Pearson/Allyn & Bacon.

Glass, C. S., & Wegar, K. (2000). Teacher perceptions of the incidence and management of attention deficit hyperactivity disorder. Education, 121(2), 412.

Graham, L. (2008). Drugs, labels and (p)ill-fitting boxes: ADHD and children who are hard to teach. *Discourse: Studies in the Cultural Politics of Education, 29*(1), 85-106.

Greene, R. W., Beszterczey, S. K., Katzenstein, T., Park, K., & Goring, J. (2002). Are students with ADHD more stressful to teach? *Journal of Emotional & Behavioral Disorders, 10*(2), 79.

Hall, A. S., & Gushee, A. G. (2002). Medication interventions for ADHD youth: A primer for school and mental health counselors. *Journal of Mental Health Counseling, 24*(2), 140.

Halperin, J. M., Bédard, A.-C. V., & Curchack-Lichtin, J. T. (2012). Preventive interventions for ADHD: A neurodevelopmental perspective. *Neurotherapeutics, 9*, 531-541.

Hamilton, N. J., & Astramovich, R. L. (2016). Teaching strategies for students with ADHD: Findings from the field. *Education, 136*(4), 451-460.

Harrison, J. R., Soares, D. A., Rudzinski, S., & Johnson, R. (2019). Attention deficit hyperactivity disorders and classroom-based interventions: Evidence-based status, effectiveness, and moderators of effects in single-case design research. *Review of Educational Research, 89(*4), 569-611.

Johnston, C., Chen, M., & Ohan, J. (2006). Mothers' attributions for behavior in nonproblem boys, boys with attention deficit hyperactivity disorder, and boys with attention deficit hyperactivity disorder and oppositional defiant behavior. *Journal of Clinical Child & Adolescent Psychology, 35*(1), 60-71.

Klassen, A., Miller, A., Raina, P., Lee, S., & Olsen, L. (1999). Attention-deficit hyperactivity disorder in children and youth: A quantitative systematic review of the efficacy of different management strategies. *Canadian Journal of Psychiatry, 44*(10), 1007-1016.

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.

Levine, E. S., & Anshel, D. J. (2011). "Nothing works!" A case study using cognitive-behavioral interventions to engage parents, educators, and children in the management of attention-deficit/hyperactivity disorder. *Psychology in the Schools*, *48*(3), 297-306.

Livingstone, L. T., Coventry, W. L., Corley, R. P., Willcutt, E. G., Samuelsson, S., Olson, R. K., & Byrne, B. (2016). Does the environment have an enduring effect on ADHD? A longitudinal study of monozygotic twin differences in children. *Journal of Abnormal Child Psychology, 44*(8), 1487–1501.

Malekpour, M., Aghababaei, S., & Hadi, S. (2014). Effectiveness of family, child, and family-child based intervention on ADHD symptoms of students with disabilities. *International Journal of Special Education, 29*(2), 29-34.

Markel, C., & Wiener, J. (2014). Attribution processes in parent–adolescent conflict in families of adolescents with and without ADHD. *Canadian Journal of Behavioral Science, 46*(1), 40-48.

Martinussen, R., Tannock, R., & Chaban, P. (2011). Teachers' reported use of instructional and behavior management practices for students with behavior problems: Relationship to role and level of training in ADHD. *Child & Youth Care Forum, 40*(3), 193-210.

Marton, I., Wiener, J., Rogers, M., Moore, C., & Tannock, R. (2009). Empathy and social perspective taking in children with attention-deficit/hyperactivity disorder. *Journal of Abnormal Child Psychology, 37*, 107-118.

Mautone, J., Lefler, E., & Power, T. (2011). Promoting family and school success for children with ADHD: Strengthening relationships while building skills. *Theory into Practice, 50*(1), 43-51.

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey Bass.

Mertens, D. M. (2020). Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods (5th ed.). Sage Publications.

Milich, R. (1994). The response of children with ADHD to failure: If at first you don't succeed, do you try, try again? *School Psychology Review*, *23*, 11-18.

Moore, D. (2003). *The dependent gene: The fallacy of 'nature vs. nurture'*. Henry Holt and Company.

Mrug, S., Hoza, B., Pelham, W. E., Gnagy, E. M., & Greiner, A. R. (2007). Behavior and peer status in children with ADHD: Continuity and change. *Journal of Attention Disorders*, *10,* 359-371.

Mrug, S., Molina, B. S. G., Hoza, B., Gerdes, A. C., Hinshaw, S. P., Hechtman, L., & Arnold, L. E. (2012). Peer rejection and friendships in children with attention-deficit/hyperactivity disorder: Contributions to long-term outcomes. *Abnormal Child Psychology, 40*(6), 1013-1026.

Norouzi, E., Hossieni, F., & Solymani, M. (2018). Effects of neurofeedback training on performing bimanual coordination in-phase and anti-phase patterns in children with ADHD. *Applied Psychophysiology & Biofeedback, 43*(4), 283-292.

Onwuegbuzie, A. J., Jiao, Q. G., & Bostick, S. L. (2004). *Library anxiety: Theory, research, and applications.* Scarecrow Press.

Patton. M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Sage Publications.

Perception. (2003). In *Merriam-Webster's dictionary* (11th ed.). Merriam-Webster.

Pfiffner, L. J. (2011). *All about ADHD: The complete practical guide for classroom teachers* (2nd ed.). Scholastic.

Plomin, R., Reiss, D., Hetherington, E. M., & Howe, G. W. (1994). Nature and nurture: Genetic contributions to measures of the family environment. *Developmental Psychology, 30*(1), 32-43.

Pozzi-Monzo, M. (2012). Ritalin for whom? Revisited: Further thinking on ADHD. *Journal of Child Psychotherapy, 38*(1), 49-60.

Purdie, N., Hattie, J., & Carroll, A. (2002). A review of the research on interventions for attention deficit hyperactivity disorder: What works best? *Review of Educational Research, 72*(1), 61-99.

Quinn, M., & Lynch, A. (2016). Is ADHD a "real" disorder? *Support for Learning, 31*(1), 59-70.

Robinson, G. E. (2004). Beyond nature and nurture. *Science, 304*(5669), 397-399.

Rumrill, Jr., P. D. (2004). Non-manipulation quantitative designs. *Work, 22*(3), 255-260.

Russell, A. E., Tay, M., Ford, T., Russell, G., & Moore, D. (2019). Educational practitioners' perceptions of ADHD: A qualitative study of views of the home lives of children with ADHD in the UK. *British Journal of Special Education, 46*(1), 8-28.

Sarris, J., Kean, J., Schweitzer, I., & Lake, J. (2011). Complementary medicines (herbal and nutritional products) in the treatment of attention deficit hyperactivity disorder (ADHD): A systematic review of the evidence. *Complementary Therapies in Medicine, 19*(4), 216-227.

Sheppard, M. K. (2015). From fidgeters, footerers and flibbertigibbets to the medicalization of childhood behavior: Off-label drug treatment of ADHD and the protection of the child's best interests. *International Journal of Children's Rights, 23*(3), 548-568.

Singh, I. (2004). Doing their jobs: Mothering with Ritalin in a culture of mother-blame. *Social Science & Medicine, 59*(6), 1193-1205.

Stormont, M. (2001). Social outcomes of children with AD/HD: Contributing factors and implications for practice. *Psychology in the Schools, 38*(6), 521-531.

Tarver, J., Daley, D., & Sayal, K. (2014). Attention-deficit hyperactivity disorder (ADHD): An updated review of the essential facts. *Child: Care, Health & Development, 40*(6), 762-774.

Tatlow-Golden, M., Prihodova, L., Gavin, B., Cullen, W., & McNicholas, F. (2016). What do general practitioners know about ADHD? Attitudes and knowledge among first-contact gatekeepers: Systematic narrative review. *BMC Family Practice*, *17,* 1-15.

Taylor, L. E., & Antshel, K. M. (2021). Factors associated with parental treatment attitudes and information-seeking behaviors for childhood ADHD. *Journal of Attention Disorders, 25*(4), 607-617.

Thapar, A., Cooper, M., Eyre, O., & Langley, K. (2013). Practitioner review: What have we learnt about the causes of ADHD? *Journal of Child Psychology & Psychiatry, 54*(1), 3-16.

Thapar, A., Cooper, M., Jefferies, R., & Stergiakouli, E. (2012). What causes attention deficit hyperactivity disorder? *Archives of Disease in Childhood*, *97*(3), 260-265.

Thyagarajan, R. (2016). A case study using cognitive-behavioral therapy-management of ADHD. *Indian Journal of Health & Wellbeing, 7*(5), 471-477.

Weyandt, L. L., Fulton, K. M., Schepman, S. B., Verdi, G. R., & Wilson, K. G. (2009). Assessment of teacher and school psychologist knowledge of attention-deficit/hyperactivity disorder. *Psychology in the Schools, 46*(10), 951-961.

Journal Article Tables and Figures

Figure 5.1

Biomedical Interventions for ADHD

Biomedical Interventions
Medication can only be prescribed by medical professionals. It does not cure, but rather eases ADHD symptoms during the time it is active in the student's body.
Stimulants **Methylphenidate-Based** Side Effects: headache; decreased appetite; stomachache; nervousness; trouble sleeping; nausea; reduced spontaneity. Other Side Effects: slowing of growth in children; eyesight changes or blurred vision; heart-related problems; worsening of psychiatric problems; circulation problems. Methylphenidate (Adhansia XR, Aptensio XR, Concerta, Cotempla XR-ODT, Daytrana patch, Desoxyn, Jornay PM, Metadate, Methylin, Quillichew, Quillivant, & Ritalin) Dextromethylphenidate (Dexedrine Spansule, Focalin, & Mydayis) --- **Amphetamine-Based** - Side Effects: headache; trouble sleeping; circulation problem in fingers and toes; decreased appetite; nervousness; dizziness; diarrhea; constipation; mood changes; dry mouth; runny nose, nosebleed; itching rash, allergic reactions; increased tics; reduced spontaneity. Other side effects: slowing of growth in children; eyesight changes or blurred vision; heart-related problems; worsening of psychiatric problems. Mixed salts of Amphetamine (Adderall, Adzenys ER, Dyanavel SR, Evekeo, Procentra, & Zenzedi) Lisdexamfetamine (Vyvanse)
Norepinephrine Reuptake Inhibitor Side Effects: nervousness; sleep problems; fatigue; upset stomach; dizziness; dry mouth; severe liver injury; suicidal thoughts. Atomoxetine (Strattera)
Alpha Adrenergic Agents Side Effects: fatigue; drowsiness; dizziness; dry mouth; decreased appetite; increased appetite; constipation; irritability; low blood pressure. Guanfacine XR (Intuniv) Clonidine XR (Kapvay)
Antidepressants Side Effects: nausea; vomiting; dry mouth; headache; constipation; sweating; joint aches; sore throat; blurred vision; diarrhea; dizziness; raise in blood pressure; chest pain, fainting; ringing in the ears, fast heartbeat; mental/mood changes; tremors; weight loss/gain. Tricyclic: Imipramine, Amitriptyline, Desipramine, & Nortriptyline Nontricyclic: Bupropion & Monoamine Oxidase

Figure 5.2

Parent-Provided Interventions for ADHD

Parent-Provided Interventions
Parents often look for interventions that will not have the side effects caused by medications and that are cost-effective.
Micronutrient Supplements (Zinc; Iron; Magnesium; Vitamin B; Vitamin D; Omega-3 Fatty Acids)
Herbal supplements (French Maritime Pine Bark; Ginkgo Biloba; St. John's Wort; Caffeine; Ginseng; Valerian; Ningdong; Bacopa; & Passionflower)
Remove food dyes from the diet.
Remove food preservatives from the diet.
Remove extra sugar from the diet.
Remove sodas from the diet.
Few-Foods Diet (finds food allergens)
Increase protein intake.
Improve sleep schedule.
Use mindfulness activities.
Increase time outside.
Participate in therapies (neurofeedback; music; play; or psychological (talk) therapy.
Exercise.
Limit time on electronics.

Figure 5.3

School-Based Interventions for ADHD

School-Based Interventions			
Classroom Interventions			
Use visuals of acceptable talk time & level, such as a talking stick or traffic light.	Chunk long projects into several pieces with clear deadlines for each chunk.	Allow the student to use speech-to-text or text-to-speech.	Check student understanding by having them verbally summarize.
Allow the student a choice in how to show mastery of a concept.	Use a visual timer/alarm to help with time management.	Give more time for tests, assignments, & projects.	Use auditory cues as reminders for desired behaviors.
Pre-teach necessary skills, such as vocabulary.	Sit the student in an area with fewer distractions.	Take actions to promote student-teacher relationship.	Post and follow a basic classroom routines.
Decrease assignment length	Post rules & discuss daily	Tailor assignment to student's level.	Limit repetitive assignments
Executive Functioning Interventions			
Present learning objectives in at least two ways.	Start lessons with verbal & visual summary of what students will be learning.	Allow the student to take a test or do work in a quieter environment.	Help student to clearly connect new material to prior knowledge.
Teach the student how to self-monitor.	Allow the student to use privacy boards.	Allow the student to use technology to complete work.	Allow the student to use headphones.
Post a list of student materials for each lesson.	Write clear directions for all assignments.	Help student set goals for tests, assignments, & projects.	Summarize key points visually & verbally.
Provide organization tools: colored folders, notebook w/ dividers, planner, or an assignment book.	Focusing tools: guided notes, colored markers, mnemonics, & probing questions.	Review behavior expectations often, especially if changing working styles (group work to independent work).	Review take-home assignments and provide clear, written instructions.
Physical Movement Interventions			
Schedule breaks with purposeful movement.	Tailor activity length to student's age.	Refrain from removing recess as a punishment.	Allow student to stand to do work.
Sit the student where they will be least disruptive if they move or fidget.	Allow the student to move or fidget in a non-distracting, quiet way.	Actively engage the student in the learning process, versus passive involvement, limiting down time.	Allow the student to have some type of seat that allows movement
Behavior Interventions			
Provide or refer the parent to training or support programs.	Use appropriate command language (clear, specific, & manageable).	Use daily report cards or some other kind of school-to-home communication.	Use a behavior chart or behavior contract
Use when/then or if/then contingencies.	Use response-cost programs (i.e.., token economy).	Use of time-out or loss of privileges as a natural consequence.	Use choice as a reward.
Use purposeful, frequent praise.	Ignore minor misbehavior	Provide opportunities to be successful in front of peers.	Use contingent positive reinforcement.
Peer-Mediated Interventions			
Provide specific instruction in social skills & other behavioral competencies, (sports & game rules)	Use social reinforcement through peer modeling & tutoring.	Support smooth transitions by using transition buddies & prompts	Provide opportunities for group or paired learning

Figure 5.4

Impact of Causality on Intervention Options

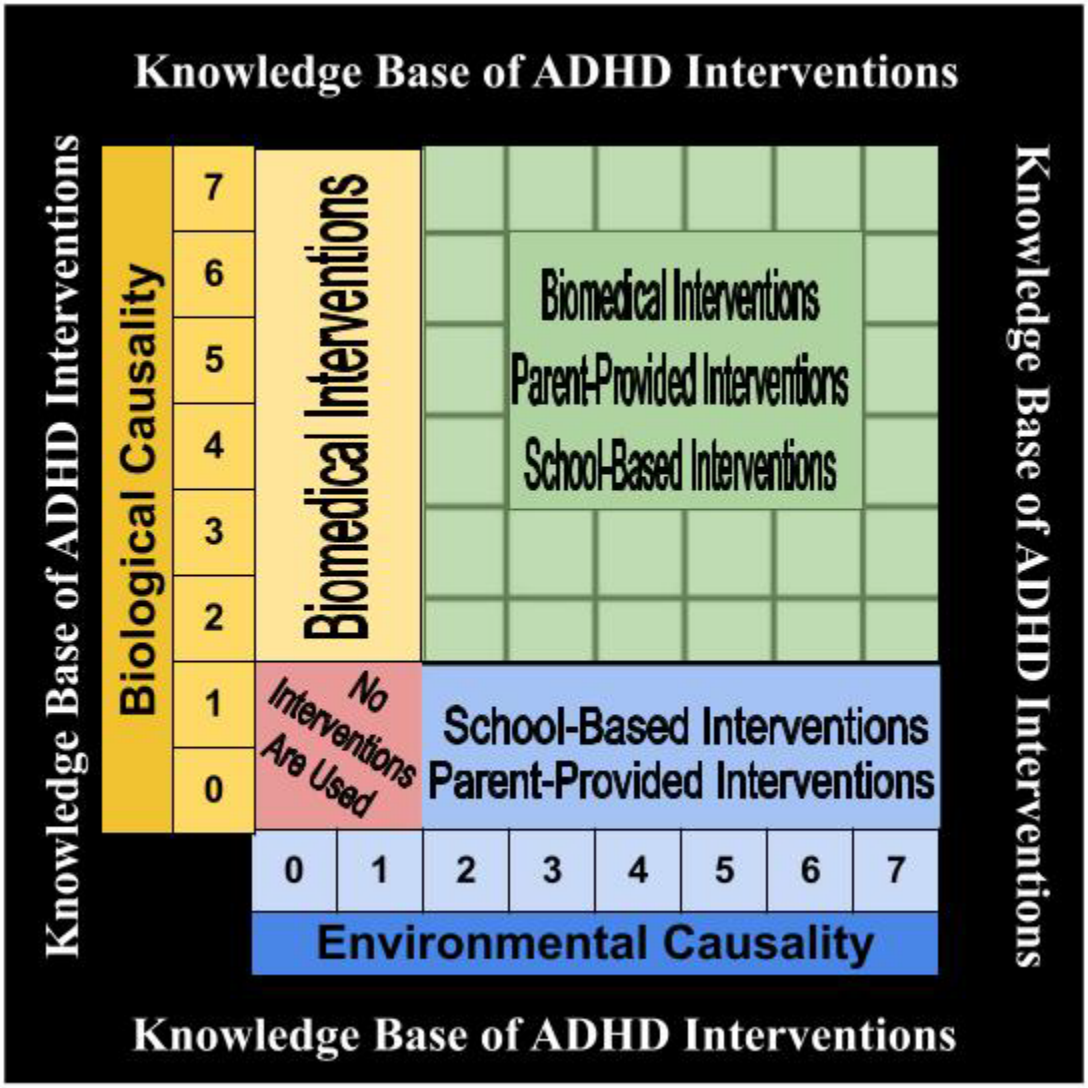


Table 5.1

Agreement with the Use of Biomedical Interventions

Question	% who Strongly Disagree (1)	% who Disagree (2)	% who Partially Disagree (3)	% who Partially Agree (4)	% who Agree (5)	% who Strongly Agree (6)
Giving the child amphetamine-based stimulants	3.70%	0.00%	22.00%	32.90%	30.50%	11.00%
Giving the child methylphenidate-based stimulants	1.20%	2.40%	11.00%	40.20%	36.60%	8.50%
Giving the child antidepressants	4.90%	9.80%	32.70%	40.20%	12.20%	1.20%
Giving the child norepinephrine reuptake inhibitors	4.90%	9.80%	37.80%	31.70%	15.90%	0.00%
Giving the child alpha adrenergic agents	3.70%	4.90%	36.60%	41.50%	13.40%	0.00%

Table 5.2

Agreement with the Use of Parent-Provided Interventions

Question	% who Strongly Disagree (1)	% who Disagree (2)	% who Partially Disagree (3)	% who Partially Agree (4)	% who Agree (5)	% who Strongly Agree (6)
Limiting child's time on electronics.	1.20%	0.00%	2.40%	6.10%	39.00%	51.20%
Improving child's sleep schedule.	1.20%	0.00%	1.20%	6.10%	42.70%	48.80%
Having child use mindfulness activities.	1.20%	1.20%	0.00%	7.30%	50.00%	40.20%
Increasing child's amount of exercise.	1.20%	0.00%	0.00%	13.40%	48.80%	36.60%
Increasing child's time outdoors.	1.20%	0.00%	0.00%	22.00%	47.60%	29.30%
Removing sugar from diet.	3.70%	1.20%	3.70%	19.50%	43.90%	28.00%
Having child participate in therapies	1.20%	2.40%	3.70%	28.00%	43.90%	20.70%
Removing sodas from diet.	3.70%	3.70%	17.10%	30.50%	29.30%	15.90%
Removing dyes from diet.	3.70%	7.30%	15.90%	40.20%	24.40%	8.50%
Removing food preservatives from child's diet.	3.70%	7.30%	20.70%	36.60%	24.40%	7.30%
Using the Few-Foods Diet for child	4.90%	6.10%	15.90%	40.20%	26.80%	6.10%
Increasing child's protein	4.90%	11.00%	14.50%	45.10%	18.50%	4.90%
Giving child micronutrient supplements	6.10%	3.70%	18.30%	52.40%	17.10%	2.40%
Giving the child herbal supplements	6.10%	15.90%	14.60%	45.10%	17.10%	1.20%

Table 5.3

Use of School-Based Interventions

Classroom Interventions	Never: 0% (1)	Rarely: 10%| (2)	Occasionally: 30% (3)	Sometimes: 50% (4)	Frequently: 70% (5)	Usually: 90% (6)
Take actions to promote student-teacher relationship.	0.00%	0.00%	0.00%	8.50%	23.20%	68.30%
Post and follow a basic classroom routines.	1.20%	2.40%	7.30%	8.50%	18.30%	62.20%
Give more time for tests, assignments, & projects.	0.00%	1.20%	2.40%	12.20%	24.40%	59.80%
Sit the student in an area with fewer distractions.	0.00%	1.20%	3.70%	18.30%	35.40%	41.50%
Chunk long projects into several pieces with clear deadlines for each chunk.	0.00%	1.20%	7.30%	23.20%	32.90%	35.40%
Use auditory cues as reminders for desired behaviors.	4.90%	4.90%	4.90%	11.00%	45.10%	29.30%
Tailor assignment to the student's level.	0.00%	3.70%	9.80%	22.00%	37.80%	26.80%
Use a visual timer or alarm to help with time management.	15.90%	7.30%	4.90%	22.00%	25.60%	24.40%
Post rules and discuss daily.	6.10%	17.10%	8.50%	18.30%	25.60%	24.40%
Allow student to use speech-to-text or TtS.	7.30%	22.00%	14.60%	19.50%	17.10%	19.50%
Decrease assignment length.	2.40%	9.80%	23.20%	23.20%	24.40%	17.10%
Pre-teach necessary skills, such as vocabulary.	13.40%	6.10%	13.40%	28.00%	22.00%	17.10%
Allow the student a choice in how to show mastery of a concept.	1.20%	18.30%	18.30%	26.80%	19.50%	15.90%
Limit repetitive assignments.	2.40%	9.80%	12.20%	34.10%	26.80%	14.60%
Check student understanding by having them verbally summarize.	1.20%	4.90%	12.20%	34.10%	34.10%	13.40%
Use visuals of acceptable talk time & level, such as a talking stick or traffic light.	46.30%	12.20%	4.90%	14.60%	12.20%	9.80%
Executive Functioning Interventions	**Never: 0% (1)**	**Rarely: 10%| (2)**	**Occasionally: 30% (3)**	**Sometimes: 50% (4)**	**Frequently: 70% (5)**	**Usually: 90% (6)**
Allow the student to take a test or do work in a quieter environment.	2.40%	1.20%	8.50%	13.40%	28.00%	46.30%
Allow the student to use technology to complete work.	1.20%	3.70%	3.70%	20.70%	25.60%	45.10%
Provide clear, written directions for all assignments.	3.70%	4.90%	3.70%	12.20%	32.90%	42.70%
Allow the student to use headphones.	2.40%	4.90%	8.50%	17.10%	29.30%	37.80%
Start lessons with a verbal & visual summary of what the students will be learning & doing.	1.20%	1.20%	7.30%	24.40%	30.50%	35.40%
Present learning objectives in at least two ways (written, verbal, say-&-repeat, student notes)	1.20%	2.40%	9.80%	19.50%	34.10%	32.90%
Help the student to clearly connect new material to prior knowledge, such as to the previous lesson.	0.00%	0.00%	8.50%	23.20%	36.60%	31.70%
Review behavior expectations often, especially if changing working styles (group work to independent work).	2.40%	14.60%	8.50%	18.30%	24.40%	31.70%
Visually and verbally summarize key points at the end of the lesson.	0.00%	4.90%	9.80%	13.40%	43.90%	28.00%
Teach student how to self-monitor own behavior.	1.20%	7.30%	12.20%	29.30%	25.60%	24.40%
Use focusing tools, such as guided notes, colored markers, mnemonics, & probing questions.	3.70%	7.30%	15.90%	24.40%	24.40%	24.40%
Assist the student in goal setting for tests, assignments, & projects.	2.40%	12.20%	11.00%	24.40%	30.50%	19.50%
Provide organization tools: colored folders, notebook w/ dividers, planner, etc.	13.40%	14.60%	13.40%	20.70%	19.50%	18.30%
Allow the student to use privacy boards.	39.00%	14.60%	12.20%	8.50%	12.20%	13.40%
Post a list of materials needed for each lesson.	14.60%	20.70%	15.90%	24.40%	12.20%	12.20%

Table 5.3 (Continued)

Use of School-Based Interventions

Physical Movement Interventions	Never: 0% (1)	Rarely: 10%| (2)	Occasionally: 30% (3)	Sometimes: 50% (4)	Frequently: 70% (5)	Usually: 90% (6)
Allow the student to move or fidget in a non-distracting, quiet way.	1.20%	2.40%	3.70%	9.80%	29.30%	53.70%
Sit the student where they will be least disruptive if they move or fidget.	1.20%	6.10%	6.10%	6.10%	30.50%	50.00%
Allow the student to stand to do work.	0.00%	7.30%	6.10%	22.00%	17.10%	47.60%
Allow the student to have some type of seat that allows movement.	11.00%	12.20%	12.20%	12.20%	22.00%	30.50%
Engage the student in the learning process, versus passive involvement, limiting down time.	0.00%	2.40%	13.40%	18.30%	39.00%	26.80%
Schedule breaks that include purposeful movement.	3.70%	14.60%	11.00%	20.70%	24.40%	25.60%
Behavior Interventions	**Never: 0% (1)**	**Rarely: 10%| (2)**	**Occasionally: 30% (3)**	**Sometimes: 50% (4)**	**Frequently: 70% (5)**	**Usually: 90% (6)**
Use reinforcement strategies: purposeful, frequent praise; social reinforcement; contingent positive reinforcement.	0.00%	2.40%	7.30%	12.20%	26.80%	51.20%
Use appropriate command language (clear, specific, & manageable).	0.00%	2.40%	3.70%	8.50%	39.00%	46.30%
Provide opportunities to be successful in front of peers.	0.00%	0.00%	3.70%	12.20%	37.80%	46.30%
Ignore minor misbehavior.	1.20%	2.40%	8.50%	13.40%	36.60%	37.80%
Use when/then or if/then contingencies.	3.70%	8.50%	13.40%	19.50%	31.70%	23.20%
Use choice as a reward.	12.20%	4.90%	12.20%	24.40%	28.00%	18.30%
Use a behavior chart or behavior contract.	23.20%	20.70%	7.30%	19.50%	13.40%	15.90%
Use loss of privileges as a natural consequence.	17.10%	15.90%	14.60%	18.30%	19.50%	14.60%
Use daily report cards or some other kind of school-to-home communication.	25.60%	19.50%	11.00%	18.30%	13.40%	12.20%
Use response-cost programs, such as a token economy.	51.20%	14.60%	9.80%	9.80%	4.90%	9.80%
Provide or refer the parent to training or support programs.	35.40%	17.10%	20.70%	13.40%	7.30%	6.10%
Peer-Mediated Interventions	**Never: 0% (1)**	**Rarely: 10%| (2)**	**Occasionally: 30% (3)**	**Sometimes: 50% (4)**	**Frequently: 70% (5)**	**Usually: 90% (6)**
Sit the student next to a positive role model.	0.00%	3.70%	7.30%	18.30%	31.70%	39.00%
Provide opportunities for group or paired learning.	0.00%	3.70%	3.70%	24.40%	34.10%	34.10%
Use peer modeling.	3.70%	2.40%	14.60%	23.20%	26.80%	29.30%
Support smooth transitions by using transition buddies, step-by-step instructions, visual & verbal prompts.	7.30%	7.30%	8.50%	29.30%	25.60%	22.00%
Provide specific instruction in social skills and other behavioral competencies peers consider important, such as sports and game rules.	7.30%	6.10%	9.80%	22.00%	34.10%	20.70%
Use peer tutoring.	3.70%	17.10%	14.60%	24.40%	29.30%	11.00%

Table 5.4

Descriptive Analysis of Variables

Variables	Mean	Standard Deviation	Likert Label
Biological Causality	*M* = 4.56	*SD* = .72	Between Partially Agree and Agree
Environmental Causality	*M* = 4.21	*SD* = .91	Partially Agree
Parent-Provided Interventions	*M* = 4.50	*SD* = .68	Between Partially Agree and Agree
School-Based Interventions	*M* = 4.24	*SD* = .65	Use Sometimes: 50%
School-Based Interventions Subcategory: Physical Movement	*M* = 4.73	*SD* = .88	Use Frequently: 70%
School-Based Interventions Subcategory: Peer-Mediated	*M* = 4.47	*SD* = .75	Use Sometimes to Frequently: 50% to 70%
School-Based Interventions Subcategory: Executive Functioning	*M* = 4.44	*SD* = .73	Use Sometimes to Frequently: 50% to 70%
School-Based Interventions Subcategory: Classroom	*M* = 4.43	*SD* = .69	Use Sometimes to Frequently: 50% to 70%
School-Based Interventions Subcategory: Behavior	*M* = 3.99	*SD* = .84	Use Sometimes: 50%
Biomedical Interventions	*M* = 3.81	*SD* = .76	Partially Agree

Table 5.5

Correlation Table

	Biomedical Interventions	Parent-Provided Interventions	School-Based Interventions
Biological Causality	*r*= -.99(*p*=<.001)*	*r*= -.99(*p*=<.001)*	*r*= .99(*p*=<.001)*
Environmental Causality	*r*= .99(*p*=<.001)*	*r*= .99(*p*=<.001)*	*r*= -.99(*p*=<.001)*

Note. * indicates correlation is significant at the .001 level.

SECTION SIX:

SCHOLARLY PRACTIONER REFLECTION

Introduction

The purpose of this section was to reflect upon how the MU Statewide Cooperative EdD Program in Educational Leadership program has impacted me as a leader and scholar. This task did not come as a surprise; reflection exercises have been embedded throughout the program. I remember cringing the first time we were asked to write a reflection paper. You see, for me, finding a quiet space, playing meditation music, and journaling feels forced and artificial. I have tried reflecting in this manner, but it is not productive.

I now recognize the reflection process as an important part of my learning and I agree with Gillett et al. (2009) that reflection "is an essential part of personal development and prepares you for the world of work, encouraging you to develop the habit of analyzing your actions or events and considering the consequences (Gillett et al., 2009, p.164). Within my process of learning how to productively reflect, I studied various reflection models. I came to realize reflection was already engrained in my daily practice, but instead of dubbing my process as being reflective, I view it as reactive planning.

My process of reactive planning most closely resembles Gibb's Reflective Cycle of description, feelings, evaluation, analysis, conclusion, and action plan (Gibbs, 1988). As I planned for my responsibilities throughout my coursework and wrote each section of this dissertation, I would reflect upon how a previous assignment or section transpired. I would then consider if I felt confident or stressed about the task based upon an evaluation of what went well and what needed to be improved. The next step I would take is to analyze why I struggled or why a task seemed to flow easily. I would then make a

conclusion of what aspects I should keep, what I needed to improve, and what resources I was missing. Finally, I would make a specific plan for the next task, normally outlined within a spreadsheet.

Some unexpected circumstances occurred during my time within the program that I could not plan for, but I can reflect upon now. In 2019, I entered Summer One just weeks after having surgery. I then missed the last two weeks of Summer One for shoulder surgery. While still wearing a shoulder sling, I worked at setting up a new classroom due to being transferred from a long-term position within a secondary high-needs special education classroom to an elementary special education position. Then, eight months later the Covid 19 pandemic changed the world. Specifically, safety protocols forced me to become skilled in how to deliver virtual instruction to my special education students and how to lead my team of four paraprofessionals virtually. In addition, it was at this point that our cohort classes transitioned to being held virtually. My home dynamics changed as well, as my eldest child graduated high school during the pandemic and started college. In August of 2020, my professional responsibilities shifted again as I became a Special Education Process Coordinator. This provided me the opportunity to apply for and be accepted into The Missouri Pathway for Aspiring Leaders in Special Education (MoPAL) program. Therefore, in August of 2021, I began the coursework for MoPAL while simultaneously writing my dissertation proposal.

These circumstances and the educational rigor of the EdD program has made this journey both arduous and transformational. The next section will describe how I have been transformed as an educational leader in the areas of planning, leadership skills, and

equity. The following section will describe how I have been transformed as a scholar in the areas of research methods, ethics, and as a scholarly practioner.

How the Dissertation Process has Transformed Me as an Educational Leader

I have been continuously challenged to become a stronger leader during the EdD program. After reading the numerous articles highlighting both successful and disastrous leaders, I realized that leaders are often defined by the health of their team. Teams cannot thrive if they are disorganized and wasteful with their time or resources, and it is the leader's responsibility to ensure these things do not occur. One way I have learned to ensure my leadership is not disorganized is to use my primary leadership strength, which is planning.

Kotter (1990/2011) believes planning is part of the management process when it involves regulating the daily activities of an organization, as well as performing continuous problem solving. As a leader, I have learned to use my management skills to support the daily functions of my team, such as timeline organization, overseeing job duties, and providing professional advice. These tasks create "a way to reduce chaos in organizations, to make them run more effectively and efficiently" (Northouse, 2019, p. 12). I have also learned to use my leadership skills to set a vision for the team and to motivate and empower them.

Planning becomes a leadership skill when the leader begins to actively search for opportunities to improve instead of merely reacting to problems. Kotter (1990/2011) believes leaders look for opportunities in the planning and forecasting process with the goal of setting a new direction or vision. Examples of how I have used this type of planning is when I have offered professional development in classroom management

strategies or when I have intentionally worked with the team to design a master schedule to use resources most effectively. In addition, the dissertation process has provided opportunities for me to practice the skill of having to intentionally allot time to plan. This time allowed me to actively search for opportunities to improve both my writing and the study-informed resources.

The Leadership Trait Questionnaire from Northouse (2019) identified my strengths as being persistent, determined, dependable, conscientious, and diligent. Of all these traits, the one that most resonates with my daily life is the trait of being determined. According to Northouse (2019) "people with determination are willing to assert themselves, are proactive, and have the capacity to persevere in the face of obstacles. Being determined includes showing dominance at times and in situations where followers need to be directed" (p. 24). The dissertation process has also accentuated the importance of being persistent and finishing what I have started. I now have proof I can persevere and do hard things, even when the task seems never-ending!

As a leader I have learned to be very intentional about giving specific, clear, and timely directions. My ability to communicate clear directions is a skill that was also identified by the Path-Goal Leadership Questionnaire. This questionnaire identified my dominant leadership style as the directive style. According to Northouse (2019), the directive style "characterizes a leader who gives followers instructions about their task, including what is expected of them, how it is to be done, and the timeline for when it should be completed" (p. 120). This definition very clearly articulates how I have learned to give directions and set timelines.

One of the reasons I now provide such detailed and specific instructions is because I want to be sure I am treating all my followers with a consistent level of respect and communication. Having clear expectations and timelines allows everyone to know what is expected of them and the expected competency level. Providing this clear sense of direction and focusing on fairness ties directly to my skills identified by the Servant Leadership Questionnaire (SLQ).

The SLQ identified I have strengths in behaving ethically and in using conceptual skills. According to Northouse (2019), conceptualization means providing "a clear sense of [an organization's] goals and directions" (p. 230). Behaving ethically is "holding to strong ethical standards, including being open, honest, and fair with followers" (p. 236). By seeking to ensure all followers regularly know what is expected of them, I simultaneously communicate my goals while being open, honest, and fair.

According to my Clifton Strengths Inventory report, my five most dominant themes are Achiever, Learner, Responsibility, Discipline, and Intellection (Gallop, 2006-2012). In the area of Achiever, the most authentic statement I connected with from Gallop (2006-2012) stated I typically struggle to work with people who are ill-prepared. However, the coursework has provided strategies to use to mediate this situation, thus making me a more effective leader.

Writing the dissertation has influenced me as a leader by demonstrating no matter how much I learn, there is always more to discover. As a Learner, this is exciting for me! My passion for learning has fueled my motivation to serve on multiple action teams and committees. In addition, in a desire to help my team also learn, I often share tidbits of what I have learned from my research study. Further, when I encounter a new article on

ADHD, I am compelled to study it and compare it with my previous knowledge. I now read with more purpose and intentionality because I have learned what attributes to look for within quality articles.

According to the Leadership Trait Questionnaire, my greatest area of weakness is not being friendly. It is very easy for me to be task-oriented and forget about the social aspect of leadership. However, Northouse (2019) stated strong leaders "have good interpersonal skills and create cooperative relationships with their followers" (p. 25). The Clifton Strengths Inventory also identified the same weakness of not prioritizing relationships. Prior to participating in the coursework, I would not have connected relationship-building to leadership. However, through the self-assessment and the discussions focused on the importance of relationships and emotional intelligence, I am now able to recognize the partnership. Consequently, relationship-building has become a prevailing personal focus.

The dissertation process has strengthened my ability to develop cooperative relationships with the administrators who served as gatekeepers to the schools and the participants of the study. However, the most valuable cooperative relationships have been built within my cohort team. We continue to meet monthly for a time of discussion, laughter, venting, encouragement, and problem-solving.

According to the Path-Goal Leadership Questionnaire, my weakest leadership style is the achievement-oriented style. This was surprising because I felt I held very high standards of excellence for myself. However, according to Northouse (2019) achievement-oriented leaders "establish a high standard of excellence for followers and seek continuous improvement" (p. 120). So, although I held myself to a high standard,

this questionnaire divulged that I had biases towards my followers and did not consistently expect to see an equal level of competency.

Acknowledging that not holding high levels of accountability for others is a weakness, I reviewed the job expectations of my followers and made notes of the areas that I previously viewed as unobtainable. Then, I tried to view the followers' skill levels through an unbiased lens. In their article in HBR's 10 Must Reads (2013), Kahneman et al. (2011) stated "knowing you have biases is not enough to help you overcome them. You may accept that you have biases, but you cannot eliminate them in yourself" (p. 25). Therefore, I sought out an impartial support team who was able to assist me in identifying and removing my biases.

In addition, I recognized I needed to provide an environment in which my team felt comfortable informing me if I was not holding members to a high enough standard. Schools naturally have a system of hierarchy and employees tend to be classified due to their positions, not their capabilities. This type of classification system is addressed by Johnson (2017) when he said, "patterns of privilege and oppression are never just a matter of people's personalities, feelings or intentions . . . they result from our participation in particular kinds of systems, which shapes both our behavior and its consequences" (p. 68). So, while I did not consciously plan to hold low expectations of a different class of employee, I was doing so, nonetheless, and needed to change.

The final way the dissertation process has transformed me as a leader is by preparing me to be part of the equity conversation. I feel I am better equipped to work towards positive changes and have made strides towards equity for families who are English language learners. I agree with Johnson's (2017) statement, "the only way to

change the outcome is to change how we see and play the game and, eventually, change the game itself and its path of least resistance" (p. 74).

As I reflected on my development as a leader, I recognized growth in my desire to be included in the important conversations and planning meetings that are happening around me. Next, I realized my view of policy debates and political alliances has morphed from a distrustful and defensive stance to one of intrigue and opportunity. In addition, I am far more mindful of my possible biases, and I take deliberate actions to avoid them. My desire is to someday mesh these growth areas together by being part of important conversations where I can toil towards affirmative policies and create political alliances to enhance the lives of the underrepresented.

How the Dissertation Process has Transformed Me as a Scholar

One way the dissertation process influenced me as a scholar is by showing me the level of importance of the research questions. Prior to this experience, I was not aware of how the verbiage of a research question could literally redirect the entire trajectory of a study. O'Leary (2005) stated, "Research is the process of gathering data in order to answer a particular question(s)" (p. 4). As a scholarly practitioner, I possess a vested interest in finding research-based techniques to enhance my classroom teaching, thus increasing student progress. Merriam and Tisdell (2016) stated that when one has, "an interest in knowing more about one's practice, and indeed in improving one's practice, [this] leads to asking researchable questions" (p.1). As I analyzed the data from the study, I realized how the wording of questions impacted the response given by participants. In addition, I was able to identify biases within questions that I could not see prior to viewing the data wholistically.

The second way the dissertation process influenced me as a scholar was by also showing me how easily it could be to manipulate data to achieve findings to support a hypothesis. I felt the weight of what I wrote as definitive findings and recognized the need for a team of researchers to ensure an ethical handling of the data. I learned that to ensure my research is ethical, I must hold a high degree of integrity and allow myself to be accountable to others. I agree with the statement made in the AERA 2011 Code of Ethics that states that following ethical standards, "requires a personal commitment to a lifelong effort to act ethically; to encourage ethical behaviors by students, supervisors, supervises, employers, and colleagues; and to consult with others as needed concerning ethical problems" (p. 146). According to Seidman (2019):

> Aristotle's explanation of the virtue of good work allows us to see that the method of our work interacts with the virtue of our work. We may never be perfect in our quest to do good, careful, and thoughtful work in every step of the process, but a sense of imperative to move in that direction would lead us in the direction of doing ethical research with our participants. (pp. 150-151)

I understand now more thoroughly how my job as a researcher is to ensure the full truth is shown, no matter how much I agree or disagree with the results.

MacGregor and Fellabaum (2016) defined a scholarly practitioner as, "A professional working in an applied setting whose work is informed by, and extends, research and theory" (p. 69). The role of research in my work as an educator is to both empower me in the classroom and to "generate new knowledge that can be transferred to other settings" (Mertens, 2020, p.3). Therefore, the third way the dissertation process influenced me as a scholar was by teaching me the data should not only be truthful, but it

should also be meaningful and helpful. Zettelmeyer and Bolling (2014) stated it was important to know "whether data are providing actionable insight, or simply providing the illusion of actionable insight" (p. 5).

For data to be meaningful, helpful and useful, it needs to be credible and free from bias. Merriam and Tisdell (2016) stated, "triangulation - whether you make use of more than one data collection method, multiple sources of data, multiple investigators, or multiple theories - is a powerful strategy for increasing the credibility or internal validity of your research" (p. 245). I would also provide an adequate amount of data within my study to allow the reader to follow the patterns of the data, free of my personal bias (Merriam & Tisdell, 2016).

Finally, the dissertation process influenced me as a scholar by allowing me to experience the amount of time each part of the process consumes. For example, it took weeks for me to create the survey for my study. In addition, I then invested more time and also money in creating printed packets, delivering the packets to the school, and then collecting them. Due to my time and financial investment into this dissertation, I am now far more aware of how to evaluate the feasibility of a proposed study. Points of future consideration are the necessary time commitment, the complexity of the process, and the cost of collecting certain types of data.

Summary

Without a doubt, I know writing this dissertation has made me a better educational leader. The knowledge I gained and the skills I practiced in preparation for the dissertation have given me a strong foundation from which to make educated, data-based, unbiased decisions which consider the expected and unexpected impacts for all

stakeholders. In addition, my skills as a scholar have been refined and I am better equipped to thoroughly investigate all sides of an issue, find the voices in the field, and perform a future study to provide valuable contributions to the field. Overall, I am better equipped to pursue my passions, wherever they may take me.

References

Abikoff, H. (2009). ADHD psychosocial treatments: Generalization reconsidered. *Journal of Attention Disorders, 13*(3), 207-210.

Abramov, D. M., Lazarev, V. V., Gomes-Junior, S. C., Mourao-Junior, C. A., Castro-Pontes, M., Cunha, C. Q., deAzevedo, L. C., & Vigneau, E. (2019). Estimating biological accuracy of DSM for attention deficit/hyperactivity disorder based on multivariate analysis for small samples. *PeerJ, 7,* e7074.

AERA code of ethics: American educational research association approved by the AERA council. February 2011. (2011). *Educational Researcher*, *40*(3), 145–156.

Ahmann, E. (2017). Interventions for ADHD in children and teens: A focus on ADHD coaching. *Pediatric Nursing*, *43*(3), 121-131.

Aloe, A. M., Shisler, S. M., Norris, B. D., Nickerson, A. B., & Rinker, T. W. (2014). A multivariate meta-analysis of student misbehavior and teacher burnout. *Educational Research Review*, *12*, 30-44.

American Academy of Pediatrics. (2012). Sensory integration theories for children with developmental and behavioral disorders. *Pediatrics, 129*(6), 1186-1189.

American Academy of Pediatrics, Subcommittee on Children and Adolescents with Attention-Deficit/Hyperactivity Disorder. (2011). ADHD: Clinical practice guideline for the diagnosis, evaluation, and treatment of children and adolescents with attention-deficit/hyperactivity disorder. *Pediatrics, 128*(5), 1007-1022.

American Psychiatric Association (APA). (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Association.

Anderson, D. L., Watt, S. E., Noble, W., & Shanley, D. C. (2012). Knowledge of attention deficit hyperactivity disorder (ADHD) and attitudes toward teaching children with ADHD: The role of teaching experience. *Psychology in the Schools, 49,* 511-525.

Anderson, N. H. (1971). Integration theory and attitude change. *Psychological Review, 78,* 171-206.

Anderson, N. H. (1996). *A functional theory of cognition* (1st ed.). Psychology Press.

Antshel, K. M., Hargrave, T. M., Simonescu, M., Kaul, P., Hendricks, K., & Faraone, S. V. (2011). Advances in understanding and treating ADHD. *BMC Medicine, 9*(72), 1-12.

Armstrong, T. (1996). ADD: Does it really exist? *The Phi Delta Kappan, 77*(6), 424-428.

Atkinson, I. M., Robinson, J. A., & Shute, R. H. (1997). Between a rock and a hard place: An Australian perspective on education of children with ADHD. *Educational and Child Psychology, 14*, 21-30.

Barkley, R. A., & Fischer, M. (2011). Predicting impairment in major life activities and occupational functioning in hyperactive children as adults: Self-reported executive function (EF) deficits versus EF tests. *Developmental Neuropsychology*, *36,* 137-161.

Barkley, R. A., McMurray, M. B., Edelbrock, C. S., & Robbins, K. (1990). Side effects of methylphenidate in children with attention deficit hyperactivity disorder: A systemic, placebo-controlled evaluation. *Pediatrics, 86*(2), 184-192.

Barnhill, G. P. (2005). Functional behavioral assessment in schools. *Intervention in School and Clinic, 40*, 131-143.

Becker, S. P., Burns, G. L., Smith, Z. R., & Langberg, J. M. (2020). Sluggish cognitive tempo in adolescents with and without ADHD: Differentiation from adolescent-reported ADHD inattention and unique associations with internalizing domains. *Journal of Abnormal Child Psychology, 48*(3), 391-406.

Bennett, G. & Jessani, N. (Eds.) (2011). *The knowledge translation toolkit: Bridging the know-do gap: A resource for researchers.* Sage.

Benzing, V., & Schmidt, M. (2019). The effect of exergaming on executive functions in children with ADHD: A randomized clinical trial. *Scandinavian Journal of Medicine & Science in Sports, 29*(8), 1243-1253.

Bilgin, A., Baumann, N., Jaekel, J., Breeman, L. D., Bartmann, P., Bäuml, J. G., Avram, M., Sorg, C., & Wolke, D. (2020). Early crying, sleeping, and feeding problems and trajectories of attention problems from childhood to adulthood. *Child Development, 91(*1), e77–e91.

Bolisani, E., & Bratianu, C. (2018). The elusive definition of knowledge. In E. Bolisani & C. Bratianu (Eds.), *Emergent knowledge strategies: Strategic thinking in knowledge management* (pp. 1-22). International Publishing.

Boon, H. J. (2020). What do ADHD neuroimaging studies reveal for teachers, teacher educators, and inclusive education? *Child & Youth Care Forum, 49*(4), 533-561.

Bowen, J., Fenton, T., & Rappaport, L. (1991). Stimulant medication and attention deficit-hyperactivity disorder: The child's perspective. *Archives of Pediatrics Adolescent Medicine*, *145*, 291-295.

Bradstreet, J. J., Smith, S., Baral, M., & Rossignol, D. A. (2010). Biomarker-guided interventions of clinically relevant conditions associated with autism spectrum disorders and attention deficit hyperactivity disorders. *Alternative Medicine Review*, *15*(1), 15-32.

Brock, S., Grove, B., & Searls, M. (2010). *ADHD: Classroom interventions.* Semantic Scholar.

Bruni, T. P., Drevon, D., Hixson, M., Wyse, R., Corcoran, S., & Fursa, S. (2017). The effect of functional behavior assessment on school-based interventions: A meta-analysis of single-case research. *Psychology in the Schools, 54*(4), 351-369.

Bunford, N., Evans, S., & Wymbs, F. (2015). ADHD and emotion dysregulation among children and adolescents. *Clinical Child & Family Psychology Review*, *18*(3), 185-217.

Bussing, R., Schoenberg, N. E., Rogers, K. M., Zima, B. T., & Sherwin, A. (1998). Explanatory models of ADHD: Do they differ by ethnicity, child gender, or treatment status? *Journal of Emotional and Behavioral Disorders, 6*, 233-243.

Bynum, W. F. (2002). The childless father of eugenics. *Science, 296*(5567), 472.

Cains, R. A. (2000). Children diagnosed ADHD: Factors to guide intervention. *Educational Psychology in Practice, 16*(2), 159-180.

Carlson, S., Frankenberger, W., Hall, K. M., Totten, S. J., & House, K. (2006). International perspectives on attention-deficit/hyperactivity disorder: A comparison of teachers in the United States and Sweden. *Journal of the American Academy of Special Education Professionals*, 107-121.

Caspi, A., McClay, J., Moffitt, T. E., Mill, J., Martin, J., Craig, I. W., Taylor, A., & Pouton, R. (2002). Role of genotype in the cycle of violence in maltreated children. *Science, 297*(5582), 851-854.

Causality. (2003). In *Merriam-Webster's dictionary* (11th ed.). Merriam-Webster.

CDC - Centers for Disease Control and Prevention. National Resource Center on ADHD: A Program of CHADD. (2020). *ADHD fact sheets & infographics.* CHADD. https://chadd.org/understanding-adhd/adhd-fact-sheets/

Center for Children and Families. (n.d.). *Comprehensive evidence-based treatment for ADHD children and adolescents.* Florida International University. https://ccf.fiu.edu/research/_assets/psychosocial_fact_sheet-updated-1214.pdf

Cerrillo-Urbina, A. J., García-Hermoso, A., Pardo-Guijarro, M. J., Sanchez-Lopez, M., Santos-Gomez, J. L., & Martınez-Vizcaíno, V. (2018). The effects of long-acting stimulant and nonstimulant medications in children and adolescents with attention-deficit/hyperactivity disorder: A meta-analysis of randomized controlled trials. *Journal of Child and Adolescent Psychopharmacology, 28(*8), 494-507.

Chacko, A., Bedard, A.-C. V., Marks, D., Gopalan, G., Feirsen, N., Uderman, J., Chimiklis, A., Heber, E., Cornwell, M., Anderson, L., Zwilling, A., & Ramon, M. (2018). Sequenced neurocognitive and behavioral parent training for the treatment of ADHD in school-age children. *Child Neuropsychology*, *24*(4), 427-450.

Chen, M., Seipp, C. M., & Johnston, C. (2008). Mothers' and fathers' attributions and beliefs in families of girls and boys with attention-deficit/hyperactivity disorder. *Child Psychiatry & Human Development, 39*(1), 85-99.

Chimiklis, A. L., Dahl, V., Spears, A. P., Goss, K., Fogarty, K., & Chacko, A. (2018). Yoga, mindfulness, and meditation interventions for youth with ADHD: Systematic review and meta-analysis. *Journal of Child & Family Studies, 27*(10), 3155-3168.

Clarke, J. (2011). Magazine portrayal of attention deficit/hyperactivity disorder (ADD/ADHD): A post-modern epidemic in a post-trust society. *Health, Risk & Society, 13*(7/8), 621-636.

Coles, E. K., Owens, J. S., Serrano, V. J., Slavec, J., & Evans, S. W. (2015). From consultation to student outcomes: The role of teacher knowledge, skills, and beliefs in increasing integrity in classroom management strategies. *School Mental Health, 7*(1), 34-48.

Collett, B. R., & Gimpel, G. A. (2004). Maternal and child attributions in ADHD versus non-ADHD populations. *Journal of Attention Disorders, 7*(4), 187-196.

Conrad, P., & Bergey, M. R. (2014). The impending globalization of ADHD: Notes on the expansion and growth of a medicalized disorder. *Social Science & Medicine, 122,* 31-43.

Cooper, P. (2008). Like alligators bobbing for poodles? A critical discussion of education, ADHD and the biopsychosocial perspective. *Journal of Philosophy of Education, 42*(3-4), 457-474.

Corcoran, J. (2016). *Living with mental disorder: Insights from qualitative research.* Routledge.

Corcoran, J., Schildt, B., Hochbrückner, R., & Abell, J. (2017). Parents of children with attention deficit/hyperactivity disorder: A meta-synthesis, part 1. *Child and Adolescent Social Work Journal, 34*(4), 281-335.

Cordier, R., Vilaysack, B., Doma, K., Wilkes-Gillan, S., & Speyer, R. (2018). Peer inclusion in interventions for children with ADHD: A systematic review and meta-analysis. *BioMed Research International*.

Cosgrove, L., & Krimsky, S. (2012). A comparison of DSM-IV and DSM-5 panel members' financial associations with industry: A pernicious problem persists. *The Public Library of Science Medicine, 9*(3), e1001190.

Council for Exceptional Children. (n.d.). Council for Exceptional Children: The premier association for special education professionals. https://exceptionalchildren.org

Council of Administrators of Special Education. (n.d.). Home. https://www.casecec.org/

Crea, T. M., Chan, K., & Barth, R. P. (2014). Family environment and attention-deficit/ hyperactivity disorder in adopted children: Associations with family cohesion and adaptability. *Child: Care, Health and Development, 40*(6), 853-862.

Curtis, D., Chapman, S., Dempsey, J., & Mire, S. (2013). Classroom changes in ADHD symptoms following clinic-based behavior therapy. *Journal of Clinical Psychology in Medical Settings*, *20*(1), 114-122.

Curtis, D. F., Pisecco, S., Hamilton, R. J., & Moore, D. W. (2006). Teacher perceptions of classroom interventions for children with ADHD: A cross-cultural comparison of teachers in the United States and New Zealand. *School Psychology Quarterly, 21,* 171-197.

Danielson, M. L., Bitsko, R. H., Ghandour, R. M., Holbrook, J. R., Kogan, M. D., & Blumberg, S. J. (2018). Prevalence of parent-reported ADHD diagnosis and associated treatment among U.S. children and adolescents, 2016. *Journal of Clinical Child and Adolescent Psychology, 47*(2), 199-212.

Darling-Hammond, L. (2000). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives*, *8*(1), 1-44.

Darling-Hammond, L., Wei, R. C., Andree, A., Richardson, N., & Orphanos, S. (2009). *Professional learning in the learning profession: A status report on teacher development in the United States and abroad.* National Staff Development Council.

David, N. (2013). ADHD in Indian elementary classrooms: Understanding teacher perspectives. *International Journal of Special Education, 28*(2), 4-16.

Deacon, B. J. (2013). The biomedical model of mental disorder: A critical analysis of its validity, utility, and effects on psychotherapy research. *Clinical Psychology Review, 33*(7), 846-861.

Deault, L. C. (2010). A systematic review of parenting in relation to the development of comorbidities and functional impairments in children with attention-deficit/hyperactivity disorder (ADHD). *Child Psychiatry & Human Development, 41*(2), 168-192.

DeBacker, T. K., Crowson, H. M., Beesley, A. D., Thoma, S. J., & Hestevold, N. L. (2008). The challenge of measuring epistemic beliefs: An analysis of three self-report instruments. *Journal of Experimental Education, 76*(3), 281-312.

Dekkers, T. J., Popma, A., Agelink van Rentergem, J. A., Bexkens, A., & Huizenga, H. M. (2016). Risky decision making in attention-deficit/hyperactivity disorder: A meta-regression analysis. *Clinical Psychology Review, 45*, 1-16.

Dong, Q., Garcia, B., Pham, A. V., & Cumming, M. (2020). Culturally responsive approaches for addressing ADHD within multi-tiered systems of support. *Current Psychiatry Reports, 22*(6), 27.

Dort, M., Strelow, A., Schwinger, M., & Christiansen, H. (2020). What teachers think and know about ADHD: Validation of the ADHD-school-expectation questionnaire (ASE). *International Journal of Disability, Development and Education*.

Dort, M., Strelow, A., Schwinger, M., & Christiansen, H. (2020). Working with children with ADHD: A latent profile analysis of teachers' and psychotherapists' attitudes. *Sustainability, 12(*9691), 1-17.

dosReis, S., Barksdale, C. L., Sherman, A., Maloney, K., & Charach, A. (2010). Stigmatizing experiences of parents of children with a new diagnosis of ADHD. *Psychiatric Services, 61*(8), 811-816.

Dryer, R., Kiernan, M., & Tyson, G. (2006). Implicit theories of the characteristics and causes of attention-deficit hyperactivity disorder held by parents and professionals in the psychological, educational, medical, and allied health fields. *Australian Journal of Psychology, 58*(2), 79-92.

DuPaul, G. J., & Jimerson, S. R. (2014). Assessing, understanding, and supporting students with ADHD at school: Contemporary science, practice, and policy. *School Psychology Quarterly, 29*(4), 379-384.

DuPaul, G. J., & Power, T. J. (2000). Educational interventions for students with attention-deficit disorders. In T. E. Brown (Ed.), *Attention-deficit disorders and comorbidities in children, adolescents, and adults* (pp. 607-635). American Psychiatric Press.

DuPaul, G. J., & Stoner, G. (2014). ADHD in the schools: Assessment and intervention strategies. The Guilford Press.

DuPaul, G., Weyandt, L., & Janusis, G. (2011). ADHD in the classroom: Effective intervention strategies. *Theory into Practice*, *50*(1), 35-42.

Dursun, S., Demirci, E., Kilic, E., & Ozmen, S. (2021). A different view on the etiopathogenesis of attention-deficit hyperactivity disorder from an inflammation perspective. *Clinical Psychopharmacology and Neuroscience, 19(*1), 145-154.

Easton, L B. (2015). *Powerful Designs for Professional Learning* (3rd ed.). National Staff Development Council.

Emilsson, M., Gustafsson, P., Öhnström, G., & Marteinsdottir, I. (2020). Impact of personality on adherence to and beliefs about ADHD medication, and perceptions of ADHD in adolescents. *BMC psychiatry, 20*(139), 1-10.

Evertson, C., & Emmer, E. (1982). Effective management at the beginning of the school year in junior high classes. *Journal of Educational Psychology, 74*, 485-498.

Fedewa, A., Davis, M. A. C., & Ahn, S. (2015). Effects of stability balls on children's on-task behavior, academic achievement, and discipline referrals: A randomized controlled trial. *American Journal of Occupational Therapy, 69*, 1-9.

Field, A. (2018). *Discovering statistics using IBM SPSS statistics*. Sage Publications.

Filcheck, H. A., & McNeil, C. B. (2004). The use of token economies in preschool classrooms: Practical and philosophical concerns. *Journal of Early and Intensive Behavior Intervention, 1*(1), 94-104.

Fink, A. (2017). *How to conduct surveys: A step-by-step guide*. Sage Publications.

Fletcher-Wood, H., & Zuccollo, J. (2020). *The effects of high-quality professional development on teachers and students: A rapid review and metanalysis*. Education Policy Institute. https://epi.org.uk/publications-and-research/effects-high-quality-professional-development/

Furnham, A., & Sarwar, T. (2011). Beliefs about attention-deficit hyperactivity disorder. *Counselling Psychology Quarterly, 24*(4), 301-311.

Gaastra, G. F., Groen, Y., Tucha, L., & Tucha, O. (2016). The effects of classroom interventions on off-task and disruptive classroom behavior in children with symptoms of attention-deficit/hyperactivity disorder: A meta-analytic review. *The Public Library of Science ONE*, *11*(2), 1-19.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction.* Pearson/Allyn & Bacon.

Gallup. (2006-2012). *Clifton Strengths: Your signature themes.* Retrieved from www.strengthsquest.com.

Garcia Rosales, A., Vitoratou, S., Banaschewski, T., Asherson, P., Buitelaar, J., Oades, R. D., Rothenberger, A., Steinhausen, H. C., Faraone, S. V., & Chen, W. (2015). Are all the 18 DSM-IV and DSM-5 criteria equally useful for diagnosing ADHD and predicting comorbid conduct problems? *European Child & Adolescent Psychiatry, 24*(11), 1325-1337.

Ghanizadeh, A., Bahredar, M. J., & Moeini, S. R. (2006). Knowledge and attitudes towards attention deficit hyperactivity disorder among elementary school teachers. *Patient Education and Counseling, 63*(1), 84-88.

Gibbs, G. (1988). *Learning by doing: A guide to teaching and learning methods.* Further Education Unit.

Gillberg, C. (1997). Central nervous system stimulants to hyperactive children? Time to soften up the attitude towards an efficient treatment. *Lakartidningen, 94*(23), 2161-2162.

Gillett, A., Hammond, A., & Martala, M. (2009). *Inside track to successful academic writing.* Pearson Education Canada.

Glass, C. S., & Wegar, K. (2000). Teacher perceptions of the incidence and management of attention deficit hyperactivity disorder. *Education, 121*(2), 412.

Goldstein, S., & Naglieri, J. A. (2008). The school neuropsychology of ADHD: Theory, assessment, and intervention. *Psychology in the Schools, 45*(9), 859-874.

Gould, K. L., Coventry, W. L., Olson, R. K., & Byrne, B. (2018). Gene-environment interactions in ADHD: The roles of SES and chaos. *Journal of Abnormal Child Psychology, 46*(2), 251-263.

Graham, L. (2008). Drugs, labels and (p)ill-fitting boxes: ADHD and children who are hard to teach. *Discourse: Studies in the Cultural Politics of Education, 29*(1), 85-106.

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology, 78*(6), 1360–1380.

Greene, R. W., Beszterczey, S. K., Katzenstein, T., Park, K., & Goring, J. (2002). Are students with ADHD more stressful to teach? *Journal of Emotional & Behavioral Disorders, 10*(2), 79.

Gresham, F. M., McIntyre, L. L., Olson-Tinker, H., Dolstra, L., McLaughlin, V., & Van, M. (2004). Relevance of functional behavioral assessment research for school-based interventions and positive behavioral support. *Research in Developmental Disabilities, 25*, 19-37.

Grogan, M., & Weitzman, J. (2015). Using the 12-steps as a parenting intervention with ADHD adolescents. *American Journal of Family Therapy, 43*, 364-377.

Haft, S. L., Chen, T., Leblanc, C., Tencza, F., & Hoeft, F. (2019). Impact of mentoring on socio-emotional and mental health outcomes of youth with learning disabilities and attention-deficit hyperactivity disorder. *Child and Adolescent Mental Health, 24*(4), 318–328.

Hall, A. S., & Gushee, A. G. (2002). Medication interventions for ADHD youth: A primer for school and mental health counselors. *Journal of Mental Health Counseling, 24*(2), 140.

Halperin, J. M., Bédard, A.-C. V., & Curchack-Lichtin, J. T. (2012). Preventive interventions for ADHD: A neurodevelopmental perspective. *Neurotherapeutics, 9*, 531-541.

Hamilton, N. J., & Astramovich, R. L. (2016). Teaching strategies for students with ADHD: Findings from the field. *Education, 136*(4), 451-460.

Hanraetsa, I., Hulseboschb, J., & de Laata, M. (2011). Experiences of pioneers facilitating teacher networks for professional development. *Educational Media International, 48*(2), 85-99.

Harlacher, J. E., Roberts, N. E., & Merrell, K. W. (2006). Classwide interventions for students with ADHD: A summary of teacher options beneficial for the whole class. *Teaching Exceptional Children, 39*(2), 6-12.

Harrison, J. R., Soares, D. A., Rudzinski, S., & Johnson, R. (2019). Attention deficit hyperactivity disorders and classroom-based interventions: Evidence-based status, effectiveness, and moderators of effects in single-case design research. *Review of Educational Research, 89(*4), 569-611.

Hart, K. C., Fabiano, G. A., Evans, S. W., Manos, M. J., Hannah, J. N., & Vujnovic, R. K. (2017). Elementary and middle school teachers' self-reported use of positive behavioral supports for children with ADHD: A national survey. *Journal of Emotional and Behavioral Disorders, 25*(4), 246-256.

Haythornthwaite, C., & De Laat, M. F. (2010). *Social networks and learning networks: Using social network perspectives to understand social learning.* Paper presented at the 7th International conference on Networked Learning, Aalborg, Denmark.

Hong, S. B., Im, M. H., Kim, J. W., Park, E. J., Shin, M. S., Kim, B. N., Yoo, H. J., Cho, I. H., Bhang, S. Y., Hong, Y. C., & Cho, S. C. (2015). Environmental lead exposure and attention deficit/hyperactivity disorder symptom domains in a community sample of South Korean school-age children. *Environmental Health Perspectives, 123*(3), 271-276.

Immordino-Yang, M. H., Darling-Hammond, L., & Krone, C. R. (2019). Nurturing nature: How brain development is inherently social and emotional, and what this means for education. *Educational Psychologist, 54*(3), 185-204.

IRIS Center. (2014). Evidence-based practices (part 3): Evaluating learner outcomes and fidelity. Retrieved from https://iris.peabody.vanderbilt.edu/module/ebp_03/

Jiang, X., Shen, C., Dai, Y., Jiang, F., Li, S., Shen, X., Hu, Y., & Li, F. (2018). Early food allergy and respiratory allergy symptoms and attention-deficit/hyperactivity disorder in Chinese children: A cross-sectional study. *Pediatric Allergy and Immunology, 29*(4), 402-409.

Jitendra, A. K., DuPaul, G. J., Someki, F., & Tresco, K. E. (2008). Enhancing academic achievement for children with attention-deficit hyperactivity disorder: Evidence from school-based intervention research. *Developmental Disabilities Research Reviews, 14*(4), 325-330.

Johnson, A. (2017). *Privilege, power, and difference* (3rd ed.). McGraw-Hill Professional.

Johnson, A. H., Goldberg, T. S., Hinant, R. L., & Couch, L. K. (2019). Trends and practices in functional behavior assessments completed by school psychologists. *Psychology in the Schools, 56*(3), 360-377.

Johnston, C., Chen, M., & Ohan, J. (2006). Mothers' attributions for behavior in nonproblem boys, boys with attention deficit hyperactivity disorder, and boys with attention deficit hyperactivity disorder and oppositional defiant behavior. *Journal of Clinical Child & Adolescent Psychology, 35*(1), 60-71.

Johnston, C., Seipp, C., Hommersen, P., Hoza, B., & Fine, S. (2005). Treatment choices and experiences in attention deficit and hyperactivity disorder: Relations to parents' beliefs and attributions. *Child: Care, Health & Development, 31*(6), 669-677.

Kaidar, I., Wiener, J., & Tannock, R. (2003). The attributions of children with attention-deficit/ hyperactivity disorder for their problem behaviors. *Journal of Attention Disorders, 6*(3), 99-109.

Kahneman, D., Lovallo, D., & Sibony, O. (2013). Before you make that big decision. *In HBR's On Making Smart Decisions* (pp. 21-40). Harvard Business Review Press. (Reprint R1106B. Originally published in June 2011)

Keilow, M., Holm, A., & Fallesen, P. (2018). Medical treatment of attention deficit/hyperactivity disorder (ADHD) and children's academic performance. *The Public Library of Science One, 13*(11), e0207905.

Khasakhala, E., & Galava, P. (2016). Relationship between teachers' perception of causes of challenging behavior and the choice of management strategies among learners with autistic spectrum disorders. *Journal of Education and Practice, 7*(2), 80-87.

Kim, E. M., Sheridan, S. M., Kwon, K., & Koziol, N. (2013). Parent beliefs and children's social-behavioral functioning: The mediating role of parent-teacher relationships. *Journal of School Psychology, 51*(2), 175-185.

Kini, T., & Podolsky, A. (2016). *Does teaching experience increase teacher effectiveness? A review of the research*. Learning Policy Institute.

Klassen, A., Miller, A., Raina, P., Lee, S., & Olsen, L. (1999). Attention-deficit hyperactivity disorder in children and youth: A quantitative systematic review of the efficacy of different management strategies. *Canadian Journal of Psychiatry, 44*(10), 1007-1016.

Kortekaas-Rijlaarsdam, A. F., Luman, M., Sonuga-Barke, E., & Oosterlaan, J. (2018). Does methylphenidate improve academic performance? A systematic review and meta-analysis. *European Child & Adolescent Psychiatry, 28*, 155-164.

Kos, J., Richdale, A., & Hay, D. (2006). Children with attention deficit hyperactivity disorder and their teachers: A review of the literature. *International Journal of Disability, Development & Education, 53*(2), 147-160.

Kotter, J.P. (2011). What leaders really do. In *HBR's 10 must reads on leadership* (pp. 37-55). Harvard Business Review Press. (Reprint R0111F, Originally published in May 1990).

Kwasman, A., Tinsley, B. J., & Lepper, H. S. (1995). Pediatrician's knowledge and attitudes concerning diagnosis and treatment of attention deficit and hyperactivity disorders. *Archives of Pediatrics and Adolescent Medicine, 149,* 1211-1216.

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.

Lasko, B. (2020). The importance of relationship building with ADHD students. BU *Journal of Graduate Studies in Education, 12*(2), 29-32.

Lasky-Su, J., Faraone, S., Lange, C., Tsuang, M., Doyle, A., Smoller, J., Laird, N., & Biederman, J. (2007). A study of how socioeconomic status moderates the relationship between SNPs encompassing BDNF and ADHD symptom counts in ADHD families. *Behavior Genetics, 37*(3), 487-497.

Lebowitz, M. S., Rosenthal, J. E., & Ahn, W. (2016). Effects of biological versus psychosocial explanations on stigmatization of children with ADHD. *Journal of Attention Disorders, 20*(3), 240-250.

Lee, J. K., & Kronrod, A. (2020). The Strength of Weak-Tie Consensus Language. *Journal of Marketing Research (JMR), 57*(2), 353–374.

Lesesne, C. A., Visser, S. N., & White, C. P. (2003). Attention-deficit/hyperactivity disorder in school-aged children: Association with maternal mental health and use of health care resources. *Pediatrics, 111*(5), 123-127.

Levine, E. S., & Anshel, D. J. (2011). "Nothing works!" A case study using cognitive-behavioral interventions to engage parents, educators, and children in the management of attention-deficit/hyperactivity disorder. *Psychology in the Schools*, *48*(3), 297-306.

Liang, L., & Gao, X. (2016). Pre-service and in-service secondary school teachers' knowledge about attention-deficit hyperactivity disorder (ADHD) and attitudes toward students with ADHD. *International Journal of Disability, Development & Education, 63*(3), 369-383.

Linnet, K. M., Dalsgaard, S., Obel, C., Wisborg, K., Henriksen, T. B., Rodriguez, A., Kotimaa, A., Moilanen, I., Thomsen, P. H., Olsen, J., & Jarvelin, M. R. (2003). Maternal lifestyle factors in pregnancy risk of attention deficit hyperactivity disorder and associated behaviors: Review of the current evidence. *The American Journal of Psychiatry, 160*(6), 1028-1040.

Livingstone, L. T., Coventry, W. L., Corley, R. P., Willcutt, E. G., Samuelsson, S., Olson, R. K., & Byrne, B. (2016). Does the environment have an enduring effect on ADHD? A longitudinal study of monozygotic twin differences in children. *Journal of Abnormal Child Psychology, 44*(8), 1487–1501.

Loe, I. M., & Feldman, H. M. (2007). Academic and educational outcomes of children with ADHD. *Journal of Pediatric Psychology, 32*(6), 643-654.

Luo, Y., Weibman, D., Halperin, J., & Li, X. (2019). A review of heterogeneity in attention deficit/hyperactivity disorder (ADHD). *Frontiers in Human Neuroscience, 13*(42), 1-12.

MacGregor, C. J. & Fellabaum, J. (2016). Dissertation redesign for scholarly practitioners in educational leadership: Increasing impact through dissemination-ready sections. In V.A. Storey & K. A. Hesbol (Eds.), *Contemporary approaches to dissertation development and research methods* (pp. 53-69). IGI Global.

Macphee, F. L., Merrill, B. M., Altszuler, A. R., Ramos, M. C., Gnagy, E. M., Greiner, A. R., Coxe, S., Raiker, J. S., Coles, E., Burger, L., & Pelham, W. E. (2019). The effect of weighted vests and stability balls with and without psychostimulant medication on classroom outcomes for children with ADHD, *School Psychology Review, 48*(3), 276-289.

Malekpour, M., Aghababaei, S., & Hadi, S. (2014). Effectiveness of family, child, and family-child based intervention on ADHD symptoms of students with disabilities. *International Journal of Special Education, 29*(2), 29-34.

Malin, A. J., & Till, C. (2015). Exposure to fluoridated water and attention deficit hyperactivity disorder prevalence among children and adolescents in the United States: An ecological association. *Environmental Health, 14*(17), 1-10.

Markel, C., & Wiener, J. (2014). Attribution processes in parent–adolescent conflict in families of adolescents with and without ADHD. *Canadian Journal of Behavioral Science, 46*(1), 40-48.

Markham, A. N., Buchanan, E. A., & the AoIR Ethics Working Committee. (2012). *Ethical decision-making and internet research: Recommendations from the AoIR ethics working committee*. Retrieved from: http://aoir.org/reports/ethics2.pdf

Martinussen, R., Tannock, R., & Chaban, P. (2011). Teachers' reported use of instructional and behavior management practices for students with behavior problems: Relationship to role and level of training in ADHD. *Child & Youth Care Forum, 40*(3), 193-210.

Marton, I., Wiener, J., Rogers, M., Moore, C., & Tannock, R. (2009). Empathy and social perspective taking in children with attention-deficit/hyperactivity disorder. *Journal of Abnormal Child Psychology, 37*, 107-118.

Mautone, J., Lefler, E., & Power, T. (2011). Promoting family and school success for children with ADHD: Strengthening relationships while building skills. *Theory into Practice, 50*(1), 43-51.

Mayer, M., & Phillips, V. L. (2012). *Primary sources 2012: America's teachers on the teaching profession.* Bill & Melinda Gates Foundation/Scholastic.

McCarty, C., Vander Stoep, A., Violette, H., & Myers, K. (2015). Interventions developed for psychiatric and behavioral treatment in the children's ADHD telemental health treatment study. *Journal of Child & Family Studies*, *24*(6), 1735-1743.

McMenamy, J., Perrin, E., & Wiser, M. (2005). Age-related differences in how children with ADHD understand their condition: Biological or psychological causality? *Journal of Applied Developmental Psychology, 26*(2), 111-131.

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey Bass.

Mertens, D. M. (2020). Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods (5th ed.). Sage Publications.

Mikami, A. Y., Smit, S., & Johnston, C. (2019). Teacher attributions for children's attention deficit hyperactivity disorder behaviors predict experiences with children and with classroom behavioral management in a summer program practicum. *Psychology in the Schools, 56*(6), 928-944.

Milich, R. (1994). The response of children with ADHD to failure: If at first you don't succeed, do you try, try again? *School Psychology Review*, *23*, 11-18.

Miller, F., & Lee, D. (2013). Do functional behavioral assessments improve intervention effectiveness for students diagnosed with ADHD? A single-subject meta-analysis. *Journal of Behavioral Education*, *22*(3), 253-282.

Missouri CEC. (n.d.). Missouri CEC: Council for Exceptional Children. https://missouri.exceptionalchildren.org

Missouri Council of Administrators of Special Education. (n.d.). MO-CASE: Home Page. https://www.mo-case.org/

Missouri Department of Elementary and Secondary Education. (n.d.). *Nixa Public Schools (022089).* https://apps.dese.mo.gov/MCDS/Visualizations.aspx?id=22

Missouri Department of Elementary and Secondary Education. (n.d.). *State of Missouri: Special Education* Journal *of Behavioral Education*, *22*(3), 253-282. https://apps.dese.mo.gov/MCDS/home.aspx?categoryid=5&view=2

Mitchell, J., & Read, J. (2012). Attention-deficit hyperactivity disorder, drug companies and the internet. *Clinical Child Psychology and Psychiatry, 17*(1), 121-139.

Moore, D. (2003). *The dependent gene: The fallacy of 'nature vs. nurture'*. Henry Holt and Company.

Moore, D. A., Richardson, M., Gwernan-Jones, R., Thompson-Coon, J., Stein, K., Rogers, M., Garside, R., Logan, S., & Ford, T. J. (2019). Non-pharmacological interventions for ADHD in school settings: An overarching synthesis of systematic reviews. *Journal of Attention Disorders, 23*(3), 220-233.

Moore, D. A., Russell, A. E., Arnell, S., & Ford, T. J. (2017). Educators' experiences of managing students with ADHD: A qualitative study. *Child: Care, Health & Development, 43*(4), 489-498.

Moreno, G., Wong-Lo, M., & Bullock, L. (2014). Assisting students from diverse backgrounds with challenging behaviors: Incorporating a culturally attuned functional behavioral assessment in prereferral services. *Preventing School Failure, 58*(1), 58-68.

Mrug, S., Hoza, B., Gerdes, A. C. (2001). Children with attention-deficit/hyperactivity disorder: Peer relationships and peer-oriented interventions. *New Directions in Child and Adolescent Development, 91,* 51-77.

Mrug, S., Hoza, B., Pelham, W. E., Gnagy, E. M., & Greiner, A. R. (2007). Behavior and peer status in children with ADHD: Continuity and change. *Journal of Attention Disorders*, *10,* 359-371.

Mrug, S., Molina, B. S. G., Hoza, B., Gerdes, A. C., Hinshaw, S. P., Hechtman, L., & Arnold, L. E. (2012). Peer rejection and friendships in children with attention-deficit/hyperactivity disorder: Contributions to long-term outcomes. *Abnormal Child Psychology, 40*(6), 1013-1026.

Mulholland, S. (2016). ADHD-specific knowledge and attitudes of teachers (ASKAT): Development and validation of a new research instrument. *International Journal of Educational Research, 77*, 109-116.

Murphy, K. R., Barkley, R. A., Bush, T. M. A., (2002). Young adults with attention deficit hyperactivity disorder: Subtype differences in comorbidity, educational, and clinical history. *The Journal of Nervous and Mental Disease, 190*(3), 147-157.

Na, J. J., & Mikami, A. Y. (2018). Pre-existing perceptions of ADHD predict children's sociometrics given to classmates with ADHD. *Journal of Child & Family Studies, 27*(10), 3218-3231.

Nixa Public Schools. (n.d.). Nixa Public Schools: About Us. http://nixapublicschools.net/domain/300

Noda, S., Shirotsuki, K., & Nakao, M. (2019). The effectiveness of intervention with board games: A systematic review. *BioPsychoSocial Medicine, 13*, 22.

Norouzi, E., Hossieni, F., & Solymani, M. (2018). Effects of neurofeedback training on performing bimanual coordination in-phase and anti-phase patterns in children with ADHD. *Applied Psychophysiology & Biofeedback, 43*(4), 283-292.

Northouse, P.G. (2019). *Leadership: Theory and practice* (8th ed.). Sage.

O'Leary, Z. (2005). Researching real-word problems: A guide to methods of inquiry. Sage.

Oakes, W. P., Schellman, L. E., Lane, K. L., Common, E. A., Powers, L., Diebold, T., & Gaskill, T. (2018). Improving educators' knowledge, confidence, and usefulness of functional assessment-based interventions: Outcomes of professional learning. *Education & Treatment of Children, 41*(4), 533-565.

Onwuegbuzie, A. J., Jiao, Q. G., & Bostick, S. L. (2004). *Library anxiety: Theory, research, and applications.* Scarecrow Press.

Østergaard, S. D., Larsen, J. T., Dalsgaard, S., Wilens, T. E., Mortensen, P. B., Agerbo, E., Mors, O., & Petersen, L. (2016). Predicting ADHD by assessment of Rutter's indicators of adversity in infancy. *The Public Library of Science One, 11*(6), 1-15.

Ou, Q. (2017). A brief introduction to perception. *Studies in Literature and Language, 15*(4), 18-28.

Page, T. F., Pelham III, W. E., Fabiano, G. A., Greiner, A. R., Gnagy, E. M., Hart, K. C., Coxe, S., Waxmonsky, J. G., Foster, E. M., & Pelham, W. E. (2016). Comparative cost analysis of sequential, adaptive, behavioral, pharmacological, and combined treatments for childhood ADHD. *Journal of Clinical Child & Adolescent Psychology*, *45*(4), 416-427.

Patton. M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Sage Publications.

Pelham, W. E., Jr, Fabiano, G. A., Waxmonsky, J. G., Greiner, A. R., Gnagy, E. M., Pelham, W. E., 3rd, Coxe, S., Verley, J., Bhatia, I., Hart, K., Karch, K., Konijnendijk, E., Tresco, K., Nahum-Shani, I., & Murphy, S. A. (2016). Treatment sequencing for childhood ADHD: A multiple-randomization study of adaptive medication and behavioral interventions. *Journal of Clinical Child & Adolescent Psychology, 45*(4), 396-415.

Pelsser, L. M., Frankena, K., Toorman, J., & Rodrigues Pereira, R. (2017). Diet and ADHD, reviewing the evidence: A systematic review of meta-analyses of double-blind placebo-controlled trials evaluating the efficacy of diet interventions on the behavior of children with ADHD. *The Public Library of Science One, 12*(1), e0169277.

Perception. (2003). In *Merriam-Webster's dictionary* (11th ed.). Merriam-Webster.

Pfiffner, L. J. (2011). *All about ADHD: The complete practical guide for classroom teachers* (2nd ed.). Scholastic.

Pfiffner, L. J., Villodas, M., Kaiser, N., Rooney, M., & McBurnett, K. (2021). Educational outcomes of a collaborative school-home behavioral intervention for ADHD. *School Psychology Quarterly, 28*(1), 25-36.

Plomin, R., Reiss, D., Hetherington, E. M., & Howe, G. W. (1994). Nature and nurture: Genetic contributions to measures of the family environment. *Developmental Psychology, 30*(1), 32-43.

Pluess, M. (2017). Vantage sensitivity: Environmental sensitivity to positive experiences as a function of genetic differences. *Journal of Personality, 85*(1), 38-50.

Polańska, K., Jurewicz, J., & Hanke, W. (2012). Exposure to environmental and lifestyle factors and attention-deficit/hyperactivity disorder in children: A review of epidemiological studies. *International Journal of Occupational Medicine & Environmental Health, 25*(4), 330-355.

Power, T. J., Clarke, A. T., Mautone, J. A., Softer, S. L., Marshall, S. A., Sharman, J., Blum, N. J., Glanzman, M., Elia, J., & Jawad, A. F. (2012). A family-school intervention for children with ADHD: Results of a randomized clinical trial. *Journal of Consulting & Clinical Psychology*, *80*(4), 611-623.

Pozzi-Monzo, M. (2012). Ritalin for whom? Revisited: Further thinking on ADHD. *Journal of Child Psychotherapy, 38*(1), 49-60.

Psychosocial intervention: Definition & examples. (2017). Retrieved from https://study.com/academy/lesson/psychosocial-intervention-definition-examples.html

Purdie, N., Hattie, J., & Carroll, A. (2002). A review of the research on interventions for attention deficit hyperactivity disorder: What works best? *Review of Educational Research, 72*(1), 61-99.

Putman, S. M., & Rock, T. (2018). *Action research: Using strategic inquiry to improve teaching and learning.* Sage Publications.

Quinn, M., & Lynch, A. (2016). Is ADHD a "real" disorder? *Support for Learning, 31*(1), 59-70.

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.

Rapoport, J. L., & Inoff-Germain, G. (2002). Responses to methylphenidate in attention-deficit/hyperactivity disorder and normal children: Update 2002. *Journal of Attention Disorders, 6*(Suppl 1), S57-S60.

Rinn, A., & Nelson, J. (2009). Preservice teachers' perceptions of behaviors characteristic of ADHD and giftedness. *Roeper Review, 31*(1), 18-26.

Robinson, G. E. (2004). Beyond nature and nurture. *Science, 304*(5669), 397-399.

Rock, I. (1985). Perception and knowledge. *Acta Psychologica, 59*(1), 3-22.

Rodríguez, C., García, T., Areces, D., Fernández, E., García-Noriega, M., & Domingo, J. C. (2019). Supplementation with high-content docosahexaenoic acid triglyceride in attention-deficit hyperactivity disorder: A randomized double-blind placebo-controlled trial. *Neuropsychiatric Disease and Treatment, 15,* 1193-1209.

Roskam, I., Stievenart, M., Tessier, R., Muntean, A., Escobar, M. J., Santelices, M. P., Juffer, F., Van Ijzendoorn, M. H., & Pierrehumbert, B. (2014). Another way of thinking about ADHD: The predictive role of early attachment deprivation in adolescents' level of symptoms. *Social Psychiatry and Psychiatric Epidemiology, 49*(1), 133-144.

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, 59*(3), 213-222.

Rucklidge J. J., & Kaplan B. J. (2000). Attributions and perceptions of childhood in women with ADHD symptomatology. Attention-deficit/hyperactivity disorder. *Journal of Clinical Psychology, 56*(6), 711-722.

Rumrill, Jr., P. D. (2004). Non-manipulation quantitative designs. *Work, 22*(3), 255-260.

Russell, A. E., Ford, T., Williams, R., & Russell, G. (2016). The association between socioeconomic disadvantage and attention deficit/hyperactivity disorder (ADHD): A systematic review. *Child Psychiatry and Human Development, 47*(3), 440-458.

Russell, A. E., Tay, M., Ford, T., Russell, G., & Moore, D. (2019). Educational practitioners' perceptions of ADHD: A qualitative study of views of the home lives of children with ADHD in the UK. *British Journal of Special Education, 46*(1), 8-28.

Rylands, E. (2016). What makes a good resource? *Unique Classrooms.* https://www.uniqueclassrooms.com/blog/what-makes-a-good-resource

Saad, A., Hegde, S., Kechichian, T., Gamble, P., Rahman, M., Stutz, S. J., Anastasio, N. C., Alshehri, W., Lei, J., Mori, S., Kajs, B., Cunningham, K. A., Saade, G., Burd, I., & Costantine, M. (2016). Is there a causal relation between maternal acetaminophen administration and ADHD? *The Public Library of Science One, 11*(6), e0157380.

Sage Journals. (2021). Remedial and Special Education. https://journals.sagepub.com/home/rse

San Mauro Martín, I., Blumenfeld Olivares, J. A., Garicano Vilar, E., Echeverry López, M., García Bernat, M., Quevedo Santos, Y., Blanco López, M., Elortegui Pascual, P., Borregon Rivilla, E., & Rincón Barrado, M. (2018). Nutritional and environmental factors in attention-deficit hyperactivity disorder (ADHD): A cross-sectional study. *Nutritional Neuroscience, 21*(9), 641-647.

Sarris, J., Kean, J., Schweitzer, I., & Lake, J. (2011). Complementary medicines (herbal and nutritional products) in the treatment of attention deficit hyperactivity disorder (ADHD): A systematic review of the evidence. *Complementary Therapies in Medicine, 19*(4), 216-227.

Sayal, K., Hornsey, H., Warren, S., MacDiarmid, F., & Taylor, E. (2006). Identification of children at risk of attention deficit/hyperactivity disorder: A school-based intervention. *Social Psychiatry & Psychiatric Epidemiology, 41*(10), 806-813.

Scheffler, R. M., Hinshaw, S. P., Modrek, S., & Levine, P. (2007). The global market for ADHD medications. *Health Affairs (Project Hope), 26*(2), 450-457.

Schullehner, J., Thygesen, M., Kristiansen, S. M., Hansen, B., Pedersen, C. B., & Dalsgaard, S. (2020). Exposure to manganese in drinking water during childhood and association with attention-deficit hyperactivity disorder: A nationwide cohort study. *Environmental Health Perspectives, 128*(9), 097004-1-097004-10.

Schwartz, A. N., Reyes, L. M., Meschke, L. L., & Kintziger, K. W. (2021). Prenatal opioid exposure and ADHD childhood symptoms: A meta-analysis. *Children (Basel, Switzerland), 8*(2), 106.

Seidman, I. (2019). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (5th ed.). Teachers College Press.

Semrud-Clikeman, M., Walkowiak, J., Wilkinson, A., & Minne, E. P. (2010). Direct and indirect measures of social perception, behavior, and emotional functioning in children with Asperger's disorder, nonverbal learning disability, or ADHD. *Journal of Abnormal Child Psychology, 38*(4), 509-519.

Shah, R., Sharma, A., Chauhan, N., Jhanda, S. & Grover, S. (2018). Understanding parental causal explanations and help seeking in attention-deficit/hyperactivity disorder: Perspectives from a developing Asian nation. *Asian Journal of Psychiatry, 41*, 54-589.

Shanteau, J., & Nagy, G. F. (1984). Information integration in person perception: Theory and application. In M. Cook (Ed.), *Person perception (psychology in progress)* (pp. 48-86). Routledge.

Sheppard, M. K. (2015). From fidgeters, footerers and flibbertigibbets to the medicalization of childhood behavior: Off-label drug treatment of ADHD and the protection of the child's best interests. *International Journal of Children's Rights, 23*(3), 548-568.

Sherman, M. (2015). The cultural production of a pharmaceutical market: The making of ADHD. *International Journal of Communication, 9,* 2182-2201.

Sibley, M. H., Olson, S., Morley, C., Campez, M., & Pelham, W. E. (2016). A school consultation intervention for adolescents with ADHD: Barriers and implementation strategies. *Child & Adolescent Mental Health*, *21*(4), 183-191.

Simonsen, B., Fairbanks, S., Briesch, A., Myers, D., & Sugai, G. (2008). Evidence-based practices in classroom management: Considerations for research to practice. *Education and Treatment of Children*, *31,* 351-380.

Singh, I. (2004). Doing their jobs: Mothering with Ritalin in a culture of mother-blame. *Social Science & Medicine, 59*(6), 1193-1205.

Snider, V. E., Busch, T., & Arrowood, L. (2003). Teacher knowledge of stimulant medication and ADHD. *Remedial & Special Education, 24*(1), 46.

Sonuga-Barke, E. J., Brandeis, D., Cortese, S., Daley, D., Ferrin, M., Holtmann, M., Stevenson, J., Danckaerts, M., van der Oord, S., Döpfner, M., Dittmann, R. W., Simonoff, E., Zuddas, A., Banaschewski, T., Buitelaar, J., Coghill, D., Hollis, C., Konofal, E., Lecendreux, M., Wong, I. C., … European ADHD Guidelines Group (2013). Nonpharmacological interventions for ADHD: Systematic review and meta-analyses of randomized controlled trials of dietary and psychological treatments. *The American Journal of Psychiatry, 170*(3), 275-289.

Soroa, M., Gorostiaga, A., & Balluerka, N. (2013). Review of tools used for assessing teachers' level of knowledge with regards attention deficit hyperactivity disorder (ADHD). In S. Banerjee (Ed.), *Attention deficit hyperactivity disorder in children and adolescents* (pp. 151-177). IntechOpen.

Soroa, M., Gorostiaga, A., & Balluerka, N. (2016). Teachers' knowledge of ADHD: Relevance of training and individual perceptions. *Journal of Psychodidactics 21*(2), 205-226.

Stahr, B., Cushing, D., Lane, K., & Fox, J. (2006). Efficacy of a function-based intervention in decreasing off-task behavior exhibited by a student with ADHD. *Journal of Positive Behavior Interventions, 8*(4), 201-211.

Stevens, A. E., Canu, W., Lefler, E., & Hartung, C. (2019). Maternal parenting style and internalizing and ADHD symptoms in college students. *Journal of Child and Family Studies, 28,* 260-272.

Stormont, M. (2001). Social outcomes of children with AD/HD: Contributing factors and implications for practice. *Psychology in the Schools, 38*(6), 521-531.

Swank, J. M., & Smith-Adcock, S. (2018). On-task behavior of children with attention-deficit/hyperactivity disorder: Examining treatment effectiveness of play therapy interventions. *International Journal of Play Therapy, 27*(4), 187-197.

Tang, S. (1998). Students with learning difficulties in China. In D. W. Chan (Ed.), *Helping students with learning difficulties* (pp. 101-106). Chinese University Press.

Tarver, J., Daley, D., & Sayal, K. (2014). Attention-deficit hyperactivity disorder (ADHD): An updated review of the essential facts. *Child: Care, Health & Development, 40*(6), 762-774.

Tatlow-Golden, M., Prihodova, L., Gavin, B., Cullen, W., & McNicholas, F. (2016). What do general practitioners know about ADHD? Attitudes and knowledge among first-contact gatekeepers: Systematic narrative review. *BMC Family Practice*, *17,* 1-15.

Taylor, L. E., & Antshel, K. M. (2021). Factors associated with parental treatment attitudes and information-seeking behaviors for childhood ADHD. *Journal of Attention Disorders, 25*(4), 607-617.

Thapar, A., Cooper, M., Eyre, O., & Langley, K. (2013). Practitioner review: What have we learnt about the causes of ADHD? *Journal of Child Psychology & Psychiatry, 54*(1), 3-16.

Thapar, A., Cooper, M., Jefferies, R., & Stergiakouli, E. (2012). What causes attention deficit hyperactivity disorder? *Archives of Disease in Childhood*, *97*(3), 260-265.

Thyagarajan, R. (2016). A case study using cognitive-behavioral therapy-management of ADHD. *Indian Journal of Health & Wellbeing, 7*(5), 471-477.

Traynor, B. J., & Singleton, A. B. (2010). Nature versus nurture: Death of a dogma, and the road ahead. *Neuron, 68*(2), 196-200.

Tresco, K. E., Lefler, E. K., & Power, T. J. (2010). Psychosocial interventions to improve the school performance of students with attention-deficit/hyperactivity disorder. *Mind & Brain: The Journal of Psychiatry, 1*(2), 69-74.

Trout, A. L., Ortiz Lienemann, T., Reid, R., & Epstein, M. H. (2007). A review of non-medication interventions to improve the academic performance of children and youth with ADHD. *Remedial and Special Education, 28*(4), 207-226.

Turkheimer, E., & Waldron, M. (2000). Nonshared environment: A theoretical, methodological, and quantitative review. *Psychological Bulletin, 126*(1), 78-108.

Tyson, K. (2000). Using the teacher-student relationship to help children diagnosed as hyperactive: An application of intrapsychic humanism. *Child & Youth Care Forum, 29*(4), 265-289.

Uekermann, J., Kraemer, M., Abdel-Hamid, M., Schimmelmann, B. G., Hebebrand, J., Daum, I., Wiltfanga, J., & Kisa, B. (2010). Social cognition in attention-deficit hyperactivity disorder (ADHD). *Neuroscience and Biobehavioral Reviews, 35*(5), 734-743.

Varma, A., & Wiener, J. (2020). Perceptions of ADHD symptoms in adolescents with attention-deficit/hyperactivity disorder: Attributions and stigma. *Canadian Journal of School Psychology, 35*(4), 252-265.

Vereb, R. L., & DiPerna, J. C. (2004). Teachers' knowledge of ADHD, treatments for ADHD, and treatment acceptability: An initial investigation. *School Psychology Review, 33*(3), 421-428.

Volpe, R. J., DuPaul, G. J., Loney, J., & Salisbury, H. (1999). Alternative selection criteria for identifying children with ADHD: Observed behavior and self-reported internalizing symptoms. *Journal of Emotional and Behavioral Disorders, 7*(2), 103-109.

Wagner-Schuman, M., Richardson, J. R., Auinger, P., Braun, J. M., Lanphear, B. P., Epstein, J. N., Yolton, K., & Froehlich, T. E. (2015). Association of pyrethroid pesticide exposure with attention-deficit/hyperactivity disorder in a nationally representative sample of U.S. children. *Environmental Health, 14*, 44, 1-9.

Walker, S. O., & Plomin, R. (2005). The nature–nurture question: Teachers' perceptions of how genes and the environment influence educationally relevant behavior. *Educational Psychology, 25*(5), 509-516.

Walton, J. R., Mautone, J. A., Nissley-Tsiopinis, J., Blum, N. J., & Power, T. J. (2014). Correlates of treatment engagement in an ADHD primary care-based intervention for urban families. *The Journal of Behavioral Health Services & Research, 41*(4), 539-547.

West, J., Taylor, M., Houghton, S., & Hudyma, S. (2005). A comparison of teachers' and parents' knowledge and beliefs about attention-deficit hyperactivity disorder. *School Psychology International, 26,* 192-208.

Weyandt, L. L., Fulton, K. M., Schepman, S. B., Verdi, G. R., & Wilson, K. G. (2009). Assessment of teacher and school psychologist knowledge of attention-deficit/hyperactivity disorder. *Psychology in the Schools, 46*(10), 951-961.

Wickstrom, K. F., Jones, K. M., LaFleur, L. H., & Witt, J. C. (1998). An analysis of treatment integrity in school-based behavioral consultation. *School Psychology Quarterly, 13*, 141-154.

Wiener, J., & Daniels, L. (2016). School experiences of adolescents with attention-deficit/hyperactivity disorder. *Journal of Learning Disabilities, 49*(6), 567-581.

Wolraich, M. L., Hagan, J. F., Allan, C., Chan, E., Davison, D., Earls, M., Evans, S. W., Flinn, S. K., Froehlich, T., Frost, J., Holbrook, J. R., Lehmann, C. U., Lessin, H. R., Okechukwu, K., Pierce, K. L., Winner, J. D., Zurhellen, W.; Subcommittee on Children and Adolescents with Attention-Deficit/Hyperactive Disorder. (2019). Clinical practice guideline for the diagnosis, evaluation, and treatment of attention-deficit/hyperactivity disorder in children and adolescents. *Pediatrics, 144(*4): e20192528.

Wood, J. C., Heiskell, K. D., Delay, D. M., Jongeling, J. A. S., & Perry, D. (2009). Teachers' preferences for interventions for ethnically diverse learners with attention-deficit hyperactivity disorder. *Adolescence, 44*(174), 273-288.

Young, S., Adamo, N., Ásgeirsdóttir, B. B., Branney, P., Beckett, M., Colley, W., Cubbin, S., Deeley, Q., Farrag, E., Gudjonsson, G., Hill, P., Hollingdale, J., Kilic, O., Lloyd, T., Mason, P., Paliokosta, E., Perecherla, S., Sedgwick, J., Skirrow, C., & Tierney, K. (2020). Females with ADHD: An expert consensus statement taking a lifespan approach providing guidance for the identification and treatment of attention-deficit/ hyperactivity disorder in girls and women. *BMC Psychiatry, 20*(1), 1-27.

Zentall, S. S., & Javorsky, J. (2007). Professional development for teachers of students with ADHD and characteristics of ADHD. *Behavioral Disorders, 32*(2), 78-93.

Zettelmeyer, F. & Bolling, M. (2014). *Big data doesn't make decisions, leaders do: The six steps to build organizational muscle in analytics.* Northwestern University, Kellogg School of Management.

Zijlema, W. L., de Kluizenaar, Y., van Kamp, I., & Hartman, C. A. (2021). Associations between road traffic noise exposure at home and school and ADHD in school-aged children: The TRAILS study. *European Child & Adolescent Psychiatry, 30*(1), 155-167.

Zoromski, A., Evans, S. W., Owens, J. S., Holdaway, A., & Royo Romero, A. S. (2020). Middle school teachers' perceptions of and use of classroom management strategies and associations with student behavior. *Journal of Emotional & Behavioral Disorders, 22,* 214-224.

APPENDICES

Appendix A: Survey

A Survey Designed to Study: Teacher Perception of ADHD Causality & Agreement of Effectiveness and Use of Interventions

Please choose what level you currently teach:

Clear Form

○ Elementary ○ Intermediate ○ Junior High ○ High School

Please choose your level of teaching experience:

○ 1-3 years ○ 4-6 years ○ 7-10 years ○ 10+ years

Did you read the Informed Consent for this study, and in doing so, do you feel that you understand the information and wish to participate by completing this survey, understanding that participation is voluntary and you can withdraw (not complete) the survey if you choose to not participate?

○ Yes (Continue) ○ No (If no, turn in survey without completing further questions.)

Please affirm if you meet ALL of the following criteria:

1. I am employed by Nixa Public Schools.
2. I am a certified general education teacher (not special education).
3. I have at least one full year of teaching experience, prior to the current year.
4. I am currently teaching in a general education classroom setting.
5. I have at least one student with behaviors consistent with a diagnosis of ADHD (academic struggles or behavioral problems due to inattention, hyperactivity, and/or impulsivity - no official diagnosis needed).

○ Yes (Continue) ○ No (If no, turn in survey without completing further questions.)

Please indicate your level of agreement for the cause of each behavior:

BIOLOGY : (e.g., student has a neurological, biochemical, or anatomical abnormality, due to genetics, heredity, brain development, prenatal complications, a childhood stroke, a streptococcal infection, or a frontal lobe injury.)

ENVIRONMENT: (e.g., student impacted by poor home support, inconsistent discipline, incomplete authoritative relationships, anger, avoidance, limited relational satisfaction, low social class, severe marital discord, paternal criminality, maternal mental disorder, placement in out-of-home care, toxin exposure, or trauma.)

Please mark a level of agreement for BOTH categories
Please indicate one score on right and one score on left for each question.

Biology is the Cause							Environment is the Cause					
Strongly Disagree	Disagree	Partially Disagree	Partially Agree	Agree	Strongly Agree		Strongly Disagree	Disagree	Partially Disagree	Partially Agree	Agree	Strongly Agree
○	○	○	○	○	○	Fails to give close attention to details or makes careless mistakes in schoolwork, at or during other activities (e.g., overlooks details, work is inaccurate).	○	○	○	○	○	○
○	○	○	○	○	○	Has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading).	○	○	○	○	○	○
○	○	○	○	○	○	Does not seem to listen when spoken to directly (e.g., mind seems elsewhere, even in the absence of any obvious distraction).	○	○	○	○	○	○
○	○	○	○	○	○	Does not follow through on instructions and fails to finish schoolwork or chores, (e.g., starts tasks but quickly loses focus and is easily sidetracked).	○	○	○	○	○	○
○	○	○	○	○	○	Has difficulty organizing tasks and activities (e.g., difficulty managing tasks; difficulty keeping materials in order; messy, disorganized work; poor time management.)	○	○	○	○	○	○
○	○	○	○	○	○	Avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework).	○	○	○	○	○	○
○	○	○	○	○	○	Loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).	○	○	○	○	○	○
○	○	○	○	○	○	Easily distracted by extraneous stimuli (may include unrelated thoughts).	○	○	○	○	○	○
○	○	○	○	○	○	Forgetful in daily activities (e.g., doing chores, running errands).	○	○	○	○	○	○
○	○	○	○	○	○	Fidgets with or taps hands or feet or squirms in seat.	○	○	○	○	○	○
○	○	○	○	○	○	Leaves seat in situations when remaining seated is expected (e.g., leaves his or her place in the classroom or in other situations that require remaining in place).	○	○	○	○	○	○
○	○	○	○	○	○	Runs about or climbs in situations where it is inappropriate. (Note: Adolescents may be limited to feeling restless).	○	○	○	○	○	○
○	○	○	○	○	○	Unable to play or take part in leisure activities quietly.	○	○	○	○	○	○
○	○	○	○	○	○	Often "on the go" acting as if "driven by a motor" (e.g.,uncomfortable being still for extended time; may be viewed by others as being restless or difficult to keep up with).	○	○	○	○	○	○
○	○	○	○	○	○	Talks excessively.	○	○	○	○	○	○
○	○	○	○	○	○	Blurts out an answer before a question has been completed (e.g., completes people's sentences; cannot wait for turn in conversation).	○	○	○	○	○	○
○	○	○	○	○	○	Has trouble waiting his/her turn (e.g., while waiting in line).	○	○	○	○	○	○
○	○	○	○	○	○	Interrupts or intrudes on others (e.g., butts into conversations, games, or activities; may start using other people's things without asking).	○	○	○	○	○	○

Effectiveness of Biomedical and Parent-Provided Interventions

Please indicate your level of agreement that the following interventions are effective for treating students with behaviors consistent with a diagnosis of ADHD:	Strongly Disagree	Disagree	Partially Disagree	Partially Agree	Agree	Strongly Agree
Giving the child micronutrient supplements: (Zinc, Iron, Magnesium, Vitamin B, Vitamin D, & Omega-3 Fatty Acids).	○	○	○	○	○	○
Giving the child methylphenidate-based stimulants: (Adhansia XR, Aptensio XR, Concerta, Cotempla XR-ODT, Daytrana patch, Desoxyn, Jornay PM, Methadate, Methylin, Quillichew, Quillivant, Ritalin, Dexedrine, Spansule, Focalin, & Mydayis).	○	○	○	○	○	○
Giving the child herbal supplements: (French Maritime Pine Bark; Ginkgo Biloba; St. John's Wort; Caffeine; Ginseng; Valerian; Ningdong; Bacopa; & Passion Flower).	○	○	○	○	○	○
Give child amphetamine-based stimulants: (Adderall, Adzenys, Dyanavel, Evekeo, Procentra, Zenzedi, Vyvanse).	○	○	○	○	○	○
Increasing the child's time spent outdoors.	○	○	○	○	○	○
Giving the child alpha adrenergic agents: (Intuniv & Kapvay).	○	○	○	○	○	○
Increasing the child's protein intake.	○	○	○	○	○	○
Removing food dyes from the child's diet.	○	○	○	○	○	○
Removing food preservatives from child's diet.	○	○	○	○	○	○

Please indicate your level of agreement that the following interventions are effective for treating students with behaviors consistent with a diagnosis of ADHD:	Strongly Disagree	Disagree	Partially Disagree	Partially Agree	Agree	Strongly Agree
Having the child participate in therapy (neurofeedback, music therapy, play, or psychological).	○	○	○	○	○	○
Removing sodas from the child's diet.	○	○	○	○	○	○
Using the Few-Foods Diet for the child to find and eliminate food allergens.	○	○	○	○	○	○
Giving the child antidepressants: (Imipramine, Amitriptyline, Desipramine, Nortriptyline, Bupropion & Monoamine Oxidase).	○	○	○	○	○	○
Giving the child norepinephrine reuptake inhibitor: (Strattera).	○	○	○	○	○	○
Increasing the child's amount of daily exercise.	○	○	○	○	○	○
Teaching the child how to use mindfulness activities.	○	○	○	○	○	○
Improving the child's sleep schedule.	○	○	○	○	○	○
Removing extra sugar from the child's diet.	○	○	○	○	○	○
Limiting the child's time on electronics.	○	○	○	○	○	○

Use of School-Based Interventions

Please indicate how often you use the following interventions for students with behaviors consistent with a diagnosis of ADHD:	Never: 0%	Rarely: 10%	Occasionally: 30%	Sometimes: 50%	Frequently: 70%	Usually: 90%
Sit the student in an area with fewer distractions.	○	○	○	○	○	○
Chunk long projects into several pieces with clear deadlines for each chunk.	○	○	○	○	○	○
Support transitions by using transition buddies, stepped instructions, visual & verbal prompts.	○	○	○	○	○	○
Use a behavior chart or behavior contract.	○	○	○	○	○	○
Sit the student where they will be least disruptive if they move or fidget.	○	○	○	○	○	○
Assist the student in goal-setting for tests, assignments, & projects.	○	○	○	○	○	○
Teach the student how to self-monitor their own behavior.	○	○	○	○	○	○
Allow the student to move or fidget in a non-distracting, quiet way.	○	○	○	○	○	○
Use response-cost programs, such as a token economy.	○	○	○	○	○	○
Pre-teach necessary skills, such as vocabulary.	○	○	○	○	○	○
Allow the student to stand to do work.	○	○	○	○	○	○
Decrease assignment length.	○	○	○	○	○	○
Post and follow a basic classroom routines.	○	○	○	○	○	○
Use time-out or loss of privileges as a natural consequence.	○	○	○	○	○	○
Allow the student to have some type of seat that allows movement.	○	○	○	○	○	○
Allow the student a choice in how to show mastery of a concept.	○	○	○	○	○	○
Review behavior expectations often if changing working styles (group work to independent work).	○	○	○	○	○	○
Use focusing tools: guided notes, colored markers, mnemonics, & probing questions.	○	○	○	○	○	○
Sit the student next to a positive role model.	○	○	○	○	○	○
Use reinforcement strategies: purposeful, frequent praise; social reinforcement; contingent positive reinforcement.	○	○	○	○	○	○
Post a list of materials the student will need for each lesson.	○	○	○	○	○	○
Allow the student to take a test or do work in a quieter environment.	○	○	○	○	○	○
Use peer modeling.	○	○	○	○	○	○
Check student understanding by having them verbally summarize.	○	○	○	○	○	○
Help student to clearly connect new material to prior knowledge, such as previous lesson.	○	○	○	○	○	○
Use daily report cards or some other kind of school-to-home communication.	○	○	○	○	○	○
Allow the student to use headphones.	○	○	○	○	○	○
Give more time for tests, assignments, & projects.	○	○	○	○	○	○

Please indicate how often you use the following interventions for students with behaviors consistent with a diagnosis of ADHD:	Never: 0%	Rarely: 10%	Occasionally: 30%	Sometimes: 50%	Frequently: 70%	Usually: 90%
Use auditory cues as reminders for desired behaviors.	○	○	○	○	○	○
Refrain from using the removal of recess as a punishment.	○	○	○	○	○	○
Start lessons with a verbal & visual summary of what the students will be learning & doing.	○	○	○	○	○	○
Allow the student to use privacy boards.	○	○	○	○	○	○
Allow the student to use speech-to-text or text-to-speech.	○	○	○	○	○	○
Use appropriate command language (clear, specific, & manageable).	○	○	○	○	○	○
Schedule breaks that include purposeful movement.	○	○	○	○	○	○
Provide clear, written directions for all assignments.	○	○	○	○	○	○
Provide opportunities to be successful in front of peers.	○	○	○	○	○	○
Use when/then or if/then contingencies.	○	○	○	○	○	○
Post rules and discuss daily.	○	○	○	○	○	○
Limit repetitive assignments.	○	○	○	○	○	○
Tailor assignment to the student's level.	○	○	○	○	○	○
Take actions to promote student-teacher relationship.	○	○	○	○	○	○
Use a visual timer or alarm to help with time management.	○	○	○	○	○	○
Allow the student to use technology to complete work.	○	○	○	○	○	○
Present learning objectives in at least two ways (written, verbal, say-&-repeat, student notes).	○	○	○	○	○	○
Provide organization tools: colored folders, notebook w/ dividers, planner or a homework assignment book.	○	○	○	○	○	○
Use choice as a reward.	○	○	○	○	○	○
Provide specific instruction in social skills and sports and game rules.	○	○	○	○	○	○
Visually and verbally summarize key points at the end of the lesson.	○	○	○	○	○	○
Review take-home assignments and provide clear, written instructions.	○	○	○	○	○	○
Ignore minor misbehavior.	○	○	○	○	○	○
Provide opportunities for group or paired learning.	○	○	○	○	○	○
Engage the student in the learning process, vs. passive involvement to limit down-time.	○	○	○	○	○	○
Use visuals of acceptable talk time & level, such as a talking stick or traffic light.	○	○	○	○	○	○
Use peer tutoring.	○	○	○	○	○	○
Provide or refer the parent to training or support programs.	○	○	○	○	○	○

Appendix B: Informed Consent

College of Education
University of Missouri

Consent to Participate in a Research Study:

Project Title: ADHD: Paying Attention to the Impact of Teacher Perceptions
Principal Researcher: Corbyn Bartels, Dr. Dr. Cynthia J. Macgregor, Advisor
IRB Reference Number: *insert IRB number*

Introduction
You are being invited to take part in a research project. You must be 18 years of age or older. Your participation is voluntary, and you may stop being in this study at any time.

The purpose of this research project is to find out if there is a relationship between a teacher's perception of ADHD causality and their choice of, or support for, interventions.

You are being asked to complete a one-time survey. The information you provide through the survey will be kept confidential and only the research team will have access to it. Your participation should last 15-20 minutes. For your time and effort, you will be given the option to be entered into a drawing for a Starbuck's gift card. If you choose to enter the drawing, you will need to provide an email, which may make your participation no longer confidential.

If you have questions about this study, you can contact the University of Missouri researcher at 417-866-9332 or corbynmariebartels@gmail.com.

If you have questions about your rights as a research participant, please contact the University of Missouri Institutional Review Board (IRB) at 573-882-3181 or muresearchirb@missouri.edu. The IRB is a group of people who review research studies to make sure the rights and welfare of participants are protected. If you want to talk privately about any concerns or issues related to your participation, you may contact the Research Participant Advocacy at 888-280-5002 or email muresearchrpa@missouri.edu. You can ask the researcher to provide you with a copy of this consent for your records, or you can save a copy of this consent if it has already been provided to you. We appreciate your consideration to participate in this study.

Participant Criteria
The parameters that the participants must meet are as follows: (a) employed by Nixa Public School District; (b) certified general education teacher (not special education); (c) have at least one year of teaching experience; (d) currently teaching in a general education classroom setting (not a special education classroom or intervention room); and (e) have students in their classroom that display behaviors consistent with a diagnosis of ADHD (academic struggles, behavioral problems, inattention, hyperactivity, and impulsivity) as based on the American Psychiatric Association's (2013) *Diagnostic and Statistical Manual of Mental Disorders,* DSM-5 diagnostic criteria. ***Students do not need to have an official ADHD diagnosis.***

18 Criteria of DSM-5

(1) Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or during other activities (e.g., overlooks or misses details, work is inaccurate)
(2) Often has difficulty sustaining attention in tasks or play activities (e.g., has difficulty remaining focused during lectures, conversations, or lengthy reading)
(3) Often does not seem to listen when spoken to directly (e.g., mind seems elsewhere, even in the absence of any obvious distraction)
(4) Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., starts tasks but quickly loses focus and is easily sidetracked)
(5) Often has difficulty organizing tasks and activities (e.g., difficulty managing sequential tasks; difficulty keeping materials and belongings in order; messy, disorganized work; has poor time management; fails to meet deadlines)
(6) Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (e.g., schoolwork or homework; for older adolescents and adults, preparing reports, completing forms, reviewing lengthy papers)
(7) Often loses things necessary for tasks or activities (e.g., school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones)
(8) Is often easily distracted by extraneous stimuli (for older adolescents and adults, may include unrelated thoughts)
(9) Is often forgetful in daily activities (e.g., doing chores, running errands; for older adolescents and adults, returning calls, paying bills, keeping appointments)
(10) Often fidgets with or taps hands or feet or squirms in seat
(11) Often leaves seat in situations when remaining seated is expected (e.g., leaves his or her place in the classroom, in the office or other workplace, or in other situations that require remaining in place)
(12) Often runs about or climbs in situations where it is inappropriate. (Note: In adolescents or adults, may be limited to feeling restless)
(13) Often unable to play or take part in leisure activities quietly
(14) Is often "on the go" acting as if "driven by a motor" (e.g., is unable to be or uncomfortable being still for extended time, as in restaurants, meetings; may be experienced by others as being restless or difficult to keep up with)
(15) Often talks excessively
(16) Often blurts out an answer before a question has been completed (e.g., completes people's sentences; cannot wait for a turn in conversation)
(17) Often has trouble waiting his/her turn (e.g., while waiting in line)
(18) Often interrupts or intrudes on others (e.g., butts into conversations, games, or activities; may start using other people's things without asking or receiving permission; for adolescents and adults, may intrude into or take over what others are doing)

What are the risks?

There are no known risks to you as a result of participating in this study. However, if you or someone you are close with have behaviors consistent with a diagnosis of ADHD, the questions may feel personal and may make you uncomfortable.

What are the benefits?

You may not benefit directly from this study. However, the information from this study will be shared with other educators who may choose to implement suggestions based on findings.

Appendix C: Citi Training

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM) COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Corbyn Bartels (ID: 6882310)
- **Institution Affiliation:** Missouri State University (ID: 750)
- **Institution Email:** corbyn2017@live.missouristate.edu
- **Institution Unit:** EAD
- **Phone:** 4178669332
- **Curriculum Group:** Human Research
- **Course Learner Group:** Social-Behavioral-Educational Researchers
- **Stage:** Stage 1 - Basic Course
- **Record ID:** 25821190
- **Completion Date:** 17-Jan-2018
- **Expiration Date:** 16-Jan-2021
- **Minimum Passing:** 80
- **Reported Score*:** 92

REQUIRED AND ELECTIVE MODULES ONLY DATE COMPLETED SCORE
History and Ethical Principles - SBE (ID: 490) 6-Jan-2018 4/5 (80%) Defining Research with Human Subjects - SBE (ID: 491) 16-Jan-2018 4/5 (80%) The Federal Regulations - SBE (ID: 502) 16-Jan-2018 5/5 (100%) Assessing Risk - SBE (ID: 503) 16-Jan-2018 5/5 (100%) Informed Consent - SBE (ID: 504) 17-Jan-2018 5/5 (100%) Privacy and Confidentiality - SBE (ID: 505) 17-Jan-2018 5/5 (100%) Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680) 17-Jan-2018 5/5 (100%) Students in Research (ID: 1321) 17-Jan-2018 4/5 (80%) Conflicts of Interest in Human Subjects Research (ID: 17464) 17-Jan-2018 4/5 (80%) Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928) 17-Jan-2018 5/5 (100%) Missouri State University (ID: 1169) 17-Jan-2018 No Quiz

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?ka91d1667-3c77-4f4f-aa73-d31e6b719a9f-25821190
Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929

Web: https://www.citiprogram.org
COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM) COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Corbyn Bartels (ID: 6882310)
- **Institution Affiliation:** Missouri State University (ID: 750)
- **Institution Email:** corbyn2017@live.missouristate.edu
- **Institution Unit:** EAD
- **Phone:** 4178669332
- **Curriculum Group:** Human Research
- **Course Learner Group:** Social-Behavioral-Educational Researchers
- **Stage:** Stage 1 - Basic Course
- **Record ID:** 25821190
- **Report Date:** 17-Jan-2018
- **Current Score**:** 92

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES MOST RECENT SCORE Students in Research (ID: 1321) 17-Jan-2018 4/5 (80%) History and Ethical Principles - SBE (ID: 490) 16-Jan-2018 4/5 (80%) Defining Research with Human Subjects - SBE (ID: 491) 16-Jan-2018 4/5 (80%) The Federal Regulations - SBE (ID: 502) 16-Jan-2018 5/5 (100%) Assessing Risk - SBE (ID: 503) 16-Jan-2018 5/5 (100%) Informed Consent - SBE (ID: 504) 17-Jan-2018 5/5 (100%) Privacy and Confidentiality - SBE (ID: 505) 17-Jan-2018 5/5 (100%) Unanticipated Problems and Reporting Requirements in Social and Behavioral Research (ID: 14928) 17-Jan-2018 5/5 (100%) Missouri State University (ID: 1169) 17-Jan-2018 No Quiz. Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680) 17-Jan-2018 5/5 (100%) Conflicts of Interest in Human Subjects Research (ID: 17464) 17-Jan-2018 4/5 (80%)

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?ka91d1667-3c77-4f4f-aa73-d31e6b719a9f-25821190
Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-529-5929
Web: https://www.citiprogram.org

Appendix D: IRB Approval Letter

Institutional Review Board
University of Missouri-Columbia
FWA Number: 00002876
IRB Registration Numbers: 00000731, 00009014

310 Jesse Hall
Columbia, MO 65211
573-882-3181
irb@missouri.edu

December 07, 2021

Principal Investigator: Corbyn Bartels (MU-Student)
Department: Educational Leadership-EDD

Your IRB Application to project entitled ADHD: SHOULD LEADERSHIP BE PAYING ATTENTION TO THE IMPACT OF TEACHER PERCEPTIONS? was reviewed and approved by the MU Institutional Review Board according to the terms and conditions described below:

IRB Project Number	2075482
IRB Review Number	346391
Initial Application Approval Date	December 07, 2021
IRB Expiration Date	December 07, 2022
Level of Review	Exempt
Project Status	Active - Exempt
Exempt Categories (Revised Common Rule)	45 CFR 46.104d(2)(ii)
Risk Level	Minimal Risk
HIPAA Category	No HIPAA
Approved Documents	Recruitment Outreach Phase One and Two Online Survey Informed Consent

The principal investigator (PI) is responsible for all aspects and conduct of this study. The PI must comply with the following conditions of the approval:

- No subjects may be involved in any study procedure prior to the IRB approval date or after the expiration date.
- All changes must be IRB approved prior to implementation utilizing the Exempt Amendment Form.
- Major noncompliance deviations must be reported to the MU IRB on the Event Report within 5 business days of the research team becoming aware of the deviation. Major deviations result when research activities may affected the research subject's rights, safety, and/or welfare, or may have had the potential to impact even if no actual harm occurred. Please refer to the MU IRB Noncompliance policy for additional details.
- The Annual Exempt Form must be submitted to the IRB for review and approval at least 30 days prior to the project expiration date to keep the study active or to close it.
- Maintain all research records for a period of seven years from the project completion date.

If you are offering subject payments and would like more information about research participant payments, please click here to view the MU Business Policy and Procedure: http://bppm.missouri.edu/chapter2/2_250.html

If you have any questions or concerns, please contact the MU IRB Office at 573-882-3181 or email to muresearchirb@missouri.edu.

Thank you,
MU Institutional Review Board

Appendix E: Request & Consent to Conduct Research

6/3/2021

Dr. Gearl Loden
Superintendent, Nixa Public School District
Faught Administration Center
301 S Main St, Nixa, MO 65714

RE: Permission to Conduct Research Study

Dear Dr. Loden,

I am writing to request permission to conduct a research study within the Nixa Public School District. I have worked for Nixa Public School District since 2014 and I am currently serving as the Process Coordinator for Espy and Inman. I am also currently enrolled in the MU Statewide Cooperative EdD Program in Educational Leadership through the University of Missouri-Columbia, and I am in the process of writing my dissertation.

The research study I would like to conduct is entitled: ADHD: PAYING ATTENTION TO THE IMPACT OF TEACHER PERCEPTIONS. The purpose of the study is to determine if there is a relationship between teachers' perceptions of ADHD causality and their choice of or support for interventions.

I would like to conduct the study during the 2021-2022 school year. If approval is granted, I would need the ability to have a survey emailed to all teachers of Nixa Public Schools. I would need an initial email and then two follow-up emails two weeks apart from the initial. The emails would have an explanation of the participant qualifications, which are: (a) employed by Nixa Public School District; (b) certified general education teacher (not special education); (c) have at least one year of teaching experience; (d) currently teaching in a general education classroom setting (not a special education classroom or intervention room; and (e) have students in their classroom that display behaviors consistent with a diagnosis of ADHD (academic struggles, behavioral problems, inattention, hyperactivity, and impulsivity) as based on the American Psychiatric Association's (2013) Diagnostic and Statistical Manual of Mental Disorders, DSM-5 diagnostic criteria. Attached to the email would be an Informed Consent, the DSM-5 Diagnostic Criteria, and the link to the Qualtrics survey. For the type of study I would like to do, the optimal participation number is 82.

No students or parents will be contacted for this study, unless the parent is also an employee of the district and gets invited through the emails. All identifying data of the participants will be confidential. The data will be used for the dissertation, along with creating a piece to submit for publishing consideration. Should this study be published, only pooled results will be documented, and the Nixa Public School District will not be

referenced. No costs will be incurred by either the school district or the individual participants.

Your approval to conduct this study would be greatly appreciated. If you have any questions or concerns, I would be happy to answer them. You may contact me at my personal cell number of 417-866-9332 or at corbynbartels@nixaschools.net. For your convenience, I have attached a letter that you can print, sign, date, and return. You do not have to use this letter if you prefer to write your own that acknowledges your consent and permission for me to conduct this study at Nixa Public Schools.

Sincerely,

Corbyn Bartels

MU Human Subjects Research Protections Program/IRB:
Office of Research
University of Missouri
Columbia, MO 65211

Subject: Study Approval Letter

To whom it may concern:

This letter acknowledges that Nixa Public School District has received and reviewed a request by Corbyn Bartels to conduct a research study entitled: ADHD: PAYING ATTENTION TO THE IMPACT OF TEACHER PERCEPTIONS within the Nixa Public School District during the 2021-2022 school year. I approve of this research to be conducted at our facility.

Once the researcher receives approval for her research project from the MU Human Subjects Research Protections Program/IRB, I agree to provide access for the approved research study. If we have any concerns or need additional information, we will contact the MU Human Subjects Research Protections Program/IRB at muresearchirb@missouri.edu or 573-882-3181.

Sincerely,

Dr. Gearl Loden
Superintendent, Nixa Public School District
417-724-6200
GearlLoden@nixaschools.net

Signature

6-14-2021

Date

Appendix F: *RASE* Author Guidelines

HAMMILL INSTITUTE ON DISABILITIES

Remedial and Special Education
Author Guidelines

Remedial and Special Education (RASE) is devoted to the discussion of issues involving the education of persons for whom typical instruction is not effective. Emphasis is on research, systematic reviews, and discussion papers that have compelling implications for the practice of remedial and special education. Published bimonthly.

Types of Manuscripts

Topics appropriate for the journal include, but are not limited to, definition, identification, assessment, characteristics, management, and instruction of underachieving and exceptional children, youth, and adults; related services; family involvement; service delivery systems; legislation; litigation; and professional standards and training. Manuscripts should have clear and explicit implications for educational policy or practice. The following types of articles are considered for publication:

- **Original research studies,** including experimental (group and single-subject methodologies), quasi-experimental, descriptive (e.g., observational studies, surveys), correlational, and qualitative designs. **Length:** 20–30 typed, double-spaced pages, including references, tables, figures, and an abstract.
- **Literature reviews,** including meta-analyses, best-evidence syntheses, and other systematic reviews of the literature. **Length:** 25–40 typewritten, double-spaced pages, including references, tables, figures, and an abstract
- **Conceptual, policy, or position papers. Length:** 20–30 typewritten, double-spaced pages, including references, tables, figures, and abstract.

Manuscript Page Counts: ***should include abstract, references, tables, and figures,*** and ***each table should start on a new page***.

Acceptance Criteria

Submitted manuscripts are screened for (a) appropriateness of content, (b) adherence to guidelines outlined in the APA *Publication Manual,* (c) page length limits (specified above), and (d) clear implications for special education policy and practice. If these criteria are met, the manuscript is assigned to an editor or associate editor. Each manuscript is reviewed by at least two evaluators with expertise related to the content and/or methodology of the manuscript. When reviews are returned, the editor assigned to the manuscript carefully considers reviewers' comments, independently evaluates the manuscript, and makes an editorial decision to: accept, accept pending revisions, request a revision subject to re-review, or reject. Our goal is to provide an initial decision within 90 days. Authors receive anonymous copies of reviewers' comments. Reviewers are informed of the final decision and are provided with blinded copies of all reviewers' comments. Major criteria for publication are quality of the writing, methodology, implications for practice/policy, and overall importance to the field. Manuscripts addressing topics already closely aligned with articles recently published (or forth-coming) in RASE will not be prioritized. All research studies must provide a clear indication that IRB approval was obtained and human participant protections enforced.

Manuscript Preparation

Manuscripts should be prepared according to the ***Publication Manual of the American Psychological Association*** **(7th ed., 2020).** Manuscripts should adhere to the following formatting guidelines:

1. **Title Page.** Submit a separate title page file with (a) article title; (b) names of all authors; (c) author affiliations, complete mailing address for contact author, e-mail addresses of all authors; and (d) any acknowledgments, financial disclosure information, author notes, or other text that could identify authors to reviewers.
2. **Format.** 8½ × 11 in. document; 1-in. margins; double-spacing, left alignment, Times New Roman, 12-pt. type for text. Include title & abstract. Text and table files must be Word text documents; no PDFs.
3. **Tables.** Each table should start on a new page. Tables should be double-spaced; please use Word's table functions.
4. **Endnotes.** Use endnotes sparingly. Number with Arabic numerals starting with 1 and continuing through the article. Example: (see Note 1). NO footnotes.

Authors for Whom English is a Second Language. It is highly recommended to have a colleague or copyeditor who is fluent in English review the manuscript before submission.

Figures. Figures should be separate files, with each figure on a new page or file. Figures must be **black and white only** and production-ready. Because most art will be reduced to fit, use bold type that is large enough to be reduced and still be readable, and make sure rules/tick marks are at least 1 pt. Acceptable electronic formats for art: TIFF, EPS, Word, or Excel. For scans/photos, download the SAGE **Image Resolution Guidelines** from the Instructions & Forms link at https://mc.manuscriptcentral.com/rase. If loading Excel files causes problems, copy/paste them into a Word document.

Permissions. It is the author's responsibility to obtain written permission for material (e.g., figures, tables, extensive quotes) taken directly or adapted from another source. Payment of any fees the copyright holder may require is also the author's responsibility. Permissions often take a considerable amount of time to be granted, so start the request process early. **Material taken from software or from the Internet also requires obtaining permission.** Download a *Permissions Request* form from the *Instructions & Forms* link at https://mc.manuscriptcentral.com/rase. Read permissions carefully to ensure the language is broad enough to allow publication in all formats, including electronic and print. Failure to obtain permission will result in removal of the item or the article.

Supplemental Material. Decisions regarding inclusion of supplemental material will be made by the editor as part of the article acceptance process. With the exception of videos and podcasts, supplemental files will be deposited to **Figshare** and assigned a DOI. Authors are responsible for the scientific accuracy and file functionality of all supplemental files; materials will not be copyedited, typeset, or proofread. Additional information and guidelines are available for download from the Instructions and Forms link (https://mc.manuscriptcentral.com/rase).

Manuscript Submission

Submit electronically: https://mc.manuscriptcentral.com/rase

Log in, or click the "Create an Account" option if you are a first-time user. Once logged in, click on "Author." Click the "Start New Submission" link in the left-hand box and follow the submission steps. A guide can be accessed on the main page via the Help section, *User Tutorials* link.

Co-Editors

Dr. Kathleen Lynne Lane
Co-Editor, Remedial and Special Education
University of Kansas
Dept. of Special Education
1122 West Campus Road
JRP Room 542
Lawrence, KS 66045
Kathleen.Lane@ku.edu

Dr. Karrie Shogren
Co-Editor, Remedial and Special Education
University of Kansas
Dept. of Special Education
1122 West Campus Road
JRP Room 522
Lawrence, KS 66045-3101
shogren@ku.edu

updated 11-19

VITA

Corbyn Bartels was born and raised in the Blue Mountains of Harrisburg, Pennsylvania. She graduated as Valedictorian of her high school in 1995, got married in 1997, and graduated in 1998 from Evangel University in Springfield, Missouri. She earned a Bachelor of Science degree in Elementary Education and Special Education, with concentrations in Learning Disabilities, Mental Retardation, and Behavioral Disorders. After working one year in Springfield Public Schools as a special education teacher, Corbyn and her husband returned to Pennsylvania where she taught for three more years as a regular education teacher prior to choosing to leave the workforce for seven years to raise her four children, who are currently all teenagers.

In 2008, Corbyn completed the requirements to become a licensed pastor with the Assemblies of God and returned to the workforce as the Outreach Pastor for River of God Church in Enola, Pennsylvania. In 2014, Corbyn earned a Master of Arts in Theology degree from Valley Forge University in Valley Forge, Pennsylvania. That same year Corbyn's family transitioned back to Missouri where Corbyn became employed as a high school, high-needs special education teacher with Nixa Public Schools.

In 2018, Corbyn earned her Master of Science in Education Administration degree from Missouri State University. In 2019, she was named the Nixa High School Teacher of Year, which was the same year she began the University of Missouri's Statewide Cooperative Doctor of Education Program. In 2020, Corbyn transitioned into her current position as a special education process coordinator. In 2021, Corbyn began the Missouri Pathway for Aspiring Leaders in Special Education (MoPAL) Program to earn a Special Education Director endorsement.