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# Preparing College Students with ADHD for Online Job Interviews: Self-Regulation & Psychophysiology

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# PREPARING COLLEGE STUDENTS WITH ADHD FOR ONLINE JOB INTERVIEWS: SELF-REGULATION & PSYCHOPHYSIOLOGY

by

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## ABSTRACT

This dissertation investigates the complex dynamics of digital communication, highlights the unique stressors it places on college students with attention-deficit/hyperactivity disorder (ADHD), and advocates for adopting interdisciplinary methods to enhance their participation in online communication environments. While online interviewing has become increasingly common in the employment domain, it poses unique difficulties for individuals with ADHD, who may struggle with self-regulation and communication skills. Due to the absence of physical presence, online interviews pose a significant challenge to individuals in perceiving and responding to the nuanced range of non-verbal cues, which can greatly impact the effectiveness of their communication. To advance this investigation, the dissertation presents three manuscripts examining the self-regulation behaviors of college students with ADHD during online job interviews. It also proposes strategic interventions to alleviate their challenges and actively participates in the discussion on empowering these individuals to navigate the digital communication realm successfully.

The first manuscript provides a comprehensive literature review of the current use of technology in higher education to prepare students with disabilities for online interviewing. The second manuscript presents a research study investigating self-regulation behaviors in students with ADHD during simulated online interviews using physiological measurements. The third manuscript focuses on how postsecondary educators can integrate self-regulation and aspects of neuroscience in their daily pedagogy.

Overall, the results from these chapters illustrate the specific challenges faced by students with ADHD in online interviews and emphasize the significance of self-regulation strategies. By

equipping students with effective self-regulation skills, postsecondary institutions can enhance their employment opportunities and overall success. These manuscripts contribute to a broader understanding of ADHD, self-regulation, and online interactions, informing future research and support strategies in the evolving context of virtual employment interviews.

Mommy and Daddy, words cannot adequately express the depth of gratitude and love I feel as I dedicate this dissertation to you. Your unwavering sacrifices have not gone unnoticed; they have served as my inspiration for perseverance, resilience, and dedication. I have found strength in the invaluable lessons you have taught me and the remarkable examples you have set. From you, I have learned to face challenges with grace, to remain steadfast in the pursuit of my goals, and always to remember the power of hard work and determination. This dissertation is not only a product of my own efforts but also a testament to the immeasurable love, guidance, and sacrifice you have generously bestowed upon me. It reflects your unwavering belief in my abilities and your unwavering commitment to my success.

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| | |
|---|---|
| ADHD | Attention-deficit/hyperactivity Disorder |
| AI | Artificial Intelligence |
| ALTs | Advanced Learning Technologies (ALTs) |
| ASD | Autism Spectrum Disorder |
| DEIB | Diversity, Equity, Inclusion, and Belonging |
| EF | Executive Function |
| IND | Intellectually Disabled |
| LBBI | Literacy-based Behavioral Intervention |
| MAIS | Marino Interview Assessment Scale |
| SAS | Student Accessibility Service |
| SRL | Self-Regulated Learning |
| ViTA | Virtual Interactive Training Agents |
| VIT-TAY | Virtual Interactive Training Agent for Youth |
| VR-JIT | Virtual Reality Job Interview Tool |

# CHAPTER ONE: INTRODUCTION

Online interviewing has become increasingly common for employers to screen and select job candidates. However, this shift toward virtual platforms has inadvertently widened the gap in employment opportunities for students with disabilities (Ranasinghe, 2022; Rockney et al., 2021). Despite this approach's efficiency and effectiveness, it presents distinctive challenges for many, particularly college students diagnosed with one of the fastest-growing diagnoses among this demographic (Barnett, 2019). Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder ADHD is associated with deficits in executive functions and attention, which contribute to impaired social performance, academic underachievement, and reduced quality of life (Lambek et al., 2011; Reynolds et al., 2019; Schwörer et al., 2020).

Online interviewing involves conducting remote interviews using virtual platforms or video conferencing tools such as Zoom, Microsoft Teams, or Skype Team (Akyirem et al., 2023). These formats offer advantages such as convenience and scalability by eliminating the need for physical proximity between the interviewer and the candidate. However, the virtual nature of online interviewing poses challenges for individuals with impaired social interactions, including difficulties with self-regulation skills (Orgad, 2005). Self-regulation skills are essential for effective communication and navigating during online communication (Feiler, 2014; Webb et al., 2018; Zimmerman, 2000). Individuals with ADHD, who already face disparities and challenges in the employment domain, may find it even more challenging to navigate and communicate effectively during online interviews. Addressing and mitigating these specific challenges is crucial to ensure equal access and opportunities for all candidates, regardless of their abilities or disabilities.

Postsecondary institutions are critical for equipping students with the knowledge and skills necessary for success in academic and professional settings. Explicit instruction of self-regulation skills is often overlooked in one area (Sanders et al., 2021; Zimmerman, 2013). These skills, essential for effective learning and personal development, are not explicitly taught in many postsecondary settings. This omission is particularly significant for students with disabilities, who tend to require explicit instruction and support in developing learning and communication strategies (Breslow, 2015). By explicitly equipping college students with ADHD self-regulation strategies to regulate their thoughts, emotions, and behaviors during high-stress social situations, such as online interviews, educators in postsecondary institutions can enhance the employment opportunities and overall success of students with disabilities, equipping them with the necessary tools to excel in the job interviewing process and ensure that the evolving job market remains accessible, equitable, and navigable for all prospective candidates, including those with ADHD.

The significance of this dissertation lies in its potential to fill the knowledge gap regarding the preparation of college students with ADHD for online interviews. While research has explored various aspects of ADHD and its impact on academic performance (Langberg & Becker, 2020), limited attention has been paid to understanding how self-regulation skills influence interviewee behavior during the job interview process, particularly in online interviews. As online interviewing continues to gain prominence, it is essential to identify effective strategies and interventions can empower students with ADHD to succeed.

This chapter explores self-regulation skills in students with ADHD during online interviews, identifying current knowledge and gaps in the existing literature. By investigating

self-regulation skills and psychophysiological measurements, we aim to enhance the preparation for virtual interviews with students with ADHD and contribute to a broader understanding of ADHD, self-regulation, and online communication. Ultimately, our goal is to inform future research and support strategies in the evolving context of virtual employment interviews.

## Employment Interviews

Employment interviews have evolved in recent years, reflecting technological advancements (Skylar et al., 2019). Traditionally, the employment interview process was predominantly face-to-face, fostering direct interpersonal interaction between the interviewer and the candidate. The global outbreak of COVID-19 caused a significant change in the recruitment landscape. To ensure both safety and operational continuity, organizations quickly switched to online interviewing (Doll, 2018; Soubelet-Fagoaga et al., 2021). This shift went beyond a temporary solution and marked a new era in employment interviews. For example, prominent U.S. companies like Target and Walmart have adopted innovative methods such as pre-recorded screening interviews. In this approach, candidates record their responses to avatars, creating a more asynchronous and technology-driven evaluation process (Gorbova et al., 2017). Emerging technological advances include virtual platforms with lifelike avatars and artificial intelligence (AI) technology to engage job applicants and identify candidates for in-person interviews (Singh & Doval, 2019). While this technological shift ostensibly offers advantages in terms of scalability and convenience, it inadvertently introduces additional barriers for students with disabilities who may already grapple with delayed social skills. For example, the avatar-based interviewing paradigm potentially attenuates these students' ability to effectively communicate

and navigate through the interview process, thereby exacerbating disparities and challenges faced by individuals with disabilities in the employment domain. Consequently, it is imperative to concurrently address and mitigate emergent barriers to ensure equitable access and opportunities for all candidates, irrespective of their abilities or disabilities (Affleck et al., 2016; Tobosco, 2011). Additionally, it is crucial to acknowledge the already daunting employment statistics for individuals with disabilities, including ADHD. People with disabilities often experience higher rates of unemployment or underemployment compared to the general population (Chan & Rumrill, 2016). This is especially true for individuals with neurodevelopmental disorders like ADHD, who may encounter difficulties in specific job-related tasks and social interactions (Barnett, 2019; Yutong, 2022).

## Attention Deficit/Hyperactivity Disorder in College Students

ADHD is a neurodevelopmental disorder occurring in childhood and persisting into adulthood. It is characterized by patterns of inattention, hyperactivity, and impulsivity which interfere with daily functioning and development (Centers for Disease Control and Prevention, n.d.). According to research, employed individuals between 2002 and 2007 revealed that the prevalence of diagnosed ADHD in adults rose more than three-fold from 1.24 to 4.02 cases per 1000 covered members, with the largest proportion of cases being in the 18-24 years age group (Montejano et al., 2011). Furthermore, half of all college students receiving disability services are diagnosed with ADHD (McKeem, 2008). These statistics highlight the high prevalence of ADHD among college students and the increasing diagnosis rates in adults. As the diagnoses of ADHD increase and our understanding of the condition deepens, it becomes increasingly clear

that it is important to acknowledge and address the specific academic and social challenges individuals with ADHD face (Dupaul et al., 2009; Hemminway et al., 2021). These individuals not only navigate academic complexities but also struggle with impaired social functioning (Barkley, 2008; Sacchetti & Lefler, 2017), which can ultimately lead to decreased life satisfaction (Gudjonsson et al., 2009; Mick et al., 2008; Pritchard et al., 2012).

The social ramifications of ADHD further compound struggles faced by these students, such as profound impairments in their social cognition and interactions (Kofler et al. 2015), encompassing issues such as emotional face and prosody perception, and theory of mind deficits (Mary et al., 2016; Tatar & Cansiz, 2020). The genesis of these impairments is often linked to impairments in executive function associated with ADHD (Fleming & McMahon, 2012; Jhambh & Garg., 2014). Further, ADHD is correlated with increased emotional instability and deteriorated self-esteem compared with their non-ADHD peers (Saccheti & Lefler, 2017). However, research by Aduen et al. (2018) details how social skills are performance-based rather than skills-based, requiring interventions to focus on performance deficits rather than target acquisitions. By recognizing the performance-based nature of social skills, we can identify specific strategies and interventions to improve social performance in individuals with ADHD.

## Executive Function and Self-Regulation in College Students With ADHD

Executive function (EF) is a broad term encompassing cognitive processes such as attention, working memory, cognitive flexibility, and inhibitory control (Zelazo et al., 2016). Previously, EF skills were thought to be primarily associated with frontal lobe development (Aron, 2008). However, recent research indicates it involves collaboration among diverse neural

networks throughout the brain (Fiske & Holmboe, 2019). For example, EF, self-regulation, and metacognition are closely interconnected in coordinating cognitive and behavioral processes as well as facilitating adaptive responses and goal-oriented behaviors (Diamond, 2013; Fahy, 2014; Jacob & Parkinson, 2015; Nyongesa et al., 2019).

Distinguishing between hot and cool EF skills provides a useful framework for understanding cognitive and emotional regulation, particularly in different situational contexts. Hot EF skills include emotion regulation, delay of gratification, and impulse control, which are crucial for managing emotional responses to emotional stimuli (Kim et al., 2013; Olsson et al., 2016). By contrast, cool EF skills are related to the modulation of cognitive processes in the presence of non-emotional stimuli, including working memory, attentional control, and cognitive flexibility (Hobson et al., 2013). Further, metacognition, which refers to an individual's ability to analyze and monitor their cognitive operations introspectively, plays a vital role in self-regulation, which requires an awareness and understanding of one's cognitive processes, strategic application of diverse problem-solving approaches, and the ability to evaluate one's performance autonomously. Metacognition and EF are closely intertwined, as metacognitive abilities are essential for coordinating, overseeing, and evaluating performance, which are fundamental components of EF. This highlights the need to further explore the synergistic relationship between metacognition and EF in various cognitive and emotional contexts (Lyons & Zelazo, 2011; Zelazo et al., 2016).

Self-regulation is the autonomy of the executive function and refers to the ability to regulate emotions, thoughts, and behaviors in alignment with established objectives (Bandura, 1996). It is a pivotal mechanism that enables individuals to adapt and respond effectively to

diverse contextual demands (Carver & Scheier, 1981; Schunk, 2001; Winne, 2001). Conversely, metacognition involves the awareness and understanding of one's thought processes (Flavell, 1979). These skills allow individuals to plan, monitor, and assess cognitive activities and goals (Winne, 1996).

The transition to college initiate several new responsibilities and stressors for students, including having to manage diverse academic requirements, navigate social interactions, and potentially balance part-time employment (Field et al., 2013). These tasks rely heavily on executive function and can have a negative impact on academic and social outcomes (Pascual et al., 2019; Greef et al., 2017; Nesbitt et al., 2013). For college students with disabilities such as ADHD, specific deficits in EF, such as working memory, attention, and inhibition, pose significant challenges in this complex context (Barkley, 2010; Kofler et al., 2011). These students also frequently struggle with inhibition deficits, resulting in difficulties controlling impulsive behaviors and regulating their emotions (Reynolds et al., 2019).

To empower college students with ADHD, it is crucial to provide them with effective self-regulatory strategies. By fostering self-awareness, self-monitoring, self-evaluation, and self-control, individuals with ADHD can improve their ability to manage their behaviors, emotions, and responses, ultimately leading to more positive outcomes in their academic and social lives.

## Communication, Executive Function, and Self-Regulation

The nexus between EF, self-regulation, and communication is crucial in online interviews, particularly for neurodiverse populations. For example, the EF constructs of attention, inhibition, and cognitive flexibility are vital for navigating nuanced interactions,

especially in virtual communication settings such as online interviews. Previous research supports the link between attention, cognitive flexibility, expressive language, and communication abilities, highlighting the interconnectedness of these EF constructs (Howard, 2023; Pureza et al., 2011). Additionally, cognitive flexibility is correlated with neural mechanisms involved in speech processing, further emphasizing the integration of EF constructs within communication contexts (Zhao et al., 2022).

In the context of online interviewing, individuals with ADHD, who may have difficulties with executive functioning, encounter specific challenges related to self-regulation and communication. Impairments in executive functioning can affect attention and cognitive flexibility, making it more difficult for individuals to sustain focus, adapt to changing circumstances, and express themselves effectively during interviews. Virtual communication, lacking physical presence and non-verbal cues in online interviews (Paolettie, 2022), can pose challenges for individuals with ADHD. They may have difficulties interpreting tone, facial expressions, and body language (Nilsen 2015; Giddan 1991), which are crucial for effective communication (Meeran et al., 2005; Stefani & Marco.2019) and for gauging social dynamics and adjusting their communication accordingly. These challenges can manifest as difficulties in staying on topic, impulsive responses, and struggles with organizing thoughts coherently in real-time communication (Noreika et al., 2013; Abramovitch & Schweiger, A, 2009). Overall, the virtual nature of online communication in interviews presents unique challenges for students with ADHD, requiring tailored support and strategies to help them navigate and succeed in this context.

Throughout the college landscape, students with ADHD face distinct challenges when it comes to integrating and managing higher-order EF cognitive skills and foundational cognitive functions. Higher-order EF skills, such as metacognition, fluid reasoning, complex problem solving, and advanced theory of mind, play a crucial role in handling the complex social interactions inherent in interviewing contexts (Azoivie et al., 2016; Cantor et al., 2014; Rabinovico et al., 2015; Tang et al., 2019; Toplak et al., 2008). These skills are supported by attention, processing speed, and memory, creating a synergy essential for managing information, staying focused, and facilitating interactive exchanges during conversation (Kearney et al., 2013; Lambek et al., 2011; Luu et al., 2011; Reynolds et al., 2019). This symbiotic relationship between communication and self-regulation becomes particularly evident during high-stakes interactions such as online interviews (Feiler, 2014). Given the potential difficulties college students with ADHD face in terms of foundational and higher-order executive functioning skills (Brown & Brown, 2023; Novakovic-Agopian et al., 2011), it is evident online interviewing presents a unique set of challenges for this population.

Fortunately, implementing self-regulatory strategies and online communication skills training have been found to improve students' communication performance and self-efficacy in self-regulated learning skills (Lamb, 2002; Lee & Son, 2022). However, additional research is necessary to determine the strategic personalized supports students' need to navigate the complexities and demands of online interviews. This underscores the need to explore the psychophysiological factors associated with college students' performance during online interviews.

## Advanced Learning Technologies (ALTs) and Psychophysiological Measurements

Advanced learning technologies (ALTs) are computer-based instructional systems that utilize technologies like hypermedia, virtual reality, and intelligent tutoring systems to support learning (Azevedo et al., 2022). These technologies can provide learners with various types of representations, such as text, diagrams, animations, and simulations, to facilitate learning, problem-solving, and self-regulated learning. (Harley et al., 2018) This range of data visualization facilitated by ALTs extends from data channels, like eye-tracking capturing gaze behavior, to more comprehensive, multimodal multichannel data. (Nielsen, 2001; Taub & Azavedo, 2021)

## Advanced Learning Technologies (ALTs)

ALTs are sophisticated tools foster learning and self-regulation (Azavedo et al., 2022; Kinebrew et al., 2017). They provide learners with multifaceted representations and interactive features to accommodate diverse learning needs and preferences (Harley et al., 2018). Furthermore, ALTs facilitate the monitoring of learners' progress, support goal setting, and encourage strategic regulation of learning processes (Molenaar et al., 2019; Sasouf et al., 2022; Azavedo et al. 2017; Taub & Azavedo, 2023).

### Big Interview

The Big Interview, an Advanced Learning Technology (ALT) specifically designed for online interviewing, represents a pivotal tool in modern interview preparation and practice (Skillings, 2011). The Big Interview is an online platform of simulated interview questions curated by marketing and recruitment experts. The questions are categorized according to

different topics and may be customized to suit the user's needs. System elements of the Big Interview (e.g., how many questions the respondent has answered) support self-regulation by providing learners with information by monitoring their progress, setting goals, and regulating their strategies.

## Psychophysiological Measurements

Psychophysiological measurements serve as a valuable tool to uncover the internal states of learners, offering insights into cognitive load, emotional arousal, and attentional focus in real-time (Ax, 1964; Gersak et al., 2022; Peng et al., 2020). These techniques provide quantifiable metrics shed light on learners' engagement levels, stress responses, and cognitive effort during educational activities. Among these techniques, eye-tracking is a non-invasive method to track learners' visual attention and engagement (Calado et al., 2019; Sing & Modi, 2023; Lenantini et al., 2020; Bouichieix & Lowe, 2010), while galvanic skin response (GSR) offers a window into their emotional state and arousal levels (Verhulst et al., 2020; Naguweskie et al., 2018). Together, these methods create a comprehensive profile of the learner's psychophysiological state, facilitating a deeper understanding of their learning processes (Sharma & Ginnakos, 2020; Cukurova et al., 2020; Taub et al., 2017). The data from these techniques are crucial for educators and researchers alike, as they pave the way for tailored educational interventions and enhanced learning experiences. The following sections will delve into the intricacies of eye-tracking and GSR, exploring how these tools can be effectively utilized to support learners, particularly in the context of advanced learning technologies (ALTs), as highlighted by Perez-Alvarez et al. (2022) and Taub and Azavedo (2023).

Eye Tracking

Eye tracking can reveal the cognitive strategies employed by learners as they select, organize, and integrate multiple representations during learning with an ALT (Taub et al., 2017). As such, eye-tracking data can provide valuable insights into participants' visual attention and cognitive processing during an online interview data by allowing for the collection of measurements, such as fixations, saccades, and regressions (Rayner, 2009), which offer detailed information about the participant's gaze patterns and reading behavior. *Fixations* occur when the participant focuses on a specific area on the screen for a certain duration, whereas *saccades* represent the movements between fixations, often associated with reading or scanning. *Regressions*, in turn, involve the eyes returning to a previous area, such as when reading text. By analyzing these measurements, researchers can understand how participants navigate and engage with online interview content, shedding light on their attentional focus, cognitive load, and information-processing strategies. Such insights can inform the development of effective online interview protocols and enhance our understanding of the online interview process.

Studies utilizing eye-tracking technology revealed the impact of factors on social attention (Zehnder et al., 2021). Furthermore, eye-tracking technology has been used to investigate cognitive load. For instance, Orsi (2019) found a significant relationship between pupillary diameter variation and cognitive load, suggesting pupil diameter can indicate performance in cognitive tasks. Rondón (2021) expanded the application of eye tracking, demonstrating its ability to detect differences in cognitive processing caused by different presentation formats of learning content. Eye tracking has also been used to assess cognition in individuals with limited motor control (Anand et al., 2013). It has been proposed to identify

cognitive activities performed by computer users (Moraleda, 2019). These examples highlight the versatile and invaluable role of eye tracking in providing detailed and sensitive data on cognitive function and attention in a wide range of contexts and populations, including those with neurological disorders and varying cognitive abilities. Studying the self-regulation skills of students with ADHD and/or anxiety practicing their interviewing skills, eye-tracking data can help identify areas of the interview may be particularly challenging for students, such as maintaining eye contact or responding to unexpected questions.

## Online Interview Preparation Strategies for ADHD: A Technological Approach

Educators employ a variety of strategies, including mock interviews (Browning & Cunningham, 2012), coaching (Horn et al., 2023), role-playing (Genova et al., 2022), and feedback sessions (Downey et al., 2022) to enhance students' interview skills. Such approaches provide a simulated interview experience and offer opportunities for students to observe, practice, and receive constructive feedback. Additionally, technology plays a vital role in this process by providing tools like the Bug in Ear, which allows instructors to offer immediate, discreet feedback to students during practice interviews (Horne et al., 2023), as well as through video-based interventions (Munandar et al., 2022) and simulated interviews (Walker et al., 2016).

However, to ensure the effectiveness of these strategies for students with ADHD, it is important to incorporate and explicitly state self-regulation techniques into instructional materials. Addressing these skills in the context of interview training can empower these students to effectively manage their unique challenges and maximize their potential during the interview.

By integrating self-regulation strategies, higher education institutions can offer more comprehensive support, fostering the success of all students, including those with ADHD, in pursuit of interview readiness and future career aspirations.

## Conclusion

Employment interviews have evolved significantly in recent years, from face-to-face encounters to technologically mediated formats, notably due to the COVID-19 pandemic and advancements in technology, with large companies such as Target and Walmart even implementing avatar-based interviews. While offering the advantages of convenience and scalability, these new formats can introduce challenges, especially for students with disabilities, by amplifying existing barriers and requiring adept navigation through digital platforms. For individuals with ADHD, which is prevalent among college students, these challenges are particularly noteworthy because of the associated academic and social difficulties, originating partly from deficits in executive function and impaired social interactions. Executive functioning, intertwined with self-regulation and metacognition, is particularly vital in the context of online interviews, requiring the effective management of information, attention, and adaptive communication. Interventions focusing on improving performance deficits and implementing self-regulation strategies have shown promise in enhancing students' communication performance and self-efficacy. Advanced Learning Technologies (ALTs), capable of collecting diverse data such as eye tracking and physiological sensors, serve as potent tools for assessing and understanding self-regulation skills in real time, offering insights into underlying neural and physiological mechanisms, and informing the design of precise,

personalized interventions. As higher education institutions leverage various strategies and technologies to prepare students, particularly those with ADHD, for employment after college, integrating self-regulation skills into training and instructional materials becomes imperative to ensure their successful navigation through the evolving landscape of employment interviews.

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# CHAPTER TWO: SYSTEMATIC REVIEW: VIRTUAL REALITY AND AVATAR ONLINE COMMUNICATION INTERVENTIONS FOR NEURODIVERSE STUDENTS

This chapter titled, "Exploring VR and Avatar-Based Interventions for Students with ADHD in Online Job Interview Prep" will be submitted for publication in the refereed professional journal titled, the Journal of Postsecondary Education and Disability. VR Interventions for Students with ADHD in Online Job Interviews: A Systematic Review of the Literature.

Online interviewing presents a unique challenge for college students with attention-deficit/ hyperactivity disorder (ADHD) due to the core characteristics of the disorder, including difficulty in maintaining attention, impulsivity, and hyperactivity (Crundwell et al., 2007; Natalia & Agnieszka, 2021). In virtual interview settings, therefore, students with ADHD may find it challenging to sustain focus, listen attentively, and organize their thoughts. To address the unique communication hurdles faced by students with ADHD in online interviews, it is crucial to explore the role of self-regulation skills (Feiler, 2014; Taylor & Aldon, 2010). Self-regulation involves monitoring, controlling, and directing one's thoughts, emotions, and behaviors, offering a promising avenue for enhancing communication abilities in the context of virtual interviews (Ahmed et al., 2017). The primary purpose of this systematic literature review is to explore how college students with ADHD are preparing for success during online interviews.

Abstract

The transition from education to employment is a critical phase in the lives of all students, including those with attention-deficit/hyperactivity disorder (ADHD). Online job interviews have become increasingly prevalent, demanding new strategies to prepare students effectively for this important part of the hiring process. This systematic literature review focuses on empirical studies using virtual reality (VR) and avatars to prepare students with ADHD for online job interviews, specifically the effectiveness of VR interventions in enhancing their job interview skills and employability outcomes. The review identified several studies suggesting VR interventions positively impact students with ADHD, enhancing interview performance and increasing employment opportunities. Individualization is crucial, encouraging instructors to customize training based on each student's strengths and growth areas, tailoring interventions for optimal outcomes. The review underscores the importance of VR-based interventions as a promising avenue for preparing students with ADHD for online job interviews. However, while current evidence suggests their efficacy, further research is required to delve into the nuances of these interventions, with an emphasis on customization to cater to the unique needs of individual students. By incorporating nonobjective survey measures and fostering individualized training, future studies can provide a more holistic understanding and optimize the preparation process for students with ADHD.

## Introduction

Individuals with neurodevelopmental disorders, including ADHD, often encounter significant challenges when trying to obtain and sustain a position in competitive job markets (Michalski et al., 2021) and, as a result, their rates of securing competitive employment are disproportionately low (Bush & Tasse, 2017). Despite these challenges, such as stigmatizing views by employers, these individuals' desire to work remains strong (Kinoshita et al., 2013; Modini et al., 2016). In addition to earning a living, employment offers invaluable benefits like structure, social support, decision-making opportunities, and increased independence (Modini et al., 2016). Building on this understanding, it is crucial to examine specific populations, in this case, college students with ADHD, to better grasp the nuances of their employment challenges and potential interventions, particularly online interviews.

### Online Interviews and the Employment Process

Online interviewing offers companies the advantage of being able to assess a broad range of candidates without a significant resource expenditure (Iniesto et al., 2021; Talview, 2023). For example, conducting online interviews enables employers to conduct interviews remotely, saving on costs associated with travel and physical venues. Further, virtual interviews provide employers an opportunity to ascertain if a potential employee can effectively contribute in a remote setting, proven to be an important factor during the COVID-19 pandemic (Chandrate & Soman, 2020; Lewitt & Gosain, 2020), which showed many businesses could operate effectively with remote workers.

Concurrently, the rise of online screening interviews poses different challenges for candidates than traditional face-to-face interviews (Feiler, 2014). For individuals with disabilities, these challenges include (a) access to efficient computers and software, (b) stable and fast internet connections, and (c) navigating online interview platforms (Rutherford, 2021). Stylianidou and Mavrou (2021) further identified difficulties in effectively conveying positive nonverbal cues, such as genuine smiles and appropriate humor. A 2022 report from the U.S. Bureau of Labor Statistics highlighted the unemployment rate for persons with disabilities was double that of individuals without disabilities, indicating a consistent employment disparity. Online interviews hold potential in enhancing workforce participation and diversity, especially for students with disabilities (Burdette et al., 2015; Wyants & Dennis, 2017). It is imperative these individuals receive necessary accommodations and support to ensure equity in online interviewing processes.

## Virtual Environments

Educators are increasingly interested in virtual environments as they offer real-world simulations within the classroom setting (Newbutt et al., 2016; van Vonderen, 2004). For individuals with disabilities, these immersive and interactive environments offer a safe, controlled space to practice and develop social and practical skills needed in the real world (Vasquez et al., 2016). These tools can be customized to meet the specific learning preferences of individuals with neurodevelopmental disorders. They include adjustable features such as text size or color contrast for visual aid, a focus on promoting social interactions, and integrated

feedback mechanisms to offer real-time guidance and support (Kandalaft et al., 2013; Knight et al., 2013).

There are two primary forms of virtual training: video-based, where learners observe and imitate skills, and computer-based, which allows for direct interaction via hardware and software applications. Both methods have shown positive outcomes, though the latter offers the advantage of active learner involvement, potentially enhancing learning outcomes (Mechling et al., 2005; Walker et al., 2016). The goal of such training is the application of learned skills in real-life situations, especially employment. However, a significant challenge lies in generalization of these skills. Thus, individuals with neurodevelopmental disorders often struggle to apply skills learned in one environment to another, particularly in spontaneous situations (Hwang & Hughes, 2000; Parsons & Cobb, 2011; Rogers & Krantz, 2000). As a result, the effectiveness of virtual training in translating to real-world performance remains a question.

It is crucial, therefore, to evaluate the efficacy of virtual environments in enhancing online interviewing skills. This review aims to consolidate evidence on the use of virtual environments for vocational training in individuals with neurodevelopmental disorders, including those diagnosed with ADHD or other related disabilities.

For the scope of this review:

a) A “virtual environment” is defined by the following criteria: (i) the display or projection of an image; (ii) an interactive feature within the environment; and (iii) provision of sensory feedback, such as visual, auditory, or haptic sensations (Gray, 2017; Michalski et al., 2019).

b) A study is deemed to have a vocational theme if its primary outcome revolves around work or job-related aspects.

c) A study is identified as focusing on interviewing skills.

## Methodology

### Search Strategy

The PRISMA guidelines are evidence-based standards for conducting and reporting systematic reviews and meta-analyses (Liberati et al., 2009). They aim to improve the transparency, accuracy, and completeness of reporting in these studies, making it easier for others to assess the quality of the research and make informed decisions. The literature review followed PRISMA guidelines starting on August 29, 2019, with an update on September 29, 2023. Various databases, including Science Direct, PsycInfo, ERIC, and Google Scholar, were searched using specific criteria related to college subjects, ADHD, online interviews, and virtual reality, with terms like "virtual," "training," and "employment."

### Inclusion Criteria

A set of specific criteria was developed to determine which articles to include in this exhaustive literature review. First, selected articles had to provide empirical data pertaining to the utilization of self-regulation strategies by students with ADHD during the preparation for online job interviews within the context of higher education. Second, the articles had to incorporate elements of job preparation encompassing interview readiness as an integral facet. Third, the articles had to be undertaken within formal educational environments, specifically

within universities, colleges, or vocational schools. These types of settings were chosen due to their capacity to offer students with disabilities explicit guidance and support in the cultivation of effective interviewing skills. Students with ADHD can receive tailored instruction and assistance in interview proficiency at specialized education programs, disability services offices, and career development centers within postsecondary institutions. (Alvalrez-Godos et al.2023). Fourth, in recognition of the rapid advancements in Advanced Learning Technologies (ALTs) (Marcoulides, 1990), we imposed a temporal restriction on our search, limiting the search to studies published between 2016 and 2023. Finally, to ensure the robustness of the literature, our review exclusively incorporated studies disseminated through peer-reviewed journals.

## Literature Screening and Inclusion

In the process of article selection for this systematic review, the research team initially screened titles and abstracts to identify potential studies meeting our inclusion criteria. Subsequently, full-text articles were obtained and carefully examined for eligibility. Articles were included if they conformed to our pre-established inclusion criteria. Furthermore, the research team extensively reviewed the reference lists of the included articles to identify any additional experimental and/or quasi-experimental studies who included students with disabilities.

### Information Retrieval and Data Collection

Data retrieval encompassed information on the purpose, sample characteristics, study type, analysis procedures, findings, and recommendations from the selected studies. Specifically, we focused on data related to college students with ADHD.

## Results

### Search Results

As a result of the above process and eligibility criteria, we initially identified 3,561 manuscripts through database searching and a supplementary snowballing strategy to locate additional relevant articles. After importing these publications into the Notion platform, we conducted a deduplication process to remove duplicates, leaving 1,159 papers, whose titles and abstracts were subsequently screened. During the following full-text review, we excluded two studies as they did not involve students with disabilities in their participant cohorts. Furthermore, we excluded one additional study because it did not incorporate virtual interviewing as part of the employment preparation process for students. Consequently, we included findings and insights from a final selection of eight studies in our comprehensive review that satisfied inclusion and exclusion criteria previously.

## Findings

### Description of Studies

The researcher examined five studies (Burke et al., 2021; Downey et al., 2023; Genova et al, 2023; Kumazaki et al., 2022; Smith et al., 2022) to investigate the effectiveness of virtual

interventions in enhancing job interview skills and employment outcomes among students with ADHD and other neurodevelopment disorders. Burke et al. (2021) aimed to determine the impact of virtual interactive training agents (ViTA) on employment interview skills. Their study included a sample of 153 participants, of which 16.34% reported ADHD or ADD, with other disabilities also represented. The researchers employed a quasi-experimental design involving repeated-measures linear regression and conducted descriptive analyses. Downey et al. (2023) assessed the effectiveness of a Literacy-Based Behavioral Intervention (LBBI) e-book in improving job interview skills among three college-aged males. Utilizing a multiple-probe design, they calculated central tendency and range, determined the direction, trend, and level of data to identify condition changes, conducted Tau U post-hoc analyses, and evaluated social validity.

Genova et al. (2021) examined the preliminary effectiveness and feasibility of a virtual reality job interview tool (VR-JIT) in improving the job interview performance of 14 participants aged 16-19 with Autism. The researchers adopted a randomized controlled design, employing t-tests and chi-square analysis for data evaluation. Kumazaki et al. (2022) evaluated a group-based online job interview training program, focusing on 14 participants with autism spectrum disorders (ASD), aged 18-24. Their study utilized a quasi-experimental design, involving descriptive statistics and interclass correlation coefficient analysis. Lastly, Smith et al. (2022) assessed two virtual interview training programs, VR-JIT, and Virtual Interactive Training Agent for Youth (VIT-TAY), across a sample of 1,183 participants from various states. Study participants encompassed a wide range of disabilities, including Other Health Impaired (OHI), Emotional Behavior Disorder (EBD), Intellectual Disabilities (InD), and speech and language

disabilities. The researchers adopted a secondary summary of quasi-experimental studies approach, utilizing cluster-adjusted chi-square, t-tests, and stata modules for data analysis. These eight studies (see Table 1) collectively contribute to a deeper understanding of the effectiveness of virtual interventions in enhancing job interview skills among students with ADHD and neurodevelopmental disorders. Their varied methodologies, sample characteristics, and analysis procedures provide valuable insights into this critical area of research. Genova et al.'s study, specifically focused on the preliminary effectiveness and feasibility of VR-JIT, holds significance for exploring innovative tools to improve job interview performance among individuals with ADHD and related conditions.

In the pursuit of enhancing job interview skills and employment outcomes for individuals with ADHD and related conditions, five distinct studies were examined within this systematic literature review. Burke et al. (2021) investigated the effectiveness of a virtual interactive training agent (ViTA) intervention, noting positive outcomes regarding self-efficacy, strengths, career decisions, and overall scores. A significant increase in the strength subscale suggested notable progress in participant strengths. After the ViTA treatment, the MIAS scale scores showed higher values, with the general subscale displaying the highest mean scores after the treatment. However, the precise impact of the ViTA application on outcomes remained uncertain.

Downey et al. (2023) employed a multiple-probe design to assess the efficacy of an LBBI e-book intervention. Their findings indicated improved participant performance during the intervention, supported by favorable perceptions of the intervention's social validity among both parents and professionals. In contrast, in a randomized controlled design study, Genova et al.

(2021) identified a significant improvement in performance within the experimental group compared to the control group using the VR-JIT. While the improvement within the experimental group was not statistically significant, the VR-JIT intervention was deemed both feasible and well received by participants.

Kumazaki et al. (2022) evaluated a group-based online job interview training program, noting a high completion rate and an absence of technological challenges or participant distress. However, they found no significant relationships between demographic data and improvements in subjective and objective evaluation measures. Finally, Smith et al. (2022) revealed an intriguing correlation between the number of virtual interviews completed and higher employment rates, emphasizing the importance of interview score quality in advancing from easy to difficult interviews. Together, these studies provide valuable insights into interventions aimed at improving job interview skills and employment prospects for individuals with ADHD and related conditions, highlighting both the potential benefits and areas requiring further exploration.

## Technology Use in Interventions

Recent technological advancements have had a significant impact on job interview training methods, particularly for individuals with autism spectrum disorders (ASD) and intellectual and developmental disabilities (IDD). Genova et al. (2022) and Downey et al. (2022) exemplify this trend. Genova et al. conducted a pilot randomized controlled trial using a virtual reality job interview tool (VR JIT), while Downey et al. utilized e-books and video conferencing

platforms to teach virtual job interview skills to college students with IDD. Both interventions focus on enhancing interviewing skills through interactive and immersive feedback. Similarly, Kumazaki et al. (2022) introduced a group-based online job interview training program using a virtual robot (GOT). Participants engaged in mock interviews with virtual robots and received feedback sessions. Burke et al. (2018) also contributed to this field by using virtual interactive training agents (ViTA) to improve interview self-efficacy among adults with autism and other developmental disabilities. Their system provided a platform for practicing responses to common interview questions.

Expanding the range of technological applications, Smith et al. (2020) investigated the effectiveness of Virtual Reality Job Interview Training (VR-JIT) and Virtual Interactive Training Agent for Youths (VIT-TAY). These computerized simulators were designed to enhance interview skills for individuals with disabilities. Munandar et al. (2022) focused on a video-based intervention (VBI) to improve storytelling abilities in job interviews for college students with autism. Participants used laptops for recording and playback of their responses. Additionally, Horn et al. (2023) explored the effects of eCoaching for transition-age students with autism. They used two-way communication tools for live-streamed interviews and immediate feedback. Walker et al. (2016) utilized the TLE TeachLivE system, Skype, and other audio-visual equipment to create simulated job interviews in a mixed-reality lab for individuals with IDD. This approach offered a blend of virtual and real-world interaction. Collectively, these studies highlight the potential of technological interventions in bridging the employment gap for individuals with disabilities, as shown in the provided table.

## Discussion

The recommendations from the reviewed studies offer valuable insights into how to improve employment prospects and interview skills for individuals with neurodevelopmental disorders. The studies highlight key areas for future research and interventions.

Research suggests virtual environments like ViTA hold promise for enhancing employment interview skills among individuals with ASDs and IDD. This recommendation highlights the potential of Advanced Learning Technologies in addressing specific skill development needs. Studies recommend exploring the long-term effects of ViTA interventions, investigating the combination of ViTA with other interventions, and researching the unique needs and challenges faced by individuals with ASDs and intellectual disabilities in employment contexts. These recommendations align with the call for more comprehensive investigations to refine and expand the application of ViTA in vocational trainings.

Second, the research on the LBBI procedure highlights its potential as useful technology for teaching job interview skills to individuals with IDD. This recommendation encourages educational institutions to prioritize the development of employment-related skills and provide work experience opportunities specifically for students with IDD.

Third, the reviewed studies stress the significance of large-scale investigations to evaluate the effectiveness of virtual interventions. This includes assessing the interventions in larger samples, examining their applicability in different populations, and determining their long-term effects on employment rates and job retention. These recommendations underscore the need for rigorous empirical research to establish the broader impact of virtual interventions on employment outcomes.

Lastly, the research encourages future studies using long-term, longitudinal designs conducted in authentic employment settings. This approach is seen as essential for gauging the effectiveness of interventions in helping individuals with ASDs achieve competitive positions. Moreover, the call for larger and more diverse sample sizes highlights the importance of capturing a broader spectrum of experiences and challenges faced by individuals with neurodevelopmental disorders. Additionally, while there is a strong emphasis on the need for further research, the findings underscore the importance of exploring the broader applications of virtual environments in employment-related areas beyond job interviews. In conclusion, the recommendations provided by the reviewed studies offer a roadmap for advancing research and interventions aimed at enhancing a comprehensive approach to employment interview skills of individuals with neurodevelopmental disabilities. These recommendations call for further exploration, customization, and a commitment to data sharing in the pursuit of more inclusive and effective vocational support programs.

## Conclusion

As the use of technology in the hiring process becomes more widespread, it is important to consider the implications and potential advantages of online interviewing for individuals with specific disorders such as ADHD. This systematic literature review identified promising findings regarding the effectiveness of interventions in virtual environments such as (ViTA), (VIT-TAY), and VR-JIT in improving job interview skills and employment outcomes for individuals with ADHD. Further, the literature consistently underscores the significance of personalized instruction when teaching interviewing skills in virtual environments to students with disabilities

as generic approaches may not adequately address the unique needs of neurodiverse students. Exploring self-regulatory behavior among these students emerges as a promising avenue for customization, allowing educators to develop strategies that align with the specific strengths and areas for growth. However, more evidence is necessary more evidence is necessary to establish a comprehensive understanding of the impact of these technologies on the employment success of individuals with ADHD, and well as other historically systematically excluded populations. This research study is critical as it fills a significant gap in current knowledge by providing empirical data on the efficacy of virtual interview training tools for this specific population. By highlighting the nuances of how students with ADHD respond to and benefit from virtual interview training, the study contributes to the development of more effective, inclusive hiring practices. It also has the potential to inform educational and vocational training programs, enabling them to tailor their approaches to better support the unique learning styles and needs of neurodiverse individuals. Furthermore, this research can guide technology developers in creating more accessible and effective tools that cater to a wider range of users, ultimately fostering greater inclusivity and diversity in the workplace.

Moreover, this study's findings are particularly relevant in the context of Diversity, Equity, Inclusion, and Belonging (DEIB) practices. The insights gained from this research can significantly contribute to the enhancement of DEIB strategies within organizations, especially in the realm of recruitment and hiring. By understanding the unique challenges and strengths of individuals with ADHD in virtual interview settings, employers can revise their hiring practices to be more equitable and accommodating. This not only ensures a more inclusive recruitment process but also paves the way for a diverse workforce where the talents and perspectives of

neurodiverse individuals are valued and leveraged. Consequently, this research not only addresses a crucial academic gap but also serves as a pivotal resource for organizations striving to embody true DEIB principles in their operational and cultural ethos.

Moving forward, future research should continue to investigate the effectiveness of ViTA, VIT-TAY, and VR-JIT in larger and more diverse samples. This will provide a comprehensive understanding of their applicability across different populations and settings. Additionally, exploring the long-term effects of these interventions on employment rates and job retention is crucial for assessing their sustained impact. Studies should prioritize the development and evaluation of individualized and customized instructional approaches that incorporate self-regulatory behavior as a key component. In conclusion, students with ADHD may initially encounter difficulties in preparing for online employment interviews. However, the reviewed literature provides evidence that interventions like ViTA, VIT-TAY, and VR-JIT can be effective tools in bridging this gap.

These findings highlight the importance of personalized instruction and the potential benefits of integrating self-regulatory behavior into vocational training programs. By advancing research and practice in these areas, practitioners can better equip individuals with ADHD with the tools and skills for success in the evolving landscape of online job interviews, ultimately enhancing their employability and career prospects.

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# CHAPTER THREE: EXPLORING SELF-REGULATION SKILLS IN NEURODIVERSE COLLEGE STUDENTS DURING ONLINE INTERVIEWING USING PSYCHOPHYSIOLOGICAL METRICS

This chapter titled, "Exploring the Utilization of Physiological Metrics in Assessing Online Interview Performance of College Students with ADHD" has been submitted for publication in the refereed journal titled, the *Journal of Special Education Technology,* and was led by first author Tahnee L. Wilder, and coauthors, Nikola Sarria, Konstantina Papaioanou, Dr. Eleazar Vasquez, and Dr. Matthew T. Marino.


## Abstract

Online interviewing has become a popular method for employers to screen and select job candidates. This shift towards virtual social exchanges changed the dynamics of employment interviews. However, this shift in employment interview practices provides an opportunity to further the gap for employment for neurodiverse college students. This study focuses on the self-regulation skills college students with ADHD utilize during online interviewing. It provides insights and recommendations for educators, administrators, and technology developers, emphasizing the importance of a holistic approach to interview preparation. By advocating for a comprehensive and multifaceted approach to interview preparation, this study aims to enhance support for college students with ADHD in online interview settings, while promoting equity and accessibility in higher education.

## Introduction

In special education settings, interview skills are crucial to assess students' needs and inform appropriate interventions (Walker et al., 2016; Pavri & Hegwer-DiVita, 2006). However, the integration of AI technology has revolutionized this process by providing objective and efficient assessment of interview responses. AI systems can analyze, and rate interview answers based on predetermined criteria, ensuring consistency and accuracy in the evaluation (Senarathne et al., 2021). Moreover, introducing eye tracking as a tool for understanding cognitive and emotional processes during interviews adds another layer of insight (Dickson & McGinnies, 1966; Nourbakhsh et al., 2012). Eye tracking allows researchers to observe visual attention patterns, providing valuable information about what aspects of the interview stimuli capture the interviewee's attention. This integrated approach can enhance the assessment of interview performance and inform the development of effective interventions for neurodiverse individuals (Agrawal 2020; Tian 2019; Dissanayake 2021).

This manuscript investigates the self-regulation strategies employed by college students with ADHD during online interviews and examines whether current cognition measurements can predict interview performance. The research questions explore the relationship between different performance levels (Gold, Silver, Bronze) on the Big Interview AI across numerous independent variables. The study will answer the following questions:

- Research Question 1: "Does the percentage of fixation duration on the interviewer (Area of Interest - AOI) vary among students with different performance levels (i.e., Gold, Silver, Bronze) on the Big Interview AI during the reception language phase?"

- Research Question 2: "To what extent does the Flanker Inhibitory Control and Attention Test predict performance categories (i.e., Gold, Silver, Bronze) on the Big Interview AI?"
- Research 3: "To what extent does the Metacognitive Self-Regulation Subscale of the Motivated Strategies for Learning Questionnaire predict performance categories (i.e., Gold, Silver, Bronze) on the Big Interview AI?"

This manuscript plays a pivotal role in advancing our understanding of the self-regulation strategies implemented by college students with attention deficit hyperactivity disorder (ADHD) during online interview scenarios. This domain is increasingly relevant in today's digital and remote learning environments. By focusing on this specific demographic, the study addresses a crucial gap in the literature, offering insights into the unique challenges and strategies of students with ADHD in higher education settings.

The study makes several contributions to the field of special education technology in higher education. It offers empirical evidence and actionable insights for educators, administrators, and technology developers. These findings help guide the creation and optimization of online interview platforms that are inclusive and supportive of students with ADHD. Additionally, the study adds to the academic discourse on self-regulation, cognitive functioning, and metacognitive strategies in online learning environments. This fosters a deeper understanding of student engagement and performance in digital settings. Ultimately, this research lays the foundation for improved learning experiences, personalized support, and better educational outcomes for college students with ADHD. These efforts align with the broader goals of equity and accessibility in higher education.

# Literature Review

## AI in Online Interview Preparation

While online interviewing provides a cost-effective means of assessing a broad range of candidates, it presents a unique challenge for college students with ADHD (Iniesto et al., 2021; Talview, 2023). The unemployment rate for persons with disabilities is twice that of individuals without disabilities in a 2022 report from the U.S. Bureau of Labor Statistics. With the emergence of online screening interviews, job interview dynamics have evolved to include virtual social interactions (McCarthy, 2020) which can elicit different responses compared to traditional face-to-face interviews (Feiler, 2014).

Stylianidou and Mavrou (2021) further identified difficulties in effectively conveying positive nonverbal cues such as genuine smiles and appropriate humor. While online interviews can enhance workforce participation and diversity, particularly for students with disabilities (Wyants & Dennis, 2017; Burdette et al., 2015), it is crucial for these individuals to receive the necessary accommodations and support to ensure equity in online interviewing processes.

Educators are increasingly interested in virtual environments as they provide real-world simulations within the classroom setting (van Vonderen, 2004; Newbutt et al., 2016). For individuals with disabilities, these immersive and interactive environments offer a safe and controlled space to practice and develop social and practical skills needed in the real world (Vasquez et al., 2016). They can be tailored specifically to the learning styles of people with neurodevelopmental disorders, including adjustable features, an emphasis on relationships, and integrated feedback (Kandalaft et al., 2013; Knight et al., 2013).

Simulated interviews serve as a practice involving replication of the interview environment and conditions through technology like virtual reality (VR) or detailed role-play scenarios. This is done through screen projections and conducting mock interviews in an immersive, engaging, and genuine workplace setting that replicates intricate interpersonal interactions (Mursion, 2017). The questions, environment, and sometimes even the time and stress levels are designed to be as authentic as possible to provide a real-world experience. Simulated interviews have been recognized as a valuable tool for enhancing online interviewing skills among students with disabilities (Bell & Weinstein, 2011). This format allows them to practice their responses to common interview questions and receive feedback on their performance, preparing them for actual employment interviews conducted in a virtual setting.

In another study, Chou et al. (2022) developed a mock interview platform integrates augmented reality (AR) and artificial intelligence (AI). The platform utilizes personality observability, ideal working style, and a semantic score to determine intrinsic traits. It enhances accuracy by improving voice, pose, and emotion models, and incorporates features such as eye gaze direction and speech fluency. Customization options further allow tailored analysis reports based on specific requirements. Candidates can conduct mock interviews, refine their skills, receive feedback, and gain a better understanding of their performance. By providing a realistic and interactive experience, simulated interviews offer students the opportunity to develop and refine their interviewing skills, enhancing their chances of success in the job market. (Burke et al., 2018; Lord et al., 2016; Walker et al., 2016).

## Eye Tracking in Behavioral Studies

Eye-tracking technology has gained attention for its non-invasive and precise measurements of visual attention and engagement. It shows promise in learning and interview settings (Calado et al., 2019; Sing & Modi, 2023; Lenantini et al., 2020; Bouichieix & Lowe, 2010). Tracking eye movements offers insights into cognitive processes and engagement.

Zehnder et al. (2021) highlighted how eye-tracking analyzes social attention during interactions. It reveals the impact of factors on attentional focus. Eye-tracking also helps assess cognitive function in individuals with limited motor control (Anand et al., 2013). Moraleda (2019) proposes its use in identifying cognitive activities by computer users. These applications show the ability of eye-tracking to provide detailed data on cognitive function and attention. It transcends conventional boundaries and serves diverse contexts and populations, including those with neurological disorders.

## Executive Function and Self-Regulation During Interviews

Executive function (EF) and self-regulation skills (SRS) are fundamental constructs contributing to the cognitive processes. EF encompasses working memory, cognitive flexibility, and inhibitory control (Zelazo, 2015; Diamond, 2013), while SRS refers to the strategies to assist individuals in effectively managing and directing their personal, emotional, and cognitive resources to achieve a goal (Benga, 2015; Sanders et al., 2021; Cohn et al., 2013; McGivern, 2023). These two constructs are closely intertwined, as self-regulation relies on executive functions to control and direct behavior and cognitive processes effectively.

Students with ADHD often face challenges in managing EF and SRS due to impaired executive function skills, including difficulties with attention, impulse control, and hyperactivity, which are prominent characteristics of the disorder (Toplak et al., 2018). Additionally, these students may encounter obstacles in recognizing emotions, understanding prosody, and interpreting nonverbal communication.

In the context of employment interviews, both EF and SRS are crucial, as they support cognitive and behavioral processes such as attention regulation, task switching, problem-solving, and emotional control which enable individuals to navigate the challenges and demands of the interview process successfully (Diamond, 2013; Fahy, 2014; Jacob & Parkinson, 2015; Nyongesa et al., 2019). However, many students with ADHD struggle to manage these skills due to inherent neurodevelopmental disparities which affect their cognitive and behavioral domains (Aron, 2008; Fiske & Holmboe, 2019).

To enhance the EF skills of students with ADHD, with a specific focus on preparing them for the challenges of online employment interviews, targeted interventions are necessary. A promising approach to developing such interventions involves gaining insights from educational neuroscience (Taub & Azevedo, 2023; Walker et al., 2016).

## Theoretical Frameworks

### Social Cognitive Theory

Albert Bandura's Social Cognitive Theory (Figure 1) established in 1986 and expanded upon in 2001, presents a framework for understanding human behavior through a model of

triadic reciprocal causation. This model posits that behavior is not merely a result of internal processes or external stimuli, but rather a dynamic interplay between three distinct factors: personal factors, environmental influences, and the behavior itself. The personal component encompasses cognitive, affective, and biological events; the environmental component refers to the physical and social surroundings that provide the setting for behavior; and the behavioral component includes the actions that can, in turn, influence both personal factors and the environment.

Central to Bandura's theory is the concept of human agency, which is the capacity of individuals to exert control over the nature and quality of their actions. This agency is characterized by intentionality, forethought, self-reactiveness, and self-reflectiveness. It is the ability of individuals to make choices, to plan and execute actions, and to reflect upon their own capabilities and the outcomes of their actions. The social cognitive theory underscores the proactive and self-regulating aspects of human behavior, asserting that individuals are not merely reactive to their environment but are active agents in shaping their own behavior and the world around them. Through this lens, Bandura's theory provides a comprehensive perspective on the complex and reciprocal nature of the interplay between individuals and their environments.

Cyclical Model of Self-Regulation

Zimmerman's Theory of Self-regulation (2000), as seen in Figure 2, is centered on the concept of self-regulated learning, where individuals take control of their own educational process. This process is explained through a cyclical model comprising three distinct phases.

In the forethought phase, learners engage in task analysis and goal-setting. This phase involves the assessment of the task at hand, along with the establishment of clear, measurable, and attainable goals for performance. Learners also consider motivational factors such as their beliefs in their ability to succeed (self-efficacy) and the value of the task, which in turn influences their approach to learning.

The performance phase is where individuals put into practice metacognitive strategies to monitor and steer their cognitive processes and behaviors. This includes being aware of and reflecting on their thought patterns, maintaining attention and focus, and implementing strategies that promote learning. The monitoring aspect is crucial as it allows learners to make adjustments in real time, enhancing their ability to manage their learning effectively.

Lastly, the reflection phase involves a retrospective evaluation of their efforts and outcomes. Learners assess their performance, attributing success or failure to factors within their control. This reflection is instrumental in informing future learning cycles, as it helps in recognizing the effectiveness of the strategies employed and in making necessary adjustments for subsequent learning endeavors.

Zimmerman's Cyclical Model of Self-regulation (2000) offers a structured approach to learning by emphasizing the importance of planning, monitoring, and reflecting, which collectively empower individuals to take charge of their learning experiences and outcomes.

Executive Function and Communication

Executive function refers to a set of interconnected cognitive skills that are crucial for organizing goal-directed behavior. One key skill is inhibition, which enables individuals to consciously restrain impulsive actions or suppress automatic responses in favor of more thoughtful reactions. Sustained attention, another important component, involves the ability to maintain focused cognitive resources for extended periods, which is essential for completing tasks. Working memory, another aspect, involves holding and manipulating information in the mind, which is crucial for complex cognitive tasks. Cognitive flexibility, on the other hand, allows for mental agility, enabling individuals to shift thinking patterns, adapt to changing situations, and engage in innovative thinking. These dimensions of executive function are not only fundamental for adaptive functioning but have also been extensively studied by researchers such as Barkley (2001), Diamond (2013), Fiske and Holcombe (2019), and Zelazo et al. (2016), whose seminal works have contributed to a nuanced understanding of these complex cognitive processes.

The goal of the study, which is to examine effective communication in an online interview setting. It emphasizes the interdependence and fluidity of various constructs involved in communication, such as reciprocity, receptive language, and expressive language. These constructs interact with each other (seen in Figure 3) during social exchanges, and cognitive processes are not linear but cyclical. For example, during a conversation, individuals inhibit their responses while sustaining attention to the speaker in reciprocity. Receptive language involves processing information using working memory and cognitive strategies to plan a response. Expressive language requires cognitive flexibility in topic changes and assessing motivation to

maintain the conversation. These examples demonstrate the interdependent nature of these constructs.

## Methods

### Participants

The participants in this study were college students attending a prominent university in the southeastern United States. We aimed for a diverse sample by targeting specific populations with our recruitment efforts, sending materials to professors in Special Education Departments, and utilizing marketing channels through the campus Student Disability Offices and Career Services. Inclusion criteria dictated participants must be enrolled at the university and be diagnosed with ADHD to qualify for the study. The researchers employed these strategies to attract and involve college students with disabilities.

The dataset provides a comprehensive overview of a cohort of 46 participants, shedding light on their demographic and academic characteristics. Gender distribution reveals a predominant female representation (54.3%), followed by male (21.7%), and non-binary participants (15.2%), with a small proportion of missing data (8.7%). In terms of racial identity, most participants identify as White (65.2%), with smaller representations from Black or African American (13%), Latin (13%), and Asian backgrounds (4.3%). The age distribution is skewed towards younger individuals, with a mean age of 21.49 years, and a concentration in the 18-24 age bracket, reflecting a typical college-aged population. Academic status within the college is varied, with equal proportions of seniors and juniors (21.7% each), followed by freshmen (19.6%), master's students (8.7%), doctoral students (6.5%), and sophomores (6.5%). A diverse

range of majors is represented, with Health Sciences, Aerospace Engineering, and Biology being the most common. However, the data also reveals a significant variety in academic disciplines, showcasing the heterogeneity of the student body. The results underscore the importance of considering both demographic and academic factors when analyzing student populations, providing a nuanced understanding of their characteristics and academic pursuits.

## Instruments

### Big Interview

The *Big Interview (Skillings, 2011)* is a digital platform designed to systematically facilitate rigorous job interview preparation, aiming to assist users in securing their desired job positions and compensation, irrespective of their prior experience (Big Interview, n.d.). This platform synergizes instructional modules with practical exercises to enhance interview techniques. It incorporates curated video tutorials and an interactive interview simulation tool. It enables users to predict potential inquiries, develop pertinent responses, and proficiently highlight their interpersonal skills and alignment with organizational culture. Additionally, the platform supplies exemplary responses accompanied by analytical insights, allowing users to tailor these to their specific requirements.

### Eye Tracking

The Tobii Pro Fusion is a compact and versatile eye-tracking device provides precise data collection for various research scenarios. With a wide range of sampling rates, from 60 Hz to 1200 Hz, it captures high-resolution gaze data to meet different study needs. (Tobii Pro, n.d.)

### Flanker's Inhibition Subtest and Metacognitive Subtest of MSLQ

The Flanker task is designed to assess a participant's ability for attention and inhibitory control. Participants are required to concentrate on a specific stimulus while suppressing their response to adjacent stimuli in the form of arrows. The central stimulus may align with (congruent) or oppose (incongruent) the direction of the flanking stimuli. Twenty trials are executed for participants aged 8-85. Images of this assessment are shown in Figure 4. The administration of this test typically takes around three minutes (NIH. N. d.).

### Motivated Strategies for Learning Questionnaire (MSLQ)

The Motivated Strategies for Learning Questionnaire (MSLQ) is a standardized and validated tool to assesses students' use of different learning strategies (Pintrich et al., 1991). In this study, we specifically focus on the Learning Strategies section of the MSLQ to better understand self-regulation strategies used by college students with ADHD. By utilizing the standardized and validated MSLQ, we can ensure the collected data's reliability and validity, which informs targeted interventions and support mechanisms tailored to self-regulated learning (See Figure 5).

## Procedures

Upon arriving at the laboratory for the study, participants were greeted by a researcher who verified their identity and ensured any potential obstacles to collecting eye-tracking data were adjusted, such as clothing, glasses, or hair. The initial phase of the session involved participants giving their written consent after being informed about the study. This was followed by screening questions to confirm their ADHD diagnosis.

Next, participants were asked to complete the Learning Strategies Scales of Motivated Strategies for Learning Questionnaire (MSLQ), which assessed their metacognition. They then completed the Flanker Inhibition and Attention Subtest of the NIH Toolbox. All assessments were administered according to standardized procedures.

Imotions software was used for eye-tracking calibration to ensure accurate data collection. Once calibration was completed, participants were directed back to the Big Interview platform to start the interview session. They were instructed to imagine themselves in a scenario where they were interviewing for their dream job. After the interview, participants received a $25 Amazon gift card as compensation. They also had a debriefing session to address any questions and were thanked for their time.

## Data Analysis

### Big Interview Scoring

The platform's scoring criteria are rooted in comprehensive research on successful interview strategies. This ensures an impartial and standardized assessment. Consequently, participants receive an exhaustive breakdown of their scores, supplemented by performance feedback. This facilitates the identification of both their strong suits and potential areas of improvement. Within the Big Interview framework, Artificial Intelligence (AI) Scoring operates in multiple stages: it evaluates various facets of the participants' responses during the simulated interview, such as content, formulation, and delivery, and compares these elements against a set standard embodies efficient communication and adept interview methodologies. Additionally,

certain behaviors might trigger alerts, although not impacting the overall score, could warrant scrutiny.

### Gold

A gold score was coded as one. The AI perceives the user's answer as well-articulated. A deeper look into the category-wise score provides more granularity on areas of excellence and potential minor refinements.

### Silver

A silver score was coded as two and indicates a commendable effort. The AI identifies strengths in the user's response but notes room for enhancement. A thorough examination of the category scores reveals areas of proficiency and potential concerns.

### Bronze

A bronze score was coded as three and suggests improvement. The AI determines the user's response has significant areas that can benefit from refinement. A detailed analysis of the category scores can pinpoint these areas.

## Standardized Cognitive Assessments

The Flanker Inhibition and Sustained Attention assessment, along with the Metacognition Self-Regulation Subscale of the Motivated Strategies for Learning Questionnaire (MSLQ), are standardized cognitive assessments used to evaluate different aspects of cognitive functioning.

The Flanker task assesses accuracy and reaction time to derive a comprehensive score, typically ranging from 85 to 115. This score represents the individual's performance level, with scores closer to the average range indicating typical performance. The Metacognition Self-Regulation Subscale of the MSLQ consists of twelve items, each rated on a seven-point Likert scale. The average score of these items reflects the degree to which metacognitive self-regulation strategies are utilized. Higher average scores indicate a greater utilization of these strategies. The MSLQ manual provides normative data for interpreting individual scores in relation to a broader sample of college students. Together, these assessments provide a comprehensive understanding of an individual's cognitive abilities, with the Flanker task focusing on speed and accuracy, and the Metacognition Self-Regulation Subscale highlighting the use of reflective and strategic learning processes.

# Results

## Preliminary Analysis

In this study, data cleaning was conducted by removing 0 values and repeated time measurements were not associated with calculations of receptive language. An analysis of variance (ANOVA) was conducted to examine the percentage of fixation duration during different performance levels of interviews. Additionally, a multinomial linear regression was employed to analyze the continuous variables of the cognitive assessments and performance interviews. The participants in this study had an average Flanker score of approximately 80.18, with a range of 60 to 108. On the Metacognitive Self-Regulation Subscale of the Motivated

Strategies for Learning Questionnaire (MSLQ), the participants had an average score of approximately 3.81.

Research Question 1: To what extent do standardized cognitive measures predict the odds of a candidate's performance (Gold/Silver versus Bronze) on the Big Interview?

The first research question examines the percentage of fixation duration on different areas of interest (interviewer, content, interviewee) among students with different performance levels (Gold, Silver, Bronze) during the receptive language phase of an online interview. An independent samples t-test was conducted to compare the means of fixation duration between the interviewer, content, and interviewee. The results showed a statistically significant difference between groups for the content area. The Bronze group spent more time attempting to comprehend the question instead of engaging with the other individuals in the interview. Furthermore, there was a trend in the data indicating that those who scored better spent more time engaging. These findings suggest that individuals with higher performance levels in a practice job interview exhibit more engagement during the receptive language phase, while the Bronze group focuses more on the content area.

Research Question 2: To what extent do standardized cognitive measures predict the odds of a candidate's performance (Gold/Silver versus Bronze) on the Big Interview?

Addressing the second research question, the researchers performed a binary logistic regression analysis to assess the predictive power of cognitive assessments in determining a candidate's likelihood of performing well on the Big Interview, addressing the second research question. The results revealed a negative coefficient for NIH Dimensional Card Sorting task, indicating that difficulty with task-switching, a common challenge for individuals with ADHD, may have a negative impact on online interview performance. The results to this research question are finalized in Table 2 These findings contribute to our understanding of the self-regulation strategies and cognitive factors that influence the performance of college students with ADHD in online interview scenarios. The study emphasizes the importance of considering these factors when designing interventions and support systems to enhance the employment prospects of neurodiverse individuals.

## Discussion

### Implications for Practice

The findings of this study have significant implications for both educators and individuals diagnosed with ADHD. Regarding the first research question, it is evident that the Bronze group focused more on the content during the interview. As a result, educators can emphasize the importance of a more balanced interview, addressing both content and engagement skills. Moreover, the analysis showed no significant difference in eye contact between the interviewer

and interviewee. Therefore, educators can shift the focus from eye contact to other skills such as body language and posture.

For the second research question, which found significant results between the relationship between cognitive flexibility and interview performance, cognitive flexibility played a significant role. Educators can incorporate explicit teaching of executive function skills that specifically target cognitive flexibility. Additionally, educators can assist learners in developing self-monitoring strategies, including using checklists. This way, individuals can refer to a list of strategies if they encounter difficulties during the interview process.

For individuals diagnosed with ADHD, the study offers important implications. It is recommended to maintain engagement during interviews by creating a distraction-free environment, turning off notifications, and resisting the urge to scroll or engage in other activities. Advocating for oneself by requesting content questions in advance can also be helpful, especially when supporting the use of the Americans with Disabilities Act. Moreover, working on cognitive flexibility and staying flexible rather than rigid in responses is advised. Individuals should be self-aware of the best strategies for them and implement them effectively.

These implications provide practical guidance for educators and individuals with ADHD, aiming to enhance interview performance and support the unique needs of this population. By implementing these recommendations, educators can create inclusive and supportive interview environments, while individuals with ADHD can effectively navigate the challenges of online interviews and present themselves as strong candidates for employment opportunities.

## Diversity and Inclusion

The integration of Diversity, Equity, Inclusion, and Belonging (DEIB) practices in online interview processes is crucial for accommodating the diverse needs of neurodiverse populations, particularly college students with ADHD. The study in question offers pivotal insights into the interviewing behaviors of these students, categorizing their performance into three tiers: Gold, Silver, and Bronze. Notably, the Bronze group exhibited a longer fixation duration on content comprehension, suggesting a potential area for enhanced educational support. This fixation disparity underpins the necessity for DEIB practices that emphasize a balanced approach to both content understanding and interpersonal engagement in interviews.

In addition to behavioral observations, the study employed binary logistic regression to ascertain the effects of cognitive flexibility on interview outcomes. The negative correlation with NIH Dimensional Card Sorting underscores the challenges faced by individuals with ADHD in task-switching scenarios, a skill imperative in the fluid dynamics of interviews. These findings advocate for the inclusion of executive function skill development in preparatory programs, highlighting the need for tailored strategies that foster cognitive flexibility.

Practically, these results prompt a shift in educational strategies, encouraging the development of holistic interview skills that extend beyond traditional focal points like eye contact to encompass overall engagement and body language. For individuals with ADHD, creating structured and distraction-minimized environments can significantly enhance interview performance. Proactively acquiring content questions aligns with DEIB principles, ensuring that all candidates, regardless of neurodiversity, have equitable opportunities to excel(Kwon et al., 2018; Emmers et al., 2017).

In essence, the study not only amplifies the voices of neurodiverse individuals in online interview contexts but also provides a blueprint for inclusive practices that align with DEIB frameworks. By adopting these insights, educators can more effectively prepare students with ADHD for the workforce (Fletcher et al., 2006), and individuals can leverage self-advocacy and adaptive strategies to navigate the complexities of virtual interviews. Such concerted efforts are vital in fostering an equitable job market that values diversity and recognizes the distinct contributions of all individuals (Toye et al., 2018; Martin, 2014.; Gormey et al., 2018).

## Limitations

The present study aimed to investigate the experiences of college students with ADHD in online interview scenarios and provide valuable insights for educators, administrators, and technology developers in creating inclusive and supportive interview platforms. However, it is important to acknowledge and address the limitations of the study design.

Firstly, comorbidities were not ruled out in the recruitment process. While this decision was made to increase the sample size and promote inclusivity, it may have introduced self-reporting bias and potential inaccuracies in the diagnosis information provided by the participants. It is worth noting that 75.5% of the participants were registered with student accessibility services at UCF and voluntarily disclosed their confirmed ADHD diagnosis. This highlights the importance of considering the participants' self-reported diagnosis in the context of their engagement with support services.

Secondly, the study may have been affected by volunteer bias. The participants primarily consisted of individuals who were willing to engage in the study, which could potentially impact

the representation of the sample. It is possible that students with a strong dislike for online interviewing may be underrepresented in the findings. Future research should aim to explore strategies to mitigate volunteer bias and ensure a more diverse and representative sample.

Despite these limitations, the study provides valuable insights into the experiences of college students with ADHD in online interview scenarios. By addressing these limitations and considering the nuanced challenges faced by individuals with ADHD, educators, administrators, and technology developers can work towards creating interview platforms that are more inclusive, supportive, and accommodating for this population. Further research is warranted to build upon these findings and develop effective interventions and strategies to enhance the interview experiences and employment prospects of college students with ADHD.

## Recommendations for Future Research

Several future research ideas can further advance the utilization of physiological metrics in assessing the online interview performance of college students with ADHD. These ideas aim to explore different aspects of the topic and contribute to a more comprehensive understanding of the factors influencing interview performance and the development of effective interventions.

One potential avenue for future research involves utilizing multimodal data, such as galvanic skin response (GSR) and facial analysis, to examine the impact of saccades and anxiety on neurodiverse individuals during online interviews. By incorporating these additional physiological metrics, researchers can better understand the cognitive and emotional processes underlying interview performance. Correlating these metrics with interview outcomes can provide valuable insights into the specific physiological responses associated with successful

performance and those that may hinder performance. This line of research can contribute to the development of targeted interventions and support strategies that address the unique challenges faced by individuals with ADHD during online interviews.

Another important direction for future research is to diversify the participant population to include individuals with other types of diagnoses in addition to ADHD. While ADHD is a common comorbidity, it is essential to expand the scope of research to encompass a more inclusive and diverse range of abilities and racial backgrounds. By intentionally designing studies that include participants with different diagnoses, researchers can gain a more comprehensive understanding of the interview experiences and performance of neurodiverse individuals. This broader perspective can inform the development of interventions and support systems that are more inclusive and tailored to the unique needs of individuals with various neurodevelopmental disorders.

Furthermore, future research can focus on exploring the psychophysiological measures during the expressive language phase of online interviews. While the present study primarily examined the participants' psychophysiological responses during the listening phase, investigating the strategies they employ when expressing themselves can provide valuable insights into the cognitive and physiological processes involved in effective communication. Understanding how individuals with ADHD navigate the challenges of expressing themselves during online interviews can inform the development of interventions and training programs that enhance their communication skills. By examining the psychophysiological measures during the

expressive language phase, researchers can gain a more holistic understanding of the interview performance of college students with ADHD.

Lastly, a promising area for future research is to design and implement an intervention study specifically targeting cognitive flexibility and its impact on communication skills during online interviews. Cognitive flexibility plays a crucial role in adaptive behavior and effective communication. Investigating the effects of interventions that improve cognitive flexibility on the communication skills of college students with ADHD can provide valuable insights into how cognitive flexibility influences interview performance. This research can contribute to the development of evidence-based interventions that enhance cognitive flexibility and, in turn, improve communication skills in individuals with ADHD. By examining the specific impact of interventions on cognitive flexibility and communication skills, researchers can provide practical recommendations for educators and practitioners working with neurodiverse individuals during online interviews.

Overall, these future research ideas contribute to the ongoing exploration of utilizing physiological metrics in assessing online interview performance and provide valuable insights for educators, researchers, and practitioners in special education technology. Expanding our knowledge in these areas can enhance support and create more inclusive and effective interventions for neurodiverse college students during online interviews. The findings from these future research endeavors can inform the development of evidence-based practices and interventions that optimize the interview experiences and employment prospects of college students with ADHD.

## Conclusion

The findings of this study contribute to the understanding of self-regulation strategies utilized by college students with ADHD during online interviews. Notably, participants who achieved Bronze scores exhibited a self-regulation strategy prioritizing content over interpersonal engagement. These individuals dedicated much time to processing and comprehending the interview questions rather than actively engaging with the interviewer or self. This behavior suggests that they employed a deliberate self-regulation strategy, focusing on information processing as a priority.

Furthermore, the study revealed no statistically significant difference in visual attention between the interviewer and the interviewee. This finding highlights the importance of shifting the emphasis from traditional factors such as eye contact to other communication skills. Educators should emphasize other aspects of communication such as body language, prosody, and vocabulary, particularly in the online context. By recognizing the significance of these factors, educators can better support college students with ADHD in effectively conveying their thoughts and ideas during online interviews.

Regarding accommodations, the study recommends implementing the American Disabilities Act accommodation of previewing interview questions in advance. This accommodation can provide individuals with ADHD the opportunity to better prepare for the interview, manage their cognitive processes, and enhance their overall performance. By offering

this accommodation, educators can create a more inclusive and supportive environment for neurodiverse students.

Additionally, the study highlights the importance of focusing on cognitive flexibility during executive function skills teaching. Cognitive flexibility plays a crucial role in adaptive behavior and effective communication. By explicitly teaching and developing cognitive flexibility skills, educators can assist college students with ADHD navigate the challenges of online interviews. This can lead to improved communication skills and enhanced interview performance.

In conclusion, the findings of this study underscore the significance of incorporating principles of diversity, equity, inclusion, and belonging (DEIB) in online interview practices. By adopting DEIB principles, educators can create an inclusive and accessible higher education environment that supports the unique needs of college students with ADHD. This includes recognizing and valuing self-regulation strategies, shifting the focus to communication skills beyond eye contact, providing appropriate accommodations, and prioritizing the development of cognitive flexibility. By implementing these recommendations, educators can foster a more inclusive and equitable interview process, ensuring all students have equal opportunities to succeed and showcase their abilities.

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# CHAPTER FOUR: BRAIN, BEHAVIOR, AND THE VIRTUAL WORLD: STRATEGIES FOR SUPPORTING NEURODIVERSE INDIVIDUALS DURING ONLINE COMMUNICATION

This chapter titled, “Brain, behavior and the virtual world: Strategies for supporting individuals with ADHD in an online job interview” will be submitted for publication in the peer-reviewed interdisciplinary professional journal titled, *Computers and Education.*


## Abstract

The job search process has become increasingly digital in recent years, including transitioning from in-person to virtual interviewing. While this is allegedly efficient in terms of personnel and financial resources for the hiring company, it presents distinct challenges for individuals with disabilities, especially those diagnosed with attention deficit-hyperactivity disorder (ADHD), who may face difficulties in maintaining concentration, organizing responses quickly, and navigating the virtual communication nuances during the interview process (Hudak et al., 2019). This neurodevelopmental disorder, characterized by attention deficits, impulse control issues, and hyperactivity, often leads to difficulties in academic and social realms. A noteworthy symptom, executive dysfunction, further intensifies these individuals' obstacles during virtual interviews due to decreased social cues (Pennington et al., 2023; Ashburn 2003; Faust & Artstein 2013) and increased technological distractions (Rosselli & Christopher, 2019; McGeorge et al., 2001; Kalgotra & McHaney 2019). Given the rising prevalence of online interviewing methods, it is crucial to understand and address the unique barriers these candidates face. This manuscript delves into the nuances of ADHD-related challenges in the context of virtual job interviews, shedding light on systemic issues and offering potential solutions to level the playing fieldThe

job search process is challenging for most people, but it can be particularly challenging for college students with disabilities, including ADHD, who inherently face a higher risk of discrimination and barriers as they transition from the supportive environment of school to the wider world of work (Burke et al., 2018; Dubois et al., 2023).

In recent years, a critical component of the job search process, employment interviews, has evolved from being in-person meetings to virtual interactions due to the rise of online interviewing methods. Despite their advantages for employers, online interviews present unique challenges for college students with ADHD. An ADHD diagnosis is characterized by executive dysfunction, difficulties in attention, hyperactivity (Barnett, 2019; Dipeolu, 2011), and impulse control, including problems self-regulation (Feiler, 2014; Fleming & McMahon, 2012; Howard et al., 2013; Kofler et al., 2015), characteristics than can have a negative effect on navigating virtual interviews environments (Barnett, 2019; Lambek et al., 2011; Reynolds et al., 2019).

This manuscript aims to explore and demonstrate how integrating information gained from educational neuroscience, technology, self-regulated learning, and explicit instruction can empower educators to create a comprehensive and supportive learning environment for their students with ADHD to help level the playing field as they transition to the world of work.

## Executive Function and Self-Regulation Skills in Students With ADHD

Executive function (EF) and self-regulation skills (SRS) are crucial constructs that play essential roles in various cognitive processes. EF encompasses working memory, cognitive flexibility, and inhibitory control (Zelazo, 2015; Diamond, 2013), while SRS refers to strategies

that help individuals manage and direct their personal, emotional, and cognitive resources to achieve a goal (Benga 2015; Sanders et al., 2021; Cohn et al., 2013; McGivern 2023). These two constructs are closely intertwined, as self-regulation relies on executive functions to control and direct behavior and cognitive processes effectively.

For students with ADHD, managing EF and SRS can be particularly challenging due to impaired executive function skills (i.e., executive dysfunction is major characteristic of the disorder; Toplak et al., 2018), including difficulties with attention, impulse control, and hyperactivity. Additionally, these students may face obstacles in recognizing emotions, understanding prosody, and interpreting nonverbal communication.

In the context of employment interviews, both EF and SRS are essential, as they facilitate cognitive and behavioral processes such as attention regulation, task switching, problem-solving, and emotional control, thereby allowing individuals to navigate the challenges and demands of the interview process successfully (Diamond, 2013; Fahy, 2014; Jacob & Parkinson, 2015; Nyongesa et al., 2019). However, many students with ADHD struggle with managing these skills due to inherent neurodevelopmental disparities affect cognitive and behavioral domains (Aron, 2008; Fiske & Holmboe, 2019).

To improve the EF skills of students with ADHD, with a particular focus on preparing them for the challenges of online employment interviews, targeted interventions are necessary. One effective way to develop such interventions involves understanding educational neuroscience (Taub & Azevedo, 2023; Walker et al., 2016).

## The Importance of Educational Neuroscience for Success in Online Employment Interviews

Gaining insights into the neural processes underlying learning and behavior allows educators to design and implement more effective and tailored instructional strategies for students. State-of-the-art of virtual reality technologies for children on the autism spectrum (Lakshmiprabha et al., 2014). With a solid grasp of educational neuroscience, added to their already existing experience and pedagogical knowledge, educators can enhance their ability to support students in developing self-regulation skills and adapting to virtual environments, including managing the cognitive and emotional demands of online employment interviews. The result is the creation of learning experiences that are neurologically congruent and contextually relevant, and empower students to succeed in the modern job market (Howard-Jones, 2014). Lteracy in educational neuroscience goes beyond theoretical understanding and becomes a practical tool to enable educators to create learning experiences are cognitively aligned, contextually relevant, and empirically supported. This, in turn, ensures that students are not passive recipients of knowledge but active participants in managing and directing their own learning and performance during online employment interviews.

Cultivating self-regulation skills is crucial when preparing students for online employment interviews, given such events' independent and often unstructured nature. A deep understanding of educational neuroscience equips educators with the ability to design learning experiences to promote the development of neural pathways associated with self-regulation. Having an educator with a deep understanding of self-regulation skills at a neural level enables students to proficiently regulate their cognitive, emotional, and behavioral responses when

encountering high-pressure circumstances (Zimmerman & Schunk, 2001), such as online interviews. The following will look at strategies to accomplish important statements.

## Practical Strategies for Preparing Students with Disabilities for Online Interviews

To enhance the chances of employment interview success for students with ADHD, it is imperative to provide personalized preparation that focuses on addressing areas in need of improvement and capitalizing on their strengths. This can be accomplished by implementing a range of strategies, including but not limited to, evaluating, and enhancing their EF skills, actively seeking input from the students themselves to tailor the preparation process, and incorporating the use of up-to-date technology to facilitate learning and engagement.

### Assessment of Executive Function

The EF skills of individuals with ADHD may be assessed by means of various rating scales, such as the *Behavior Rating Inventory of Executive Function* (BRIEF) (Gioia et al., 2000), the *Barkley Deficits in Executive Function Scale-Children and Adolescents* (BDEFS-CA) (Barkley, 2014), and the *Delis Rating of Executive Functions* (D-REF) (Delis et al., 2001). These scales assess different aspects of executive function, including behavioral regulation, metacognitive problem-solving, self-management of time, self-organization/problem-solving, and attention/working memory.

Another type of measurement, performance-based assessments, provide a more direct measure of executive function. The *Complex Task Performance Assessment* (Shallice & Burgess, 1991) and the *Ruff Figural Fluency Test (RFFT)* (Ruff, 1988) are examples of performance-

driven assessments. The Complex Task Performance Assessment involves simulating real-life tasks and scoring participants based on their efficiency, adherence to rules, interpretation abilities, task completion, and errors. The RFFT, in turn, assesses planning, reasoning, mental flexibility, working memory, inhibition, strategy generation, and action regulation, requiring participants to draw unique patterns within a time limit.

By utilizing these rating scales and performance-based assessments, educators and other practitioners can identify the strengths and areas in need of improvement of students with ADHD. Further, it is important to conduct ongoing EF assessments, integrating the results with other pertinent information such as academic performance, behavioral observations, and self-report questionnaires, to construct a comprehensive profile that accurately encapsulates an individual's skills. Such information can help tailor interventions and support strategies to meet the specific needs of these students, promoting their academic success and overall well-being (Holmes et al., 2010; Strait et al., 2020).

## Student Input

Embedding students' voices within pedagogical interventions, particularly in preparing for employment interviews, ensures strategies and supports are relevant and resonate with the individual student's unique experiences, challenges, and aspirations (Haliday et al., 2019; Socas, 2021). Educators gain valuable insights into how to effectively tailor interventions by asking reflective questions, as in Figure 1, in which students reflect on and articulate their experiences, strengths, challenges, and aspirations for their interviewing skills (Coulombe et al., 2020; O'Brien & Blue, 2018). By ensuring the strategies and supports are congruent with students'

needs, this iterative reflection, input, and adaptation process cultivates an environment where students actively contribute to their learning and development journey, fostering a sense of ownership and agency in preparation for employment interviews.

Teachers can leverage the reflection questions formulated by the Big Interview platform (see Figure 1) to amplify student participation and foster deeper self-reflection, bridging the gap between academic learning and real-world job preparedness.

### The Role of Technology in Supporting Students in Online Employment Interviews

To address the challenges students with ADHD face, virtual platforms, advanced learning technologies (ALTs) (i.e., virtual reality [VR] platforms), and avatars have been explored as means to provide targeted training and practice, aiming to enhance their online employment interviewing skills. Specifically, combining technology and pedagogical interventions aims to improve social cognition and interaction skills, major hurdles for individuals with ADHD, ensuring equal access and opportunities for all candidates in the evolving job market (Feiler, 2014; Howard et al., 2013; Kofler et al., 2015). The integration of technological advancements and understanding of neurodevelopment are crucial in developing interventions that are contextually relevant and neurologically congruent. This approach fosters an environment where students with ADHD can navigate the complexities of online interviews with enhanced self-regulation and adaptive learning strategies.

## Video-Based Interventions

Video-based modeling is a teaching method utilizes videos to demonstrate desired behaviors or skills. The effectiveness of video-based modeling in skill development has been well documented for individuals with autism spectrum disorder (ASD), showing significant success in acquiring various skills (Leslie et al., 2021). While the primary study populations in this research consist of autistic individuals, it has implications for individuals with ADHD, as there is a considerable overlap between ASD and ADHD diagnoses. Thus, ASD often has co-occurring anxiety symptoms and ADHD (McVey et al., 2018). Further, studies comparing ASD, ADHD, and ASD+ADHD have found no significant differences in social impairment between these groups, suggesting the impact on social functioning may not differ notably when these disorders coexist (Harkins et al., 2022).

This overlap underscores the potential applicability of video-based modeling not just for individuals ASD but also for the broader spectrum of students with co-occurring diagnoses. Further, although video-based instruction has shown benefits in teaching adaptive behaviors to children with ASD (Vidya et al., 2021), there's a need to delve deeper into its potential to refine communication abilities during job interviews for college students with disabilites.

Given the intricate challenges in job interviews – often necessitating structured and explicit instruction in social communication skills (Bennett et al., 2013) – the above findings are encouraging as an indication that video-based interventions tailored to neurodiverse individuals' unique needs appear to be a promising approach. These interventions ensure individuals are

proficiently equipped to navigate the complexities of today's job market by offering comprehensive preparation and robust support.

## Mock Interviews

Another type of intervention, mock interviews, allows individuals to practice their interview skills and receive feedback in a simulated interview setting. The purpose is to offer a safe and supportive environment for candidates to enhance their ability to respond effectively to questions from potential employers. It involves an interviewer who plays the employer's role, although the setting may not exactly mimic a real interview environment. Feedback is provided to help the interviewee understand their strengths and areas that require improvement. The National Association of Colleges and Employers (NACE) recommends using mock interviews to prepare students for employment. (NACE, 2017).

The efficacy of mock interviews in bolstering interviewing capabilities and improving employment outcomes for students with disabilities is robustly supported by empirical research. For instance, Lord (2019) used mock job interviews as a form of assessment to help students diagnosed with speech-language impairments prepare for employment interviews. The interviews were tailored to students' projected careers and were designed to mimic real-life interviews as closely as possible. The questions were formed from a bank of questions collated from links with industry partners, course leaders, employers, and/or publicly available practice questions. The interviews were timed to ensure fair assessment conditions across students and scored according to the researcher's university guidelines. The evaluation data suggest the mock job interviews helped the students improve their job interview skills (Lord, 2019).

Corroborating the value of mock interviews, a quasi-experimental study (Huss et al., 2017) accentuated the success rates of students participating in a mock interview program. The study involved 30 interns, who completed a survey to evaluate their experience after participating in a mock interview. The results showed that the mock interview was useful for preparing students for actual interviews; feedback provided during the debriefing session was particularly helpful.

Effective feedback to students necessitates explicitness, ensuring clarity and comprehension. Relying on operationalized data from the Big Interview platform, as detailed in the Appendix, teachers can provide specific and actionable insights to guide student improvement. Moreover, to maximize the impact of this feedback and facilitate accurate self-assessment by students, any vocabulary or terms used must be thoroughly explained. By demystifying jargon and using clear language, educators empower students to internalize feedback and take ownership of their learning journey.

Mock interviews are valuable tools for preparing professional candidates for real-life employment interviews. They provide practice in responding to interview questions and receiving feedback to improve presentation skills. Students are advised to take advantage of practice/mock interviews offered by career centers to gain confidence and polish their verbal communication skills (Walker, 1993). Mock interviews help develop oral communication skills and can be assigned as class activities. However, mock interviews conducted in a classroom setting may not have the same impact as formal situations (Hansen et al., 2009; Newberry & Collins, 2012).

## Simulated Interviews Using Virtual Reality

Simulated interviews also serve as practice interviews but often involve more replicating the actual interview environment and conditions by using technology like virtual reality (VR) or detailed role-play scenarios to create a realistic interview environment. Employing screen projections, mock interviews are conducted in an immersive, engaging and genuine workplace setting designed to replicate intricate interpersonal interactions (Mursion, 2017). The questions, environment, and sometimes even the time and stress levels, are made to be as authentic as possible to provide a real-world experience. Simulated interviews, closely mirroring real-world experiences of online interviewing, have been recognized as a valuable tool for enhancing interviewing skills among students with disabilities in the context of the prevalent use of online interviewing methods (Bell & Weinstein, 2011). The format enables them to practice their responses to common interview questions and receive feedback on their performance, ultimately enhancing their preparedness for actual employment interviews conducted in a virtual setting.

The Big Interview (Skillings, 2011) is an online platform designed to help individuals prepare for job interviews. The tool provides practical AI applications for exam preparation and job interview preparation. Students can use Big Interview to practice responding to questions from their project's sponsor, which can help them prepare for real-life job interviews. Research (Hope et al., 20202) show the use of Big Interview had positive aspects, including the ability to review the videos to self-reflect and self-correct patient questioning and counselling, the flexibility of the platform and the capacity to plan communication Further, the Big Interview includes a criteria list to help interviewers assess candidates' qualifications for a particular role. The list is typically developed by the hiring manager and includes a set of skills, experience, and

knowledge essential for a given job. Fulk and colleagues (2022) students experienced these applications as valuable and relatively easy to use, regardless of age, gender, or major.

Research studies have shown that simulated interviews positively impact the social and communication skills of individuals with intellectual disabilities (InD). For example, Walker et al. (2016) used a two-step treatment package to improve individuals' social skills and job interview performance with InD. The treatment package included virtual interviews within the TLE TeachLivE TM environment, followed by coaching sessions. TeachLivE ™ is a mixed-reality laboratory combines a physical space with simulated people, providing a safe and controlled virtual learning environment to practice and enhance skills. The coaching sessions focus on mentoring, reflection, and analyzing participant performance in the treatment interview to identify strategies for improving participant responses.

The study found simulated interviews and coaching sessions in mixed-reality environments effectively enhanced social skills and job interview performance in individuals with InD. Following the intervention, the participants demonstrated significant improvement in their social skills and job interview performance. Additionally, the intervention facilitated the transfer of skills to real-world job interviews (Walker et al., 2016).

In another study, Chou et al. (2022) developed a mock-interview platform by integrating augmented reality (AR) and artificial intelligence (AI). The platform utilizes personality observability, ideal working style, and a semantic score to determine intrinsic traits. It can

enhance accuracy by improving voice, pose, and emotion models and incorporating features like eye gaze direction and speech fluency. Further, customization options allow tailored analysis reports based on specific requirements. The platform enables candidates to conduct mock interviews, refine their skills, receive feedback, and better understand their performance. This innovative use of AR and AI revolutionizes job interviews, benefiting both employers and candidates.

By providing a realistic and interactive experience, simulated interviews offer students the opportunity to develop and refine their interviewing skills, ultimately enhancing their chances of success in the job market. In short, students learn about the procedures involved in securing employment and develop the necessary skills to engage in the process actively (Burke et al., 2018; Chou, 2022; Lord et al., 2016; Walker et al., 2016).

## Discussion

The advancement of technology for assessing EF and SRS during online interviews has opened new possibilities to analyze self-regulation behaviors – often a skill deficit among individuals with ADHD and, as such, a particular challenge in online interviews. Among these recent innovations (Roque et al., 2018), "multimodal trace data" refer to collecting data from multiple sources, such as eye tracking, log files, and video recordings, to provide a more comprehensive understanding of student behavior and learning processes. *Eye tracking* can be traced back to several cognitive processes, including visual attention to instructional content, eye movement indicating confusion, time monitoring, wasting time by looking at irrelevant instructional materials, visual attention to others, and monitoring classroom behaviors for

cognitive engagement. *Log files* are like a diary of events that happen when a student interacts with a computer program or a game. They record things like when the student clicks the mouse, typed on the keyboard, or made a mistake. By looking at these files, teachers can better understand how their students are learning and what they might need help with. Finally, *video recording* of practice sessions and employing technological platforms enable teachers to observe and analyze student behavior during simulated online interviews, gaining insights into their engagement, motivation, and deployment of learning and interview strategies.

This integration of technology and visual data allows for a more comprehensive understanding of students' self-regulation behaviors and paves the way for further advancements in supporting and enhancing these skills in the context of online interviews. By utilizing data from various technological sources such as eye tracking, log files, and video recordings, teachers gain comprehensive insights into student behavior, which, in turn, enables them to make informed, data-based decisions about planning and teaching activities.

However, it is essential to provide sufficient training to ensure the proper use of these data and avoid making incorrect assumptions about students' cognitive and emotional states. While multimodal behavioral trace data have been recognized as valuable for assessing students' self-regulatory behaviors and understanding their learning processes, there is still a need for further exploration and integration of its potential in pedagogical practice to strengthen teachers' understanding and enhance students' self-regulated learning (SRL).

**Recommendations for Future Research and Practice**

To improve employment interview preparedness among students with disabilities, several research and development opportunities should be considered. First, conducting longitudinal studies would provide insights into the long-term effects of interventions targeting EF and SRS on students' employment outcomes and, thus, help determine the sustainability and effectiveness of such interventions over time. Second, it is important to explore the effectiveness of different technological tools, such as video-based interventions and mock interviews, in enhancing the interview skills of students with disabilities. This line of research could shed light on these tools' specific benefits and optimal implementation. Third, investigating the impact of tailored interventions, based on individual students' strengths and growth areas, on their performance in employment interviews would ensure that strategies are personalized and relevant to each student's unique needs and capabilities. Fourth, examining the role of self-monitoring procedures and reflective practices in enhancing self-regulation skills and interview performance can empower students with disabilities to develop autonomy and self-regulation. By engaging in reflective practices, students become active participants in learning and improve their self-regulation skills and preparedness for employment interviews. By exploring these areas, the field can adopt a comprehensive and student-centered approach to prepare students with disabilities for the challenges of employment interviews.

Finally, to optimize outcomes, it is important for educators to increase their literacy in educational neuroscience. By leveraging insights from neuroscience research, teachers will gain a better understanding of their students' profiles and, as a result, be able to tailor interventions to cater to their specific needs. Such interventions may involve explicit instruction on EF and SRS, offering structured practice sessions, utilizing technology such as VR simulations for interview

rehearsal, and incorporating metacognitive strategies to enhance self-awareness and adaptive responses during interviews. In short, by increasing their literacy in educational neuroscience, educators can empower students with ADHD to confidently navigate the challenges of employment interviews and increase their chances of success.

## Conclusion

The research (Gropper & Tannock, 2009) highlights the challenges faced by students with disabilities, particularly those with ADHD, during online employment interviews. These challenges primarily stem from inherent characteristics of ADHD, including executive dysfunction and impaired social interactions. To address these challenges, enhancing EF and SRS is crucial. Even after participating in mock interviews and hiring simulations, students may still not feel interview-ready due to a lack of real-life experience and the pressure it brings. The artificial environment of campus settings and recorded video responses cannot replicate the adrenaline and nerves experienced in a worksite setting during a simulation conducted by professionals in the field (Schaff & Randalls, 1972; Walker, 1993). Educators with a deep understanding of educational neuroscience can design learning experiences to promote the development of neural pathways associated with self-regulation.

Further, strategic use of technology, such as VR and avatars, provides a realistic and structured platform for students, especially those with ADHD, to practice online interviews and improve their preparedness and performance. This technology simulates the demands of real online interviews and offers a controlled environment for structured and supported practice. Moreover, promoting self-regulated learning by encouraging active participation by students in

managing their own learning and performance is crucial. Consequently, incorporating student input through structured reflective practices emerges as a cornerstone in crafting and implementing effective, student-centric interventions for preparing college students with ADHD for successful navigation through the employment interview landscape. This can be achieved by providing explicit instruction and feedback on performance, which are vital for successfully navigating the complexities of online interviews.

Positioning students with ADHD to successfully navigate the complexities of the employment interview landscape by allowing them to reflect on their performance is pivotal for their individual career trajectories as well as enriching the workforce with their unique skills and perspectives. The nexus between individualized self-regulation strategies and enhanced interviewing skills is underscored by the pivotal role EF plays in managing the multifaceted demands of the interview process, such as responding coherently to questions, managing stress, and maintaining focus. By equipping students with ADHD with tailored self-regulation strategies, teachers empower them to manage these demands, enhancing their ability to present themselves proficiently and, ultimately, reach their goal of securing employment. This is particularly pertinent considering the employment rate for individuals with ADHD is estimated to be 30.4% lower than for individuals without ADHD (Breslin & Adlaf, 2005). Thus, by bolstering the interviewing skills of students with ADHD through individualized self-regulation strategies, we not only pave the way for them to traverse their career paths successfully but also enrich the workforce and society in general with these individuals' unique skills and talents, thereby fostering a diverse, inclusive, and dynamic work environment.

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# APPENDIX A: UCF IRB LETTER

UNIVERSITY OF CENTRAL FLORIDA

**Institutional Review Board**
FWA00000351
IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

APPROVAL

July 21, 2023

Dear Tahnee Wilder:

On 7/21/2023, the IRB reviewed the following submission:

| | |
|---|---|
| Type of Review: | Initial Study, Expedited categories 4, 6, and 7 |
| Title: | Investigating Metacognitive Strategies for Self-Regulated Learning of Students with Disabilities during Online Interviews |
| Investigator: | Tahnee Wilder |
| IRB ID: | STUDY00005383 |
| Funding: | Name: TBD Customer |
| Grant ID: | |
| IND, IDE, or HDE: | None |
| Documents Reviewed: | • Barkleys_ADHD-EF_Index.docx, Category: Test Instruments;<br>• NIH Toolbox Test Descriptions, Category: Test Instruments;<br>• Study 5383 Wilder. HRP-503.07.18.23.docx, Category: IRB Protocol;<br>• Study 5383 Wilder.Dissertation.RecruitmentMaterial.Social Media.Flyer_07.18.23.docx, Category: Recruitment Materials;<br>• Study 5383 Wilder.Dissertation.ScriptforProfessors_07.18.23.docx, Category: Recruitment Materials;<br>• Updated.Consent.07.18.23, Category: Consent Form;<br>• Wilder Dissertation Screening Form, Category: Other;<br>• Wilder Dissertation Screening Form, Category: Recruitment Materials; |

The IRB approved the protocol on 7/21/2023. Annual continuing review is not required.

In conducting this protocol, you are required to follow the requirements listed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB

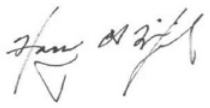
Library within the IRB system. Guidance on submitting Modifications and a Continuing Review or Administrative Check-in is detailed in the manual. If continuing review is required and approval is not granted before the expiration date, approval of this protocol expires on that date.

Use of the stamped version of the consent form is required. To document consent, use the consent documents that were approved and stamped by the IRB. Go to the Documents tab to download them.

When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,



Harry Wingfield
Designated Reviewer

## APPENDIX B: FIGURES AND TABLES

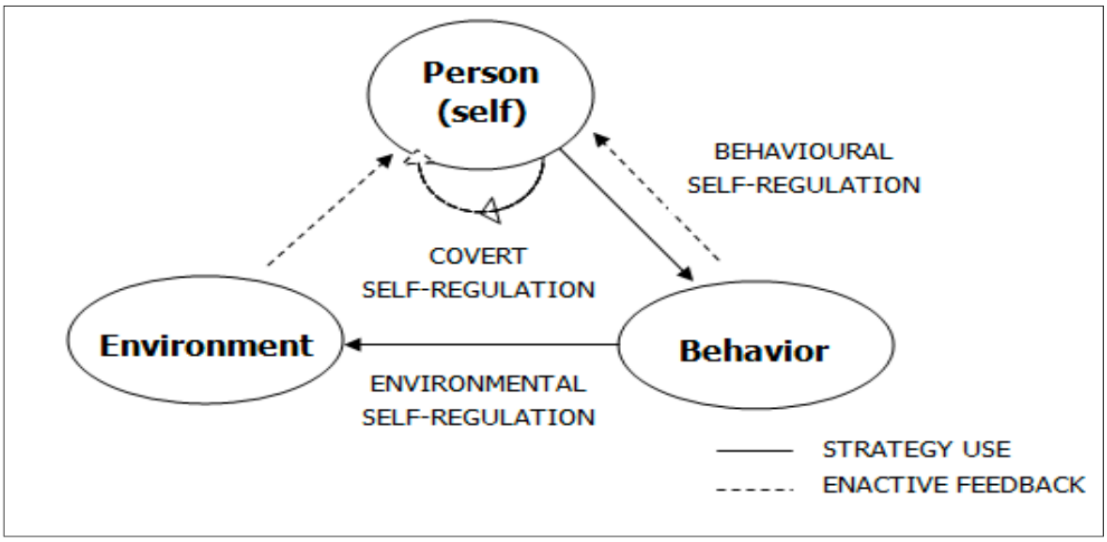



Figure 1: Social Cognitive Theory by Bandura (1986, 2001)

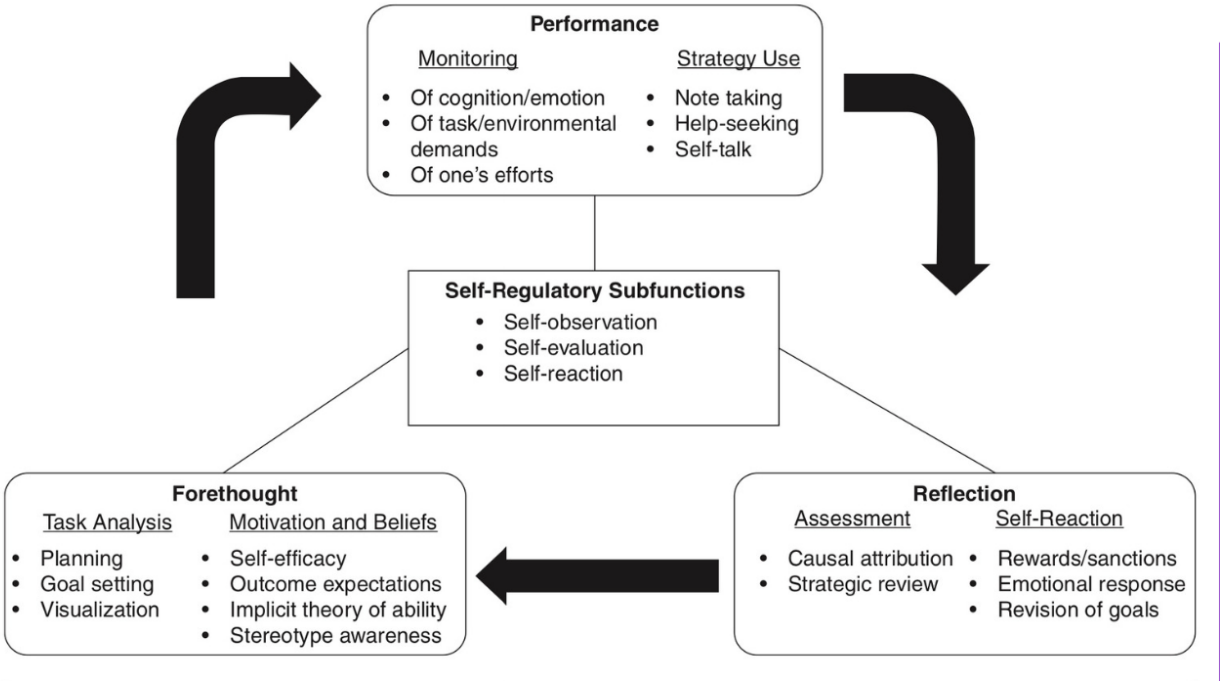



Figure 2: Cyclical Model of Self-Regulation

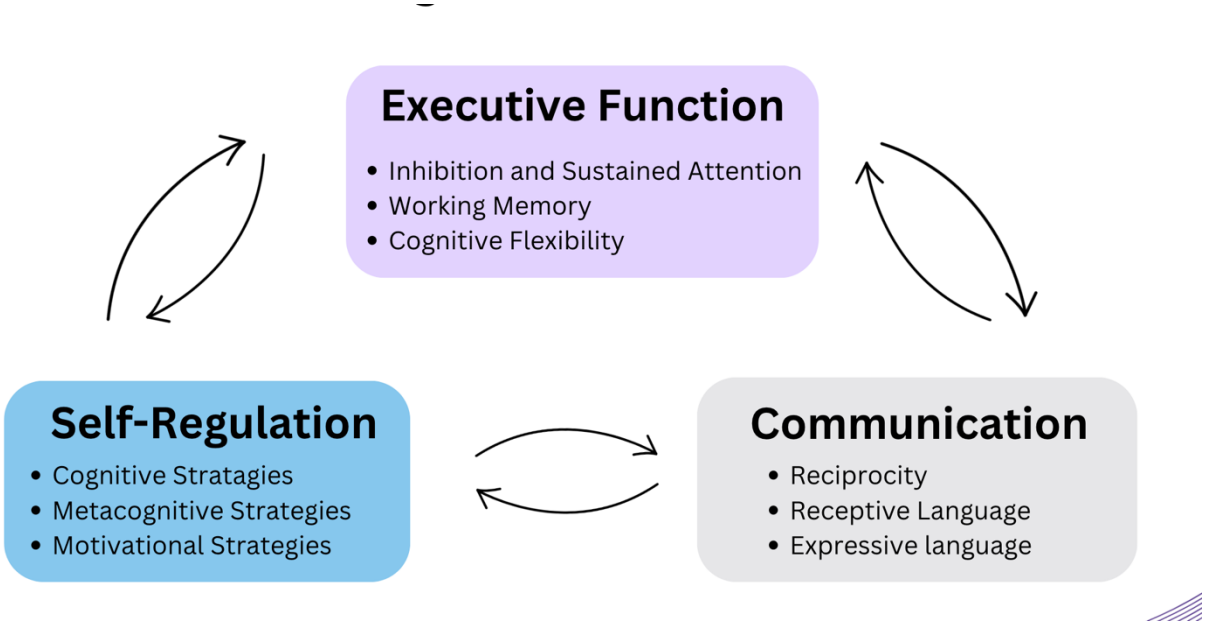



Figure 3. Conceptual Framework of Cognitive Strategies During Communication

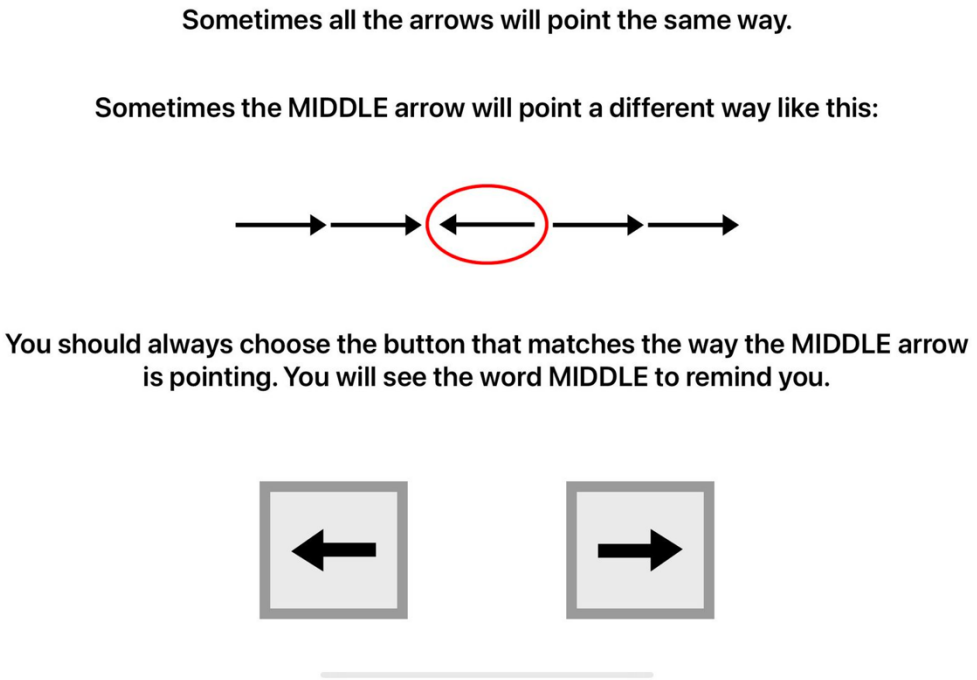



Figure 4: Flanker's Inhibitory and Attention Test (NIH Toolbox, n.d.)

**Cognitive and Metacognitive Strategies: Metacognitive Self-Regulation**

**Metacognition refers to the awareness, knowledge, and control of cognition. We have focused on the control and self-regulation aspects of metacognition on the MSLQ, not the knowledge aspect. There are three general processes that make up metacognitive self-regulatory activities: planning, monitoring, and regulating. Planning activities such as goal setting and task analysis help to activate, or prime, relevant aspects of prior knowledge that make organizing and comprehending the material easier. Monitoring activities include tracking of one's attention as one reads, and self-testing and questioning: these assist the learner in understanding the material and integrating it with prior knowledge. Regulating refers to the fine-tuning and continuous adjustment of one's cognitive activities. Regulating activities are assumed to improve performance by assisting learners in checking and correcting their behavior as they proceed on a task.**

Item

33. During class time I often miss important points because I'm thinking of other things. (REVERSED)
36. When reading for this course, I make up questions to help focus my reading.
41. When I become confused about something I'm reading for this class, I go back and try to figure it out.
44. If course materials are difficult to understand, I change the way I read the material.
54. Before I study new course material thoroughly, I often skim it to see how it is organized.
55. I ask myself questions to make sure I understand the material I have been studying in this class.
56. I try to change the way I study in order to fit the course requirements and instructor's teaching style.
57. I often find that I have been reading for class but don't know what it was all about. (REVERSED)
61. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying.
76. When studying for this course I try to determine which concepts I don't understand well.
78. When I study for this class, I set goals for myself in order to direct my activities in each study period.
79. If I get confused taking notes in class, I make sure I sort it out afterwards.





Figure 5: Question of the Cognitive and Metacognitive Strategies of the MSLQ (Pintrich, 1991)

Table 1: Empirical Studies on Virtual Interview Training in College Students with Disabilities

| Author(s) & Year | Purpose | Sample | Study Type/ Analysis Procedures | Types of Technology Used | Use of Technology |
|---|---|---|---|---|---|
| Burke et al., 2021 | To investigate the effectiveness of virtual interactive training agents (ViTA) in improving employment interview. | *N* = 153<br>25 reported having ADHD or ADD, which accounts for 16.34% of the sample. Other disabilities included autism (64.71%), intellectual disability (40%), cerebral palsy (4.58%), Down syndrome (0.65%), Prader-Willi syndrome (0.65%), and other non-specific types (24.18%). | *Study Type:*<br>Quasi-experimental<br><br>*Data Analysis*:<br>1. Repeated-measures linear regression<br>2. Descriptive analyses | Use of virtual interactive training agents (ViTA) as a way to practice interviewing | System provided participants with feedback on their performance and allowed them to practice their responses to common interview questions. |
| Downey et al., 2023 | To examine the effectiveness of an LBBI e-book in enhancing job interview skills for college students with IDD and assessed its real- | 3 college males ages 19-20 | *Study Type:*<br>Multiple-probe design<br><br>*Data Analysis:*<br>1. Calculated central tendency and ranges, and | E-books or participants strengths and preferences, feedback vi screen share | video conferencing platform to conduct virtual job interviews with the participant |

| Author(s) & Year | Purpose | Sample | Study Type/ Analysis Procedures | Types of Technology Used | Use of Technology |
|---|---|---|---|---|---|
| | world application and perceived validity. | | determined the direction, trend, and level of data to identify condition changes.<br>2. Tau U post-hoc analysis of graphed data to establish the effect size across conditions.<br>3. Perceptions of parents and professionals to evaluate the social validity. | | |
| Genova et al., 2021 | To examine the preliminary effectiveness and feasibility of a virtual reality job interview tool (VR-JIT) in improving job interview performance. | *N* = 14<br><br>Ages 16-19 | *Study Type:*<br>Randomized controlled design.<br><br>*Data Analysis:*<br>1. T- test<br>2. Chi square | Virtual reality job interview tool (VR JIT) | interviewing with a virtual human and receiving feedback. Participants were able to choose from a range.<br><br>of potential responses that appeared on the computer screen. T |

| Author(s) & Year | Purpose | Sample | Study Type/ Analysis Procedures | Types of Technology Used | Use of Technology |
|---|---|---|---|---|---|
| Horn et al., 2023 | To assess the effects of ECoaching, | *N= 3 transition aged students*<br>*Ages 14-21* | *Study Type:* Single case design with multiple baselines<br><br>*Data Analysis:* Visual Analysis and Tau-U | E-coaching (i.e., Bug in Ear) | Two- way Communication in sessions enabled Via HP Pavillions 15-cs) for live streamed interviews and Apple Airpods for immediate feedback. |
| Kumazaki et al., 2022 | Evaluate group-based online job interview training program, | *N* = 14<br>Ages 18-24<br>Average IQ = 87.1<br>Individuals with autism | *Study Type:*<br>Quasi-experimental<br><br>*Data Analysis:*<br>1. Descriptive statistics<br>2. Interclass correlation coefficient. | Group based online job interview training program using a virtual robot | Virtual robots to simulate a job interview scenario. The participants engaged in mock online job interviews with virtual robots in the first session, followed by a feedback session with the interviewer and evaluators. |
| Smith et al., 2022 | To evaluate the effectiveness of two virtual interview training programs, VR-JIT, and VIT-TAY. | *N* = 1,183<br>(across 13 states)<br><br>Average Age for VR-JIT= 16-21<br><br>Average Age for VIT-TAY = 15- 256 | *Study Type*<br>1. Secondary summary of quasi-experimental Studies<br><br>*Data Analysis:* | Virtual Reality Job Interview Training (VR-JIT) and Virtual Interactive Training Agent | Computerized job interview simulators designed to improve interview skills and access to employment for individuals with disabilities. |

| Author(s) & Year | Purpose | Sample | Study Type/ Analysis Procedures | Types of Technology Used | Use of Technology |
|---|---|---|---|---|---|
| | | Disabilities represented: OHI, EBD, IND, speech, and language disability | 1. Cluster-adjusted chi-square<br>2. t-tests using a school-level clustering variable to evaluate between-group student-level descriptive characteristics.<br>3. Stata modules | for Youths (VIT-TAY), | |
| Walker et al., 2016 | Investigate the effectiveness of simulated job interviews in a mixed-reality environment | *N= 5*<br><br>Students diagnosed with IND | *Study Type:* Single Case Design (multiple probe across days)<br><br>*Data Analysis*: Visual Analysis | TLE TeachLivE system, Skype, cameras, speakers, and microphones | Mixed-reality lab with virtual interviewer for simulated job interviews, remote interactor via Skype, using cameras, speakers, and mics for audio/video data. |

Table 2: Results of RQ2 for Manuscript 3

| | | | | | | | 95% C.I.for EXP(B) | |
|---|---|---|---|---|---|---|---|---|
| | | B | S.E. | Wald | df | Sig. | Exp(B) | Lower | Upper |
| Step 1[a] | NIHDimenCardSorting | -.065 | .024 | 7.487 | 1 | .006 | .937 | .895 | .982 |
| | NIHFlanker | .012 | .033 | .139 | 1 | .710 | 1.012 | .949 | 1.080 |
| | MSLQ | -.385 | .380 | 1.024 | 1 | .312 | .681 | .323 | 1.434 |
| | NIHListSorting | -.050 | .032 | 2.495 | 1 | .114 | .951 | .893 | 1.012 |
| | Constant | 10.843 | 4.953 | 4.793 | 1 | .029 | 51171.956 | | |

a. Variable(s) entered: NIHDimenCardSorting, NIHFlanker, MSLQ, NIHListSorting.