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Preparing Educators to Effectively Engage with Postsecondary STEM Students with Autism

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PREPARING EDUCATORS TO EFFECTIVELY ENGAGE WITH POSTSECONDARY STEM STUDENTS WITH AUTISM

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Dedication

I dedicate this thesis to my mom, Socorro, who sacrificed everything (her own person) to always support me as well as to my dad, Salvador, who provided all the material support to make my education possible.

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Abstract

Autism spectrum disorder (ASD) is a lifetime mental disability (Boucher, 2009). Because the brains of people with autism work differently than their non-neurodiverse peers (Kuzminskaite et al., 2020), they tend to respond to external stimuli in a hypo- or hyper-sensory fashion. One of the primary considerations that must be accounted for when working with individuals with autism is that the brains of these persons are each neurologically distinct. In other words, there is no "one-size-fits-all" means by which individuals with ASD learn and develop and, consequently, no single way to therefore engage with said individuals (Anderson & Butt, 2017; Kuzminski et al., 2019). Students with ASD present with strengths that position them to be successful in STEM fields, including attention to and focus on details, persistence, and recognizing and using patterns (Hassenfeldt et al., 2019). However, even though students with ASD demonstrate cognitive and academic capabilities that contribute to the STEM fields, they also experience barriers in other areas (sensorial, social, emotional, communication, routine changes, time management) that pose difficulties in college (Wick, 2022). Therefore, students with ASD need continuous accommodation, support, and/or interventions or treatments as their unique needs change and evolve. Consequently, those educators working alongside students with ASD require a comprehensive understanding of the students' extraordinary and efficient neurological distinctness, as the brain of ASD just "works different" (Wick, 2022). The work presented herein seeks to address these considerations and to promote conversation around best practices for supporting and engaging with postsecondary STEM students with ASD.

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List of Abbreviations

ASD	Autism Spectrum Disorder
CDC	Centers for Disease Control and Prevention
GTA	Graduate Teaching Assistant
PD	Professional Development
STEM	Science, Technology, Engineering, and Mathematics

Chapter 1: Introduction

ASD and the Reality of Uniqueness in Students within the Spectrum

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized primarily by a difference, but uniqueness, in social communication (Davidson et al., 2023). Due to these differentiated and unique forms of social communication, individuals with ASD exhibit repetitive and (sometimes) restricted behaviors, which may be stereotyped as “atypical” despite that fact that the individual is simply trying to communicate as per their brain functionality (Davidson et al., 2023). The definition of ASD cited above directly highlights that autism spectrum disorder affects how people perceive their environment and interact within that space (Glennon, 2016). More acutely, biological differences in persons with ASD affect the psychological condition of the individual in the way of thinking, feeling, attending, listening, and making sense of the world (Guldberg et al., 2019). ASD can also impact the levels of anxiety, self-esteem, and well-being of persons diagnosed with the condition (West, 2019). As a result, the (negative) connotations and stereotypes associated with autism as a disability are largely the result of living in a society that is not accommodating toward autistic people (Guldberg, 2020). Furthermore, “disability” is the “result of the interaction of the environment and the person” (Youdell et at., 2020).

To understand ASD, one must be cognizant that there are no ready-made solutions available, and ASD cannot simply be reduced to a series of assumptions (Osteen, 2008). Instead, within educational contexts specifically, one must focus on the key issues that contribute to the students’ readiness to learn, the situational factors that influence how they engage with others and with curricular materials, and the

mechanisms that increase their sense of belonginess and well-being—all areas that may require further investigation and appropriation as per the uniqueness of ASD (Osteen, 2008).

Engagement of ASD Students in Postsecondary Education

According to the Centers for Disease Control and Prevention (CDC; 2023), the prevalence of autism is about 1 person with ASD in 36 typical persons. Autism is reported to occur in all racial, ethnic, and socioeconomic groups and occurs at a rate of four times as many cases in males *vs.* females. Government data indicates that this trend is likely to continue for the foreseeable future (CDC, 2023).

The prevalence of ASD students going to college is also reported to be increasing. According to Davidson et al. (2023), half a million young adults with ASD will be seeking postsecondary schooling within the decade. Therefore, is crucial that colleges, universities, and any other type of postsecondary education entities put in place effective supports, strategies, interventions, and/or treatments for ASD students, as these efforts are poised to positively influence ASD student success (Davidson et al., 2023).

Regardless, attending college can be both challenging and frustrating for ASD students. As was previously described, social-communication impairments or difficulties are among the main factors contributing to such negative outcomes. This can lead to other situations such as depression and anxiety for students with ASD in postsecondary education (Chandrasekhar, 2019). Academic difficulties, struggles with time management and daily living skills, and lack of support from educators and institutions can compound these outcomes, increasing attrition rates among ASD students (Chandrasekhar, 2019).

Within the STEM disciplines, undergraduate students with ASD spend a significant amount of time interacting with graduate teaching assistants (GTAs) and faculty (e.g., through participation in laboratory coursework) (Goodwin et al., 2021). Yet, limited studies have examined GTAs' and educators' awareness of and preparedness to engage with

neurodiverse individuals, including students who have been diagnosed with autism. Further research in this area can thus be an important step in identifying how to best support the academic and professional growth of college students with ASD. While beyond the scope of this thesis, findings from this work can be used to drive education in ASD for GTAs and other educators (Hassenfeldt, 2019).

Summary of Specific Aims

The overarching goal of this thesis is to offer additional insight into how educators, including GTAs, might shape the learning experiences of postsecondary STEM students with ASD and the considerations that need to be accounted for in realizing that potential. To that end, I centered my work around two specific aims, as described below.

Specific Aim 1: The purpose of the first specific aim was to examine GTAs' current awareness of ASD and their strategies for engaging with individuals who are neurodiverse, to include undergraduates with ASD. This was accomplished through use of a survey-based approach, which included both closed- and open-ended items (Hassenfeldt et al., 2019). Given previous empirical evidence (e.g., Kuder et al., 2018; Hassenfeldt et al., 2019), I anticipated that GTAs' awareness and understanding of ASD would likely have emerged from word-of-mouth interactions. Further, I expected that GTAs would largely feel underprepared to engage with ASD learners due to limited professional development in areas related to neurodiversity being offered at the institution at which this research was conducted.

Specific Aim 2: The second aim was intentionally designed to be an essay-style piece advocating for various tactics, grounded in the literature, that could be leveraged to facilitate ASD students' transition into college and their subsequent success in a diversity

of postsecondary classroom contexts. In maintaining that focus, my goal was to have this chapter serve as a “call to action” for postsecondary educators nationwide. This approach, I contend, could be particularly impactful given the myriad ways in which ASD manifests itself (Vivanti & Messinger, 2021).

Chapter 2: Graduate Teaching Assistants' Knowledge of and Attitudes Toward Autism and Students with Autism

Introduction

Despite the negative stereotypes associated with autism spectrum disorder (ASD) and with neurodiversity more broadly, individuals with ASD possess incredible intelligence and can be real experts in a specific field, area of study, or activity (Center for Disease Control and Prevention [CDC], 2023). As alluded to previously, the growing tendency of students with ASD to pursue postsecondary education necessitates greater attention in terms of support that can be provided by instructors, including graduate teaching assistants (GTAs) (Hassenfeldt, 2019). For this reason, it is important to explore the knowledge, perceptions, preparedness, and current practices of GTAs who engage with students with ASD (Glennon, 2016).

To address this aim, the present study employed a survey-based approach, which included both closed- and open-ended items (McClain et al., 2019) designed to generate a case study describing the status of GTAs' knowledge of ASD and preparedness to support undergraduates with ASD at The University of Texas at El Paso. The following specific research questions guided this work:

RQ1) What degree of knowledge do GTAs currently possess regarding ASD?

RQ2) Do GTAs currently feel well-equipped to teach college students with autism? Why, or why not?

RQ3) According to GTAs, what are some of the strengths and challenges associated with autism?

I hypothesized that, in general, GTAs would self-report diverse experiences involving students with ASD in the classroom, with most of their awareness and knowledge of best practices to engage with such populations emerging through word-of-mouth conversations with colleagues (Hassenfeldt et al., 2019). Similarly, I expected that GTAs would be able to identify few specific skills and/or strategies that could be adapted for use with students with ASD as well as limited strengths/challenges associated with the condition. Importantly, rather than portraying GTA competency from a deficit lens, I aim to make use of the data gathered from this study to inform the future genesis, integration, and evaluation of PD for GTAs to support advances in their knowledge, skills, and dispositions toward ASD in the classroom.

Methods

Participant Recruitment and Demographics. Participants (*N* = 18) represented a sample of convenience consisting of GTAs in various academic departments at The University of Texas at El Paso. These individuals largely self-identified as female (*n* = 9; 50% of participants) and Hispanic (*n* = 11; 61% of participants), with an average of four semesters of teaching experience. Participant recruitment occurred during the Spring 2024 semester through a general email invitation extended to the entire graduate student community on campus. The specific approaches employed to collect data from consenting participants are described below. This research was approved by The University of Texas at El Paso's Institutional Review Board (IRB) under protocol #2152661.

Measurement of GTAs' General Knowledge and Perceptions of ASD. The Autism Spectrum Knowledge Scale-General Population (ASKSG) (McClain et al., 2019) was used to evaluate GTAs' current knowledge of ASD (RQ1), as the instrument has previously been validated with participants similar to those in the present study. The ASKSG is a 31-item inventory consisting of closed-ended statements about the ASD condition. Respondents are required to indicate whether each statement is true or false. Additionally, two open-ended items (adapted from Dillenburger et al., 2013; McClain et al., 2019) were appended to the survey to further examine GTAs' perceptions of ASD (RQ2 & RQ3): *Do you currently feel well-equipped to teach college students with autism? Why, or why not?*; and *In your opinion, what are some of the strengths and challenges associated with autism*? All responses were collected online via The University of Texas at El Paso's QuestionPro platform.

Analysis of Survey Responses. Closed-ended items on the ASKSG were coded for accuracy ("0" = incorrect true/false determination; "1" = correct true/false determination). Open-ended responses were blinded and subjected to inductive coding, which allowed for emergent themes to be identified in the dataset (McClain et al., 2019). Each response was coded by two individuals with expertise in biology education (L.G. and J.T.O.), yielding high interrater reliability ($\kappa = 0.878$; $p < 0.001$). All disputes were resolved through conversation between L.G. and J.T.O. until consensus was obtained.

Results

RQ1: GTAs Possess Moderate, though Variable, Knowledge of ASD. Analysis of participant responses on the ASKSG suggests that GTAs generally hold accurate views regarding facets of ASD that are regularly discussed in the media (e.g., “Vaccines can cause autism spectrum disorder.”), that challenge stereotypical norms (e.g., “All individuals with autism spectrum disorder have low intellectual quotients.”), or that reflect observable aspects of the condition (e.g., “Many individuals with autism spectrum disorder have difficulties expressing themselves.”) (Table 1). Conversely, the level of accuracy noted for items representing factual (i.e., “textbook”) knowledge about ASD was more variable. For instance, less than 40% of participants (n = 7) were aware that <2% of people in the United States have ASD and only half recognized that differences in identification rates of ASD exist across various racial and ethnic groups. This latter observation, I contend, is particularly compelling given the regional demography within the El Paso borderplex.

Table 1. Participant knowledge of ASD, as measured via the ASKSG.

Item	Correct Response	Observed Accuracy
Less than 2% of people in the US have autism spectrum disorder.	True	39%
Vaccines can cause autism spectrum disorder.	False	94%
Boys are four times as likely than girls to have autism spectrum disorder.	True	50%
Children who have a brother or sister with autism spectrum disorder are more likely to develop the disorder.	True	44%
Autism spectrum disorder is caused by a lack of motherly warmth.	False	94%
Advanced paternal (father) age is a risk factor for autism spectrum disorder.	True	39%
There are no differences in the identification rates of autism spectrum disorder across racial and ethnic groups.	False	50%

Item (Cont'd)	Correct Response	Observed Accuracy
All individuals with autism spectrum disorder have low intellectual quotients (i.e., IQs).	False	100%
Individuals with autism spectrum disorder may not play or work with objects the way they are intended.	True	78%
Individuals with autism spectrum disorder may have strict routines or rituals.	True	83%
Individuals with autism spectrum disorder have difficulties interacting socially with others.	True	78%
Some individuals with autism spectrum disorder may be uncoordinated or clumsy.	True	83%
Many individuals with autism spectrum disorder have difficulties expressing themselves.	True	83%
Symptoms of autism spectrum disorder do not appear before the age of two years.	False	50%
Diagnosis of autism spectrum disorder is primarily based on behavioral observations and parent interviews.	True	78%
Autism spectrum disorder can only be diagnosed after the age of four years.	False	83%
If a teacher believes a student has autism spectrum disorder, they can make a diagnosis.	False	83%
Autism spectrum disorder can be diagnosed with brain imaging.	False	44%
For a diagnosis of autism spectrum disorder, symptoms must be present from early childhood.	True	44%
It is possible for autism spectrum disorder to develop into adulthood.	False	33%
A diagnosis of autism spectrum disorder can only be made by a medical doctor.	False	56%
There are no beneficial treatments available for individuals with autism spectrum disorder.	False	78%
Restricting certain foods (e.g., gluten) is an effective treatment for autism spectrum disorder.	False	67%
Social skills training is an effective treatment for some individuals with autism spectrum disorder.	True	94%
Intellectual quotient (i.e., IQ) and age affect treatment success for children with autism spectrum disorder.	True	50%
Most individuals with autism spectrum disorder will never learn to speak.	False	83%
Symptoms of autism spectrum disorder do not change throughout an individual's life.	False	83%
Autism spectrum disorder only affects children.	False	100%
Many individuals with autism spectrum disorder have difficulties living and working independently in adulthood.	True	61%

Item (Cont'd)	Correct Response	Observed Accuracy
Up to 70% of individuals with autism spectrum disorder also have an additional mental health diagnosis (e.g., anxiety).	True	83%
Many children with autism spectrum disorder are at risk for academic difficulties	True	89%

RQ2: The Majority of GTAs Do Not Feel Equipped to Teach College Students with ASD. Qualitative analyses demonstrated that most GTAs did not perceive themselves to be prepared to engage with postsecondary learners with ASD (*n* = 11; 61% of participants). Rationales provided to justify those perceptions included a lack of education/training on ASD (*n* = 7; 39% of participants) and a lack of appropriate pedagogical/teaching materials designed specifically for ASD learners (*n* = 3*;* 17% of participants) (Table 2). As one participant noted:

> *I believe I am not ready or well-equipped to teach college students with autism. Although I have dealt with a person with autism, this was a high-functioning individual, which may differ from other people with autism… Also, I don't believe that a lot of the teaching material for college students [is] suited for people with this diagnosis.*

Interestingly, a small number of GTAs (*n* = 3; 17% of participants) acknowledged that they were ill-equipped to teach undergraduates with ASD but were not certain about what factors may have contributed to this perceived (or real) lack of preparation. In this instance especially, providing GTAs with structured opportunities to learn about ASD and engage

with neurodiverse students may be a beneficial step in advancing growth and success for all involved.

Among those GTAs who self-reported feeling equipped to work alongside students with ASD (*n* = 7; 39% of participants), 43% (*n* = 3) did so because of their commitment to inclusive teaching practices. This was followed by an equal number of responses related to advanced education on/knowledge of ASD and personal experiences. Sample quotes representing these themes are presented in Table 2 below.

Table 2. GTA responses to the question: "*Do you currently feel well-equipped to teach college students with autism? Why, or why not?"*

Theme	**No. of Responses (%)[a]**	**Sample Quote**
Reasons for Not Feeling Well-Equipped		
Lack of ASD Education/Training	7 (39%)	"Not really. I have not received training on how to properly address their academic needs."
Lack of Appropriate Pedagogical and Training Materials	3 (17%)	*See the above quote*
Uncertain	3 (17%)	"I am unsure what their needs consist of, so no."
Reasons for Feeling Well-Equipped		
Advanced Degree or Education	2 (11%)	"I feel well-equipped, because I have an advanced degree and I have had students with autism and my son has autism."
Personal Experience	2 (11%)	"Yes. I believe that the experience I have had with teaching college students from diverse cultural and social backgrounds in the past years has prepared me to handle and adjust my teaching skills to suit the needs of my students."
Sufficient Knowledge of ASD	2 (11%)	"Yes, I feel confident teaching students with autism. I feel as though my life experience and understanding of the subject matter

		allow me to be able to take different approaches to ensure the students are able to learn."
Commitment to Inclusive Teaching	3 (17%)	"As a teaching assistant, I feel well-prepared to teach college students with autism due to my educational background and resources available to me. My training has included specific modules on educational inclusivity and strategies."

[a]*N* = 18; GTA responses were coded into multiple categories, as appropriate.

RQ3: GTAs Acknowledge a Diversity of Strengths and Challenges Associated with ASD. When prompted, GTAs noted several strengths possessed by individuals with ASD, including their compassionate nature, attention to specific tasks or details, and intellectual acumen (Table 3). It is noteworthy that these features align directly with the literature base on ASD (Anderson et al., 2017). Conversely, difficulty socializing, disruptions to routines, and negative external perceptions or stigmas were cited as some of the challenges encountered by persons with ASD. Attention to these factors, too, has been replete in the ASD literature (Vivanti & Messinger, 2021). These findings suggest that GTAs are cognizant of prevalent conceptions of the ASD condition, even if they are not acutely aware of that fact. More broadly, they signal potential areas where GTA professional development could be implemented to capitalize upon GTAs' familiarity with given ASD strengths and challenges.

Table 3. GTA responses to the question: "*In your opinion, what are some of the strengths and challenges associated with autism*?"

Theme	No. of Responses (%)[a]	Sample Quote[b]
Perceived Strengths		
Attention to Specific Tasks and Details	11 (61%)	"In my opinion, some of the strengths associated with autism include exceptional attention to detail, strong memory skills, and the ability to think creatively…"
Compassionate Nature	2 (11%)	-
Excellent Memory/Highly Intelligent	7 (39%)	*See the above quote*
Prosocial Behavior	1 (6%)	"From what I've experienced, some of the strengths could be that they tend to be…social, which makes it easier for other people to include them in activities."
Artistic	1 (6%)	-
Perceived Challenges		
Difficulty Communicating	3 (17%)	"There are some challenges in communicating that can affect social life like making friends, finding [a] partner. Plus finding a job."
Sensory Sensitivity	2 (11%)	-
Difficulty Socializing or Being Part of a Team	5 (28%)	"Difficulties with social interactions…may affect their ability to adapt to changes and navigate social environments, which can impact their academic and professional experiences.
Misdiagnosis or Delayed Diagnosis	1 (6%)	-
Difficulty with Memory/Recall	1 (6%)	-
Conditions Unconducive to Learning	2 (11%)	"[The] challenge is that many of us are not well trained."
Disruptions to Routines	2 (11%)	"A challenge would be difficulty adjusting when going off routine or being in an unfamiliar environment."
Negative External Perceptions or Stigma	3 (17%)	"Neurodivergence is highly stigmatized, and it's worse for autistic students, in my own experience."

Perceived Challenges (Cont'd)		
Varied Emotional Control	1 (6%)	-
Repetitive or Stimming Behaviors	1 (6%)	-

[a]*N* = 18; GTA responses were coded into multiple categories, as appropriate.
[b]Note that several themes are missing sample quotes, as many respondents simply provided a list of strengths and weaknesses.

Concluding Thoughts and Study Limitations

Advancing GTAs' knowledge of and attitudes toward learners with ASD should arguably be an essential element of their professional training (*sensu* Hassenfeld et al., 2019), as this will ideally lead to direct benefits for the ASD students and the institution as a whole (Vivanti, 2020). The findings presented above suggest that GTAs are already aware of some of the factors impacting ASD student success, even if that awareness is highly variable in select areas. That said, openness to expanding one's understanding of the ASD condition is even more important, as research demonstrates that this results in greater appreciation for the unique ways in which ASD can manifest itself (Davidson, 2023).

I wish to acknowledge that there are several limitations to this work, the primary one being a small sample size, which impacts the generalizability of the outcomes described. Future research would benefit from expanding the eligible participant pool to include GTAs at other universities, those without prior teaching experience, etc. Furthermore, while the data demonstrate how GTAs perceive that they attend to learners with ASD, this may or may not reflect actual behaviors and actions in the classroom. In this case, collection and analysis of video observations might provide fruitful insights. Collectively, these approaches can offer a more holistic view on how we, as educators, can most effectively promote the personal, intellectual, and professional growth of students with ASD.

Chapter 3: Promoting the Inclusion and Advancement of Autistic Students within Postsecondary Learning Environments

Introduction

The primary impairments that characterize the autism condition are limitations in communication—even though persons with autism spectrum disorder (ASD) are verbal—and an inability to fully engage in social interactions (Ames, 2016). Autism is a complex reality, and diagnosis does present with other challenges that are mainly associated with how the individual with ASD responds to the environment and its variants or elements, what is commonly referred to as sensory integration (Baczewski et al., 2022). Within the context of science, technology, engineering, and mathematics (STEM) at the postsecondary level, studies have shown that students who have been diagnosed with ASD represent the most growing population on college campuses (Gurbuz et al., 2019).

Understanding how to empower and support learners and/or students with autism to be successful in postsecondary STEM education is the key to giving opportunity to a potential neurodiverse scientist. In turn, having a better comprehension of how ASD impacts the regular or normal executive functions of the brain makes it possible to develop the best support to close the bridge between neurotypical and neurodiverse learners, and, more broadly, to comprehend how the ASD brain functions as a whole (Elias & White, 2018). Awareness and understanding could likewise enforce inclusive environments that may also improve academic and social outcomes for postsecondary STEM students with ASD (Hillier et al., 2018). Some of the main factors to consider as part of this process are the supports needed to facilitate social

interactions, decode social clues, promote emotional regulation, and establish routines (Hassenfeldt, 2019). Achieving this goal is arguably complicated by the reality that the community of autism is impacted by societal attitudes influenced by ideas and views instead of knowledge of ASD (Guldberg et al., 2019). Consequently, I contend that a system with integrative educational practice and/or ASD education that emphasizes inclusiveness and empathy will offer skills to better support and empower ASD students who are part of the postsecondary STEM community (Dewsbury & Brame, 2019).

One initial step that could be taken is to examine individuals' awareness of ASD and their strategies for engaging with students with ASD. This could be accomplished with the use of semi-structured interview techniques (Biesta, 2016), among other strategies. Given previous empirical evidence, including my own research (see Chapter 2), it is likely that awareness and understanding of ASD largely emerges from word-of-mouth interactions (Hassenfeldt et al., 2019). Further, it is expected that there is no suitable intervention that can apply to all individuals or students with ASD, resulting in the adoption of diverse strategies to engage with individuals who are neurodiverse (Kuder et al., 2018). Therefore, knowledge about ASD may lead to a decrease in misconceptions about ASD and may foment a positive environment for neurodiverse students in college STEM environments (Hassenfeldt, 2019).

More specifically, equipping educators with knowledge about ASD could lead to a powerful impact on undergraduate student learning at many colleges and universities through enhancement of instructors' ability to provide quality teaching because of improved capacity to offer worthwhile and substantial learning opportunities for diverse learners (Dewsbury & Brame, 2019; Kern & Olimpo 2022). As alluded to previously,

creating more knowledge around ASD and fostering an empathetic community could likewise provide postsecondary STEM students with ASD a better chance to obtain their bachelor's degree by reducing attrition (Wick, 2022).

Broadly, identification of areas of ASD education to support STEM students with ASD is relevant because "in the history of ASD studies, knowledge through expertise has been claimed" (Locke et al., 2023). Consequently, such education could consider the following elements: 1) what terminology should be used to define and describe ASD; 2) the theoretical basis for educational best practices for engaging with students with ASD, as supported by existing literature and empirical studies; 3) how spending time with a person with ASD can shape one's thinking and attitudes toward acceptance and support for people with ASD; 4) parental information, defined as key and important information to develop effective tools to accept ASD; 5) other supports that offers relevance to ASD students; 6) how departmental and institutional policies shape the culture around neurodiverse individuals on college campuses; and 7) how sustained education on autism can contribute to transformative conditions to support students with ASD (Guldberg, 2020). Realization of these elements could occur through seminars, workshops, mentorship programs, conferences with parents, or even graduate courses (Goodwin et al., 2021).

In what follows, I explore each of the aforementioned elements. While they are presented in itemized fashion to increase clarity and readability, it is important to note that a dynamic interaction exists between all elements, which—both individually and collectively—shape the experiences of postsecondary students with ASD.

ASD Description and Terminology

According to psychologist Lev Vygotsky, a description for ASD is "*the mechanism of external asociality (ASD) and the disintegration of the persona[ity] (the social in us)"* (Vygotsky 1931/2018, pp. 184–192). Kretschmer (1921) similarly defined ASD as *"having a hypersensitive condition and apathetic at the same time."* Vivant & Messinger (2021) have, more recently, described the condition as possessing "lack of interest" (Vivanti & Messinger, 2021).

Regardless of the source, definitions of ASD typically encompass three main elements: impairments in social interaction, limitations of social communication, and apparent minimal social imagination (Vivanti & Messinger, 2021). Impairment in social interaction implies that there is a tendency for individuals with ASD to stay by themselves. The preference is to navigate alone, showing non-verbal signs. There is no eye contact, avoidance of physical contact, and insensibility to emotions. Relatedly, limitations in social communication may manifest as use of truncated phrases or sentences with limited, if any, bidirectional expressions or dialogue being employed. Both factors interface with the possibility of scarce social imagination, which is described as the inability of ASD individuals to predict explicit (or visible) social outcomes in a given situation (Vivanti & Messinger, 2021).

Theoretical Basis for Educational Best Practices for Engaging with Students with ASD (ASD Theories)

The definition of ASD and its associated characteristics and methods of intervention/treatment "cannot be interpretable or be explainable without the context

and/or theme of theories" (Vivanti & Messinger, 2021). Notably, theories may often describe and/or illustrate the reciprocal or relational conditions that exist between "disorders"—such as how ASD is categorized—and "regular" or "typical" development (Pennington, 2014). Establishment of a clear and intentional theoretical basis can also serve as the focal point to promote a conceptual understanding of ASD and to critically evaluate assumptions about what are "normal" and "desirable" behaviors, all with the intent to guide parents, educators, and potential students with ASD in postsecondary STEM education and/or other persons toward a more accurate and holistic understanding of ASD (Osteen, 2008).

It is equally important to note that ASD is not a new condition. Hence, theories about ASD have been evolving for nearly ten decades, shaping the diagnostics, policies, treatments, interventions, and approaches employed. Ideally, modifications and advancements are made that reduce confusion around conflicting ideologies about what constitutes "typical versus atypical" development. This further underscores the importance of emphasizing that there is not a standard rule by which to discuss ASD as a condition that it is real and existential, as the ways in which ASD manifests are unique to each individual (Vivanti & Messinger, 2021).

Below, I analyze how various theories contributed to the knowledge and treatment of ASD over time. Further, I discuss how these theories have led to possible accommodations and interventions for persons with ASD, while acknowledging that such theories exist within a broader model of disability and neurodiversity and its connection with the Diagnostic and Statistical Manual of Mental Disorders (DSM), where ASD is composed of several categories (Su et al, 2020).

Theories of ASD – Cognitive Focus

In the 1970s, the fields of psychology and psychiatry offered several new theories about ASD, some included in the DSM III, that refined conceptualizations of the condition. However, this was largely focused on empirical data for clinical decision making as well as epidemiological studies to understand ASD from a psychiatric perspective (Strand, 2011). Comparatively, in the 1980s, subdisciplines within psychology posited theories that offered choices to understand and treat the cognitive manner of ASD. These psychological science theories positioned ASD as a “primary cognitive deficit” and “impairments in theory of mind” (Baron-Cohen 2020), with weak “central coherence” (Frith, 1989), and executive dysfunction (Osteen, 2008).

According to Happe (2006), previous ASD positions failed to provide unequivocal support. Namely, earlier theoretically-driven studies routinely described ASD from a deficit viewpoint, even though the ASD condition and our understanding of ASD are constantly evolving (Pellicano, et al., 2005). For instance, most recent research has suggested that what had previously been defined as “early abnormalities” observed in ASD might instead be ASD domain-general (a generalized feature of ASD) rather than ASD domain-particular (a particular characteristic of ASD) (Elsabbagh & Johnson, 2016). Additional insights are offered from neuroscientific and biological research, which focus our attention on causal models of ASD, mainly with respect to genetics and brain anatomy, as a means to offer more robust explanations about ASD that may enhance understanding and enable educators to better provide supports that empower students with ASD (Osteen, 2008). Regardless, as indicated at the outset of this chapter, these theoretical and empirical findings cannot be applied in a uniform or static manner, as

everyone with ASD is unique in their condition, situations, expectations, and needs (Su et al., 2020).

Theories of ASD – Interventions and Accommodations

Theories of ASD pertaining to interventions and accommodations have commonly centered on 1) continuous and diversified applications to accommodate, intervene, and/or modify as per ASD traits (Thapar & Rutter, 2020); and 2) behavioral accommodations and interventions as realities that co-occur in ASD because of the specific biology of the ASD brain, as conceptualized within the neuroscience field (Happe & Roland, 2008). In a broader sense, the aim here is to explain not only the characteristics shown by persons with ASD, but also the reasons for why those characteristics are present, as this enables practitioners to identify effective accommodations and interventions, minimizing modifications, that are suited to each unique individual with ASD. This is especially relevant in postsecondary educational contexts, where the variable nature of classroom environments can either support or impede the learning and success of students with ASD (Vivanti, 2020).

Getting to Know Individuals with ASD

As one of the primary difficulties associated with ASD is often limitations in socialization, intentional engagement with individuals with ASD in any context (including the postsecondary classroom) is arguably a step in the right direction. Research demonstrates that faculty who interact with students with ASD recognize that those students have many strengths, such as attention to details, excellent memory, a positive

attitude toward adherence to rules, strong passion for topics that interest them, and a very deep and intense knowledge of what can be a very particular subject area (Anderson et al., 2017). However, the ways in which students with ASD express themselves or socialize with others are recognized by faculty as being challenging or, at worst, almost impossible. This represents a poor fit for students with ASD in college environments and, because of challenges with socialization, all indicated strengths are masked, presenting the student with ASD as mostly being impaired rather than being capable (Hillier et al., 2018).

How, then, do we (as individuals) come to “know” our peers with ASD? One possible answer may be through mentorship (Hillier et al., 2018). Work by Eby et al. (2013) emphasizes three forms of mentoring: 1) instrumental support, which focuses on goal attainment and career advancement; 2) psychological support, which centers on emotional actions (e.g., encouragement) that foster a mentee’s well-being; and 3) networking support, which is aimed at expanding a mentee’s social capital, particularly in professional contexts. According to Drake, participating in multiple mentorship opportunities can aid ASD students in becoming aware of the typical requests and demands imposed by collegiate learning environments. Notably, mentoring within these spaces has been identified as an effective practice to empower students with ASD, ease the transition from K-12 to postsecondary education, and foster new personal relationships (e.g., Lucas & James, 2018).

Parental Information: Supports & Expectations

Parents often assume the role of full-time caregiver for children with ASD (Hillier et al., 2021). Consequently, transparent and accessible resources (e.g., support groups, tools) for parents are a must, especially during major life events for the individual with ASD, such as the transition from K-12 to postsecondary education. According to Elias and White (2018), parents express that the most needed supports are the ones related to independence of the ASD student, social interactions, emotional supports, and daily living skills. For example, while it is recognizable that individuals with ASD can excel in academic areas, when they are experiencing challenges with daily living skills activities, this impedes their ability to gain independence and make progress (Elias & White, 2018; Buijsman et al., 2022).

Relatedly, parents indicate that repetition is a key part in proceeding toward meeting the specific and unique needs of a student (or any individual) with ASD (Hillier et al., 2021). For instance, reinforcing daily living skills, even with high-functioning individuals with ASD, can assist in reducing barriers to achieving autonomy (Hillier et al., 2021). Future research, with the support of parents, can expand the possibility of identifying types of independent living skills that are specific and uniquely equipped to address the needs of individuals with ASD (Elias & White, 2018). Involving parents in meaningful ways (e.g., finding supports, strategies, accommodations, treatments) can be effective not only in promoting the growth of students with ASD, but also the overall well-being and confidence of the caregiver(s) (Elias & White, 2018).

Other Forms of Supports: Technology

In light of the fact that communication and language challenges present as primary impairments associated with ASD (Ames, 2016), adopting educative materials and technologies that aid in the development and growth of these skills continues to be an emphasis of curricular interventions. Online instructions, using repetition, and providing visual guidelines could also serve as viable resource in understanding the academic requests imposed upon students (with ASD). When coupled with printed information, this strategy may further aid the ASD student in clarifying broader academic expectations (Lei et al., 2021). Further, because technology applications are vast, there is increased potential to accommodate the diverse needs of ASD learners, particularly if existing technologies can be adopted in lieu of always requiring that new technologies be developed (Lei et al., 2021). That said, as novel technologies and applications (e.g., artificial intelligence in higher education) emerge, educators and researchers would do well to explore how these tools can be used to support students with ASD.

How Departmental and Institutional Policies Shape the ASD Culture

Information about programs, services, and/or accommodations in higher education that support students with ASD has been implemented across most of postsecondary education (Brown et al., 2012)**.** As previously mentioned, at the time of designing or defining interventions, it is important to remain cognizant of the fact that there is no “one-size-fits-all” approach (Kern & Olimpo 2022). Rather, postsecondary entities are entitled to accommodate neurodiverse students, including students with

ASD, according to their capabilities in cost, feasibility, and political suitability (Brown et al., 2012).

Sustained Education on ASD

As has been detailed throughout this chapter, ASD is dynamic and manifests in unique ways in each impacted individual (Karaminis et al., 2023). The result is that *any* person who interfaces with and/or advocates for individuals with ASD must be open to continuous professional development (PD) and learning with respect to the condition. Within the collegiate environment, for instance, a student may be neutral to environmental conditions when they are in their junior year but may be triggered by sensory stimuli (e.g., excessive noise in a team-based course) in their senior year. Consequently, they be perceived as a "failure" in that context if they disassociate from the environment despite their level of interest in and knowledge of the subject. Equipping educators with the skills to effectively intervene in such situations and providing routine opportunities for them to refine those skills through sustainable PD opportunities is therefore advantageous. Such opportunities should be both strategy-based as well as focused on promoting a culture of acceptance (Den Houting, 2019).

From a practical standpoint, the need for periodic and sustained education on ASD on a given topic is not specific to this context but rather an established best practice across a wide array of disciplines (Kern & Olimpo, 2022). The body of literature in this area reifies the notion that there is no "one-size-fits-all" approach to providing PD, nor does the "one-hit-wonder" tactic offer much in the way of effectiveness. Instead, PD

must be customized for the intended audience and reflect explicit short- and long-term goals/benefits for that population (Viezel et al., 2020)

Discussion and Conclusions

There is no simple solution for educational entities, including colleges and universities, to holistically address ASD, but fostering knowledge and awareness of ASD among educators (including GTAs) may one day result in a different reality with respect to neurodiverse educational practices in postsecondary STEM classrooms and beyond (Guldberg, 2020). It is not necessary to be trained as an expert in autism to support students who have been diagnosed with ASD; perhaps it is sufficient to receive ASD education centered on the distinct, unique, and diverse needs of ASD students in postsecondary education (Osteen, 2008). In this sense, the objective of ASD education is to promote inclusion and advancement of students with ASD in college—it is to prepare educators to empower students with ASD through fostering a culture of acceptance and positive attitudes toward ASD, comprehending the intricacies of the condition, and understanding how to best advance evidence-based practices that will incite change in the pedagogies for and learning experiences of postsecondary students with ASD (Locke et al., 2023). Within this framing, it is important to keep in mind that said ASD education is a continuous process that may not have an end, as the characteristics of autism are complex, challenging, and ever-evolving (Guldberg, 2020).

Importantly, the promotion of inclusiveness through realities of acceptance may lead to advancements for *all* college students—those considered neurotypical and those considered neurodiverse—yielding potentially significant outcomes in students'

academic and career growth as well as preparing those students to be the next generation of ASD advocates (Pickard et al., 2022).

Chapter 4: Overarching Conclusions

As described herein, autism spectrum disorder (ASD) and other conditions related to neurodiversity exert both positive and negative influences on the structure of postsecondary learning environments. In light of those influences, fostering knowledge and awareness of ASD among collegiate instructors—including GTAs—may one day result in a different reality with respect to educational practices in postsecondary classrooms and beyond (Guldberg, 2020). Importantly, it is not necessary to be trained as an expert in autism to support students who have been diagnosed with ASD; perhaps it is sufficient for instructors to receive professional development (PD) centered on the distinct and diverse needs of undergraduates with ASD (West, 2019). In this sense, the objective of PD is mainly to forge awareness, understanding, a better attitude, comprehension, and the best approach toward students with autism (Locke et al., 2023). Within this framing, it is important to keep in mind that said professional development is a continuous process that may not have an end, as the characteristics of autism are complex and ever-changing (Guldberg, 2020). Regardless, the impact of developing and incorporating education about ASD within instructor PD is highly recommended because “even under extremely challenging circumstances, our attitudes about and perspectives on people with ASD and their behaviors make a critical difference in their lives—and in ours” (Christiansen, 2022).

Relatedly, as new pedagogies and educational tools are implemented to advance the academic and professional growth of learners with ASD, these same learners should be provided an opportunity to actively contribute to the design of those innovations, as this will ideally maximize their efficacy (Davidson et al., 2023). While beyond the scope

of this thesis, understanding *how* those innovations and interventions are influential—including incorporation of use cases and user perspectives—will be critical in furthering the goal of achieving access to exceptional educational experiences for postsecondary students with ASD (Gulberg et al., 2017; Botha & Cage, 2022). Importantly, the anticipated benefits of these efforts will not be limited to neurodiverse students but should practically and meaningfully enhance the learning opportunities of all individuals in the spaces in which those efforts are deployed.

Through iterative cycles of PD, planning, execution, and evaluation, significant progress can continue to be made in advancing the intellectual and social capital of ASD learners in college and university settings. This thesis serves as a first step in pursuing my own ambitions toward realizing this goal.

References

Ames, M. E., McMorris, C. A., Alli, L. N., & Bebko, J. M. (2016). Overview and Evaluation of a Mentorship Program for University Students With ASD. *Focus on Autism and Other Developmental Disabilities*, *31*(1), 27–36. https://doi.org/10.1177/1088357615583465

Anderson, C., & Butt, C. (2017). Young Adults on the Autism Spectrum at College: Successes and Stumbling Blocks. *Journal of Autism and Developmental Disorders*, *47*(10), 3029–3039. https://doi.org/10.1007/s10803-017-3218-x

Baron-Cohen, S., Tsompanidis, A., Auyeung, B., Nørgaard-Pedersen, B., Hougaard, D. M., Abdallah, M., Cohen, A., & Pohl, A. (2020). Foetal oestrogens and autism. *Molecular Psychiatry*, *25*(11), 2970–2978. https://doi.org/10.1038/s41380-019-0454-9

Baczewski, L. M., Pizzano, M., Kasari, C., & Sturm, A. (2022). Adjustment Across the First College Year: A Matched Comparison of Autistic, Attention-Deficit/Hyperactivity Disorder, and Neurotypical Students. *Autism in Adulthood*, *4*(1), 12–21. https://doi.org/10.1089/aut.2021.0012

Biesta, G. (2016). *The beautiful risk of education* (1st ed.). Routledge. https://doi.org/10.4324/9781315635866

Brown, K. R. (2012). *Institutional practices that support students with autism spectrum disorders in a postsecondary educational setting*. ProQuest

Dissertations & Theses.

Boucher, J. (2009). *The autistic spectrum : characteristics, causes, and practical issues*. SAGE.

Botha, M., & Cage, E. (2022). “Autism research is in crisis”: A mixed method study of researcher’s constructions of autistic people and autism research. *Frontiers in Psychology*, *13*, 1050897–1050897. https://doi.org/10.3389/fpsyg.2022.1050897

Botha, M., Hanlon, J., & Williams, G. L. (2023). Does Language Matter? Identity-First Versus Person-First Language Use in Autism Research: A Response to Vivanti. *Journal of Autism and Developmental Disorders*, *53*(2), 870–878. https://doi.org/10.1007/s10803-020-04858-w

Buijsman, R., Begeer, S., & Scheeren, A. M. (2023). ‘Autistic person’ or ‘person with autism’? Person-first language preference in Dutch adults with autism and parents. *Autism : The International Journal of Research and Practice*, *27*(3), 788–795. https://doi.org/10.1177/13623613221117914

Chandrasekhar, T. (2020). Supporting the Needs of College Students with Autism Spectrum Disorder. *Journal of American College Health*, *68*(8), 936–939. https://doi.org/10.1080/07448481.2019.1686003

Christiansen, A. (2022). Uniquely Human: A Different Way of Seeing Autism. *Journal of Developmental and Behavioral Pediatrics*, *43*(6), 375–375. https://doi.org/10.1097/DBP.0000000000001098

Davidson, D., DiClemente, C. M., & Hilvert, E. (2023). Experiences and

Insights of College Students with Autism Spectrum Disorder: An Exploratory Assessment to Inform Interventions. *Journal of American College Health*, *71*(1), 10–13. https://doi.org/10.1080/07448481.2021.1876708

den Houting, J. (2019). Neurodiversity: An insider's perspective. *Autism : The International Journal of Research and Practice*, *23*(2), 271–273. https://doi.org/10.1177/1362361318820762

Dewsbury, B., & Brame, C. J. (2019). Inclusive Teaching. *CBE Life Sciences Education*, *18*(2), fe2–fe2. https://doi.org/10.1187/cbe.19-01-0021

Dillenburger, K., Jordan, J. A., McKerr, L., Devine, P., & Keenan, M. (2013). Awareness and knowledge of autism and autism interventions: A general population survey. *Research in Autism Spectrum Disorders*, *7*(12), 1558-1567.

Drake, S. (2014). College experience of academically successful students with autism. Journal of Autism, 1(5), 1–4. http://dx.doi.org/10.7243/2054-992X-1-5

Eby, H. (2013). Exploring Human Libraries at the MSLA LIT Forum 2013. *MSLA Journal*, *40*(2), 12-.

Elias, R., & White, S. W. (2018). Autism Goes to College: Understanding the Need of a Student Population on the Rise. *Journal of Autism and Developmental Disorders*, *48*(3), 732–746. https://doi.org/10.1007/s10803-017-3075-7

Elsabbagh, M., & Johnson, M. H. (2016). Autism and the Social Brain: The First-Year Puzzle. *Biological Psychiatry (1969)*, *80*(2), 94–99. https://doi.org/10.1016/j.biopsych.2016.02.019

Frith, U. (1989). *Autism : explaining the enigma*. Basil Blackwell.

Glennon, T. J. (2016). Survey of College Personnel: Preparedness to Serve Students With Autism Spectrum Disorder. *The American Journal of Occupational Therapy*, *70*(2), 7002260010p1-7002260010p6. https://doi.org/10.5014/ajot.2016.017921

Goodwin, E. C., Cary, J. R., & Shortlidge, E. E. (2021). Enthusiastic but Inconsistent: Graduate Teaching Assistants' Perceptions of Their Role in the CURE Classroom. *CBE Life Sciences Education*, *20*(4), ar66–ar66. https://doi.org/10.1187/cbe.21-04-0106

Guldberg, K. (2020). *Developing excellence in autism practice : making a difference in education* (First edition.). Routledge, Taylor & Francis Group.

Guldberg, K., Bradley, R., Wittemeyer, K., Briscombe, J., Phillips, C., & Jones, G. (2019) Good autism practice report. London: Autism Education Trust

Guldberg, K., Parsons, S., Porayska-Pomsta, K., & Keay-Bright, W. (2017). Challenging the knowledge-transfer orthodoxy: Knowledge co-construction in technology-enhanced learning for children with autism. *British Educational Research Journal*, *43*(2), 394–413. https://doi.org/10.1002/berj.3275

Gurbuz, E., Hanley, M., & Riby, D. M. (2019). University Students with Autism: The Social and Academic Experiences of University in the UK. *Journal of Autism and Developmental Disorders*, *49*(2), 617–631. https://doi.org/10.1007/s10803-018-3741-4

Hand, B. N., Gilmore, D., Harris, L., Darragh, A., Hanks, C., Coury, D., Moffatt-Bruce, S., & Garvin, J. (2021). “They looked at me as a person, not just a diagnosis”: A qualitative study of patient and parent satisfaction with a specialized primary care clinic for autistic adults. *Autism in Adulthood*, *3*(4), 347–355. https://doi.org/10.1089/aut.2020.0082

Happé, F., & Ronald, A. (2008). The ‘Fractionable Autism Triad’: A Review of Evidence from Behavioural, Genetic, Cognitive and Neural Research. *Neuropsychology Review*, *18*(4), 287–304. https://doi.org/10.1007/s11065-008-9076-8

Happé, F., Ronald, A., & Plomin, R. (2006). Time to give up on a single explanation for autism. *Nature Neuroscience*, *9*(10), 1218–1220. https://doi.org/10.1038/nn1770

Hassenfeldt, T. A., Factor, R. S., Strege, M. V., & Scarpa, A. (2019). How Do Graduate Teaching Assistants Perceive and Understand Their Autistic College Students? *Autism in Adulthood*, *1*(3), 227–231. https://doi.org/10.1089/aut.2018.0039

Hillier, A., Goldstein, J., Murphy, D., Trietsch, R., Keeves, J., Mendes, E., & Queenan, A. (2018). Supporting university students with autism

spectrum disorder. *Autism : The International Journal of Research and Practice*, *22*(1), 20–28. https://doi.org/10.1177/1362361317699584

Hillier, A., Ryan, J., Buckingham, A., Schena, D., Queenan, A., Dottolo, A., & Abreu, M. (2021). Prospective College Students With Autism Spectrum Disorder: Parent Perspectives. *Psychological Reports*, *124*(1), 88–107. https://doi.org/10.1177/0033294120905517

Karaminis, T., Gabrielatos, C., Maden-Weinberger, U., & Beattie, G. (2023). Portrayals of autism in the British press: A corpus-based study. *Autism: The International Journal of Research and Practice*, *27*(4), 1092–1114. https://doi.org/10.1177/13623613221131752

Kern, A. M., & Olimpo, J. T. (2023). SMART CUREs: a Professional Development Program for Advancing Teaching Assistant Preparedness To Facilitate Course-Based Undergraduate Research Experiences. *Journal of Microbiology & Biology Education*, *24*(1). https://doi.org/10.1128/jmbe.00137-22

Kuder, S. J., & Accardo, A. (2018). What Works for College Students with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, *48*(3), 722–731. https://doi.org/10.1007/s10803-017-3434-4

Kuzminskaite, E., Begeer, S., Hoekstra, R. A., & Grove, R. (2020). Short report: Social communication difficulties and restricted repetitive behaviors as predictors of anxiety in adults with autism spectrum

disorder. *Autism : The International Journal of Research and Practice*, *24*(7), 1917–1923. https://doi.org/10.1177/1362361320934218

Kuzminski, R., Netto, J., Wilson, J., Falkmer, T., Chamberlain, A., & Falkmer, M. (2019). Linking knowledge and attitudes: Determining neurotypical knowledge about and attitudes towards autism. *PloS One*, *14*(7), e0220197–e0220197. https://doi.org/10.1371/journal.pone.0220197

Lei, J., Jones, L., & Brosnan, M. (2021). Exploring an e-learning community's response to the language and terminology use in autism from two massive open online courses on autism education and technology use. *Autism : The International Journal of Research and Practice*, *25*(5), 1349–1367. https://doi.org/10.1177/1362361320987963

Locke, J., Osuna, A., Myrvold, R. J., & Closson, J. S. (2024). Supporting Autistic College Students: Examining the Mentoring, Organization and Social Support for Autism Inclusion on Campus (MOSSAIC) Program. *Journal of Autism and Developmental Disorders*, *54*(6), 2094–2107. https://doi.org/10.1007/s10803-023-05969-w

Lucas, R., & James, A. I. (2018). An Evaluation of Specialist Mentoring for University Students with Autism Spectrum Disorders and Mental Health Conditions. *Journal of Autism and Developmental Disorders*, *48*(3), 694–707. https://doi.org/10.1007/s10803-017-3303-1

McClain, M. B., Harris, B., Schwartz, S. E., Benallie, K. J., Golson, M. E., & Benney, C. M. (2019). Brief Report: Development and Validation of the Autism Spectrum Knowledge Scale General Population Version:

Preliminary Analyses. *Journal of Autism and Developmental Disorders*,

Osteen, M. (2008). *Autism and Representation* (1st ed., Vol. 1). Routledge. https://doi.org/10.4324/978020393508

Pellicano, E., Maybery, M., & Durkin, K. (2005). Central coherence in typically developing preschoolers: does it cohere and does it relate to mindreading and executive control? *Journal of Child Psychology and Psychiatry*, *46*(5), 533–547. https://doi.org/10.1111/j.1469-7610.2004.00380.x

Pennington, B. F. (2014). *Explaining abnormal behavior : a cognitive neuroscience perspective* (1st ed.). Guilford Press.

Pickard, H., Pellicano, E., den Houting, J., & Crane, L. (2022). Participatory autism research: Early career and established researchers' views and experiences. *Autism : The International Journal of Research and Practice*, *26*(1), 75–87. https://doi.org/10.1177/13623613211019594

Robinson, O. C. (2014). Sampling in Interview-Based Qualitative Research: A Theoretical and Practical Guide. *Qualitative Research in Psychology*, *11*(1), 25–41. https://doi.org/10.1080/14780887.2013.801543

Strand, M. (2011). Where do classifications come from? The DSM-III, the transformation of American psychiatry, and the problem of origins in the sociology of knowledge. *Theory and Society*, *40*(3), 273–313.

Su, P. L., Rogers, S. J., Estes, A., & Yoder, P. (2020). The Role of Early Social Motivation in Explaining Variability in Functional Language

in Toddlers with ASD. *Autism : The International Journal of Research and Practice*, *25*(1), 244–257. https://doi.org/10.1177/1362361320953260 https://doi.org/10.1007/s11186-011-9142

Thapar, A., & Rutter, M. (2021). Genetic Advances in Autism. *Journal of Autism and Developmental Disorders*, *51*(12), 4321–4332. https://doi.org/10.1007/s10803-020-04685-z

Viezel, K. D., Williams, E., & Dotson, W. H. (2020). College-Based Support Programs for Students With Autism. *Focus on Autism and Other Developmental Disabilities*, *35*(4), 234–245. https://doi.org/10.1177/1088357620954369

Vygotsky, L. (1931/2018). From the EDI clinic. In Zavershneva, E., & van der Veer, R. (Eds.). Vygotsky's notebooks. A selection. Singapore: Springer.

Vivanti, G. (2020). Ask the Editor: What is the Most Appropriate Way to Talk About Individuals with a Diagnosis of Autism? *Journal of Autism and Developmental Disorders*, *50*(2), 691–693. https://doi.org/10.1007/s10803-019-04280-x

Vivanti, G., & Messinger, D. S. (2021). Theories of Autism and Autism Treatment from the DSM III Through the Present and Beyond: Impact on Research and Practice. *Journal of Autism and Developmental*

Disorders, *51*(12), 4309–4320. https://doi.org/10.1007/s10803-021-04887-z

Wick, J. M. (2022). *Postsecondary Stem Students with Autism: Loneliness, Social Anxiety, Adjustment, and Autism Severity Profiles*. ProQuest Dissertations & Theses.

Youdell, D., & Lindley, M. R. (2019). *Biosocial Education: The Social and Biological Entanglements of Learning* (1st ed.). Routledge. https://doi.org/10.4324/9781315226408

Data & Statistics on Autism Spectrum Disorder (April 4, 2023). Centers for Disease Control and Prevention. (July 31,2023) https://www.cdc.gov/ncbddd/autism/data.html

Vita

Luzconsuelo Gavaldon was raised in El Paso, Texas, where she graduated high school in 2019. Luzconsuelo has spent her whole life in her native city, El Paso, Texas, and her plans are to stay in El Paso. However, she feels attracted by the English lifestyle and may look for an opportunity in that country. Luzconsuelo earned her bachelor's degree in Biological Sciences with Biomedical Concentration in Spring 2022. Luzconsuelo aspires to pursue additional opportunities in both the research and education sectors, specifically in areas where deep research about the brilliant brain of autism can be the focus. Luzconsuelo wants to support persons and college students like her who are in the spectrum.