A Comparison Study of CICO and SG-CICO for Students with High-Incidence Disabilities in an Inclusive Middle School Setting

by

Joanna Newlin

Bachelor of Arts, Allegheny College, 1991

Master of Education, Loyola University of Maryland, 1997

Submitted to the Graduate Faculty of

the School of Education in partial fulfillment

of the requirements for the degree of

Doctor of Education

University of Pittsburgh

2019

UNIVERSITY OF PITTSBURGH

SCHOOL OF EDUCATION

This dissertation was presented

by

Joanna Newlin

It was defended on

July 16, 2019

and approved by

Rachel E. Robertson, PhD, BCBA-D, Assistant Professor of Special Education, Instruction and

Learning

Jennifer L. Russell, PhD, Associate Professor, Learning Sciences and Policy

Katherine Schultz, EdD, Lancaster Lebanon Intermediate Unit

Dissertation Director: Douglas E. Kostewicz, PhD, BCBA-D, Associate Professor of Special

Education, Instruction and Learning

A Comparison Study of CICO and SG-CICO for Students with High-Incidence Disabilities

in an Inclusive Middle School Setting

Joanna Newlin, EdD

University of Pittsburgh, 2019

Considering the current reality that students with high-incidence disabilities are regularly placed in general education settings as the *least restrictive environment*, it is critical that educators continue to search for effective inclusive practices. The Universal Design for Learning (UDL) framework shows promise as a proactive method of creating inclusive classroom environments that meet the complex needs of students with high-incidence disabilities such as ADHD, high-functioning autism, specific learning disabilities, and anxiety/depression. However, a review of the literature revealed that a gap in the research exists that identifies effective evidenced-based interventions that also align with UDL guidelines and recommended strategies for students with high-incidence disabilities. The current study utilized a single-subject, alternating treatments design with two middle school students to compare two iterations of the widely-used Check In Check Out program designed by Crone, Hawken, and Horner (2010). The purpose of this study was to answer the following research question: *What are the effects of Check In Check Out (CICO) compared to Self-Guided Check In Check (SG-CICO) on academic engagement in a middle school inclusive setting for students with high-incidence disabilities?* The study showed a slightly greater effect on on-task engagement for the Self-Guided Check In Check Out iteration. These results highlight the potential of the Self-Guided Check In Check Out method as a component of a universally-designed classroom for students with high-incidence disabilities.

Table of Contents

List of Tables

List of Figures

Dedication

It is with genuine gratefulness that I dedicate this work to the following people...

To my advisor, Doug Kostewicz,

for your candid, yet endlessly supportive, feedback throughout the entire process,

To my dad, Roy, for our weekly coffee talks that fueled my curiosity for learning

and provided encouragement at each and every step along the way,

To my lovely boys, Ben and Connor,

thank you for your understanding when I had to spend long hours away from home.

It was wanting better things for both of you that always kept me going.

And finally, for Josh,

there is no way that I could have completed this program and this project

without your never-ending encouragement and love. Thank you!

1.0 Chapter 1

The inclusion of students with disabilities in the general education setting has grown significantly over the past fifty years. Within the United States, the commitment to inclusive education expanded on the wave of the civil rights movement. Legislation in the 1970s, such as the Rehabilitation Act of 1973 and Public Law 94-172 (Education for All Handicapped Children Act of 1975) formalized this commitment. Schools were now mandated to provide education for all students, even those with the most severe disabilities. In addition, schools were now required to educate students in the "*least restrictive environment* commensurate with their needs".

In response to this foundational legislation and its subsequent revisions and reauthorizations (e.g., Americans with Disabilities Act, of 1990; Individuals with Disabilities Education Act 1990, 1997, 2004), the majority of students with high-incidence disabilities such as attention-deficit hyperactivity disorder, high-functioning autism, and specific learning disabilities are educated in general education classrooms (i.e., inclusion) as the least restrictive educational environment. Students with High-Functioning Autism Spectrum Disorder (HFASD) are of particular interest considering that these students usually have average-to-above-average intelligence and can keep up with peers academically, and are therefore placed in inclusive classrooms as the *Least Restrictive Environment*. However, the very nature of an autism diagnosis indicates the social deficits inherent with the disorder. In the social world of school, students with autism face ongoing difficulties navigating the complexities of the school day, particularly at the middle and high school level (Hart & Whalon, 2011). Considering that the population of students with autism continues to grow, and that the current long-term outcomes for students with autism is exceptionally poor, identifying effective interventions that are flexible and simple to implement

1

in inclusive settings is critical (Burgess & Cimera, 2014: Shattuck et al., 2012; Wehman et al., 2014).

Fortunately, a number of effective supports for students with HFASD have already been identified. In *Life Journey through Autism: An Educators' Guide to Asperger Syndrome,* Myles et al. (2005) identifies categories of supports that have shown to be beneficial for students with HFASD. The supports are especially needed to address the greatest barriers in navigating the complex world of school for students with autism (e.g., multiple transitions between content areas and settings, peer interactions, organization). Many of these challenges fall under the category of *executive functioning* deficits that also commonly affect students with ADHD, anxiety/depression, and specific learning disabilities (Barkley, 2008; Brown, 2005; Diamond, 2013; Myles et al., 2005).

In order to address the influx of students with high-incidence disabilities, a variety of inclusive practices have been implemented with varying degrees of success. One model of inclusion that focuses on a proactive approach to designing the classroom and curriculum for *all* students is the model of Universal Design for Learning (CAST, 2018). Universal Design for Learning is based on the principles of the Universal Design architectural movement introduced by Ronald Mace in the 1970s in response to the requirements of the Rehabilitation Act of 1973 (Mace, 1988; United States Access Board, 2018). The movement called for all new construction to be designed to meet the needs of individuals with disabilities from the onset, thereby avoiding the need to retrofit buildings (Al-Azawei, Serenelli, & Lundqvist, 2016; Mace, 1988). Retrofitting (i.e., altering aspects of an existing building) is a much costlier endeavor, requiring increased labor, time, and effort than if the original building was designed to be accessible to all from the beginning.

Universal Design for Learning (UDL) applies a similar philosophy to the field of education (CAST, 2018). The main goal of UDL is to develop flexible curricular options, classroom settings, and instructional practices that meet the diverse needs of the student populations found in schools today (CAST, 2018; Ok, Rao, Bryan, & McDougall, 2017). The UDL guidelines established by the Center for Applied Special Technology (CAST) provide a framework for designing and implementing a UDL curriculum based on three main principles: 1.) Providing multiple means of representation, 2.) Providing multiple means of action and expression, and 3.) Providing multiple means of engagement (CAST, 2018). The philosophy of UDL is not specific to students with disabilities, however, the overarching goal of UDL (i.e., intentionally planning responsive, flexible classrooms) has the potential to create a successful environment of inclusion for all students (CAST, 2018; UDL-IRN, 2011).

In a review of the literature focusing on specific UDL-based strategies, the majority of studies indicate improvements for students with disabilities in both academic progress and engagement, although significant gains in engagement did not necessarily correspond into academic gains (Marino et al., 2014). The nature of the interventions included procedural strategies, wide-ranging implementation approaches, and technology-based interventions. Themes around student engagement focused on the importance of choice, age-relevant content, and opportunities to socialize.

As UDL research is still in its early stages, a gap in the literature exists for studies that examine how, and to what extent, widely-implemented interventions already in use align with UDL guidelines. In addition, examining how those same interventions align with recommended strategies for students with HFASD will add to the literature on inclusive practices for this expanding population of students. Ok et al. (2017) in a systematic review of the current research

on Universal Design for Learning, explicitly calls for studies that utilize experimental design, specifically single-case research.

In an effort to move the body of research on UDL further, this current study compared a positive support behavior intervention widely-implemented in schools with a variation of the intervention. The *Check In, Check Out* model developed by Crone, Hawken, and Horner (2010) was compared with a newly-designed iteration termed *Self-Guided Check In, Check Out* or SG-CICO (Parry, 2014). The new iteration was designed to reduce time-demands on teachers by introducing a self-management component for the student.

Study outcomes may provide further information on effective strategies for students with high-incidence disabilities in general education classrooms and can also be implemented easily into a Universal Design for Learning framework. Considering the large number of students with high-incidence disabilities in inclusive classrooms, it is especially important to identify those practices that could benefit the most commonly included students in general education settings. In addition, the long-term outcomes for individuals with these diagnoses is poor in terms of job prospects, interpersonal relationships, and community engagement. Research is critical to identify appropriate supports and practices that can improve the current environment for these students, and also potentially lead to more positive long-term outcomes.

In summary, the purpose of the current study was to address the following Problem of Practice: *How can schools effectively increase and implement inclusive practices that reduce barriers and increase independence for students with high-incidence disabilities, including but not limited to high-functioning autism, in general education settings?*

2.0 Review of Literature

Over the past fifty years, a societal shift towards the inclusion of individuals with disabilities into all aspects of society has transpired worldwide. This commitment within the field of education can be summarized in the work of the United Nations Educational, Scientific, and Cultural Organization, otherwise known as UNESCO. In UNESCO's Salamanca Statement of 1994, clause 5 states that regular schools with an inclusive orientation are "the most effective measures of combating discriminatory attitudes, creating welcoming communities, building an inclusive society and achieving education for all" (UNESCO, 1994). Within the United States, the legislative journey towards removing barriers to education for all students reaches back to the 14th Amendment and the guarantee of equal rights to all citizens (Constitute, 2018).

Based on the foundation laid with the 14th Amendment and slowly evolving and culminating into a wave of civil rights legislation in the 1970s, the push for the rights of students with disabilities was formalized with the Rehabilitation Act of 1973 and Public Law 94-172, Educational for All Handicapped Children Act of 1975 (Wrightslaw, 2018). One provision of the 1975 Act that resulted in a profound change in the education of students with disabilities was the requirement for school districts to educate students with disabilities in the Least Restrictive Environment (LRE) possible in which their needs can be met (Education for All Handicapped Act Public Law 94-142, 1975). This provision was again included when the act was revised and renamed the *Individuals with Disabilities Education Act* (IDEA) in 1990 and subsequent reauthorizations of the Act in 1997 and 2004 (IRIS Center, 2018).

With the insertion of the phrase "*Least Restrictive Environment*" in the legislation came a push for inclusion from some factions to educate a wider-range of students with disabilities in the

general classroom than ever before. In response, the field of education witnessed the development and implementation of many iterations of inclusive practices that continue to evolve. Although debate is ongoing regarding the appropriateness of inclusion for all students, the majority of students with high-incidence disabilities such as high-functioning autism, attention-deficit hyperactivity order, specific learning disabilities, and anxiety/depression are commonly-placed in inclusive classrooms as the least restrictive educational environment.

In order to address this need to educate as many students in the general education classroom, schools have implemented an assortment of inclusive practices with varying levels of success. For example, schools have addressed the inclusion mandate with practices such as one-to-one aides, hybrid push-in/pull-out programs, co-teaching, peer-mediated instruction, and differentiated instruction to name just a few (Zigmond, Kloo, & Volonino, 2009; Tomlinson, 2001; Villa, Thousand, Nevin, & Liston, 2005). It is important to note that although students may be placed in general education classrooms, evidence suggests that instructional practices generally used in traditional classrooms clash with established evidence-based practices shown to be effective for students with disabilities (Lindsay, 2003; Zigmond et al., 2009; Volonino & Zigmond, 2007). One model of inclusion that focuses less on 'retrofitting' (i.e., adjusting the existing curriculum to individual needs) and more on a proactive approach to designing the classroom and curriculum is the model of Universal Design for Learning (CAST, 2018).

Universal Design for Learning stems out of the Universal Design architectural movement that emerged in response to the Rehabilitation Act of 1973 (Mace, 1988; United States Access Board, 2018). In the 1970s, Ronald Mace coined the term Universal Design (UD) to describe a movement that called for all new construction to be designed to accommodate individuals with disabilities from the outset (Al-Azawei, Serenelli, & Lundqvist, 2016; Mace, 1988). This

common-sense approach to building design is now required by all new construction for institutions that receive any federal funding.

Universal Design for Learning (UDL) is a variation of this movement specifically for educational settings (CAST, 2018). The UDL guidelines emerged out of joint project between the U.S. Department of Education, Office of Special Education Programs (OSEP) and CAST entitled the National Center on Accessing the General Curriculum Together (CAST, 2018). The purpose of UDL is to develop curricular options, classroom environments, and instructional practices that are flexible and meet the needs of the diverse student population existing in schools today (CAST, 2018; Ok, Rao, Bryant, & McDougall, 2017).

The UDL guidelines provide a framework for designing and implementing a curriculum based on three basic principles: 1.) Provide multiple means of representation, 2.) Provide multiple means of action and expression, and 3.) Provide multiple means of engagement (CAST, 2018). Each of these principles is further expanded into guidelines and checkpoints to aid in the implementation of UDL. Although the philosophy of UDL is not specific to students with disabilities, the overarching goal of creating flexible, responsive classrooms through intentional planning has the potential to build the environment for successful inclusion (CAST, 2018; UDL-IRN, 2011).

Since Rose and Meyer (2002) were first credited with the term Universal Design for Learning, a growing body of research has accumulating regarding its efficacy for all students (Al-Azawei et al., 2016; Canter, King, Williams, Metcalf, & Potts, 2017; Ok et al., 2017). In addition, a body of research also exists that examines the benefits of UDL-based interventions for students with specific disabilities (e.g., Hall, Cohen, Vue, & Ganley, 2015; Coyne, Evans, & Karger, 2017; Kennedy, Thomas, Meyer, Alves, & Lloyd, 2014). It is especially important to identify those

practices that could benefit students in disability categories that are most-commonly included in general education classrooms.

In response to the large number and range of students found in general education settings, many schools are turning toward positive behavior interventions such as the Check In Check Out system (Crone, Hawken, & Horner, 2010) or Check and Connect (Sinclair, Christenson, Evelo, & Hurley, 1998). These evidence-based practices are already in wide-use and Ok et al. (2017) argue that a paucity of research exists that examines the alignment of the UDL guidelines with currently-used interventions. Identifying the efficacy of existing interventions that can be implemented simply and broadly is necessary to best meet the needs of the widest range of students.

2.1 Inclusion of Students With High Functioning Austism

One specific disability category commonly found in general education is that of autism. The necessity to address the needs of students with autism spectrum disorder increased dramatically over the past two decades. According to the Center for Disease Control, one in every 68 children is now diagnosed with an autism spectrum disorder (CDC, 2017). Professionals in the autism field believe that the rates for Asperger Syndrome, now under the umbrella of the autism spectrum, is one in every 250 (AANE, 2017). In 2013-2014, school districts nationwide reported 538,000 students with autism receiving services and this figure is only anticipated to grow as more children with autism reach school age (US Department of Education, 2016).

The characteristics of autism spectrum disorders vary widely from individuals with severe impairments (i.e., nonverbal and low functional living skills) to those with only minimal communication and social impairments. However, even those considered to have High-

Functioning Autism Spectrum Disorder (HFASD) face challenges in navigating the complexities of school life. Considering that students with HFASD often have average-to-above-average intelligence and can keep up with peers academically, it is common for IEP teams to determine that the Least Restrictive Educational setting is the general education classroom (Sanstosi & Sanstosi, 2012). However, students with HFASD often struggle with the social language skills necessary to navigate the classroom even though they may have advanced verbal skills in regard to vocabulary and syntax giving a false impression of their need for support (Hart & Whalon, 2011). In fact, the term "high-functioning" is actually a misnomer considering the support that a student with HFASD will require through their school tenure and beyond (Sanstosi & Sanstosi, 2012).

Perhaps of greatest concern is the preponderance of evidence showing poor long-term outcomes for students with autism, including HFASD, beyond the high school years (Burgess & Cimera, 2014; Shattuck et al., 2012; Wehman et al., 2014). According to Shattuck et al. (2012), young adults with autism appear to be at a higher risk than any other disability category for being completely disengaged from any type of postsecondary employment or schooling based on the data collected in that National Longitudinal Transition Study 2 (NLTS2). Considering the prevalence of students with autism continues to grow, identifying effective interventions that are flexible and simple to implement is critical.

Fortunately, a number of academic and environmental supports have shown to be beneficial for students with high-functioning autism. In the *Educators' Guide to Asperger,* Myles, Hagen, Holverstott, Hubbard, Adreon, and Trautman (2005) consolidate those findings into eight categories: (a) priming; (b) classroom assignment accommodations; (c) visual supports; (d) home base; (e) choice making; (f) handwriting modifications; (g) incorporation of special interests; and

(h) homework considerations. These supports are especially needed to address the symptoms of autism that greatly affect students' ability to navigate the complex world of school, particularly at the middle and high school level. Students in middle and high school are expected to transition frequently between multiple content areas, teachers, peer groups, and locations during the course of a single day. This poses particular challenges for students with autism who often experience cognitive challenges in neurological processes falling under the umbrella of *executive functioning* (Myles et al., 2005). Although researchers have slightly differing models to describe executive functioning, deficits can be generally grouped into three major categories: a) inhibitory control, b) working memory, and c) cognitive flexibility (e.g., Brown, 2005; Diamond, 2013; Russell, 2008).

Executive functioning deficits are not only typical for students with HFASD but also other high-incidence disabilities found in general education classrooms such as attention-deficit hyperactivity disorder (ADHD), anxiety/depression, and specific learning disabilities (e.g., Barkley, 1997; Swanson & Ashbaker, 2000; UDL-IRN, 2018). In fact, due to the overlapping of symptoms, children with an initial diagnosis of ADHD are often later diagnosed with HFASD (Miodovnik, Harstad, Sideridis, & Huntington, 2015). Anxiety and depression are known to disable executive functioning skills and therefore, students with these symptoms also benefit from similar supports (UDL-IRN, 2018). Finally, individuals with specific learning disabilities are more likely to have identified weaknesses in working memory, a key area of executive functioning (Cornoldi, Giofrè, Orsini, & Pezzuti, 2014; Swanson & Ashbaker, 2000). Again, understanding the need for interventions that support executive functioning skills is imperative for helping students with HFASD and other high-incidence disabilities in inclusive classrooms.

This leads to the question of what interventions currently exist that fit into a universally-designed classroom *and* support the needs of students with HFASD and other high-incidence

disabilities in inclusive classrooms. In order to further grow the capacity of schools to provide inclusive education for *all* students, a need exists to explore interventions that can be easily implemented in general education classes for students with disabilities. Considering that UDL holds promise for meeting the needs of a wide-range of students, including those with high-functioning autism, this review of literature seeks to examine the research by asking the following questions:

1. How effective are UDL-designed interventions that focus on students with disabilities in general education classrooms?

2. To what extent do the interventions align with recommended practices for students with high-functioning autism, particularly in the area of executive functioning?

2.2 Methods

2.2.1 Search Procedures

A review of the literature was conducted using the Educational Resources Information Center (ERIC) and PsycINFO databases. The search was conducted in September 2017 using specific keywords and inclusion criteria. The initial search in the ERIC database included the terms "UDL" OR "universal design for learning" in the TITLE field AND "middle school" OR "high school". The initial ERIC search resulted in 13 articles. Due to the differences in search functions between the two databases, the initial search in the PsycINFO database used the terms "UDL" OR "universal design for learning" in the TITLE field combined with "empirical study".

The PsycINFO database search resulted in 16 initial articles. In addition, an ancestral search using the reference lists of articles in the initial search yielded seven additional articles.

Following the initial search, the results were refined through a review of titles and abstracts using the inclusion criteria. In both database searches, studies that involved elementary-aged students were included as long as middle school or high school students were also contained in the data. In addition, results that focused exclusively on severe disabilities were excluded in order to focus on studies with the most universal applications for students with high-incidence disabilities including High-Functioning Autism Spectrum Disorder (HFASD). The refined inclusion criteria in the ERIC database included only empirical studies and a dependent variable that included student outcomes. This narrowed the resulting number of articles to nine. In the PsycINFO database, studies that did not take place in a school setting were excluded narrowing the resulting articles from 16 to eight. Using a combination of the above criteria, the number of articles gleaned from the ancestral search was reduced to two. After removing duplicates from the research, the resulting number of articles to be reviewed was eleven.

2.2.2 Coding Procedures

All studies were reviewed for the following: Participant characteristics including age and diagnosis, type of intervention (social and/or academic), research design (single-subject, group design, mixed methods), outcome measures, and a methodological assessment of the strength and weaknesses of the studies. In addition, studies were assessed for alignment with recommended academic and environmental supports for students with HFASD.

2.3 Results

2.3.1 Participants

Table 3 provides specific information about each reviewed study. Overall, participants in the reviewed studies ranged in age from third through twelfth grade. A total of 2,577 students participated across the 11 studies. The majority of studies (eight out of 11 or 73%) focused on middle and high school students. All but one study (Scott et al., 2013) took place in inclusive settings in which students with disabilities received instruction in general education classrooms. All studies took place in public schools in either the United States or Canada. Refer to Table A1 in Appendix A for a summary of reviewed studies.

Students with disabilities participated in all studies, however, the types of disabilities varied and not all disabilities were specifically noted. Five studies focused only on students with disabilities, while the remaining five collected data on both students with and without disabilities. The majority of students were categorized as having a Learning Disability (LD). However, it should be noted that two Canadian studies in the review did not provide specific data, only estimates, of the number of students with high-incidence disabilities (HID). According to the authors, no specifics were available because students with HID are block-funded rather than individually funded, and therefore, do not need to be reported to the state (Sokal & Katz, 2015).

2.3.2 Research Designs

The majority of reviewed studies employed a group experimental design. The remaining study employed a single-subject design (Scott et al., 2011). Of the studies utilizing a group design,

four (Coyne et al., 2017; Katz et al., 2013; Kennedy et al., 2014; Sokal & Katz, 2015) were quasi-experimental and six (Dolan et al., 2005; Hall et al., 2015; King-Sears et al., 2015; Kortering et al., 2008; Marino et al., 2014; Rappolt-Schlichtmann et al., 2013) employed a mixed-methods design. Three of the four quasi-experimental designs utilized a pre/posttest method.

2.3.3 Independent Variables/Interventions

Aligning with the purpose of this literature review, all studies measured the efficacy of specific interventions based on the Universal for Design for Learning framework. Six studies (55%) examined UDL-designed technology that could be used for all students (Coyne et al., 2017; Dolan et al., 2005; Hall et al., 2015; Kennedy et al., 2014; Marino et al., 2014; Rappolt-Schlichtmann et al., 2013). Helpful features for students with disabilities, such as text-to-speech and visual supports, were embedded in the technology. The majority of the technology-based interventions (4/6, 67%) were designed to strengthen literacy skills. However, two focused on interventions to support learning in content-area subjects (Marino et al., 2014; Rappolt-Schlichtmann et al., 2013).

The remaining interventions (5/11; 45%) focused on teacher planning, student self-management and transition (Katz, et al., 2013; Kortering et al., King-Sears, 2015; Scott et al., 2011; Sokol & Katz, 2015).

2.3.4 Dependent Variables/Measures

Eight of 11 studies (73%) measured the effects of an intervention on academic learning utilizing data from standardized tests or curriculum assessments. The types of assessments ranged

from large-scale tests such as the *National Assessment of Educational Progress* (e.g., Dolan et al., 2005) to Curriculum-Based Monitoring (CBM) (e.g., Kennedy et al., 2014) to classroom tests (e.g., King-Sears, et al., 2015). One particularly-thorough study used five different methods of collecting data including two different science assessments, a motivation inventory, electronic usage data, and a teacher background questionnaire (Rappolt-Schlichtmann, 2013).

Nine out of 11 studies (82%) also measured students' perceptions and interests through the use of student/teacher surveys (9/11, 82%), electronic usage logs (4/11, 36%), interviews (4/11, 36%) and teacher observations (3/11, 27%). The surveys included both teacher inventories and students self-reporting. The usage logs were exclusively for the interventions based on technology. Interviews or teacher observations were used in all but one study. Finally, two related studies (Katz, 2013; Sokal & Katz, 2015) examined the effect of a three-block model of UDL-implementation on students' social and academic engagement.

2.3.5 Study Findings

All interventions designed to improve student interest and/or engagement were shown to be effective. In fact, although one study found no academic gains in their UDL-based intervention, students with learning disabilities were found to be highly-engaged in the content (Marino et al., 2014).

In studies focused on improving academic outcomes, only one out of seven (Marino et al., 2014) showed no improvement in students with disabilities. Across studies that reported aggregate data for students with disabilities, greater gains were found in the student population with disabilities than those without.

Of particular interest for this review were the emerging themes surrounding student perceptions from the study by Coyne et al. (2017). In this study, the electronic usage logs of Udio, a computer-based UDL literacy tool, was assessed for patterns of student use. Three themes emerged regarding student perceptions: the importance of age-relevant content, choice-making, and opportunities to socialize. The importance of identifying these themes will be discussed later in greater detail.

2.3.6 Alignment of Intervention with Recommended Strategies for Students with Asperger/HFASD

All articles were evaluated for alignment with recommended strategies for students with Asperger Syndrome, now considered high-functioning autism. The recommended interventions are based on the work of the Organization for Autism Research's *Life Journey through Autism: As Educator's Guide to Asperger Syndrome* (Myles et al., 2005).

All studies (100%) included the recommended strategies of classroom assignment accommodations, visual supports, and handwriting modifications within the interventions. The majority of interventions allowed for student choice (Coyne, Evans, & Karger, 2017; Dolan et al., 2005; Hall, et al., 2015; Katz, 2013; King-Sears, et al., 2015; Kortering et al., 2008; Marino et al., 2014; Rappolt-Schlichtmann et al., 2013; Scott et al., 2011; Sokol & Katz, 2015) and/or integrated opportunities for special interests (Coyne, Evans, & Karger, 2017; Katz, 2013; Kortering et al., 2008; Marino et al., 2014; Rappolt-Schlichtmann et al., 2013; Scott et al., 2011) However, less than half of the studies incorporated the recommended strategies of priming (Katz, 2013; Kennedy et al., 2014; Marino et al., 2014; Rappolt-Schlichtmann et al., 2013; Sokol & Katz, 2015), providing a home base (Katz, 2013; Sokol & Katz, 2015) and considering appropriate homework

(Katz, 2013; King-Sears et al., 2015; Rappolt-Schlichtmann et al., 2013; Sokol & Katz, 2015). The percentage of studies meeting all criteria was only 18% (Katz, 2013; Sokol & Katz, 2015) with an overall average of 71%. Refer to Table A2 in Appendix A for a summary of findings.

2.3.7 Quality of Studies

All reviewed studies were evaluated for quality based on the Center for Exceptional Children standards for evidence-based practices (Cook et al., 2015). The overall percentage of CEC quality indicators met across all studies was 89% with three studies meeting all eight indicators (Dolan et al., 2005; Kennedy et al., 2014; Rappolt-Schlichtmann, 2013). A study was considered to have met the quality indicator standard when all sub-indicators were met. One-hundred percent of the reviewed studies met criteria in the following areas: context and setting, participants, intervention agent, descriptions of practice, and outcome measures. Weaknesses to the studies centered on the indicators of internal validity and data analysis with only five out of 11 (45%) meeting criteria for internal validity (Dolan et al., 2005; Hall et al., 2015; Kennedy et al., 2014; Rappolt-Schlicthmann, 2013; Scott et al., 2011). Studies did not meet criteria if internal validity percentages were not included and effect sizes were not noted. Refer to Table A3 in Appendix A for a summary of results.

2.4 Discussion

Students with High-Functioning Autism are regularly placed in inclusive settings even though they have significant organizational and social deficits. There is increasing evidence that

both the short-term and long-term outcomes for students with HFASD are poor in terms of mental health and social relationships. The Universal Design for Learning framework shows promise as a proactive method of creating inclusive classroom environments that meet the complex needs of students with HFASD and students with other high-incidence disabilities such as ADHD, Specific Learning Disabilities, and anxiety/depression.

The first research question of this review asked: *How effective are UDL-designed interventions that focus on students with disabilities in general education classrooms?* In an effort to answer this question, emerging themes, academic areas of focus, and varieties of interventions were scrutinized.

Within the realm of academics, studies ranged from a focus on general literacy skills to discrete content-area strategies. Specifically, two of those studies focused on general literacy skills (Coyne et al., 2017; Hall et al., 2015). Considering that literacy skills can translate across subject areas, this is an obvious area on which to focus for maximum effect. Overall, evidence for academic gains were found in both studies focusing on general literacy skills. Additional studies incorporated literacy skills and/or procedural skills into specific content areas such history (Dolan et al., 2005; Kennedy et al., 2014), algebra (Kortering et al., 2005), and the sciences (King-Sears et al., 2015; Marino et al., 2014; Rappolt-Schlichtmann, 2013). Although academic gains ranged from no significant gains (Marino et al., 2014) to large improvements (King-Sears et al., 2015), the increase in social and academic engagement demonstrate the potential value of these interventions in the classroom for improving student interest.

In addition, a number of themes emerged in the literature around factors reported by students that increased their social and academic engagement. Students reported that age-relevant content was important when providing leveled reading material (Coyne et al., 2017). Students also

expressed preferences for interventions that allowed for choice, independence, and flexibility, all of which can be found explicitly in the Universal Design for Learning guidelines (CAST, 2018). For example, the first UDL guideline addresses the "why" of learning and calls for *Providing Multiple Means of Engagement,* specifically checkpoint 7.1, *optimizing individual choice and autonomy* (CAST, 2018). The goal of this specific guideline is to encourage learners to be purposeful and motivated by allowing choice and independence in the classroom.

Many of the themes that emerged within the literature surrounded the individualization incorporated within technology-based interventions. Students reported that they appreciated the age-relevant content, opportunities to socialize online, choice, and flexibility that were included in the interventions utilizing technology (Coyne et al., 2017; Dolan et al., 2005; Hall et al., 2015; Kennedy et al., 2014; Marino et al., 2014; Rappolt-Schlichtmann et al., 2013). However, these positive connections for students did not necessarily translate to improvements academically. For example, Marino et al. (2014) examined the effects of video games on learning science content. Not surprisingly, students reported increased engagement when using the video games, however, academic improvements did not coincide with use of the intervention.

Even so, the preponderance of UDL interventions that were technology-based illustrate the potential of this medium for individualization (Coyne et al., 2017; Dolan et al., 2005; Hall et al., 2015; Kennedy et al., 2014; Marino et al., 2014; Rappolt-Schlichtmann et al., 2013). A number of studies incorporated opportunities for social interaction. For instance, students using the Udio program for reading reported that age-relevant content and opportunities to socialize were valued components of the software (Coyne et al., 2017).

Although face-to-face collaborative learning is highly valued in schools, it is common-sense that it may not be ideal for students with social challenges such as those with HFASD. And

yet, avoidance of face-to-face interaction may not help students develop the social skills needed to navigate the current environment of school nor the complexities of a workplace setting in the future. Although UDL-based technology allows for more structured and facilitated collaboration that could potentially alleviate stress for students on the autism spectrum or those with anxiety or depression, it must also be acknowledged that research into the mental health effects of technology is a rapidly emerging field. Considering that the use of social media in particular has shown to increase feelings of loneliness, utilizing technology as a method of encouraging social interaction may have unintended negative consequences (Primack et al., 2017). Although there is tremendous potential for individualization with technology, caution should be exercised as the field is rapidly changing and long-term effects are still unknown.

The second research question asked: *To what extent do the interventions align with recommended practices for students with High-Functioning Autism or Asperger Syndrome?*

In the review of the literature, many of the studies aligned with recommended strategies particularly in the areas of classroom assignment accommodations, visual supports, choice making, and handwriting modifications. Interventions utilizing technology allow for these strategies to be easily embedded. Although the recommended strategies were incorporated in some format, a question remains as to whether they were the best types of supports for students with autism. For example, Myles et al. (2005) recommends that visual supports for students with HFASD should have the following specific goals in mind: *1) clarifying the task, 2) reminding individual of steps to complete, and 3) focusing the individual toward completion of the task.* Although visual supports were included in all the studies reviewed, it is difficult to ascertain the specific nature of the supports.

In addition, the recommendations for priming (i.e., pre-teaching or giving notice about upcoming concepts and/or events) and homework conditions were either not stated explicitly in the studies or not a focus of the intervention. Considering that UDL guidelines specify the need to "activate or supply background knowledge" (CAST, 2011), it is possible that the interventions adhered to this guideline but did not include evidence of priming in the details of the study. Homework is not specifically included in the UDL guidelines which may account for its lack of specificity in the reports of UDL-based interventions (CAST, 2018).

The suggested strategy of incorporating special interests was specified in four of the ten studies. The third UDL guidelines focuses specifically on providing multiple means of engagement and includes choice-making. Although the majority of interventions reviewed included choice in their design, this often referred to choices in how to access content rather than choice in the content itself. Students with HFASD often have very narrow and intense interests that make it difficult for them to focus on non-preferred subjects. Allowing the incorporation of special interests could potentially increase student engagement significantly.

Perhaps the greatest gap between the UDL-based interventions and the recommendation for students with HFASD is the incorporation of a *home base.* The purpose of a home base for students on the spectrum is as a 'check in' place with a trusted adult, and a location to escape the stress of the school day if needed. It can also provide a safe location to regain emotional control. The need for a home base fits into the UDL guidelines under numerous checkpoints such as checkpoint 7.3 (minimize threats and distractions), checkpoint 8.3 (foster collaboration and community) and checkpoint 9.2 (facilitate personal coping skills and strategies) (CAST, 2018). Considering the need for all students to feel connected, not just those with HFASD, educators should consider this an essential component of UDL-based interventions.

2.4.1 Limitations

A major limitation to this literature review was the lack of specific data about students with HFASD and other high-incidence disabilities who may have participated in the studies. Although some studies included specific numbers of participants with autism, none included detailed results for those students.

A second limitation to the review is the ambiguity involved when assessing studies for the alignment with recommended strategies for students with Asperger Syndrome. For example, *homework considerations* is one of the recommended strategies but only four studies out of 11 included details about differentiated homework. Without examining the details of each intervention, it is difficult to determine if homework was specifically addressed.

Included in this review were interventions that contained quantitative data as a component of their research design. However, when examining the studies focused on the Three-Block Model of UDL (Katz, 2013; Sokol & Katz, 2015), it is impossible to determine if there is a functional relationship between the intervention and the outcomes considering the extensive nature of the intervention. Specifically, this is a large-scale implementation model that includes system and structures, inclusive instructional practices, and social and emotional learning components (Katz, 2013). Although many of the components are based on evidence-based practices, without more studies the intervention as a whole cannot be viewed as an effective package for UDL implementation.

Another limitation of this review of literature is the lack of a second coder to evaluate the details and strengths of the studies. Although the quality indicators were detailed, a second coder may have interpreted the quality of each study slightly differently. Without a second coder to

review and discuss this, there is the possibility that the overall quality of the studies may be stronger or weaker than portrayed in this review.

In addition, the search process may have been limited by utilizing only two databases and excluding non-peer reviewed studies. However, since this literature review will aid in selecting or designing an intervention to be used in a subsequent study, it was deemed critical to select studies which have been subjected to peer review.

2.4.2 Implications for Practice

A major implication for practice is that interventions based on Universal Design for Learning guidelines incorporate many of the recommended strategies for students with HFASD/Asperger Syndrome. Simply by incorporating UDL guidelines in teacher planning and instructional methods ensures that many recommendations for helping students with high-functioning autism will also be met. In fact, not only will this help students with autism in inclusive classroom, it is reasonable to conclude that UDL-based interventions will aid the inclusion of all students with disabilities.

A subsequent implication for practice is the potential use of technology to individualize engagement for students with High-Functioning Autism. As stated previously, the use of excessive technology in schools is still an emerging field. Although it has great potential for individualization, the unintended consequences of neurological changes and the potential increased isolation for students already struggling socially may outweigh its benefits.

Finally, the two studies that incorporated all the recommended strategies for students with HFASD/Asperger were those based on the Three-Block Model for UDL (Katz, 2013; Sokol & Katz, 2015). This model requires a school-wide commitment and overall shift in cultural climate.

Although shifting a school's climate is a challenging endeavor, the Three-Block Model of UDL provides guidelines to do this. In addition, working toward a cultural shift is perhaps the most important way to move the goal of inclusion ahead.

2.4.3 Implications for Research

The finding from this review of research indicates further investigation is needed on specific strategies that incorporate both UDL guidelines and the specific needs of students with HFASD or other high-incidence disabilities. Considering that students with HFASD have deficits in executive functioning that overlap those of other disabilities such as ADHD, SLD, and anxiety/depression, interventions that provide support for executive functioning could be beneficial to a large number of students in inclusive settings. Considering that research on UDL interventions is still in its early stages, a gap in the research exists for studies that focus on current widely-used interventions that may align with UDL guidelines *and* recommended strategies for students with HFASD and that overlap with other high-incidence disabilities. In a systematic review of research on Universal Design for Learning, Ok et al. (2017) highlight the need for studies utilizing experimental design, specifically single-case research to investigate interventions that include UDL components.

One such intervention that is widely-used in schools to address mildly problematic behavior and prevent the need for more intensive supports is the Behavior Education Program (BEP), also termed the Check In Check Out (CICO) system, developed by Crone, Hawken, and Horner (2010). The purpose of the program is to increase positive interaction with adults while providing clear and explicit feedback on pre-established expectations in the classroom. Systematic reviews of the literature on CICO have determined it to be an evidence-based practice for reducing

problem behavior for students at-risk (Maggin, Zurheide, Pickett, & Baillie, 2015; Wolf et al., 2016). The Behavior Education Program (BEP) of which CICO is a component, is based on the principles of behaviorism.

The CICO strategy is worthy of investigation as a minimally-intrusive, easily implemented strategy for students with HFASD and other high-incidence disabilities as it incorporates many of the recommended strategies within its design. It provides a *visual support* in the form of the Daily Progress Report that combines a visual reminder and a method for feedback for the student. It also includes *student choice* and *opportunities for student interests* in its reinforcement procedures. Two strategies that were often missing in the interventions examined in this review involved of *priming* and *providing a home base* are also incorporated in the existing design of CICO.

As CICO is a strategy that is often used as a Tier 2 intervention within a three-tiered framework of schoolwide support, the majority of the student participants in the reviewed studies had either no official diagnosis or a diagnosis of LD (Learning Disability). This leads to the question of whether this could be an effective intervention for students with other specific diagnoses such as autism, anxiety, or ADHD. Although the program is designed to be a proactive Tier II strategy for schools with schoolwide positive behavior support programs (Crone, Hawken, and Horner, 2010), there is also the need to identify appropriate interventions for already diagnosed students in inclusive settings in order to prevent more serious or chronic behaviors.

Another benefit of the CICO program is that it is designed to be low-cost, simple to implement within a few days, and presents a low time-demand on personnel. It can also be individualized as needed. The CICO program is based on the seven core principles of positive behavior support which include:

1.well-defined expectations

2.appropriate social skills instruction

3.positive reinforcement

4.conditional consequences for problem behavior

5.increased positive interaction with adults in the school

6.opportunities for self-management

7.improved communication between home and school

(Crone, Hawken, & Horner, 2010)

Based on this review of literature, CICO is worthy of further study as an intervention for students with HFASD and other high-incidence disabilities as it fits into both Universal Design for Learning guidelines and recommended strategies for students with HFASD/Asperger Syndrome. More specifically it provides supports for executive functioning deficits that pose significant barriers in inclusive classrooms (Refer to Appendix B).

Although a body of research exists demonstrating the efficacy of the CICO intervention (Campbell & Anderson, 2011; Hawken & Horner, 2003; Hawken, MacLeod, & Rawlings, 2007; Mong, Johnson, & Mong, 2011), there is minimal research on a related intervention adapted by Parry (2014) termed Self-Guided Check In, Check Out (SG-CICO). The intervention is based on the need to reduce time-demands on teachers within inclusive settings while also incorporating a self-management component for the student. The efficacy of self-management strategies has been demonstrated for students with autism spectrum disorders (e.g., Callahan & Rademacher, 1998; Lee, Simpson, & Shogren, 2007), ADHD (e.g., Gureasko-Moore, DePaul, & White, 2006; Harris et al., 2005; Scheithauer & Kelley, 2014), emotional behavior disorders (e.g., Briere & Simonsen, 2011; Willis & Mason, 2014) and learning disabilities (e.g., Crabtree, Alber-Morgan, & Konrad, 2010;Wolfe, Heron, & Goddard, 2000).

Self-monitoring is a strategy that shows promise for students and allows for minimal demands on teachers' time during class. Although numerous studies show the positive effects of self-management in special education classrooms, there is very little research conducted in general education classrooms (Wills & Mason, 2014). Considering the majority of students with ADHD, for example, are in the general education classroom at least 80% of the time, it is essential to identify strategies that are effective for students and acceptable for use by teachers in general education settings (Wills & Mason, 2014).

A comparison study that compares CICO with a Self-Guided version of CICO could add to the research on the use of the intervention for at-risk students in inclusive settings. To address the need to accommodate students with high-incidence disabilities in general education classrooms, the overarching question guiding this study is: *How can schools effectively increase and implement inclusive practices that reduce barriers and increase independence for students with high-incidence disabilities, including but not limited high-functioning autism, in general education settings?* To answer this, the following research question will focus on a comparison of two evidence-based research interventions:

1. *What are the effects of Check In/Check Out (CICO) compared to Self-Guided CICO (SG-CICO) on academic engagement in a middle school inclusive setting for students with high-incidence disabilities?*

3.0 Methods

3.1 Setting

The setting for the study was an urban, independent school with 430 students in grades kindergarten through eighth grade. A component of the school's mission was to provide a fully-inclusive setting for students with disabilities. This was supported by the fact that all students with disabilities in the school attended classes with their same-aged peers for 80% or more of the school day. At the time of the study, the population of the school included 12.8% students with diagnosed disabilities. The specific setting of the study was within the middle school (grades six through eight) where the percentage of students with diagnosed disabilities rose to 20.1%.

It is important to note that because this was an independent school, and therefore, not subject to the federal and state regulations of public schools, students with disabilities were not entitled to Individualized Education Programs (IEPs) or Section 504 Plans. However, all students included in the percentages listed above were identified as students with disabilities through either publicly-funded evaluators or outside qualified personnel. Therefore, all students identified in this setting as students with disabilities would qualify for IEPs or 504 Plans if attending a public school.

The school was located on the campus of a large, urban university and employed 45 full-time teachers. About thirty percent of students received financial aid to attend the tuition-based school. Financial aid was comprised of school-based tuition discounts (60.7%) and government funds from the Earned Income Tax Credit (EITC) and Opportunity Scholarship Tax Credit program (39.3%) (Interim Study, 2018).

The school had an established Student Services Committee which served an equivalent function as that of the Behavior Education Program (BEP) team recommended by Crone, Horner, and Hawken (2004). At the time of the study, the school did not have an established Positive Behavior Intervention and Support program (PBIS) utilized schoolwide, however, expectations for student behavior were clearly outlined in the school handbook. The system of student support in place at the time of the study was based on the Response-to-Intervention (RTI) and Multi-Tiered System of Supports (MTSS) used throughout the United States designed to reduce unnecessary referrals, identify students who do not respond to universal supports, and implement appropriate supports for students who demonstrate specific needs (CEEDAR, 2016). MTSS, combined with Universal Design for Learning (UDL) guidelines and differentiated instruction practices, provide the rationale for providing this type of intervention (CEEDAR, 2016).

3.2 Participants

Although the original focus of the study emerged from an interest in identifying effective interventions for students with HFASD, recruiting participants with only autism spectrum diagnoses proved impossible in this setting. For this reason, the following criteria was applied to identify potential participants with symptoms that overlap with those often found in students with HFASD:

1. Student must be considered at-risk for future behavioral difficulties based on formal referrals from teachers or parents through the internal procedures of the school

2.   Must have a diagnosis of a high-incidence disability from a certified school psychologist

3.   Must have identified weaknesses in working memory and processing speed evidenced by a significantly higher General Ability Index compared to a Full-Scale IQ to ensure a similar cognitive profile to many students with autism spectrum diagnoses

In addition, the student and his/her parents must provide formal written consent to participate in the study. Two potential participants were identified using the above criteria and the parents were contacted personally by the Primary Investigator once IRB granted permission to conduct the study. Both identified participants agreed to participate in the study.

Participant 1, Brad, was an 11-year-old, sixth grade Caucasian male with current diagnoses of ADHD, Developmental Coordination Disorder, and a Specific Learning Disability in the area of Written Expression. The most recent psychoeducational evaluation identified barriers to learning in the areas of focus, impulsivity, and hyperactivity. In addition, weaknesses in executive functioning skills and fine-motor skills were confirmed. Utilizing the Wechsler Intelligence Scale for Children – Fifth Edition (WISC-V), Brad had a Full-Scale IQ in the Average Range and a General Ability Index (GAI) in the High Average Range. The purpose of calculating a GAI is to minimize the impact of the subtests of working memory and processing speeds.

Participant 2, Rory, was a 12-year-old male in the sixth grade with a diagnosis of ADHD, as well as Type 1 diabetes that was carefully managed through medication. Identified barriers to learning include maintaining on-task behavior, task initiation, limited self-confidence, and difficulty with homework completion. Rory was assessed with a Full-Scale IQ in the Average Range, and a General Ability Index in the High Average Range.

3.3 Materials

3.3.1 Forms

Forms for the Check In, Check Out (CICO) intervention were adapted from *Responding to Problem Behavior in Schools: The Behavior Education Program* by Crone et al. (2004), *Michigan's Integrated Behavior and Learning Support Initiative* (2017), and the *OSEP Getting Started Workbook* (2011). The Self-Guided Check In, Check Out (SG-CICO), devised by Parry (2014), provided the materials for the intervention. A checklist for "Business-as-Usual" (BAU) was created to maintain consistency in procedures (See Appendix C for checklists).

3.3.2 Student Materials

The Primary Investigator provided a pocket folder for participants to hold the Daily Progress Report (DPR) card. Three different colors for the DPR/placeholder cards were created to aid in stimulus discrimination for the treatment conditions of the program: (a) CICO – yellow card; (b) SG-CICO – green card; and (c) BAU – blank neutral card. The format of the Daily Progress Report card remained consistent for the CICO and SG-CICO conditions (See Appendix D). A Daily Progress Report card was not needed for the "Business as Usual" condition. Instead, a neutral paper that read "No Card Today" was placed in the folder.

3.3.3 Data Collection and Analysis

Quantitative frequency data was collected during in-person observations utilizing a momentary time sampling method. All observations occurred during a pre-determined, consistent 10-minute period within the students' science class. Both participants were members of the same science class. The 10-minute period was divided into 40, 15-second intervals. A pre-recorded tone marking 15-second intervals was used during the data collection sessions to ensure consistency. Frequency of the observed behaviors was collected using a specially-designed data collection sheet (Refer to Appendix G). In addition, secondary data was collected through the Daily Progress Report cards and self-rating cards completed by the teacher and/or the student.

3.4 Independent Variables

The Independent Variable consisted of three different conditions: (a) Check In, Check Out; (b) Self-Guided Check In, Check Out; and (c) the Control condition (i.e., "Business as Usual").

3.4.1 Check In Check Out

The first condition was a modified Check In, Check Out (CICO) based on the work of Crone et al.'s Behavior Education Program (BEP) (2010). Prior to class, the student checked in with the CICO Coordinator (i.e., Primary Investigator) in a separate, quiet location. The Coordinator greeted the student with a positive tone and phrase (e.g., "Hey, I'm happy to see you today!"). The Coordinator provided the student with a yellow Daily Progress Report card (DPR)

to clearly identify the CICO condition to the student. The card was placed in the standard blue folder used for all three conditions. Procedures for the CICO condition and a brief reminder of behavior ratings were reviewed with the student. The Coordinator reminded the student that they needed to bring their assignment planner, DPR, and pencils to class and added a positive verbal phrase (e.g., Have a great class!). Upon entering class, the student handed the DPR folder directly to the classroom teacher. Following class, the student collected the DPR folder from the teacher, the teacher provided at least one positive comment about the student's behavior, and the student then proceeded to check out with the CICO Coordinator. The DPR was reviewed and the points were calculated with the student. Positive feedback was provided if the student met the point goal (80% of total points). The student also received the predetermined daily incentive if the goal was met. Neutral feedback and re-teaching were briefly provided if the point goal was not reached (e.g., "Let's review what _____ looks like again."). Student was then dismissed with a positive phrase such as "Have a nice afternoon!". At the end of each day, the CICO Coordinator entered the data in the data collection spreadsheet.

3.4.2 Self-Guided Check In, Check Out

The second condition was a variation of the Check In, Check Out condition designated as Self-Guided Check In Check Out. This was a modified procedure to one designed by Parry (2014) and was nearly identical to the original Check In, Check Out procedure with the addition of the self-guided responsibilities of the student. This condition followed the same procedure as the CICO condition with the exception that the SG-CICO Coordinator (i.e., the Primary Investigator) briefly reviewed the procedures for self-monitoring of behaviors prior to each class and showed the student the green copy of the DPR card in the folder. The Coordinator provided an example as

a reminder of the rating procedures (e.g., "If you received a few reminders to be quiet during class, what rating would you give yourself?"). Student was reminded of the goal and then dismissed with a brief phrase of encouragement. Prior to the same class, the SG-CICO Coordinator also gave the teacher an identical green DPR card.

During class, the student kept the green DPR card and self-rated his behaviors throughout class. The teacher completed the DPR and returned it directly to the SG-CICO coordinator at the end of class. The student also returned the DPR self-rating card to the Coordinator at the end of class. However, there was no direct discussion between teacher and student during this condition.

The procedure for Check Out in this condition was the same as the first CICO Condition with one notable exception. In the SG-CICO condition, bonus points were awarded and specific praise was given for each goal when the student's ratings matched those given by the observer/teacher. The student compiled bonus points over multiple sessions towards a pre-determined incentive.

3.4.3 Control Condition

The third treatment condition was the "Business as Usual", or control condition. In this condition, the student followed the normal daily procedures for all students in the class with the addition of a brief visit to the Coordinator (i.e., Primary Investigator) before and after class. The Coordinator provided a few words of verbal encouragement along with a neutral-colored paper that read "No Card Today". At the end of the day, the student returned to the Coordinator to return the blue folder. The student was then dismissed with a positive tone (e.g., "Have a great evening! See you tomorrow."

3.5 Dependent Variable

The dependent variable measured within the study was the percent of intervals of on-task engagement behavior during a 10-minute class period. Academic engagement included both *on-task/ active engagement* and *on-task/eyes on task. On-task/Active engagement* was operationally defined as observable on-topic interaction of the student with the teacher, peers, or class activities when in assigned area. *On-task/Eyes on task* was operationally defined as "any instance in which the student is loo king at the teacher, desk material, or source of instruction (this includes screens or peers) when in assigned area" (Skerbertz & Kostewicz, 2013). All other observed behaviors were identified as *Off-task /non-engagement*.

The experimenter used a momentary time sampling data collection procedure to determine the presence or absence of on-task/engagement behavior. The experimenter watched for 10 minutes each session. The observation time was broken into 40, 15-second time intervals. At the conclusion of each interval, the experimenter placed a checkmark if the student displayed one of the on-task-engagement behaviors. Otherwise, the box was left blank. At the conclusion of the observation day, the total number of intervals was divided by the total number of intervals marked with a checkmark to determine the percent of on-task/engagement intervals for each participant during that day's session.

A related outcome measure was the teacher and student ratings of behavior during each session. For both the CICO and SG-CICO conditions, the teacher recorded ratings of students' in-class observed behaviors on a Daily Progress Report card (Refer to Appendix D). During the SG-CICO condition, the student also rated their own behavior utilizing an identical Daily Progress Report card. Alignment data between the teacher and student during this condition was calculated

in the form of bonus points. Students received one bonus point for each of the four areas in which their rating aligned with the teacher's.

3.6 Experimental Design

Within the umbrella of single-subject research, the method selected for this study was the *alternating treatments design* first proposed by Barlow and Hayes (1979). An alternating-treatment design focuses on the comparison of two interventions to determine which is most effective in changing a single behavior. In this case, both of the chosen interventions for this study were shown to be effective in changing behavior but have yet to be compared to each other.

The three conditions for the study were Check In, Check Out (CICO), Self-Guided Check In, Check Out (SG-CICO), and "Business as Usual". The sequence of conditions was counterbalanced for the entire study, an important consideration of alternating treatment design for the internal validity of the study (Manolov & Onghena, 2017). In addition to counterbalancing, both students experienced each of conditions within every three-day span with the order of conditions changing every three observation days. The alternating treatments design also allowed for a quick switch of the interventions independent of student responses. Participating students were made aware of the day's current condition by the use of different colored materials and variations in verbal prompting each day.

Data collected from the study was depicted with line graphs using an established format specific to alternating treatments designs. The data was interpreted using visual analysis to systematically compare results across interventions and identify stratification of the data across trends and levels (Cooper et al., 2007).

3.7 Procedures

3.7.1 Training

The Primary Investigator developed training based on the work of Parry (2014). The training utilized the CICO Coordinator and Fidelity Checklists, the SG-CICO Coordinator and Fidelity Checklist and the Business-as-Usual Checklist to provide a procedure for the training sessions. These forms were also used to aid in treatment fidelity throughout the study. Refer to Appendix C for examples of the checklists.

3.7.2 Rotation of Treatment Conditions

A pre-established schedule for the intervention rotation was created prior to implementation. Participants were made aware of the treatment condition for the day during the pre-class Check In session. The three treatment conditions were rotated and counterbalanced across participants. When a student missed a day, the treatment schedule picked up from that point. Each class period lasted for 50 minutes. Observational data was collected for 6 sessions per condition over a period of six weeks.

3.7.3 Student Training

Sessions for the student occurred after formal consent to participate in the intervention was obtained. Prior to training, students were asked to complete a *Reinforcer Preference Survey* (See Appendix F) to identify meaningful incentives for each participant. Training comprised of one-to-

one explicit teaching of expected behaviors and earned rewards. The training session for CICO was approximately 10 minutes and included details on the time, location, and procedures for the before- and after-class meetings.

A separate training on self-rating occurred for SG-CICO and was approximately 10 minutes. Each student was taught through examples and non-examples how to accurately use the Daily Progress Report rating scale. Self-monitoring for the target responses was modeled and practiced using role-plays. To verify acquisition of the skills, a trial session was held in which the PI observed the student, and both the student and PI rated the students' behavior for the class. Following the session, the PI and student checked for alignment of their ratings.

3.8 Interobserver Agreement, Fidelity of Treatment, and Social Validity

3.8.1 Interobserver Agreement

The training session for collecting interobserver agreement data was conducted by the Primary Investigator and was approximately 15 minutes in length. The training included:

a)   Introduction of the operational definition for each dependent variable

b)   Providing examples and non-examples of behavior to be observed

c)   Three one-minute practice sessions utilizing the pre-recorded tone marking 15-second intervals to ensure that 80% agreement was reached prior to the first classroom observation session

Interobserver data was collected for 28.6% of sessions. A consistent recording of intervals was used by both observers simultaneously via shared earbuds to ensure uniformity. Following

each session, data was compared and IOA agreement was calculated. If the session resulted in less than 80 percent agreement, a brief re-training session was held to reduce future disparities. Using a total agreement approach, IOA scores totaled 82.7%.

3.8.2 Fidelity of Treatment

Fidelity checklists were utilized as a guide by the Coordinator throughout the study to maintain consistency in the implementation of the interventions (Refer to Appendix C). The secondary researcher utilized to collect IOA data was also employed to collect treatment fidelity data. Fidelity of treatment was calculated for 28.6% of sessions and equaled 98.7% of steps completed.

3.8.3 Social Validity

A key focus of the research was to evaluate the acceptability of the interventions by the student. The treatment acceptability surveys were completed following participation in the study by the student for both the CICO and SG-CICO conditions. See Appendix E for the *Student Acceptability Questionnaire.*

4.0 Results

The results section contains the data collected for the two participants, Brad and Rory, throughout the study. Three types of data were collected including: (a) the percent of intervals students engaged in on-task/engagement: (b) individual teacher ratings and self-monitoring student ratings; and (c) social validity data for participants.

4.1 On-Task Engagement

Figure 1 contains the graphs for engaged on-task behavior for the participants across all three conditions. Calendar days included in the study are depicted in the x-axis and the percentage of intervals of observed on-task behavior occurs along the y-axis. Filled dots with a dotted data path represent on-task behavior during the Check In Check Out (CICO) sessions, while open dots with a dashed data path depict on-task behavior during the Self-Guided Check In Check Out condition (SG-CICO). Filled dots with a solid data path represent the number of intervals of on-task behavior during the Business-as-Usual condition (i.e., control condition). Both participants had six repetitions of the three conditions for a total of 18 sessions over a six-week period.

4.1.1 Participant 1 (Brad)

During the Check In Check Out condition (CICO), Brad displayed on-task behavior an average of 53.75 % (*Mdn = 50%)* of intervals compared to a mean of 62.46% (*Mdn = 61.25%*)

during Self-Guided Check In Check Out conditions (SG-CICO).   In the Business as Usual condition (i.e., control condition), Brad displayed the lowest average levels of on-task behaviors (52.92%; *Mdn = 51.25%)*.

Brad displayed high variability of on-task/engagement across all conditions. The greatest variability was for the Business-as-Usual condition (range = 17.5 - 80%) while the CICO condition had the least variability across sessions (range = 45 – 75%). The trend direction, or steepness of the data across time, for both the CICO and SG-CICO conditions increased over time. In contrast, the data for the BAU condition depicted a decreasing trend. To summarize, when examining Brad's results, the SG-CICO condition resulted in both a higher mean *(M = 61.46%)* and a higher median *(Mdn = 50%)* than the other two conditions while also showing an improving trend. However, all data paths had considerable overlap between other conditions.

4.1.2 Participant 2 (Rory)

During the CICO condition, Rory was observed engaging in on-task behavior an average of 75.83% (*Mdn = 85%)* of observed intervals compared to 81.25% (*Mdn = 81.25%)* in SG-CICO or 65.42% (*Mdn = 71.25%)* in BAU sessions. The percent of intervals with on-task behaviors depicted high variability for the BAU condition (range = 32.5 – 87.5%) and slightly lower variability in both the CICO (52.5 – 90%) and SG-CICO (range = 70 - 100%) conditions. When examining the trend direction, there was a decrease for Rory in the CICO condition. However, for the SG-CICO and the BAU conditions the trend direction increased over time. When comparing the differing outcomes across conditions, the SG-CICO condition had the highest mean percent of intervals with the lowest variability and an increasing trend. Regardless, data paths from all

conditions overlapped with other conditions and resulted in unclear stratification of the data (Refer to Figure 1).
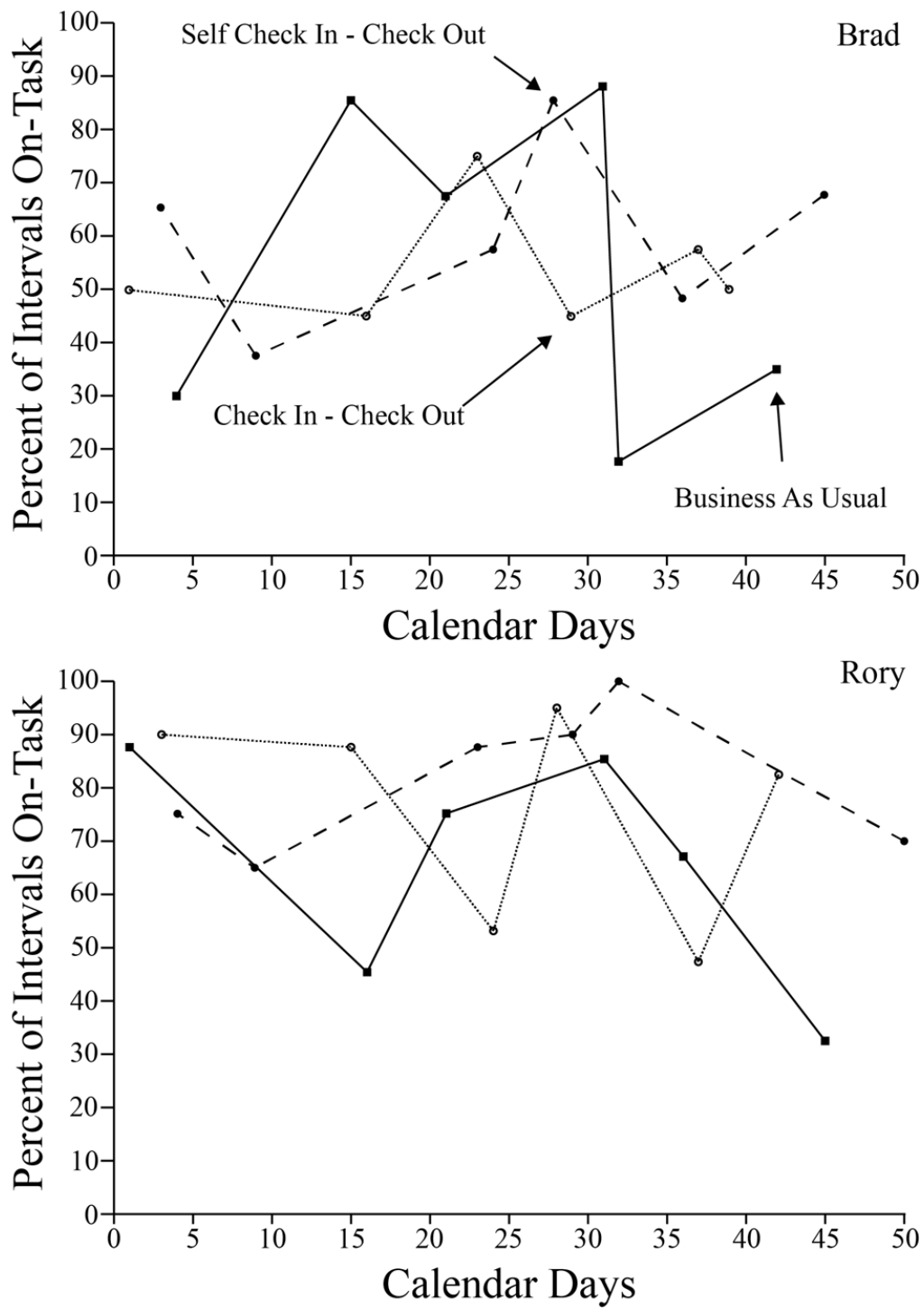
Figure 1. Frequency of observed on-task behavior of students

4.2 Daily Progress Report Data

In addition to the data compiled during direct observation, related data was collected through daily teacher ratings for the CICO and SG-CICO conditions. The SG-CICO condition had additional data with the inclusion of student self-monitoring data from each session. According to the results, Brad achieved his goals the majority of the time for the CICO condition (5 out 6 sessions; 83.3%) and 100% of the time in the SG-CICO condition. Rory, on the other hand, achieved his goals according to the teacher ratings only once out of six sessions (16.6%) in the CICO condition compared to 50% of the SG-CICO sessions (3 out 6).

Additionally, students were allotted a Bonus Point for each category in which the student's rating aligned with the teacher's rating during a session (Table 1).

Table 1. Average Points Earned on Daily Progress Report Teacher Rating Scale

	Brad		Rory	
Average Goal Ratings (# possible points)	CICO	SG-CICO	CICO	SG-CICO
Arrival (3)	2.67	3.00	2.83	2.67
Classwork (3)	2.83	2.83	2.83	3.00
Participation (3)	1.67	2.17	2.50	2.67
End of Class (3)	2.50	3.00	0.83	1.50
Average Total Points (12)	9.67	11.00	9.00	9.83
# of sessions goal achieved /Total Sessions	5/6	6/6	1/6	3/6
Average bonus points awarded per SG_CICO session (4)		3.5		3.17

4.3 Social Validity

At the conclusion of the study, the Primary Investigator provided the participants with surveys to assess the social validity of the CICO and SG-CICO conditions. Each item in the survey was assessed on a 5-point scale, ranging from Strongly Disagree (1) to Strongly Agree (5). Overall, when calculating the average of all positively-worded statements across participants, the SG-CICO condition received a slightly higher average social validity score of 4.56 (out of a maximum 5 points), as compared to the CICO condition ($M = 4.38$). The students strongly agreed that "Having my teacher rate my behavior helped me stay on track" for both the CICO and SG-CICO conditions. Interestingly, when reporting about the SG-CICO condition both students agreed strongly ($M = 5$) that "Participating in this program has helped me complete more work in class". For the CICO condition the students reported that they only mildly agreed with the statement ($M = 4$).

Finally, in response to the statement "Overall, I think the program would be good for other kids who may be struggling in school", the SG-CICO received a slightly higher average rating ($M = 5$) than the CICO condition ($M = 4.5$). One statement on the survey was negatively-worded and therefore was separated from the results in Table 2. In response to the statement, "I didn't like participating in this program because other students were not doing the same thing", Brad "neither agreed nor disagreed" while Rory strongly disagreed with the statement for both conditions.

Table 2. Social Acceptability Ratings from Participants

	Brad		Rory	
	CICO	SG-CICO	CICO	SG-CICO
The before-class check in helped prepare me to have a great day in class.	5	4	5	5
The training sessions which taught me the **expected behaviors (CICO) or taught me how to self-monitor** (SG-CICO) were helpful before starting the point card system.	1	4	5	4
Having my teacher rate my behavior helped me stay on track (and keep my behavior ratings accurate).	5	5	5	5
I think this program helped me stay more on-task and follow the behavior expectations in class.	4	4	4	4
Participating in this program has helped me complete more work in class.	4	5	4	5
I think the after-class check out was helpful to review my progress.	4	5	5	4
Overall, I enjoy this program and would like to continue participating in it.	5	5	5	4
I think the CICO/SG-CICO program would be good for other kids who may be struggling in school.	4	5	5	5
Average overall rating	**4.00**	**4.63**	**4.75**	**4.50**
Average CICO rating across participants	**4.38**			
Average SG-CICO rating across participants	**4.56**			

5.0 Discussion

The current educational system in the United States is theoretically committed to creating an inclusive environment for all students. For students with high-incidence disabilities, this most often means a placement in a general education setting. The question of how to most effectively support the wide-ranging emotional, social, and academic needs of these students has yet to be answered. The impetus for the current study was to move the literature forward towards addressing the following Problem of Practice: *How can schools effectively increase and implement inclusive practices that reduce barriers and increase independence for students with high-incidence disabilities, including but not limited to high-functioning autism, in general education settings?*

5.1 Research Question

Based on the continual need for research on inclusive behavioral supports for students with high-incidence disabilities (HID), the current study compared two behavioral interventions in an attempt to answer the following research question: *What are the effects of Check In/Check Out (CICO) compared to Self-Guided CICO (SG-CICO) on academic engagement in a middle school inclusive setting for students with high-incidence disabilities?*

Utilizing an alternating treatments, single-subject experimental design, a modified CICO intervention was compared with a modified SG-CICO intervention. The study included two middle-school participants in an independent K-8 school located on a large, urban university campus. The interventions selected were based on principles of positive behavior support (Crone,

Hawken, & Horner, 2010) and aligned with the Universal Design for Learning framework (CAST, 2018).   Furthermore, the interventions were designed specifically for use in inclusive environments. An analysis of the study revealed valuable findings for both practitioners and researchers.

5.1.1 Observed On-Task Behavior

When comparing the behavioral interventions with the control condition (BAU), both SG-CICO and CICO demonstrated a greater occurrence of on-task behavior. In other words, implementing one of the positive behavior support interventions resulted in an increase in on-task engagement for both participants. This finding implies that utilizing either CICO or SG-CICO is preferable to proceeding with Business-as-Usual for students with the high-incidence disability of ADHD.

More specifically, an analysis of Brad's on-task behavior showed both a higher mean and median for the SG-CICO condition than either the CICO or BAU conditions. This implies a stronger relationship between the SG-CICO intervention and the frequency of on-task behavior, consistent with the findings of Parry (2014) in his original iteration of the SG-CICO design. In addition, this supports the potential of self-monitoring interventions for students with HID and HFASD found in previous research focused on self-monitoring focused on improving on-task behavior (Gureasko-Moore et al., 2006; Lee, Simpson, & Shogren, 2007; Wills & Mason, 2014).

An analysis of Rory's observed on-task behavior resulted in a higher mean for the SG-CICO compared to the CICO condition. However, the median for the SG-CICO condition was lower. According to Gast et al. (2014), when conducting a visual analysis of graphed data it is recommended that the median may be a greater indicator as it limits the effect of extreme values

in the data. In this case, both the mean and median were identical indicating that one intervention was not clearly superior to the other in Rory's case.

Although SG-CICO resulted in higher frequencies of on-task behavior, the high variability across conditions for both participants signifies that further research is needed to verify this result. A plausible explanation for the variability in the data is the possible effect that content of the class material and/or the nature of required tasks had on student engagement. For example, during a number of sessions, students were engaged in individual computer work on a topic of their interest. Both choice and the use of technology have been found to increase engagement for all students, particularly those with ADHD and HFASD (CAST, 2018; Myles et al., 2005; UDL-IRN, 2018).

Other sessions consisted of a lecture format on the reproductive system. During this unit, the majority of the students in the class, including the study participants, exhibited an increase in off-task behavior. Without further exploration, it is impossible to determine whether these confounding factors had a significant effect on behavior. At this time, it cannot be said with confidence that experimental control was established based on the variability of the data.

Perhaps the most important finding comes from the time demand involved in implementing CICO versus SG-CICO. Over time, the intention for the SG-CICO design is to completely fade, or greatly reduce, the need for teacher ratings of student behavior (Parry, 2014). If the results of both CICO and SG-CICO are comparable but SG-CICO requires less burden on teachers, this is a clear benefit considering the challenges of providing inclusive supports in general education classrooms.

5.1.2 Teacher/Student Ratings of Behavior

A critical component of the design of the CICO and SG-CICO interventions is the Daily Progress Report (DPR) card that provides direct feedback to the student on focused goals. Both the CICO and SG-CICO conditions included a teacher rating component of student behavior and provided a related measure of the interventions. Both participants met their goals more consistently during the SG-CICO intervention compared to the CICO intervention further evidence that the SG-CICO had a greater effect on behavior.

When examining the ratings for specific goals, Brad consistently had the lowest rating in the area of appropriate class participation (e.g., spontaneously talking out). Whereas, Rory had the greatest difficulty with tasks occurring at the end of the class period (e.g., writing assignments correctly and without prompting in his planner). This provides evidence that the data collected naturally through the DPR has the bonus advantage of guiding the development of future goals for individual students. In summary, the DPR ratings indicate more positive outcomes for the SG-CICO intervention in terms of meeting individual student goals.

According to UDL guidelines, principles of positive behavior support, and recommended strategies for students with HFASD, Visual Supports are recommended for students with HID, including those with ADHD and HFASD (CAST, 2018; Crone et al., 2010; Myles et al., 2005; UDL-IRN, 2018). The SG-CICO condition provided a visual guide for the participants in the form of the Daily Progress Report card. In contrast to the other two conditions, the participants had a copy of the goals easily accessible to them throughout the class period. The inclusion of the visual guide could partially account for the increase of on-task behavior for the participants during the SG-CICO condition.

The conferring of bonus points for alignment between teacher and student ratings was intended to raise the awareness of the student to their own behavior. The results of the current study showed a high degree of alignment between student and teacher. The next logical step would be to begin fading the teacher DPR ratings. A fading schedule that removes the need for teacher rating slowly (e.g., every other day, to once per week, to once per month) would help ensure maintenance of the behavior.

Considering that students with ADHD and HFASD often find it challenging to understand the perspective of others, the self-evaluation component of the SG-CICO condition had added utility (Diamond, 2013, Barkley 1997; Myles et al., 2005). Within the SG-CICO design, students were "forced" to confront misperceptions about their own behavior. As a consequence of this confrontation, the potential exists to raise student awareness of specific behaviors that need to improve across all settings. In turn, this could lead to the greater generalization of the desired behaviors.

5.1.3 Social Validity

The student surveys of social validity presented a positive view of both interventions. The SG-CICO intervention resulted in a slightly higher overall average rating across participants (4.56 out of 5) compared to the CICO rating of 4.38. Brad, in particular, responded more favorably to the SG-CICO condition. Rory, on the other hand responded slightly more favorably to the CICO condition. One possible explanation for this is that the SG-CICO requires more work on behalf of the student due to the self-rating form. In addition, it is possible that students may also experience greater discomfort when confronting their own behavioral challenges. It can be argued, however,

that facing this discomfort is essential for long-term behavioral changes to be maintained and generalized.

Although it was not indicated in the written survey, both students at separate times verbally expressed their disappointment upon realizing it was a BAU day. Furthermore, both participants independently verbalized enthusiasm on at least one occasion upon learning it was a day they could earn bonus points (e.g., SG-CICO condition). This could possibly be attributed to the meaningfulness of the reinforcers for each participant. Identifying and offering meaningful reinforcers for students also speaks to the potential for individualization of the SG-CICO intervention.

5.2 Limitations

The following limitations to the study should be considered when interpreting the results.

First, in the attempt to control for the many variables that occur in a natural setting, the interventions were altered from their original design to include only one class instead of a full-day format. Although this change allowed for better variable control (i.e., teacher, subject area, and environment), it was not a true replication of either the CICO or SG-CICO interventions. The current study was limited to one class (e.g., science) that took place on a rotating schedule, four days out of every six school days. In addition, the class time alternated between a morning slot and an afternoon slot depending on its place in the rotation. These factors made it difficult to establish beneficial routines for the students. For students with High-Incidence Disabilities, such as ADHD and HFASD, building routines around new behaviors is fundamental for long-term maintenance (UDL-IRN, 2018).

A second difference between the current iteration and the original design of the interventions was inclusion of a home/school connection. The choice to limit the study to the school setting and omit the home connection was intended to control for the positive verbal support provided to the student. Although it was determined that controlling the nature of positive support to students was the priority for this study, it must be acknowledged that the lack of a home/school connection is a significant difference from the original design of the interventions (Crone, Hawken, & Horner, 2010; Parry, 2015).

Another limitation was the challenge of managing multiple students in the short period of time before and after class. In this setting, students had five minutes to transition from one class to another. They are expected to collect their needed materials for the next class, use the restroom and get a drink during this time. Understandably, students also use this break to briefly socialize with their friends. The five-minute period is intended to provide adequate transition time for students in general education. However, for many students with HID, transitioning from one task to another is often a challenge in the best of circumstances without adding the extra task of Checking in and Checking out at another location (Brown, 2005; Diamond, 2013; Myles et al., 2005). The Primary Investigator had to work quickly to complete all of the procedural steps. More than two participants would have made the procedures prohibitive, if not impossible, to complete in the time allowed.

The final limitation is a common one when conducting direct observation. It is a distinct possibility that the participants' behavior was affected by the presence of the observer, also called *the Hawthorne Effect* (Mertens, 2015). Although the observer was a non-participant in the class, it is conceivable that the observer's entrance to the room may have served as a prompt and affected the frequency of the participants' on-task behavior.

5.3 Implications for Practice

Despite the limitations, the results of this study provide useful information for practitioners. This study supports the need to create universally-designed classrooms that promote an environment in which not everyone needs to do the same thing at the same time. The results of the social validity survey indicate that students do not necessarily mind doing something different from other students. In the ideal universally-designed classroom, individual tasks would be a common occurrence, and self-reflection and assessment that guide appropriate goal setting would be included with implementation of the UDL framework (CAST, 2018). Both Rory and Brad also reported that "participating in this program helped me complete more work in class" and "stay on track". Although the frequency data does not show a clear functional relationship between the interventions and on-task behavior, the participants reported that both interventions helped improve their mindset around classroom engagement. In theory, changing the mindset of students around classroom engagement leads to future achievement gains (Dweck, 1986). For practitioners, this further endorses the need to implement practices that provide timely, directed feedback to students.

In addition to feedback from teachers, the study also highlights the potential of increasing self-monitoring for students. Administrators should continue to build capacity in teachers to differentiate for all students, and particularly those with HID. Self-monitoring in its many forms (e.g., self-rating, self-management, self-reflection, and self-assessment) is a low-cost, low time-demand practice for inclusive classrooms which could benefit all students. It is common sense that the more the flexibility within the general education classroom, the greater the potential for inclusivity and individualization for students with high-incidence disabilities.

Practitioners should also consider utilizing a framework of action research and improvement science to test small-scale iterations of the SG-CICO and CICO interventions. For example, a comparison study of students with HID to those without could highlight whether the interventions are more effective for specific populations of students as well as neurotypical students. Classroom teachers, as opposed to outside researchers, have the greatest access to a wide-range of students in their natural setting. Administrators could help guide and educate teachers to do their own quality research on these interventions, not just for making internal decisions based on the data, but with the goal of moving the field of effective behavioral interventions ahead more rapidly.

5.4 Implications for Future Research

Although the results of the current study indicate the potential of SG-CICO and the continued benefits of CICO, further research could expand on these findings. Considering that a clearly superior intervention was not identified in this study, a longer study that included a larger number of participants and allowed for more repetitions of each condition could help clarify which condition was most effective. In addition, Wolery, Gast, and Ledford (2014) suggest incorporating a final phase to the alternating treatment design in which only the most effective condition is used. This would ensure that treatment interference between conditions is eliminated and a more accurate gauge of the efficacy of the intervention is attained.

Furthermore, considering that the original Problem of Practice was seeking inclusive interventions for students with High-Functioning Autism Spectrum Disorders, future studies that focus specifically on this population are essential. Although there are many overlaps with

symptoms found in other High-Incidence Disabilities, HFASD presents its own unique set of challenges. Future studies could aid in pinpointing the most effective interventions for these students.

Finally, it must be acknowledged that inclusive interventions often require additional time and effort on behalf of teachers. Identifying interventions that align with principles of positive behavior support, differentiated instruction, and Universal Design for Learning hold great promise for the future of inclusive education. Likewise, future research into interventions that lessen the burden on teachers while increasing the efficacy of positive supports for students must be a continued focus in the field of education if these practices are to be widely-implemented.

5.5 Conclusion

A continued need exists to identify effective interventions for students with high-incidence disabilities that are flexible, easily adaptable, and simple to implement. In fact, this need is perhaps more important than ever as individuals and organizations recognize the importance of creating inclusive societies (UNESCO, 1994). It is only logical that if students with high-incidence disabilities continue to be placed in general education settings, then identifying practices to meet the needs of these students should be a top priority for educators and researchers.

The purpose of this study was to do exactly that – expand the literature on effective inclusive practices that can be implemented quickly, efficiently, and effectively in schools while also holding the potential for student individualization. The capabilities of the evidence-based Check In Check Out program to do this has been previously established (Maggin, Zurheide,

Pickett, & Baillie, 2015; Wolf et al., 2016). There also exists one dissertation demonstrating the added benefit of a self-evaluation component (Parry, 2014).

This current study builds on the existing research by comparing the two interventions while adding an additional component to the SG-CICO intervention that incentivized alignment of teacher and student ratings. Overall, SG-CICO showed a slightly greater therapeutic level than the CICO condition for one participant according to observed frequency of on-task behavior across sessions. However, the advantage of one intervention over the other was unclear for the second participant. In addition, data collected from the teacher via Daily Progress Reports demonstrated a higher number of sessions during which participants met their behavioral goals for the SG-CICO intervention compared to the other two conditions. Finally, the SG-CICO intervention had a slightly higher average social validity rating across participants indicating that it is on par with the CICO intervention in terms of student acceptability.

Although the current evidence underlines the potential for SG-CICO, it also highlights the need for further research due to the high variability of the data. Even so, based on the initial results, both interventions are worthy of use within a multi-tiered system of supports due to their flexibility, simplicity, and initial positive results. SG-CICO holds added potential with the inclusion of a self-evaluation component. The self-rating Daily Progress Report card provides the tool for increasing student's responsibility in monitoring their behavior while also serving as a visual guide to support working memory.

Another focus of this study was to investigate the extent a widely-used behavioral intervention aligned with Universal Design for Learning guidelines. Details of the alignment are outlined in Table B1 (See Appendix B). According to CAST (2018), Universal Design for

Learning encourages the intentional planning of responsive, flexible classrooms. It can be asserted that both SG-CICO and CICO provide a tool for doing just that.

In conclusion, the SG-CICO program warrants further use by practitioners and further investigation by researchers. Educators face a legal mandate to provide the *"least restrictive environment"* for students with all disabilities. To do so requires an unrelenting search for the most effective interventions to do so. Regardless of the legal mandate, educators who agree with UNESCO's Salamanca Statement of 1994, have the ethical responsibility to create inclusive schools as "the most effective measures of combating discriminatory attitudes, creating welcoming communities, building an inclusive society and achieving education for all." A continued effort to expand the literature on inclusive practices is an essential element towards reaching that goal.

Appendix A Literature Review Summary

Table 3. Summary of Reviewed Studies

Authors (Year)	Participants	Research Design	Intervention	Outcome Measures	Results
Coyne et al. (2017)	Ten students, ages 10-14 with IDD 5 with ASD Seven teachers Suburban special education public elementary and middle school	Mixed methods design	Udio, a computer-based UDL literacy tool created to improve reading comprehension and increase interest in reading	Usage of Udio Methods of participation in online discussions (text, draw, audiorecord) Use of built-in Udio supports Students Perceptions of Udio	All students accessed main components of Udio independently Students utilized various methods of participation 100% of students used audio-assisted reading; 50% used sentence starters Three themes emerged regarding perceptions: age-relevant content, choice, & opportunities to socialize
Dolan et al. (2005)	Ten 11th & 12th grade students with LD Suburban public high school Inclusive setting	Quasi-experimental group design	Prototype of a computer-based testing with text-to-speech (CBT-TTS)	National Assessment of Educational Progress (history & civics) test scores Usage patterns Students perceptions of CBT-TTS	Significant difference for longer reading passages (ES = 0.6) 90% of students reported TTS was used to read test questions Qualitative data suggests that students' preferences for the TTS test form was due to independence and flexibility of use.
Hall et al. (2015)	284 students in 4 middle schools; 73 were SWD 10 teachers (GE=7; SE=3) Inclusive setting	Experimental Group design Mixed methods	*Strategic Reader*, a technology-based system using UDL principles and CBM to reading progress	Comparison results of the Gates-MacGinitie Reading Test Teacher interviews Student surveys	Significant increase (0.1 level) in comprehension scores for all students Significant increase (0.05 level) for students with LD using the online CMB SWD reported higher engagement with *Strategic Reader* than their peers

Authors (Year)	Participants	Research Design	Intervention	Outcome Measures	Results
Katz et al. (2013)	631 students in grades 1 through 12 (Note: students in Canada with HID are not reported) Inclusive setting	Quasi-experimental pre/post-test group design	Three-Block Model of UDL (a method to help teachers implement UDL principles)	Observations of engaged behavior Students surveys pre- and post-intervention	Significant increase overall engaged behavior (partial η = .549), and active engagement (partial η = .582). Significant increase in overall social variables (e.g., inclusion/exclusion, student autonomy), partial η = .124
Kennedy et al. (2014)	141 high school students including 32 SWD Inclusive setting	Quasi-experimental pre/posttest group design	Content Acquisition Podcasts (CAPs) to improve content-area vocabulary	CBM weekly vocabulary probes	Gains in vocabulary ES for SWD = 1.83 ES for GE = 0.84
King-Sears et al. (2015)	**High School Students** UDL: GED = 17 HID = 7 Comparison: GED = 24 HID = 12 **Teachers** = 4 GE = 2; SE = 2 Inclusive setting	Mixed methods group design	IDEAS self-management strategy for mole conversion	Mole conversion tests Social validity questionnaire	**Performance Data** Post-test ES for HID = .80 Delayed post-test ES for HID = .97 No significant ES for GE students **Social Validity** The majority of both GE and HID students found IDEAS helpful (87%, 100%); liked it (73%; 100%); and would recommend it to others (87%; 71%)

Authors (Year)	Participants	Research Design	Intervention	Outcome Measures	Results
Kortering et al. (2008)	290 students including 37 with HID	Mixed-methods quasi-experimental group design	UDL-based interventions (14 algebra, 10 biology)	Student surveys following each class in which a UDL intervention occurred (Student Self-Reported Engagement Scale)	All students (both GE and HID) reported significant increased perceived engagement
Marino et al. (2014)	341 students between ages 10-14 57 students with LD Inclusive setting	Mixed-methods quasi-experimental group design ABAB design	Four UDL-based middle school life science video games designed by Filament Games	Level of engagement	Quantitative analysis showed no benefits for students with LD Qualitative data showed students with LD highly engaged
Rappolt-Schlichtmann, et al. (2013)	622 fourth-grade students SWD = 62 22 teachers Inclusive setting	Mixed-methods group design	Universally Designed for Learning Science Notebook (USDN)	Assessing Science Knowledge (ASK) Survey Motivation for Science (MFS) Inventory Measure of Academic Progress (MAP) Electronic usage log Teacher background questionnaire	Improved outcomes in science knowledge for all students (ES=.32) Teachers more experienced with traditional science notebooks had more positive outcomes with USDN (ES=1.307) Students reported increased engagement

Authors (Year)	Participants	Research Design	Intervention	Outcome Measures	Results
Scott et al. (2011)	6 high school students in a self-contained classroom	Single-subject design, ABAC multiple treatment	Universal Design for Transition (UDT), a UDL-based strategy for linking academic content to transition planning	Achievement measured with CBM assessments Engagement measured by teacher observation Interest measured through student survey	Increase in achievement, engagement, and interest for all participants
Sokal & Katz (2015)	183 third through eighth grade students SWD = 3 (Note: students in Canada with HID are not reported)	Quasi-experimental pre/posttest group design	Three-Block Model of UDL	Demographic survey The School Engagement Scale (self-report survey) Observations of engaged behavior	Positive impact on student engagement, specifically in social and intellectual engagement

GE = General Education; SE = Special Education; LD = Learning Disability; IDD = Intellectual and Developmental Disability; ID = Intellectual Disability; SWD = Students With Disabilities; HID = High Incidence Disability; UDL = Universal Design for Learning; CBM = Curriculum Based Measurement; ES = Effect size

Table 4. Alignment with Recommended Strategies for Students with Asperger Syndrome

Authors (Year)	Priming*	Classroom Assignment Accommod-ations *	Visual Supports *	Home Base	Choice Making *	Handwriting Modifications	Incorporation of Special Interests *	Homework Considera-tions *	Total	%
Coyne, Evans, & Karger (2017)		X	X		X	X	X		6/8	75%
Dolan et al. (2005)		X	X		X	X			4/8	50%
Hall, et al. (2015)		X	X		X	X			4/8	50%
Katz (2013)	X	X	X	X	X	X	X	X	8/8	100%
Kennedy et al. (2014)	X	X	X			X			4/8	50%
King-Sears et al. (2015)		X	X		X	X		X	6/8	75%
Kortering et al. (2008)		X	X		X	X	X		5/8	63%
Marino et al. (2014)	X	X	X		X	X	X		6/8	75%
Rappolt-Schlichtmann et al. (2013)	X	X	X		X	X	X	X	7/8	88%
Scott et al. (2011)		X	X		X	X			4/8	50%
Sokal & Katz (2015)	X	X	X	X	X	X	X	X	8/8	100%
Total meeting criterion	5/11	11/11	11/11	2/11	10/11	11/11	6/11	4/11		
Total %	46%	100%	100%	18%	91%	100%	55%	37%		

Average percentage of articles meeting criteria 71%

These strategies also provide a means of supporting the executive functioning needs in the areas of inhibitory control, working memory, and cognitive flexibility.

Table 5. CEC Quality Indicators

1.0   Context and Setting
2.0   Participants
3.0   Intervention agent
4.0   Description of Practice
5.0   Implementation of fidelity
6.0   Internal validity
7.0   Outcome measures/dependent variables
8.0   Data analysis

Authors (Year)	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	Total	%
Coyne, Evans, & Karger (2017)	X	X	X	X	X		X	X	7/8	88
Dolan, Hall, Banerjee, Chun, & Strangman (2005)	X	X	X	X	X	X	X	X	8/8	100
Hall, Cohen, Vue, & Ganley, (2015)	X	X	X	X	X	X	X		7/8	88
Katz (2013)	X	X	X	X	X		X	X	7/8	88
Kennedy, Thomas, Meyer, Alves, & Lloyd (2014)	X	X	X	X	X	X	X	X	8/8	100
King-Sears, Johnson, Berkely, Weiss, Peters-Burton, Evmenova, & Hursh (2015)	X	X	X	X			X	X	6/8	75
Kortering et al. (2008)	X	X	X	X	X	X	X	X	7/8	88
Marino, Gotch, Israel, Vasquez, Basham, & Becht (2014)	X	X	X	X	X		X		6/8	75
Rappolt-Schlichtmann, Daley, Lim, Lapinski, Robinson, & Johnson (2013)	X	X	X	X	X	X	X	X	8/8	100
Scott, Saddler, Thoma, Bartholomew, Virginia, & Tamura (2011)	X	X	X	X	X	X	X		7/8	88
Sokal & Katz (2015)	X	X	X	X	X		X	X	7/8	88
Total meeting criterion	11/11	11/11	11/11	11/11	10/11	5/11	11/11	8/11		
Total %	100%	100%	100%	100%	91%	45%	100%	73%		

Average % of indicators met across all studies   89%

Appendix B Check In, Check Out Program Alignment

Table 6. The Alignment of the Check In, Check Out Program with UDL Guidelines and Recommended Strategies

BEP/CICO Underlying Principle (Crone, Hawken, & Horner, 2010)	UDL Guidelines (CAST, 2018)	Recommended Strategy for Students with HFASD/Autism (Myles et al., 2005)	Support for Executive Functioning (UDL-IRN, 2018)
1.Define behavioral expectations	**6.1:** Guide appropriate goal setting	Priming Visual supports	Support for inhibitory control Support for working memory
2. Explicitly teach expectations	**9.1:** Promote expectations and beliefs that optimize motivation	Priming Visual supports Classroom assignment accommodations	Support for inhibitory control Support for working memory
3. Provide frequent feedback and reinforcement	**8.1:** Heighten salience of goals and objectives **9.3**: Develop self-assessment and reflection **5.3:** Build fluencies with graduated levels of support for practice and performance	Incorporation of special interests Choice making	Support for inhibitory control Support for working memory Support cognitive flexibility
4.Build a regular cycle of checking in and checking out with adults using Daily Progress Reports	**6.3:** Facilitate managing information and resources **8.3:** Foster collaboration and community	Home base Visual supports	Support for inhibitory control Support for working memory Support cognitive flexibility
5. Formalize consequences across home and school	**3.4:** Maximize transfer and generalization	Incorporation of special interests	Support for inhibitory control
6.Use points of Daily Progress Reports (DPRs) to monitor intervention effectiveness	**6.4:** Enhance capacity for monitoring progress.		

Appendix C CICO Coordinator and Fidelity Checklist

CICO COORDINATOR CHECKLIST: *Before Class Check-In*			
Date: _____ Student: _____			
Feature of CICO	**YES**	**NO**	**N/A**
1. Student was greeted individually with a positive tone *(eg. "Hi, it's nice to see you!).*			
2. Student was given a new Daily Progress Report (DPR) card.			
3. Expectations for the day briefly reviewed with the student.			
4. Checked with student that he/she has student planner with DPR inside and pencils for the day.			
5. Student was reminded that he/she would meet with the teacher following class to review behavior ratings.			
6. Student was briefly reminded of point goal *(and incentive, if applicable).*			
7. Student was reminded of how teacher would be rating behaviors *(e.g., "If you received a few reminders to be quiet during class, what rating would you earn?" or "If you followed all teacher directions for the whole class what rating would you earn?)*			
8. Student was given positive encouragement to make good choices to reach his/her goal.			

Based on SG-CICO Checklist by Parry (2014) and the BEP Program (Crone et al., 2004)

CICO COORDINATOR CHECKLIST: *After Class Check-Out*			

Date: _____

Student: _____

Feature of CICO	YES	NO	N/A
1. Student was greeted individually with a positive tone (*e.g. "Hey, let's see how your day went!*).			
2. The DPR point card was reviewed **and** points were calculated with the student.			
3. Positive feedback was provided if the student met the point goal.			
4. Neutral feedback and re-teaching were provided if the point goal was not reached (*e.g., "Let's practice what _____ looks like again."*)			
5. Incentive/reward was given if student met goal			
6. Student was dismissed with a positive phrase (e.g*.,"Have a great evening! See you tomorrow."*)			
7. Student's point card was entered into the data collection spreadsheet.			

Based on SG-CICO Checklist by Parry (2014) and the BEP Program (Crone et al., 2004)

"BUSINESS AS USUAL" COORDINATOR CHECKLIST *Before Class Check-In*			
Date: _____ Student: _____			
Feature of CICO	**YES**	**NO**	**N/A**
1.Student was greeted individually with a positive tone *(ex. "Hi, it's great to see you!).*			
2.Student was told this was a 'no ratings' day and given a placeholder card instead of DPR to put in folder.			
3.Student was dismissed with a positive tone *("Have a great day! See you this after class.")*			

Afternoon Check-Out			
Date: _____ Student: _____			
Feature of CICO	**YES**	**NO**	**N/A**
1.Student was greeted individually with a positive tone *(e.g. "Hi, are you ready for class?).*			
2.Student was dismissed with a positive tone *("Have a great day! See you tomorrow.")*			

Appendix D Daily Progress Report (DPR) Card

Give to teacher at the beginning of class.		**DAILY PROGRESS REPORT (Student)** **Check In, Check Out**	

Date: _____   **Day:** ____ ____

Student: _____   **Subject:** ____ Science ____   **Period (circle):** AM   PM

Arrival	On time	Brought pencil	Brought planner	Points
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	3 2 1 0

	3 expectation met	**2** mostly met	**1** partially met	**0** goal not met
Classwork	Completed **ALL** of the in-class assignments	Completed **MOST** of the in-class assignments.	Completed **SOME** of the in-class assignments.	Completed **NONE** of the in-class assignments.
Participation during class instruction.	Waited to be called on before speaking **EVERY** time.	Waited to be called on before speaking **MOST** of the time.	Waited to be called on before speaking **SOME** of the time.	**DID NOT** wait to be called on before speaking out in class.

End of Class	Wrote all assignments in planner	Included assignment details	Completed without teacher prompts	Points
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	3 2 1 0

Total Points earned:	_____
Points possible today:	____ 12 ____

Goal: 10 points (83%)   Did I reach my goal today?   YES   NO

Coordinator signature: _____

Appendix E Student Acceptability Questionnaire

CICO Intervention: *Student Validity Questionnaire*	
Select the number that best represents your level of agreement or disagreement with each statement.	

Strongly Disagree 1	Mildly Disagree 2	Neither Agree nor Disagree 3	Mildly Agree 4	Strongly Agree 5

CICO Evaluation Statements	Rating
1.The before-class Check In helped prepare me to have a great day in class.	1 2 3 4 5
2.The training sessions which taught me the **expected behaviors** were helpful before starting the point card system.	1 2 3 4 5
3.Having my teacher rate my behavior helped me stay on track and keep my behavior ratings accurate	1 2 3 4 5
4.I didn't like participating in this program because other students were not doing the same thing.	1 2 3 4 5
5. I think this program helped me stay more on-task and follow the behavior expectations in class.	1 2 3 4 5
6. Participating in this program has helped me complete more work in class.	1 2 3 4 5
7.I think the after class check-out was helpful to review my progress.	1 2 3 4 5
8.Overall, I enjoy this program and would like to continue participating in it.	1 2 3 4 5
9.I think the CICO program would be good for other kids who may be struggling in school.	1 2 3 4 5

Based on SG-CICO Acceptability Questionnaire by Parry (2014) and the BEP Program (Crone et al., 2010)

SG-CICO Intervention:
Student Validity Questionnaire

Select the number that best represents your level of agreement or disagreement with each statement.

Strongly Disagree	Mildly Disagree	Neither Agree nor Disagree	Mildly Agree	Strongly Agree
1	2	3	4	5

Self-Guided CICO Evaluation Statements	Rating
1. The before-class **Check In** helped prepare me to have a great day in class.	1 2 3 4 5
2. The training sessions which **taught me how to self-monitor** were helpful before starting the point card system.	1 2 3 4 5
3. Having my teacher rate my behavior helped me stay on track and keep my behavior ratings accurate	1 2 3 4 5
4. I didn't like participating in this program because other students were not doing the same thing.	1 2 3 4 5
5. I think this self-monitoring program helped me stay more on-task and follow the behavior expectations in class.	1 2 3 4 5
6. Participating in this program has helped me complete more work in class.	1 2 3 4 5
7. I think the after-class **Check Out** was helpful to review my progress.	1 2 3 4 5
8. Overall, I enjoy this program and would like to continue participating in it.	1 2 3 4 5
9. I think the SG-CICO program would be good for other kids who may be struggling in school.	1 2 3 4 5

Based on SG-CICO Acceptability Questionnaire by Parry (2014) and the BEP Program (Crone et al., 2010)

Appendix F Reinforcer Preference Survey

Reinforcer Questionnaire Name:_____

Date:_____

Directions: Please answer each question honestly and as best you can. You do not need to write in complete sentences.

1. Please list three of your favorite foods. _____
_____
_____

2. If you had 30 minutes of free time at school, what would you really like to do? _____
_____

    * 30 minutes at home? _____
_____

    * 30 minutes with friends? _____
_____

3. Please list three of your favorite things to do at home: _____
_____
_____

    * at school? _____

    * with friends? _____
_____

4. Please list two people who you prefer doing things with at home: _____
_____

5. Please list two people who you prefer doing things with at school: _____
_____

Interest Inventory

Directions: Please circle each item/choice that you prefer. You may circle as many or as few as you would like.

Beverages
- fruit juices
- sparkling water
- soda
- V-8 juice
- coffee
- decaffeinated coffee
- hot tea
- hot herbal tea
- milk
- chocolate milk
- lemonade
- Other _____

Recreation/Leisure
- Playing board games
- computer
- movies
- dancing
- listening to music
- singing
- playing musical instrument
- drawing
- working outside (Falk Woods)
- Yoga

- Taking walks
- Quiet or meditative time
- painting
- sculpting/pottery
- sewing
- working with tools
- looking at magazines
- looking at books/reading
- jigsaw puzzles
- acting

Other _____

Social
- talking with friends
- talking with adults
- playing a game with others
- Other _____

Food
- fruit
- nuts
- cookies
- popsicles
- chips
- snack bars
- pizza

- popcorn
- pretzels
- bagels
- granola
- Other _____

Hobbies
- photography
- collecting items
- astronomy
- machinery
- painting
- building models
- planting/gardening
- Other _____

School -based interests:
- teach a portion of a lesson
- tell a joke to the class
- be a peer tutor
- choose a modified or independent assignment
- access and time to computer or other desirable activity
- go to lunch a few minutes early
- job
- Other

- free ticket to school activity
- library
- present a skit
- present a hobby to class
- Go on a field trip
  Where? _____

Sports
- jogging/running
- basketball
- swimming
- soccer
- football
- baseball
- lacrosse
- frisbee
- skateboarding
- bowling
- miniature golf
- tennis
- bodybuilding
- weight lifting
- exercise bike
- racquetball
- Other? _____

Adapted from FBA/BPS in Portland Public Schools (2018)

Appendix G Data Collection Sheet

Date:		Observer Initials:	

Intervals (15 second intervals for a total of 10 minutes)

Student	Condition	1			2			3			4			5			6			7			8			9			10		
		OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT
1B																															
2K																															
3																															

Student	Condition	11			12			13			14			15			16			17			18			19			20		
		OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT
1B																															
2K																															
3R																															

Student	Condition	21			22			23			24			25			26			27			28			29			30		
		OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT
1B																															
2K																															
3R																															

Student	Condition	31			32			33			34			35			36			37			38			39			40		
		OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT	OA	OE	OT
1B																															
2K																															
3R																															

Term		Operational Definition
OA	On-task/Active Engagement	observable on-topic interaction of the student with the teacher, peers, or class activities when in assigned area
OE	On-task/Eyes on Task	the student is looking at teacher, desk material, or source of instruction (this includes screens or peers) when in assigned area
OT	Off Task/Non-engagement	all other behaviors

Student	# and % of intervals			
	OA	OE	OT	
1B				#
				%
2K				#
				%
3R				#
				%

Bibliography

Al-Azawei, A., Serenelli, F., & Lundqvist, K. (2016). Universal Design for Learning (UDL): A content analysis of peer reviewed journals from 2012 to 2015. *Journal of the Scholarship of Teaching and Learning*, *16*(3), 39.

Americans with Disabilities Act of 1990. Pub. L. No. 101-336, 104 Stat. 328 (1990).

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental health disorders* (5th ed.). Washington, DC: Author.

Asperger/Autism Network (AANE). (2017). *Asperger Profiles: Prevalence.* Retrieved from: http://www.aane.org/prevalence/

Barkley, R.A. (1997). Behavioral inhibition, sustained attention, and executive functions: constructing a unifying theory of ADHD. *Psychological Bulletin*, *121*(1), 65–94.

Barkley, R. A., Murphy, K. R., & Fischer, M. (2008). *ADHD in adults: What the science says*. Guilford Press.

Barlow, D.H. & Hayes, S.C. (1979). Alternating treatments design: One strategy for comparing the effects of two treatments in a single behavior. *Journal of Applied Behavior Analysis, 12,* 199-210.

Briere, D. E., & Simonsen, B. (2011). Self-Monitoring Interventions for at-risk middle school students: The importance of considering function. *Behavioral Disorders, 36*(2), 129–140.

Brown, Thomas E. (2005). *Attention deficit disorder: The unfocused mind in children and adults (pp 20–58)*. New Haven, CT: Yale University Press Health and Wellness.

Burgess, S., & Cimera, R. E. (2014). Employment outcomes of transition-aged adults with autism spectrum disorders: A state of the states report. *American Journal on Intellectual and Developmental Disabilities*, *119*(1).

Callahan, K., & Rademacher, J. A. (1999). Using self-management strategies to increase the on-task behavior of a student with autism. *Journal of Positive Behavior Interventions*, 1, 117–122.

Canter, L., King, L. H., Williams, J. B., Metcalf, D., & Potts, K. (2017). Evaluating pedagogy and practice of universal design for learning in public schools. *Exceptionality Education International* (27).

CAST (2018). Universal Design for Learning Guidelines version 2.2. Retrieved from: http://udlguidelines.cast.org

CEEDAR (2016). *MTSS, UDL, DI: Professional Development Module.* Retrieved from: http://ceedar.education.ufl.edu/mtss-udl-di-dev/

Center for Disease Control (CDC). (2016) *CDC estimates 1 in 68 school-aged children have autism; no change from previous estimate.* Retrieved from: https://www.cdc.gov/media/releases/2016/p0331-children-autism.html

Constitute. (2018). United States of America 1789. *The United States Constitution.* Retrieved from: https://www.constituteproject.org/constitution/United_States_of_America_1992

Cooper, J., Heron, T., & Heward, W. (2007). *Applied behavior analysis* (2nd ed.). Columbus, OH: Merrill/Prentice Hall.

*Coyne, P., Evans, M., & Karger, J. (2017). Use of a UDL literacy environment by middle school students with intellectual and developmental disabilities. *Intellectual and Developmental Disabilities*, *55*(1), 4–14.

Cornoldi, C., Giofrè, D., Orsini, A., & Pezzuti, L. (2014). Differences in the intellectual profile of children with intellectual vs. learning disability. *Research in Developmental Disabilities*, *35*, 2224–2230.

Crabtree, T., Alber-Morgan, S. R., & Konrad, M. (2010). The effects of self-monitoring of story elements on the reading comprehension of high school seniors with learning disabilities. *Education and Treatment of Children*, *33*(2), 187–203.

Crone, D.A., Hawken, L.S., & Horner, R.H. (2010). *Responding to problem behavior in schools: The Behavior Education Program, 2nd ed.* New York, NY: The Guilford Press.

Diamond, A. (2013). Executive functions. *Annual Review of Psychology, (64),* 135-168.

*Dolan, R. P., Hall, T. E., Banerjee, M., Chun, E., & Strangman, N. (2005). Applying principles of Universal Design to test delivery: The effect of computer-based read-aloud on test performance of high school students with learning disabilities. *Journal of Technology, Learning, and Assessment*, *3*(7).

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*, 1040-1048.

Gureasko-Moore, S., DuPaul, G. J., & White, G. P. (2006). The effects of self-management in general education classrooms. *Behavior Modification, 30*(2), 159–183.

*Hall, T. E., Cohen, N., Vue, G., & Ganley, P. (2015). Addressing learning disabilities with UDL and technology: Strategic reader. *Learning Disability Quarterly*, *38*(2), 72–83.

Hart, J. E., & Whalon, K. J. (2011). Creating social opportunities for students with autism spectrum disorder in inclusive settings. *Intervention in School and Clinic, 46*(5), 273-27

Harris, K.R., Friedlander, B.D., Saddler, B., Frizzelle, R., Graham, S. (2005). Self-monitoring of attention versus self-monitoring of academic performance. *The Journal of Special Education, 39(*3), 145–156.

Horner, R.H., Carr, E.G., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children, 71*(2), 165-179.

Interim Self-Study. (2018). *Pennsylvania Association of Independent Schools Accreditation Interim Report.*

IRIS Center (2018). Federal Legislation Timeline. *Vanderbilt University.* Retrieved from: https://iris.peabody.vanderbilt.edu/module/nur01-personnel/cresource/q1/p03/nur01_03_link_timeline/

*Katz, J. (2016). The Three Block Model of Universal Design for Learning (UDL): Engaging students in inclusive education, *Canadian Journal of Education*, *36*(1), 153–194.

*Kennedy, M. J., Thomas, C. N., Meyer, J. P., Alves, K. D., & Lloyd, J. W. (2014). Using evidence-based multimedia to improve vocabulary performance of adolescents with LD: A UDL approach. Learning Disability. *Learning Disability Quarterly*, *37*(2), 71–86.

*King-Sears, M. E., Johnson, T. M., Berkeley, S., Weiss, M. P., Peters-Burton, E. E., Evmenova, A. S., Menditto, A., & Hursh, J. C. (2015). An exploratory study of Universal Design for teaching chemistry to students with and without disabilities. *Learning Disability Quarterly*, *38*(2), 84–96.

* Kortering, L. J., McClannon, T. W., & Braziel, P. M. (2008). Universal Design for Learning: A look at what algebra and biology students with and without high incidence conditions are saying. *Remedial and Special Education, 29*(6), 352–363.

Lee, S-H., Simpson, R.L., Shogren, K. A. (2007). Effects and implications of self-management for students with autism : A meta-analysis. *Focus on Autism and Other Developmental Disabilities, 22(*1), 2–13.

Lindsay, G. (2003). Inclusive education: A critical perspective. *British Journal of Special Education*, *30*(1), 3–12.

Mace, R. L. (1988). *Universal Design: Housing for the lifespan of all people*. Rockville: MD. Retrieved from https://mn.gov/mnddc/parallels2/pdf/80s/88/88-HFL-UDS.pdf

Manolov, R., & Onghena, P. (2018). Analyzing data from single-case alternating treatments designs. *Psychological Methods,* 23(3), 480–504.

*Marino, M. T., Gotch, C. M., Israel, M., Vasquez III, E., Basham, J. D., & Becht, K. (2014). UDL in the middle school science classroom: Can video games and alternative text heighten engagement and learning for students with learning disabilities? *Learning Disability Quarterly*, *37*(2), 87–99.

Mertens, D. M. (2015). Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods (4th ed). Los Angeles, CA: SAGE Publications, Inc.

Miodovnik, A., Harstad, E., Sideridis, G., & Huntington, N. (2015). Timing of the diagnosis of attention-deficit/hyperactivity disorder and autism spectrum disorder. *Pediatrics*, *136*(4), 830–837.

Myles, B., Hagen, K., Holverstott, J., Hubbard, A., Adreon, D., & Trautman, M. (2005). Life journey through Autism: An educator's guide to Asperger Syndrome. *Organization for Autism Research (NJ1)*.

Office of Special Education Programs Center on Positive Behavioral Interventions and Supports (OSEP-PBIS). (2011). *Tier II getting started workbook [Draft]*. Hartford, CT: Center for Behavioral Education and Research.

Ok, M. W., Rao, K., Bryant, B. R., & McDougall, D. (2017). Universal Design for Learning in pre-K to grade 12 classrooms: A systematic review of research. *Exceptionality*, *25*(2), 116–138.

Parry, M. J. (2014). *Evaluating the effectiveness and feasibility of integrating self-monitoring into an existing tier II intervention for elementary school students* (Order No. 3640219). Available from ProQuest Dissertations & Theses Global; Psychology Database. (1621408787). Retrieved from http://pitt.idm.oclc.org/login?url=https://search.proquest.com/docview/1621408787?accountid=14709

Portland Public Schools. (2018). *Reinforcement Surveys.* FBA/BSP in PPS. Retrieved from: https://ppsfba.weebly.com/reinforcement-surveys.html

Primack, B. A., Shensa, A., Sidani, J. E., Whaite, E. O., Lin, L., Rosen, D., Colditz, J.B., Radovic, A, & Miller, E. (2017). Social media use and perceived social isolation among young adults in the U.S. *American Journal of Preventive Medicine*, *53*(1), 1–8.

*Rappolt-Schlichtmann, G., Daley, S. G., Lim, S., Lapinski, S., Robinson, K. H., & Johnson, M. (2013). Universal Design for Learning and elementary school science: Exploring the efficacy, use, and perceptions of a web-based science notebook. *Journal of Educational Psychology, 105*(4), 1210–1225.

Sansosti, J. M., & Sansosti, F. J. (2012). Inclusion for students with high-functioning autism spectrum disorders: Definitions and decision making. *Psychology in the Schools*, *49*(10), 917–931.

*Scott, L., Saddler, S., Thoma, C. A., Bartholomew, C., Virginia, N. A., & Tamura, R. (2011). Universal Design for Transition: A single subject research study on the impact of UDT on student achievement, engagement and interest. *Journal on Educational Psychology*, *4*(4), 21–32.

Scheithauer, M. C., & Kelley, M. L. (2014). Self-monitoring by college students with ADHD: The impact on academic performance. *Journal of Attention Disorders.* 1-10.

Sinclair, M., Christenson, S., Evelo, D.L., & Hurley, C. M. (1998). Dropout prevention for youth with disabilities: Efficacy of a sustained school engagement procedure - ProQuest. *Exceptional Children*, *65*(1), 7–21.

Skerbetz, M.D., & Kostewicz, D.E. (2013). Academic choice for included students with emotional and behavioral disorders. *Preventing School Failure: Alternative Education for Children and Youth, 57*(4), 212-222.

*Sokal, L., & Katz, J. (2015). Effects of the three-block model of Universal Design for Learning on early and late middle school students' engagement. *Middle Grades Research Journal*, *10*(2), 65–82.

Shattuck, P. T., Narendorf, S. C., Cooper, B., Sterzing, P. R., Wagner, M., & Lounds Taylor, J. (2012). Postsecondary education and employment among youth with an autism spectrum disorder. *Pediatrics*, *129*, 1042–1049.

Swanson, H.L., Ashbaker, M. H. (2000). Working memory, short-term memory, speech rate, word recognition and reading comprehension in learning disabled readers: Does the executive system have a role? *Intelligence*, *28*(1), 1–30.

Tomlinson, C.A. (2001). *How to differentiate instruction in mixed-ability classrooms* (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.

UDL-IRN (2018). *Can educators afford to ignore executive function?* Universal Design for Learning Implementation and Research Network. Retrieved from https://udl-irn.org/network-and-learn/

UNESCO (1994). *The Salamanca statement and framework for action on special needs education.* Adopted by the World Conference on Special Needs Education: Access and Quality. Salamanca, Spain.

UNESCO (2017) *A guide for ensuring inclusion and equity in education.* United Nations Educational, Scientific and Cultural Organization Paris, France: UNESCO.

United States Access Board. (1973). Rehabilitation Act of 1973. *United States Access Board.* Retrieved from https://www.access-board.gov/the-board/laws/rehabilitation-act-of-1973

U.S. Department of Education, National Center for Education Statistics. (2016). Digest of Education Statistics, 2015 (NCES 2016-014), Chapter 2. Retrieved from: https://nces.ed.gov/fastfacts/display.asp?id=64

Villa, R.A., Thousand, J.S., Nevin, A., Liston, A. (2005). Successful inclusive practices in middle and secondary schools. *American Secondary Education*, *33*(3), 33–50.

Volonino, V., & Zigmond, N. (2007). Promoting research-based practices through inclusion? *Theory into Practice*, *46*(4), 291–300.

Wehman, P., Schall, C., Carr, S., Targett, P., West, M., & Cifu, G. (2014). Transition from school to adulthood for youth with autism spectrum disorder: What we know and what we need to know. *Journal of Disability Policy Studies*, *25*(1).

Wills, H. P., & Mason, B. A. (2014). Implementation of a self-monitoring application to improve on-task behavior: A high-school pilot study. *Journal of Behavioral Education, 23*(4), 421–434.

Wolery, M., Gast, D. L., & Ledford, J. R. (2014). Comparison designs. *Single Case Research Methodology: Applications in Special Education and Behavioral Sciences, Second edition,* 297-345.

Wolfe, L., Heron, T., & Goddard, Y. (2000). Effects of self-monitoring and self-evaluation on the written language performance and on-task behavior of elementary students with learning disabilities. *Journal of Behavioral Education*, *10*(1), 49–73.

Wrightslaw. (2018). Chapter 3 History of Special Education Law. *A short history of special education law.* Retrieved from: http://www.wrightslaw.com/bks/lawbk/ch3.history.pdf

Zigmond, N., Kloo, A., & Volonino, V. (2009). What, where, and how? Special education in the climate of full inclusion. *Exceptionality*, *17*(4), 189–204.