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Generalization of executive function skills in inclusion settings for students with Asperger's syndrome

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**GENERALIZATION OF EXECUTIVE FUNCTION SKILLS IN INCLUSION
SETTINGS FOR STUDENTS WITH ASPERGER'S SYNDROME**

by
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A Thesis

Submitted to the
Department of Educational Services, Administration, and Higher Education
College of Education
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at
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Abstract

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GENERALIZATION OF EXECUTIVE FUNCTION SKILLS IN INCLUSION
SETTINGS FOR STUDENTS WITH ASPERGER'S SYNDROME

20012/13

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The purposes of this single case investigation were to research the effects of an intervention designated to prepare a student with Asperger's Syndrome for placement within a public high school. The student attended a specialized private school for grades 3-8. Upon entrance into eighth grade, the student entered the intervention program. This program included placement in a mainstream eighth grade social studies class with the accompaniment of the examiner. The intervention included daily feedback and strategies aimed to increase occurrences of task completion, increase executive function skills within the class setting, and decrease maladaptive behaviors. The identical areas of interest were sent to the student's current public high school teacher for rating. Findings reveal an increase in student's overall points earned as indicated by archival data for the intervention year. During the non-intervention year, teacher-reported points decreased significantly. This indicates that while the intervention increased the student's success in a mainstream setting (the eighth grade Social Studies class), these skills were not, however, generalized to the mainstream high school setting.

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Chapter 1

Introduction

Need for Study

Growing development and implementation of inclusion programs, brings about the need to investigate which behaviors, specific to executive function, require intervention priority. Students on the autism spectrum, specifically Asperger's Disorder are increasingly considered for full inclusion programs following self-contained placement. There is a clear need of reliable, gainful interventions in order to achieve optimal inclusion situations. These interventions should drive the students' Individualized Education Plan (IEP) as well and ensure improved delivery of services related to executive function within this population. In addition, a measure by which teachers and other support staff can gauge behavior trends will ensure proper behaviors are targeted.

Purpose

The current study will examine provisions, practices, and interventions within a specialist school to gauge preparedness for mainstream secondary placement. First, a comparison between a more restrictive environment within a self-contained classroom and a mainstream eighth grade Social Studies classroom was conducted. In measuring specific behaviors associated with executive function the researcher examined how the data from the restrictive environment would compare to that of the mainstream eighth grade Social Studies classroom.

The study also investigated existence of any trends overtime by measuring increases in specific behaviors associated with executive function. It was the hope that improvement in these areas over time existed. Also, assuming gains were made, were these gains generalized to high school? If so, which behaviors showed a significant trend?

Upon review of the results, a study into what interventions should be put in place to increase academic achievement associated with executive function was conducted. Lastly, the ability to link deficits found in data analysis to specific interventions found in current literature would be helpful in recommendations for future studies in this field.

Hypothesis

One prediction is that occurrences of specific positive behaviors associated with executive function would increase when the student was present in the mainstream environment with the intervention. Furthermore, occurrences of specific negative behaviors associated with executive function would decrease when the student was present in the restrictive environment. This would be noted by an overall increase in points earned by the student on daily point summaries as recorded by the staff member delivering the intervention. Lastly, it was predicted that occurrences of specific behaviors associated with executive function would decrease overtime as the student was immersed in full-day mainstream program with no interventions (i.e. generalization has not been achieved).

Operational Definitions

The following areas were utilized when recording data regarding the student's performance on a daily basis within the mainstream setting as well as during the current school year by the student's current teacher. These areas have been operationally defined to reduce any questions between raters and to optimize congruence of point totals overtime.

Homework Recording- Given participation in daily lessons student will increase his/her frequency of recording homework defined as independently writing down all homework assignments dictated by teacher or posted in classroom.

Off-topic Comments- Given participation in daily classroom activities, student will decrease his/her frequency of off-topic comments, defined as comments, statements, or questions non-germane to the academic topic.

Calling Out- Given structured academic periods daily student will reduce frequency of calling out defined as any verbal comment made without staff permissions.

Bringing materials to class- Given participation in daily classroom activities student will increase frequency of maintain personal property, defined as independently remembering to bring instructional/necessary items from one room to another.

Independent Problem Solving- Given participation in daily social interactions, student will increase frequency of independent problem solving defined as independently utilizing one pre-taught problem solving strategy.

Mainstream- Criteria for YALE/Medford Mainstream project: At Medford Memorial, the supervisor and school psychologist will work in on-going collaboration with public school administration and Child Study Team to move forward in identifying eligible students and potential regular class placements suited to the student's aptitude, ability, and interest.

Proposed eligibility criteria: Absence of high-intensity school expectation violations for the month prior to program entrance, maintenance of a successful day rate of 90% for the month prior to program entrance, grade level reading or math ability based upon proposed placement.

Possible placement may include "specials" including Art, Music, and Physical Education or academic classes such as Math, Literature, Science, or Social Studies.

Y.A.L.E. will provide daily support staff for all placements until such time is may be determined that support staff can be withdrawn based upon consensus reached by the receiving teachers, Y.A.L.E. support staff and Y.A.L.E. administrators.

Customized data sheets are developed and maintained for each mainstream experience in order to measure student progress.

Limitations

The current study employs an extremely small sample size of one student. It is often noted that single-case research designs tend lack of generality of obtained effects Walker B., Shippen M.E., Alberto P., Houchins, D.E. & Cihak, D.F. (2005). It can be argued that the effects of the interventions for a single individual may not be effective

with other individuals. Furthermore, these effects may not replicate with same individual at a later time. While the data and results may prove useful, incorporation of multiple individuals could provide more beneficial and significant results.

External validity is not well explained with small samples. The Data analysis can result in an unreliable interpretation. Moreover, confounding variables may include variance of measurement of teacher intervention across environments (Specialized room vs. Mainstream Classroom). These may vary. In addition, inter-rater reliability issues between current high school teacher and past teacher may have occurred when surveys were completed.

In addition, the results of the current study yield only one score for in each area (behavior, executive function, task completion) for the 2012-2013 school year. A score for each month as compiled for the 2012-2013 school year would have better determined the significance of the intervention when comparing means. Moreover, an entire summer without intervention between eighth grade and high school occurred. Skills that had generalized over the course of the 2011-2012 school year could have decreased in the rate of successful performance over the summer break.

Assumptions

The current study is a single case design. It is assumed that as a single rater was utilized, that the rater remained consistent in his or her rating of the student's performance on a daily basis. It can also be assumed that the rater for the current year employed the operational definitions when rating the student's overall performance for the current year.

Summary

The current study includes an in-depth look at data collected over the course of the 2011-2012 school year for a student with a primary diagnosis of Asperger's Syndrome. The student was referred to the specialized school for grades 3-8 at the sending district's request. Upon entrance of grade 8, the student's sending district expressed interest in having the student return to in-district placement for his high school career. As a litmus for readiness, both the district and specialized school administration opted to send the student to a mainstream Social Studies class accompanied by a liaison (the author of this study). The liaison, employed by specialized school, was to collect data and provide minimal supports if needed. Data analysis will provide answers to the hypothesized questions above regarding increases and/or decreases in specific behaviors associated with executive function across environments.

Following data analysis, a look into recent research recommending useful interventions optimizing academic achievement associated with the specific executive function behaviors occurred. Recommendations for teachers and other support staff for intervention placement and implementation were noted.

Chapter 2

Literature Review

Review of the literature will first present current definitions of Asperger's Syndrome, executive function (EF), theory of mind (ToM), as well as generalization. Second, the literature regarding the inclusion of students with Asperger's Syndrome in mainstream environments will be studied. A look at generalization in terms of specific executive function areas will be described with a discussion of current empirical limitations of available research concerning this topic.

Asperger's Syndrome Definition

The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) describes Asperger's Syndrome as "(a) severe and sustained impairment in social interaction; (b) restricted, repetitive patterns of behavior, interests, and activities; (c) clinically significant impairment in social, occupational, or other important areas of functioning; and (d) impairment in social interaction with no clinically significant delays in language acquisition" (American Psychiatric Association, 2000, p.80). For the interest of this study, emphasis will lie in area "c" of the clinical definition describing the impairments in "other areas of functioning"; specifically executive function.

Epidemiologically, there is a higher diagnostic risk for males with Asperger's Syndrome than females (Pillay and Suniti-Bhat, 2012). Furthermore, a multitude of social challenges are often associated with Asperger's Syndrome. Rao, Bieble, and Murray, (2008); Wiess and Harris, (2001) describe social challenges such as inadequate use of eye contact, understanding facial expressions, problem initiating social interaction,

difficulty interpreting verbal and nonverbal communication, inappropriate emotional response, and lack of empathy for others.

Executive Function definitions

Pennington and Ozonoff (1996) define executive function (EF) as a term describing a set of functions thought to be necessary for flexible, future oriented behavior, especially in novel circumstances. In the interest of this study, the initiation, performance of, and generalization of specific areas of executive function were considered. These are: behavior management and regulation, planning, attention to relevant stimuli, motivation, and meeting expectations. Students with Asperger's syndrome may have difficulty initiating tasks whether it be a social interaction, a chore, or to begin a homework assignment (Hume, Loftin, and Lantz, 2009). This research notes that there are environmental as well as internal implications for the difficulty with initiation. Some of the reasons, as listed above, are described in detail below:

Planning: According to Hume, Loftin, and Lantz (2009) students with autism spectrum disorders may present with difficulties "planning the steps required to complete an activity, and planning an appropriate response in a given situation" (Hume, Loftin, and Lantz, 2009, p.1331).

Attention to relevant environmental stimuli: many individuals with autism have difficulty honing in to the relevant aspects of their environment. Such a difficulty can in turn increase difficulty following cues and thus, difficulty with generalization of skills (Hume, Loftin, and Lantz, 2009).

Motivation: Hume, Loftin, and Lantz (2009) also discuss Motivation as an area of initiation often problematic for students on the autism spectrum. The researchers note that “positive incentives are often necessary to motivate students to attend and practice new behavioral patterns” (p.1331). Often, without sufficient motivation, students will not initiate desired behaviors.

Unclear motivation is the final area of initiation described by Hume, Loftin, and Lantz (2009). For students with ASD, if a request or expectation is vague, exactly how to perform is vague as well. It is this vagueness that may cause a student to fail to perform anything at all or lead to refusal.

Theory of Mind definitions

Theory of Mind (ToM) is known as one’s thoughts about another’s thoughts or feelings. Baron-Cohen, Leslie, & Firth (1985) define ToM as the specific ability to attribute the mental state of oneself and of that others. When harnessing ToM, the child is “a thinker trying to explain, predict, and understand people’s thoughts, feelings, and utterances” (Harris, 2006, p.847). Furthermore, ToM incorporates an individual’s ability to “understand that another person can hold a different belief than oneself, comprehend jokes and irony, and finally conceptualize faux pas” (Ahmed & Miller, 2011, p.668).

Baron-Cohen et al. (1985) have determined that persons with autism spectrum disorders have revealed poor ToM skills. The inability to understand these feelings can be representative of a social impairment in the processing of mental states (Baron-Cohen, 2001). “This may lead to a lack of positive social relationships, which can lead to feelings of isolation, anxiety, and depression” (Ahmed & Miller, 2011, p.668).

Theory of Mind and Executive Function

Executive control is thought to play an important role in the expression of ToM. Hughes and Graham (2002) established that in addition to the finding of EF and ToM deficits in autism spectrum disorders, these two realms are related. Pellicano (2007) conducted a study aimed to find a “punitive link between ToM and EF in young children with autism” (p.974). According to her findings, it is well established that individuals with autism show marked impairments on tasks tapping ToM and EF (Pellicano, 2007).

A study conducted by Ahmed and Miller (2011) also hoped to gain insight on the link between EF and ToM by determining EF components related to ToM. It has been established that higher ToM performance is a result of higher EF performance (Cole and Mitchell, 2000). Ahmed and Miller (2011) were also interested in pinpointing the executive function areas associated with ToM performance. They determined that the executive function areas of inhibition and working memory have a significant link with ToM.

Generalization

There is certainly evidence that children with autism spectrum disorders (ASD), including Asperger’s Syndrome are capable of acquiring social and executive function skills. Consistent generalization of these skills into the natural environment is often a measure of successful implementation of an intervention. However, Schmidt and Stichter (2012) note that most learned skills often do not consistently generalize into natural environments. Bellini and associates (2007) identified generalization as “skills in an integral component of social skills interventions, and the success of social skills

interventions should be judged based on the ability of the child to perform the skill in multiple social settings and with multiple persons” (p. 161). Many teachers and practitioners rely on what is called the “train and hope” method. The result is the lack of generalized skill gain (Stokes and Baer, 1977). It is suggested that interventions implemented in natural settings produce higher intervention effects (Bellini et al., 2007).

Executive Function and Generalization

The development of successful interventions for students with ASD to assist with the generalization of EF skills is constant and ongoing. “Challenges in generalization may be present for several reasons, including poor flexibility, difficulty relating new stimuli to past experiences, and lack of responsiveness to cues” (Hume, Loftin, and Lantz, 2009, p. 1331). Executive function deficits have a negative impact on one’s ability to generalize skills across environments or in natural settings. Recent research into cognitive theories in autism identifies the potential impact that poor mental flexibility may have on one’s ability to generalize (Hill 2004). Barkley (2007) adds that the likelihood of successful generalization is greatly dependent on the manner in which interventions are delivered, as well as plans for maintenance of the interventions.

Individuals with autism demonstrate difficulties in the ability to shift to a different thought or action according to changes in the environment or situation (Hill 2004). This rigidity paired with executive function areas associated with high organizational, inhibition, and planning demands can lead to unsuccessful academic performance and little room for successful generalization of skills.

Lack of responsiveness to environmental stimuli is another possible reason that children with autism have difficulty generalizing skills and thus, difficulty performing skills independently in a variety of locations (Koegal and Koegal, 1988). This lack of responsiveness across multiple settings may negatively impact the ability to generalize skills (Koegal and Koegal, 1988).

Russell Barkley (2012) introduces a phenomenon he terms “point of performance”. He discusses that for individuals with executive function deficits, the generalization of skills is most likely to occur when introduced and rehearsed in the natural environment. “A corollary of this is that the further away in space and time a treatment is from this point of performance, the less effective it is likely to be in assisting with the management of EF deficits” (Barkley, 2012, p.200). Barkley goes on to suggest regular discussions “to insert accommodations at key points of performance in natural settings to address the impaired domains of major life activities” (Barkley, 2012, p. 205). Without this piece of the intervention, an individual is less likely to take ownership of his or her behaviors (positive or negative), or possess the tools to generalize the behavior on his own. Point of performance can be a useful method of intervention when targeting the generalization of executive function skills for those with deficits in this area.

Inclusion Arguments

Inclusion is a growing topic of conversation and debate within the educational realm. A growing number of students with ASD are being placed within mainstream classrooms. This “increase [in inclusion placements] may be an indicator that a climate of inclusion for individuals with Asperger’s Syndrome has been created, many institutions

are not adequately prepared to accommodate these students” (Pillay and Suniti-Bhat, 2012, p.140).

In addition, there exists evidence that “including some children with special educational needs, poses severe concerns regarding the efficacy of this policy for young people with Autism Spectrum Disorders” (Osborne and Reed, 2011, p.1253). Reed, Osborne, and Waddington (2010) found that while some progress in mainstream classes for children with Autism Spectrum Disorders (ASD) has been made, the progress is not as prominent as the progress made in special placements. Mintz (2008) adds that “Asperger’s Syndrome has presented a challenge to inclusionary approaches” (p.169).

Conversely, some researchers report alternate findings. Here, the current thought is that “the inclusion of young people with ASD into mainstream school has been argued to improve their quality of life, educational performance, and social development (e.g., Connor 1998; Harris and Handleman, 1997; Knight, Petrie, Zuurmond, and Potts, 2009; Strain 1983). Additionally, mainstreaming or inclusion “is thought to increase the social awareness and tolerance of the young people exposed to the included children (Egel and Grandel, 1988). Osborne and Reed (2011) report the findings of (Reed 2010) that some reports have found that students with ASD in specialist placements actually have shown marked improvements in their social skills.

Review of Previous Studies

A study by Osborne and Reed (2011) entitled “School factors associated with mainstream progress in secondary education for included pupils with autism spectrum disorders”, examined significant levels of behavioral problems with this population of

students within this specific environment. This study is of interest with regard to the current study in that the age group, diagnoses, and environmental placement of the studies are similar: secondary school, autism spectrum disorders (ASD), and mainstream placement. The study included children with diagnosis of ASD. In this study, students spent 100% of their school day in a mainstream setting. The study conducted by Osborne and Reed (2011) included a total of 105 children, 87 boys, and 18 girls with a mean age of 13.2. The Autism Behavior Checklist was used to measure the autistic severity of the children. Findings included the following statistics: 60% had a diagnosis of Autism or PDD-NOS, and 40% a diagnosis of Asperger's Syndrome (Osborne and Reed, 2011).

The school environment was also taken into account. The students attended a total of 91 mainstream secondary schools. Students, as well as schools participated in the study. Osborne and Reed studied the following characteristics: size, number of teachers, pupils with special educational needs. The measures used were: the Autism Behavior Checklist (ABC; Krug, Arick, and Almond, 1980), Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) and the Psychological Sense of School Membership (PSSM; Goodenow, 1993).

Osborne and Reed (2011) asked parents to complete both the ABC and SDQ. In addition a questionnaire concerning the student's sense of school belonging was completed with the student. These questionnaires were completed in September/October. After nine or ten months, all parents were asked to complete the same three measures. During these same times, a teacher at each student's school was asked to complete a questionnaire regarding school environment (Osborne and Reed, 2011).

Results of the study by Osborne and Reed (2011) found that 85.7% initially and 80% of the entire population at follow-up scored in the abnormal range when focusing on their total behavior problems. Furthermore, the study found that schools with a high occurrence of students with special educational needs and individual support, supports socio-emotional behaviors. This can help with social-emotional difficulties as well as maladaptive behaviors. However, these populations do not facilitate social behaviors, good-teacher training to develop a sense of school belonging. In summary, Osborne and Reed (2011) found that children with ASD placed in a mainstream setting present high occurrence of problematic behaviors, however, over time, these behaviors can decrease over the course of a school year.

Limitations of Research

The study by Osborne and Reed (2011) acknowledge some limitations of their study. The authors note that while they studied basic school factors, it would be beneficial for future studies to look at provisions made in specialist schools. Few inclusion studies consider the generalization of skills as a means by which to measure academic performance for students with Asperger's Syndrome. Often times, standardized test scores or GPA are considered when gauging academic success. However, as defined in the executive function area above by Pennington and Ozonoff (1996), these specific skills, or lack thereof can have serious academic implications. Research and subsequent interventions must be considered as viable measurement for academic success within this population.

Specialized placement for grades 3-8 can serve as useful foundations for successful mainstream placement during high school. Research findings will serve as motivation to develop successful interventions in order to continue to improve upon the quality of inclusion programs for students with Asperger's Syndrome. The success of interventions can be measured by the generalization of specific executive function skills.

Chapter 3

Methodology

Participants

The current study involved one student that during his eighth and ninth grade school years. The schools are located near Rowan University. The participant was the current teacher of the former student in a specialized program for students with Asperger's Syndrome and other ASD disorders. The student was enrolled in a mainstream Social Studies class in a public school setting. This class enrollment served as a gauge for preparedness for full day placement in a public secondary school.

A current teacher of the student completed the survey reporting his/her current observations of the student. The archival data recorded for the 2011-2012 school year, as recorded by a former teacher of the student was also utilized. Data received from any teacher that did not accompany the student to his mainstream class during 2011-2012 school year or does not currently instruct the student during the 2012-2013 school year, was excluded from the study

Materials

Upon entrance into the mainstream class placement during the 2011-2012 school year, baseline data was recorded. The data indicated target, as well as identification of problematic, areas for generalization to a mainstream setting; specifically in the area of executive function skills. Archival data studying the subjects executive function performance was collected and utilized for the current study. A survey was constructed to be completed by current teachers to measure student performance in the new, inclusion

environment. Upon receipt of parental consent, parents requested the completion of a survey by their child's current high school teacher. The survey is a replica of the data sheet used last year on which all archival data has been collected for those students.

Design

Single sample design was used for this case study. The independent variables were the various academic environments each student has experienced. One level of the independent variable was environment of the mainstream Social Studies classroom. Another level was the specialized placement environment for the remainder of the school day. A third level of the independent variable was the students' current public high school placement. The dependent variables were the performance measures of the specific executive function, task completion, and behavior areas including: random/off-topic comments, irreverent comments/responses, calling out, appropriate participation in discussions, independent problem solving, noting cues from the environment, bringing materials to class, use of personal storage area, note taking as teacher directs, pacing with the class, homework recording, maintaining binder accurately, homework completion, active listening, and "do now" activity (independent), and class work completion.

Procedure

The procedure of the current study utilized archival data collected during the 2011-2012 school year. During this time, the participant was placed in a daily mainstream Social Studies class. The examiner observed special education children placed in a mainstream Social Studies classroom one period a day. The period lasted approximately 50 minutes. The observations took place from mid-November 2011

through June 2012. The student was counseled daily regarding his/her performance within the class. Specific executive function (organization and social) skills became of interest as difficulty in consistently carrying out these skills was, at times, problematic. The examiner explained to the student that she would be there to help them with any questions or direction he/she may have during class. In addition, the student was made aware of the areas the examiner would be observing. The students was shown the data sheet and understood that performance in their mainstream class would be reflected on the daily summary sheet for the private school. All data was recorded manually and input to the school's "Realtime" data monitoring system. All archival data was retained to be coded. Parent permission was required and acquired. Additionally, permission from the specialized school administration was obtained in order to use archival data collected during 2011-2012 school year in both the self-contained and mainstream classrooms.

A replica of the daily data sheet was converted into a Likert Scale type survey completed by the students' current teacher. Surveys designed as a replica of the original data collection sheet were sent to current teachers via parent request to find if any of the target skills were generalized to their new school environment: a public high school. Parents requested information from current teachers on the students' behalf. Therefore, school approval was not necessary as the information was collected by the parents themselves by way of envelope sealed survey. Information gathered for these surveys was retained for coding.

Chapter 4

Results

This study was designed to gauge the need for useful interventions that assist in the generalization of executive function skills for students with Asperger's Syndrome when entering mainstream educational settings. Following the collection of archival data, the replica survey was distributed to current educators to examine whether or not skills related to executive function including behavior and task completion had been generalized across educational environments: specialized private school setting with intervention to public high school without intervention.

The hypotheses for the current study were, first, that occurrences of specific positive behaviors associated with executive function would increase when the student was present in the mainstream environment with the intervention. Furthermore, occurrences of specific negative behaviors associated with executive function would decrease when students are present in the restrictive environment. This would be noted by an overall increase in point earned by the student on daily point summaries as recorded by the staff member delivering the intervention. Lastly, it was predicted that occurrences of specific behaviors associated with executive function would decrease overtime as the student was immersed in full-day mainstream program with no interventions (i.e. generalization has not been achieved).

A replica survey of that used to compile the archival data was sent to the student's current teacher. The means obtained from the archival data for each month were compared to scores reported on the replica survey.

Results were achieved with the conduction of an independent samples t-test to compare data gathered during year 2012 to that of 2013. The means for each of the 3 independent variables (Behavior, Executive Function, and Task Completion) for both years (2012 and 2013). Means for 2012: Executive Function (EF) =12.06, Behavior= 8.59, and Task completion= 6.59 were entered. These means were compared to the scores for the 2013 school year in the same areas. Scores for 2013 were: Behavior= 5.00, Executive Function= 10.00, and Task Completion= 5.00. T score =.998 significance level =.859 this is not significant.

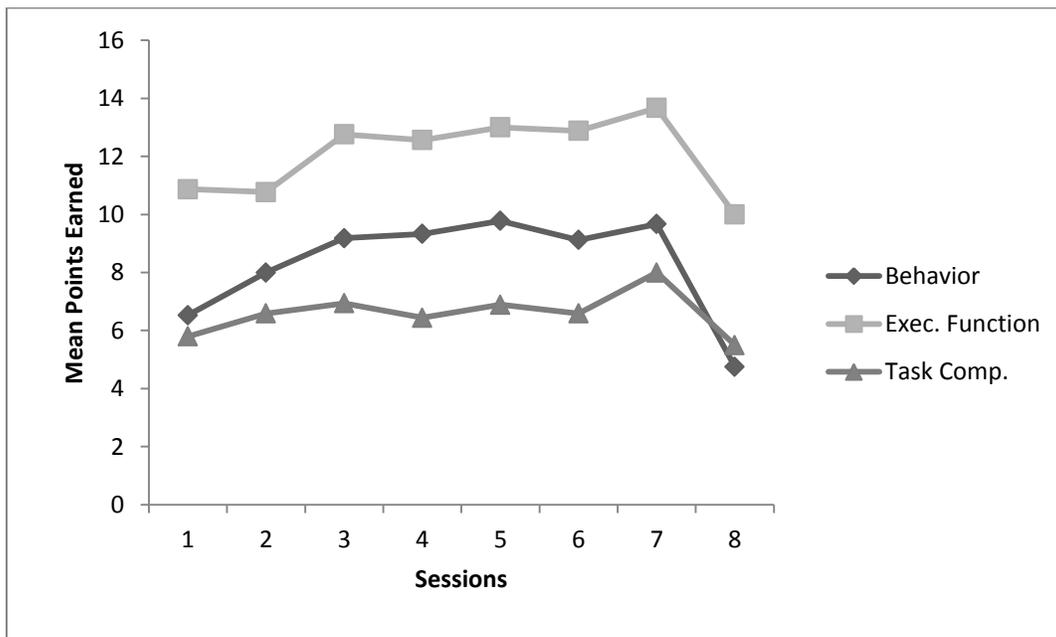


Figure 1: Mean Points Earned Across Sessions

The y-axis represents the mean points earned by the student in the areas of behavior, executive function, and task completion. The total amounts of points available

for behavior were 10. In the area of executive function, the total points available were 14. Finally, the total amount of points available to be earned for task completion was 8. A solid line connects the means for the 2012 school year whereas the dotted line connects the 2012 school year to the points earned for the 2013 school year.

The x-axis represents the session, in this case month the data was obtained. The months included in the graph are December 2011 at point 1, January 2012 at point 2, February 2012 at point 3, March 2012 at point 4, April 2012 at point 5, May 2012 at point 6, and June 2012 at point 7. These points are connected by a solid line on the graph. The point at 8 represents the data collected from the current teacher during the current 2012-2013 school year. This point is connected to the previous line of data by the dashed line to represent a change in setting from specialized middle school during the 2011-2012 school year, to public high school during the 2012-2013 school year.

The data collected produced results as indicated in Figure 1. The line with points indicated with squares measured the mean amount of points earned by the student in the area of executive function for each session. A diamond shape denotes the mean amount of points earned in the area of behavior for each session. Lastly, task completion means are noted with a triangle shape at each session.

The graph is fairly stable with a slight increasing trend throughout the 2012 sessions (sessions 1-7). Point 8 on the “sessions” axis represents the reports scores for the 2013 school year. It was during this time that a switch in school placement from specialized to mainstream occurred. The graph displays a decreasing trend at this point.

Chapter 5

Discussion

Summary

The current study addressed the topic of generalization of executive function skills for students with Asperger's Syndrome in inclusionary settings. With the increasing push for the inclusion of special education students, it was the interest of the current study to investigate whether inclusion placements are: a) truly a least restrictive environment for these students and b) skills generalized in a specialized setting could be generalized in the mainstream setting. The interventions used in the current study were implemented within the naturally occurring setting of a mainstream eight grade social studies class.

The present study was a single case design. The archival data recorded over the course of a school year examined the student's progress in specific areas of executive function including task completion, and behavior in a mainstream social studies class. The intervention included prompts, cues, and counseling for the student in order to increase task completion and executive function skills and decrease any instances of maladaptive behaviors. The data was coded and compared to the data reported by the student's current teacher in the same areas. The student in the current study is currently in a 100% mainstream setting. As previously stated, the previous year, the student in the current study spent 80% of his school day in a specialized private school placement, with one full academic period in a mainstream classroom, in addition to lunch and after school extra-curricular activities in the mainstream setting as well. The current study employed the foundations of point of performance (Barkley, 2012) by placing the student in the

natural mainstream setting to developed positive behaviors related to executive function in order to prepare for the subsequent natural setting: public high school. This comparison served as a gauge for the generalization of skills.

Results indicated, as predicted, that as the intervention year progressed, point totals earned by the student increased in all three areas: behavior, executive function, and task completion. These findings coincide with the prediction of a trend overtime measuring increases in specific behaviors associated with executive function. However, when compared to the reported point totals for the current, non-intervention year, the point totals for all three areas had decreased significantly. This is a clear indication that the skill had not been generalized as predicted.

Limitations

The current study employs an extremely small sample size of one student. It is often noted that single-case research designs tend lack of generality of obtained effects. It can be argued that the effects of the interventions for a single individual may not be effective with other individuals. Furthermore, these effects may not replicate with same individual at a later time. While the data and results may prove useful, incorporation of multiple individuals could provide more useful and significant results.

External validity is not well explained with small samples. The Data analysis can result in an unreliable interpretation. Moreover, confounding variables may include variance of measurement of teacher intervention across environments (Specialized room vs. Mainstream Classroom). These may vary. In addition, inter-rater reliability issues

between current high school teacher and past teacher may have occurred when surveys were completed.

In addition, the results of the current study yield only one score for in each area (behavior, executive function, task completion) for the 2012-2013 school year. A score for each month as compiled for the 2012-2013 school year would have better determined the significance of the intervention when comparing means.

Conclusions

Review of the literature emphasized that oftentimes, executive function deficits have a negative impact on one's ability to generalize. Recent research into cognitive theories in autism identifies the potential impact that poor mental flexibility may have on one's ability to generalize (Hill 2004). Barkley (2007) adds that the likelihood of successful generalization is greatly dependent on the manner in which interventions are delivered, as well as plans for maintenance of the interventions. The findings of the current study concur with the research on the generalization of executive function skills.

The work of Barkley (2012) provides insight to the results of the current study with regard to his "point of performance" explanation. "...the further away in space and time a treatment is from this point of performance, the less effective it is likely to be in assisting with the management of EF deficits" (Barkley, 2012, p.200). The current study employed the foundations of point of performance by placing the student in the natural mainstream setting to develop positive behaviors related to executive function in order to prepare for the subsequent natural setting: public high school. In short, the longer the

student spent away from the setting and receipt of intervention, the more significant the decrease in points earned in these areas.

The current study also found results agreeable with the study by Osborne and Reed (2011) entitled “School factors associated with mainstream progress in secondary education for included pupils with Autism Spectrum Disorders” Both the Osborne and Reed and the current student reported decreases in behavioral problems when students with ASD were placed in specialized programs rather than the mainstream.

Conclusions and future directions

The method of “point of performance” (Barkley, 2012) can be a useful method of intervention when targeting the generalization of executive function skills for those with deficits in this area. School personnel and program developers should take note of the importance of the structure of an intervention, the schedule of reinforcement as well as the setting in which the intervention is delivered. As Barkley stresses, the closer to the natural setting the intervention is delivered, the higher the likelihood of generalization of skills. School personnel and practitioners must understand that for students with executive function deficits, poor flexibility and ability to generalize across settings must be taken into account if environments, such as inclusion or mainstream placement are to be considered.

In addition to the employment of a point of performance based intervention, future studies pertaining to the generalization of skills for this population should, first and foremost include larger sample sizes. With a larger sample size, it is suggested that participants be rated using an Asperger’s Checklist such as the Gilliam Asperger’s

Disorder Scale (GADS) to place participants in groups according to their relative severity of Asperger's. This action could account for the fact the autism spectrum disorders are exactly as they are named: on a spectrum. As a result, individuals on this spectrum can present with a wide range of abilities, intelligences, and, for the interest of this study, executive function skills. By placing students into groups as indicated by GADS scores, the groups can also be compared as a correlation between skills generalized and degree of disability.

In addition to the employment of a larger sample size of students, more teachers completing the surveys for each student could add to the overall validity of the study. While inter-rater reliability may become a new issue, it can be accounted for with clear, intensive directions from researchers prior to completion of surveys. Likewise, a more comprehensive follow-up to check for generalization should occur. A suggestion would be to administer surveys to teachers at least monthly, weekly would be best.

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Appendix

Student: _____	Date: _____	
MAINSTREAM GOALS		
KEY: 2= OFTEN, 1= SOMETIMES, 0=NEVER		
<u>Behavior</u>		
Random/off-topic comments	0 1 2	
Flip/irreverent comments/responses	0 1 2	
Calling out	0 1 2	
Approp. Participation in discussions	0 1 2	
Independent problem solving	0 1 2	
Behavior Total	_____	
<u>Executive Function</u>		
Noting cues from the environment	0 1 2	
Bringing materials to class	0 1 2	
Use of personal area/storage	0 1 2	
Note taking (Short & sweet as teacher directs)	0 1 2	
Pacing with the class	0 1 2	
Homework recording	0 1 2	
Maintaining binder accurately	0 1 2	
Executive Function Total	_____	
<u>Task Completion/Appropriate Participation</u>		
Homework completion	0 1 2	
Active listening	0 1 2	
“Do now” activity (independent)	0 1 2	
Classwork	0 1 2	
Task Completion/Participation Total	_____	

Table 1: Mainstream Goals Data Sheet. Used to compile archival data

Current Classroom Observations

Please complete the survey considering your typical observations of the students. Use the key to guide your choices.

KEY for Section 1:

2= occurs w/no prompts
 1= occurs after 1 prompt/redirection
 0= does not occur
 N/A= Not applicable

Section 1

Random/off-topic comments	0	1	2	
Flip/irreverent comments/responses	0	1	2	_____
Calling out	0	1	2	_____
Approp. Participation in discussions	0	1	2	_____
Independent problem solving	0	1	2	_____

Total _____

KEY for Sections 2 & 3:

2= occurs w/no prompts
 1= occurs after 1 prompt/redirection
 0= does not occur
 N/A= Not applicable

Section 2

Noting cues from the environment	0	1	2	
Bringing materials to class	0	1	2	_____
Use of personal area/storage	0	1	2	_____
Note taking (Short & sweet as teacher directs)	0	1	2	_____
Pacing with the class	0	1	2	_____
Homework recording	0	1	2	_____
Maintaining binder accurately	0	1	2	_____

Total _____

Section 3

Homework completion	0	1	2	
Active listening	0	1	2	_____
“Do now” activity (independent)	0	1	2	_____
Classwork	0	1	2	_____

Total _____

Table 2: Replica Data Sheet. Used to compile data during full mainstream placement.