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EFFECTS OF PICTURE ACTIVITY SCHEDULES ON TASKS COMPLETED

by

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2006

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A dissertation submitted in partial fulfillment
of the requirements for the

Doctor of Philosophy - Special Education

Department of Educational and Clinical Studies
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University of Nevada, Las Vegas
December 2015

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Dissertation Approval

The Graduate College
The University of Nevada, Las Vegas

October 20, 2015

This dissertation prepared by

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entitled

Effects of Picture Activity Schedules on Tasks Completed

is approved in partial fulfillment of the requirements for the degree of

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ABSTRACT

Effects of Picture Activity Schedules on Tasks Completed

by

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Self-determination is the freedom to make choices that impact an individual's life. Many people would agree that self-determination leads to an enhanced quality of life, and choice making is considered a central element in self-determination. Most learn choice making through a gradual release of responsibility by caregivers throughout their childhood and adolescence. Many times, this is not the case for students with autism. Completed research examining choice making and people with autism has shown promising results; however, one of the primary traits of autism, the need for structured routines, often does not lend itself to evaluating choice making. Activity schedules are one way to incorporate choice making into an already structured routine, providing a schedule for daily events or specific routines. Choice making is embedded in activity schedules when people are allowed to choose the sequence of events within the schedule. Past research has suggested activity schedules to be an effective way to teach task completion to people across disability areas. The purpose of this study was to replicate and extend a previously completed study by Duttlinger, Ayres, Bevill-Davis, and Douglas (2013), which evaluated the effects of activity schedules on task completion by middle school students with intellectual disabilities, in two ways. First, this study evaluated the use of activity schedules with four middle school students with autism; second, it evaluated the effects of choice making on the number of tasks completed in sequence. Ten skills all participants could complete independently were identified

by the participating teacher and researcher using the participant's Individualized Education Program (IEP) goals as a guide. An alternating treatments design with initial baseline and final best treatment phase was implemented, evaluating the difference in the number of tasks completed between teacher and participant selection of the order of tasks. The researcher collected data on the number of tasks completed, the number of tasks completed in sequence, the fidelity of implementation, reliability of data, and social validity. Suggestions are made for practice and research based on the limited study outcomes.

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CHAPTER 1

INTRODUCTION

The one identifying indicator of an enhanced quality of life is self-determination (Wehmeyer & Palmer, 2003). According to the *Merriam-Webster Online Dictionary* (2014), *self-determination* is the freedom to make one's own choices. Further, self-determination is a natural part of life and is taken for granted by many adults; however, self-determination skills such as goal setting, self-management, self-regulation, and decision making often need to be learned by individuals with disabilities in a systematic way (Agran, Cavin, Wehmeyer, & Palmer, 2010). As a case in point, Nonnemacher and Bambara (2011) interviewed a number of adults living in residential support facilities and reported the following comments regarding self-determination: (a) "They'd boss me around" (p. 332), (b) "He used to hold my money" (p. 333), (c) "I can't tell her I don't like my job" (p. 333), (d) "I told her I wanted a job, but I haven't seemed to get one yet" (p. 333), and (e) "She said if I moved she wasn't going to talk to me anymore" (p. 334). Additionally, Wehmeyer and Palmer (2003) have suggested self-determination is the one identifying indicator of an enhanced quality of life; however, Nonnemacher and Bambara (2011) found many adults living in residential support facilities do not possess self-determination skills. When considering the suggestions of Wehmeyer and Palmer (2003) and the findings of Nonnemacher and Bambara (2011), a reader may conclude more instruction in self-determination skills should be taught to people with disabilities throughout their school years. Self-determination can be broken into several distinct component parts and viewed in different ways.

Self-Determination

Self-determination can be thought of in three ways: (a) a functional model, (b) an ecological model, and (c) a self-regulation model (Wehmeyer et al., 2011). In the functional model of self-determination, a person's actions are based on the function they serve for the individual (Wehmeyer, Kelchner, & Richards, 1996). According to Wehmeyer et al. (1996), self-determined actions contain these four characteristics: (a) they are autonomous actions, (b) the actions are self-regulated, (c) the person initiates and responds to events in an empowered manner, and (d) the actions are self-realizing. Abery and Stancliffe (1996) suggested in a book chapter they wrote that self-determination can be viewed ecologically and described as a complex process to achieve personal control over the individual's own life in the areas he or she considers to be important (as cited in Wehmeyer et al., 2011). In an ecological view, self-determination is based both on the person and the environment. The person uses his or her skills, knowledge, and beliefs to act on the environment and obtain desired outcomes. Self-determination from a self-regulation perspective is described as a balance between an existing state and a desired state. When a discrepancy exists between the two states (e.g., a person wants something), then the internal desire for self-regulation causes an action to obtain the desired item. When this occurs, the self-regulating desire will bring the person's self-regulation back into balance once again.

Self-determination has been associated with many positive outcomes for adults with disabilities. These positive outcomes include the following: (a) an enhanced quality of life (Nota, Ferrari, Soresi, & Wehmeyer, 2007), (b) greater independence (Wehmeyer & Palmer, 2003), (c) improved health and well-being (Johnson & Krueger, 2005), and (d) greater employment opportunities (Fornes, Rocco, & Rosenberg, 2008). In addition, substantial evidence has

suggested students with and without disabilities, who leave school more self-determined experience more positive outcomes as adults (Heller et al., 2011).

Several manuscripts and studies have suggested a significant correlation between self-determination and quality of life (Chambers et al., 2007; Lachapelle et al., 2005; Nota, Soresi, Ferrari, & Wehmeyer, 2011; Nota, Soresi, & Perry, 2006; Wehmeyer & Garner, 2003). Chambers et al. (2007), for example, found people with disabilities rated the importance of self-determination higher than their family members or the professionals with whom they interacted. Lachapelle et al. (2005) suggested the essential characteristics of self-determination (behavioral autonomy, psychological empowerment, self-regulation, and self-realization) predicted higher quality of life. Nota et al. (2011) summarized the need for self-determination: "People who are self-determined act volitionally to serve as the causal agent in their lives" (p. 245).

Self-determination has been broken down into many different key components by many different researchers. Wehmeyer (2014) identified the following 10 key components of self-determination: "choice making, decision making, problem solving, goal setting and attainment, self-advocacy, self-observation, internal locus of control, positive outcomes of efficacy and outcome expectancy, self-awareness, and self-knowledge" (Slide 24). Some of these components may overlap and develop from one another. For example, choice making is the act of choosing something wanted (Watanabe & Sturmey, 2003), and decision making is choosing between two more items while evaluating the outcome of each choice (Lotan & Ells, 2010). Many of the key self-determination components suggested by Wehmeyer (2014) emerged from choice making. For instance, decision making, already described, is one component emerging from choice making. An internal locus of control also emerges from choice making. As an individual makes choices and evaluates the results of those choices, his or her locus of control shifts from external

(believing some force outside of the self has control over actions and outcomes) to internal (believing a person can control his or her own actions and outcomes). In an individual, then, Wehmeyer's (2014) 10 components grow out of the ability to make choices involving life. Many people with autism have never developed the ability to make choices for themselves due to the nature of their disability.

Self-Determination and Students With Autism

The positive lifelong outcomes resulting from increased self-determination can be seen across the disability spectrum. These results may be especially evident in people with autism. The remainder of this section will discuss how increased self-determination can impact people with autism.

Teaching students with autism (students who have deficits in verbal and nonverbal communication and social interactions) self-determination (a skill requiring a person to act many times on a desired outcome by communicating his or her intent to others) may be difficult to accomplish. Current research has demonstrated the need for interventions in self-determination across disability areas (Pierson, Carter, Lane, & Glaeser, 2008) and, in particular, autism (Wehmeyer, Shogren, Zager, Smith, & Simpson, 2010).

Carter, Owens, Trainor, Sun, and Swedeen (2009) interviewed 67 parents of children with intellectual disabilities or autism and found the parents felt their children were lacking in goal setting and self-advocacy skills. The parents also felt, however, these same skills were important to their child's quality of life. The reason people have difficulty learning self-determination skills without direct instruction may result from the very nature of the disability.

To reiterate, autism is a disability affecting verbal and nonverbal communication and social interaction. The first five components (choice making, decision making, problem solving,

goal setting, and self-advocacy) of the 10 key components of self-determination suggested by Wehmeyer (2014) require people to interact with others a majority of the time. The definition of autism and the reality of its manifestations may make mastering these components difficult.

Self-determination skills are important to people with autism not only in school, but throughout their life span. Agran and Krupp (2011) suggested that providing on-the-job choice-making opportunities to individuals with autism leads to more productivity and improved problem-solving skills. Further, Watanabe and Sturmey (2003) proposed that providing choice-making opportunities within activity schedules resulted in increased time on task by adults with autism. In addition, Wehmeyer, Tassé, Davies, and Stock (2012) suggested that technology could assist people with autism in social situations. As a case in point, Hume, Plavnick, and Odom (2012) found implementation of an individual work system helped students with autism decrease the number of required adult prompts and become more independent. Similarly, Hughes, Cosgriff, Agran, and Washington (2013) examined self-determination and the role of participation in inclusive settings. They found students who were in more inclusive settings scored higher on self-determination rating scales.

People with autism require self-determination skills for the same reasons people without disabilities require these skills. Self-determination skills give people the ability to decide the fate of their own lives. Many people with autism may have the desire to become self-realizing and determine their own future. Self-determination is the process all people use to determine their own future. Students with autism need to be taught self-determination skills throughout their school years so they can have a better quality of life as suggested by Wehmeyer and Palmer (2003). One method of teaching the beginning components of self-determination (choice making and decision making) with evidence-based practices is to use visual supports.

Visual Supports

Visual supports are a promising practice to teach independence, time on task, and curbing of disruptive behaviors (Ganz, 2007). Many adults with and without disabilities use visual supports daily. These visual supports can include calendars, to-do lists, and watches (Meadan, Ostrosky, Triplett, Michna, & Fettig, 2011). Activity schedules are a type of visual support (i.e., pictures, drawings, images) presented in a sequential manner to assist a student in sequencing his or her day or activity (Banda, Grimmett, & Hart, 2009). Activity schedules can be used to (a) aid in transition behaviors (Dauphin, Kinney, Stromer, & Koegel, 2004), (b) improve communication skills (Krantz & McClannahan, 1998), (c) build daily living skills (Watanabe & Sturmey, 2003), (d) increase academic engagement (Morrison, Sainato, Benchaaban, & Endo, 2002), and (e) reduce problem behaviors (Dettmer, Simpson, Myles, & Ganz, 2000).

Banda et al. (2009) identified 12 steps in designing and implementing activity schedules relating to transition behaviors. These 12 steps are identified in Appendix A. According to Banda et al. (2009), the ultimate goal for developing activity schedules is to make the activity schedules as socially acceptable as possible and use the activity schedules in as many settings as required.

Activity schedules have been successfully taught to people with autism across the lifespan (Koyama & Wang, 2011). Activity schedules have also been used in schools to teach academic skills, behavioral skills, and vocational skills. In addition, activity schedules have been employed in vocational settings to promote time on task and task completion skills (Strickland, Coles, & Southern, 2013).

Statement of the Problem

Students with autism are at a high risk of negative post-school outcomes. Only 55% of students with autism are employed 6 years after high school graduation, 35% attend college after

high school graduation, and more than 50% do not attend college or are unemployed within 2 years of high school graduation (Shattuck et al., 2012). Continuing education or finding meaningful employment after high school is seen by many as a positive outcome for people with and without disabilities. Teaching self-scheduling (sometimes referred to as choice making) is an important part of teaching autonomy and self-determination (Koyama & Wang, 2011), and choice making is considered by many to be an integral part of self-determination (Agran et al., 2010; Ganz, 2007; Watanabe & Sturmey, 2003). Moreover, students with autism may be lacking choice-making skills when they graduate high school. Many people may conclude choice making needs to be taught systematically to people with autism before they leave school. One way to teach choice making is through the use of activity schedules (Boutot, 2009).

Purpose of the Study

Often people take for granted the importance of making personal decisions and choosing their own destiny. Instruction in self-determination is often overlooked by teachers and not taught in school to people with severe support needs as evidenced by the statements Nonnemacher and Bambara (2011) recorded when they interviewed adults living in residential support facilities. Choice making is considered by many to be a crucial part of the self-determination process; so crucial in fact that the Individuals with Disabilities Education Act (IDEA) states, “to ensure that all children with disabilities have available to them a free appropriate education that emphasizes special education and related services designed to meet their unique needs and prepare them for further education, employment and independent living” (IDEA, 2004, 1400(d) § 300.1(a)). The choices of individuals with disabilities must be involved when deciding on further education, employment, or independent living possibilities; therefore,

choice making needs to be taught in elementary and middle school prior to the need to make these life-changing decisions.

This study examined the effects of activity schedules on task completion by middle school students with autism by replicating and extending a study completed by Duttlinger, Ayres, Bevill-Davis, and Douglas (2013). Specifically, this study addressed the following four research questions:

1. Do activity schedules increase the number of tasks that can be independently completed in sequence by a middle school student with autism?
2. Is there a difference in the number of tasks correctly completed in sequence when the teacher selects the order of tasks as compared to when the student selects the order of tasks?
3. Do middle school students with autism find activity schedules more socially valuable when the sequence of tasks is chosen by the student or chosen by the teacher?
4. Do the teachers of middle school students with autism find activity schedules more socially valuable when the sequence of tasks is chosen by the student or chosen by the teacher?

In the study conducted by Duttlinger et al. (2013), middle school students with intellectual disabilities were required to complete a series of tasks when given verbal directions on the order of task completion by a teacher. Data were collected on the correct number of independently completed tasks. This study extends Duttlinger et al. by using a participant group consisting of middle school students with autism and examining if the number of tasks completed by the participant was affected when the participant selected the task order on an activity schedule compared to when a teacher did so.

To respond to the research questions, the remaining chapters are organized in the following way. Chapter 2 contains a review of relevant literature relating to self-determination, self-determination and autism, and visual supports relating to choice making. The methods implemented in this study are discussed in Chapter 3. The results of the study are presented in the fourth chapter, and the final chapter consists of a discussion of the study and concluding thoughts.

Delimitations

The present study replicated and extended previous work done by Duttlinger et al. (2013). The delimitations set for this study were based on the work of these researchers. For example, in the study completed by Duttlinger et al. (2013), the participant group was comprised of self-contained students with intellectual disabilities. This study extended Duttlinger et al.'s population to include a participant group of students in a self-contained autism program. This participant group was chosen for two reasons. First, the author wanted to verify that Duttlinger et al. could be extended to another population; second, the author chose students with autism because they were a sample of convenience.

In Duttlinger et al. (2013), the researchers used a withdrawal design to show a functional relationship between picture activity schedules and the number of tasks completed. This study used an alternating treatments design to determine if activity schedules improve the number of tasks completed by students with autism and if students with autism prefer to select the order of tasks on the activity schedule themselves or have their teacher select the order of tasks.

In Duttlinger et al. (2013), participants completed tasks in the self-contained classroom, the hall outside of the classroom, and the bathroom adjacent to the classroom. The present study selected tasks to be completed only in the self-contained classroom and did not require the

participants to leave the room during the intervention. The researcher chose to include only tasks in the self-contained classroom because students in the selected self-contained classroom are escorted when they leave the classroom, making it difficult to measure independence.

Definition of Terms

Activity schedule. A type of visual support presenting information (pictures, drawings, images, and so on) in a sequential manner to assist users in sequencing their day or activity (Banda et al., 2009).

Autism. A developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3, that adversely affects a child's educational performance (Autism, 2014).

Choice making. The act of choosing something wanted (Watanabe & Sturmey, 2003).

Decision making. Choosing between two or more possibilities and evaluating the outcomes of those choices (Lotan & Ells, 2010).

Individuals with Disabilities Education Act (IDEA). IDEA is a law ensuring educational services to children and their families throughout the United States (IDEA, 2004).

Individualized education program (IEP). Individualized education program or IEP means a written statement for a child with a disability that is developed, reviewed, and revised in accordance with §§300.320 through 300.324 (IEP, 2014).

Intellectual disability. "Intellectual disability is a disability characterized by significant limitations in both intellectual functioning and in adaptive behavior, which covers many everyday social and practical skills. This disability originates before the age of 18" (Intellectual Disability, 2014).

Intelligence quotient (IQ). A number used to express the apparent relative intelligence of a person as a ratio of mental age to chronological age or a score determined by a standardized intelligence test (Intelligence Quotient, 2015).

Nonverbal communication. All gestures generated by a person for the purpose of communication (Yammiyavar, Clemmensen, & Kumar, 2008).

Problem solving. The act of deciding a course of action for an activity or task when the solution is not known (Wehmeyer, 2014, Slide 30).

Quality of life. The general well-being of a person or society, defined in term of health and happiness rather than wealth (Quality of Life, 2015).

Self-determination. The freedom to make one's own choices. (Self-determination, 2014).

Time on task. The amount of time a person attends to a specific task or set of tasks (Morrison et al., 2002).

Visual supports. Pictorial and graphic stimuli used to enhance comprehension and learning (Brown & Mirenda, 2006).

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter contains reviews of professional literature relating to self-determination and visual supports promoting self-determination. Systematic searches of four online databases (Academic Search Premier, Education Full Text, ERIC, and PsycINFO) were conducted. The descriptors “self-determination” and “education” were used to locate studies addressing self-determination. The descriptors “self-determination,” “visual supports,” “picture activity schedules,” “autism,” and “education” were used to identify studies addressing visual supports and self-determination. The last step in locating studies for inclusion in this literature review was an ancestral search of the studies identified through the online database search, defined as a review of the reference list of each study located.

The next part of this chapter includes a review of studies addressing self-determination. After a review of the literature covering self-determination, studies addressing the use of visual supports are reviewed. Finally, a synthesis of reviewed studies relating to teaching self-determination and visual schedules is provided.

Self-Determination

Self-determination is a theory of human motivation, development, and wellness. Self-determination theory was first officially introduced in 1985 by Edward Deci and Richard Ryan in *Intrinsic Motivation and Self-Determination in Human Behavior.* In this book, Deci and Ryan differentiated the types of motivation experienced by humans, dividing motivation into two types: (a) autonomous and (b) controlled. Autonomous motivation was described as intrinsic and extrinsic motivation. Extrinsic motivation is identified as autonomous when the external influences affect the person’s sense of self. Controlled motivation, on the other hand, consists of

external and introjected regulation. External regulation was described by Deci and Ryan as a person's behavior based on external contingences of reward and punishment; introjected regulation is based on the concepts of approval, shame, self-esteem, and ego.

Within self-determination theory lie two concepts that account for individual differences: (a) causality orientations and (b) life goals. Causality orientation motivation is described in two ways: (a) the way people orient themselves to the environment when dealing with information concerning the initiation and regulation of behavior and (b) their self-determinedness in general situations and domains. Life goals were described by Deci and Ryan (1985) as being either intrinsically or extrinsically driven. Intrinsic life goals include concepts such as affiliation, generativity, and personal development; extrinsic life goals, concepts such as wealth, fame, and attractiveness. With this overall view of self-determination theory, the role of self-determination in education is now addressed.

Self Determination: What Do We Know? Where Do We Go?

Chambers et al. (2007) completed a literature review examining global self-determination. The authors utilized a team of five graduate students to complete a search of the following five online databases to locate the included studies: (a) Education Abstracts, (b) Education Resources Information Center (ERIC), (c) Exceptional Child Education Resources, (d) Psychinfo, and (e) Wilson OmniFile. The search keywords used included "self-determination" paired with a disability-related term. The initial search returned more than 1,000 articles. The abstracts and full article (if needed) were then reviewed to determine if a measure of global self-determination was included. Last, the reference lists of chosen articles were examined looking for additional articles that may qualify for inclusion in the review. The authors identified 31 articles for inclusion in the review. After identifying the studies for inclusion in the review, the

authors further divided the studies into three groups: (a) nonintervention or descriptive studies, (b) perceptions of self-determination, and (c) efficacy of interventions to promote self-determination.

Fourteen nonintervention or descriptive studies were located that contained a measure of global self-determination. These 14 studies involved 6,818 participants and were further broken down into subgroups. These subgroups were as follows: (a) self-determination of persons with intellectual disabilities, (b) self-determination setting and environments, (c) self-determination and intelligence, and (d) self-determination and adult outcomes.

Studies addressing the self-determination of individuals with intellectual disabilities were among the oldest studies located by Chambers et al. (2007). Studies as far back as 1995 were located examining the opportunities for self-determination by people with intellectual disabilities. The studies in general found limited opportunities available for such individuals to make choices and express preferences across the day.

Three studies dated 1999-2002 were located examining self-determination, settings, and environments. These studies compared the self-determination levels of adults living or working in community-based or more restrictive settings. The authors of these studies generally suggested people living or working in community-based settings were more self-determined, had greater autonomy, had more opportunities for choice, and were overall more satisfied than people in a more restrictive environment.

Studies examining self-determination and intelligence dated from 1996 to 2003. Studies showed that self-determination scores varied widely among the participants (n = 500) based on the participant's disability or lack thereof. Participants without an identified disability scored the highest on self-determination scales, and participants with intellectual disabilities scored the

lowest. Chambers et al. (2007) found studies in this subcategory were generally consistent in reporting a correlation between self-determination and IQ scores.

Chambers et al. (2007) located five studies examining the effect self-determined behavior has on adult outcomes. These studies dated from 1996 to 2005. Two studies reported students with higher self-determination scores had more positive post-school outcomes. Another study suggested, and was replicated by other researchers, self-determination contributed to a higher quality of life for participants. A final study showed significant differences between people who were self-determined and those who were not self-determined on multiple behavioral indicators.

Nine studies were located examining the perceptions of self-determination in individuals with disabilities. Seven of these studies used survey methods to collect data; one study gathered data from observations, networking groups, interviews, and student assessments. The final study used a multiple case study approach to report qualitative data. These nine studies were divided into four subgroups. These four subgroups were: (a) perceptions of people with disabilities, (b) perceptions of teachers, (c) perceptions of parents, and (d) perceptions of programmatic factors to promote self-determination.

One study was located examining the perceptions of disabilities. A survey method was used to ask 2,042 individuals (778 with disabilities) to rate the importance of quality of life across several dimensions, one of which was self-determination. Self-determination was rated higher by people with disabilities than by their family members or the professionals who service people with disabilities. The family members of people with disabilities and the professionals who work with people with disabilities ranked self-determination the lowest of the quality of life dimensions surveyed.

Several studies examining the perceptions of teachers were located by Chambers et al. (2007). These studies were dated between 1999 and 2003. The teachers surveyed in these studies reported they were familiar with the term *self-determination* and felt instruction in the components of self-determination was important. Of the postsecondary special education teachers surveyed, only about half of them included instruction in self-determination in their teacher education courses.

One study was located examining the perceptions of parents. The study was completed in 2005 and reported the parents of students with disabilities believed promoting self-determination was important for their children. The parents also reported a lack of opportunities for their children to practice self-determination skills in the school setting.

Two studies were located examining the perceptions of programmatic factors to promote self-determination. The studies were completed between the years 2001 and 2004. One study found, in programs where self-determination was a focus, teacher and parent perceptions were given as reasons for the focus on self-determination skills. The other study found similar results among the parents and friends of students with disabilities.

Ten studies were located by Chambers et al. (2007) examining the efficacy of interventions to promote self-determination. These studies were not divided into subgroups. The studies were completed between 1995 and 2003. Two studies used an observational checklist to evaluate the results of their intervention. These studies reported a significant increase in the participant's self-determined behavior. One study implemented a curriculum and evaluated the effects by using the Self-Determined Knowledge Scale. The authors reported no significant difference between the experimental group and the control group. An additional study implemented the TAKE CHARGE curriculum. These authors used multiple measures to assess

self-determination in the participants. The authors reported an improvement in all measures of self-determination except self-efficacy. One study evaluated the effect of the Choice Maker intervention materials. Self-determination was measured in this study with The Arc's Self-Determination Scale. The authors reported both the treatment and control group showed improvement on posttest measures; however, the treatment group showed a larger effect size. An additional study reported students who received the Next S.T.E.P. curriculum showed a significant improvement in self-determination skills; the control group did not. Other interventions that examined the efficacy of interventions to promote self-determination used multicomponent processes that incorporated skill building and family education. The authors of these studies reported that parents said their students showed gains in self-determination, and students also showed improvements on the measures used to evaluate self-determination.

In the conclusion section, Chambers et al. (2007) provided a synopsis of what is known concerning self-determination. In addition, the authors provided some suggestions for future research. These suggestions for future research were provided across four domains: (a) teacher training and support, (b) implementing strategies in an education context, (c) family instruction and involvement, and (d) self-determination in younger students.

According to Chambers et al. (2007), few teachers actually implement instruction that promotes self-determination in students with disabilities. It was suggested additional research is needed to better understand the required supports teachers need to assist them in providing instruction in self-determination to students with disabilities. Teachers reported difficulty in finding the time to provide instruction in self-determination to students with disabilities. Chambers et al. also suggested a need for additional research in structured curriculums that embed opportunities for students with disabilities to practice self-determination. According to the

authors, research has shown families have a bigger role in the self-determination of people with disabilities than school does. Chambers et al. further recommended additional research focusing on the specific role or roles families play in the development of self-determination skills in people with disabilities. The authors noticed the existence of few studies focusing on early elementary and early childhood education and suggested the need for additional research supporting the self-determination of younger children.

Optimal Learning in Optimal Contexts: The Role of Self-Determination in Education

Guay, Ratelle, and Chanal (2008) published a literature review of education studies guided by self-determination theory. The authors looked at studies addressing motivation based on self-determination, the linkages between motivation types and student outcomes, and how learning contexts contribute to motivational resources. At the end of the manuscript, the authors provided a summary of the benefits of self-determination.

Although Guay et al. (2008) did not list how the studies were located or what parameters were used to include studies in the literature review, they did note that more than 200 empirical studies were located using self-determination theory to guide the research. Guay et al. (2008) separated their finding into the following five areas: (a) regulatory types in school settings, (b) optimal learning and educational outcomes, (c) a person-centered approach to academic outcomes, (d) contexts and antecedents of motivational resources, and (e) conclusions and recommendations.

The authors found very few studies addressing regulatory types in school settings. Because of the limited number of studies, Guay et al. (2008) reported a general statement regarding outcomes. When examining regulatory types in school settings, the authors found

motivation to be considered of high quality when based on intrinsic regulators and of low quality when based on external regulators.

When examining learning and education outcomes, findings were divided into the following three areas: (a) behavioral outcomes, (b) cognitive outcomes, and (c) affective outcomes. Behavioral outcomes were further divided into persistence and achievement. Guay et al. (2008) stated the research on persistence indicates students who were autonomously motivated toward scholastic work were more likely to persist. The authors went on to report achievement is the standard indicator of student learning, and the more students feel pressured, the worse they perform. When examining cognitive outcomes within the realm of education, the researchers divided their findings into two areas: (a) learning and challenge seeking together and (b) creativity. Within learning and challenge seeking, Guay et al. found motivation has been associated with improved retention and depth of learning. In addition, they reported students who chose the most challenging activities felt the most autonomous. Regarding creativity, the authors reported external contingencies placed on schools may have a negative impact on student creativity. When examining affective outcomes, Guay et al. noted interjected regulation was positively correlated with behavioral persistence.

When considering person-centered approaches, Guay et al. (2008) reported that studies examining the relationships between motivations and outcomes found autonomous motivation to be important. The authors also stated that school can be an important factor in developing motivational profiles.

On examining contexts and antecedents of motivational resources, Guay et al. (2008) looked at the following three areas: (a) autonomy support, (b) involvement, and (c) structure. Within autonomy support, the authors looked at three areas: (a) parental support, (b) teacher

support, and (c) testing the support of teachers and parents. The researchers found parents to have a significant amount of control over student autonomous regulation, and as children grow older, the need for parental support diminishes. Teachers were also reported to have a large amount of influence on student autonomous regulations, and students with teachers who support autonomous regulation perform better in high-achieving academic programs. Guay et al. found only limited research evaluating the autonomy support of teachers and parents; however, the authors did state the available research suggests parents' and teachers' support for autonomous actions may be useful in predicting the student's self-regulation at school. When addressing involvement, the authors looked at parental involvement and teacher involvement. Concerning parental involvement, they reported when parents are involved with a student's education, they send a message that education is important. In addition, when parents are involved with their child's education, the parents help develop the student's perceptions and competence. Guay et al. explained when both structure and involvement were present, they were positively associated with perceived control in the classroom. On discussing structure, the authors reported everything that helps make the learning environment consistent and predictable related to the structure of the classroom.

Guay et al. (2008) drew three conclusions from their literature review. First, the authors found that intrinsic and extrinsic motivation can be reliably assessed. Second, the more students become autonomous in motivation, the higher their grades are, the more they persist, and the more satisfied they are with the school experience. Third, the researchers drew the conclusion parents and teachers who provide autonomy support and contribute to a student's autonomous motivation.

Student Self-Determination: A Preliminary Investigation of the Role of Participation in Inclusive Settings

Hughes et al. (2013) completed a study comparing the level of participation in school and community inclusive activities and the reported self-determination skill used by people with disabilities. The authors included 47 participants in their study. Participant selection was based on the four following selection criteria: (a) Students had an IEP, (b) students had moderate to extensive support needs, (c) students could respond orally to questions using four- to five-word phrases and follow two-part directions, and (d) parental consent and student assent were obtained prior to the beginning of the study. Attending three different high schools in a large urban school district in the southeastern United States, the participants all were identified as students with intellectual disabilities. These three schools met the authors' desire to have both demographically and geographically diverse areas represented. For example, 74% of the students at School A qualified for free or reduced-price lunch; 56% came from single-parent homes; 42% of the families had incomes of less than $25,000. The population makeup at School A was 81% Black, 16% White, and 3% Hispanic. In contrast, 41% of the students at School B qualified for free or reduced-price lunch; 28% came from single parent homes; 28% of the families had incomes less than $25,000. The population makeup at School B was 53% Black and 40% White. At School C, 53% of the students qualified for free or reduced-price lunch; 30% came from single-parent homes; 30% of the families had incomes of less than $25,000. The population makeup at School C was 52% Black, 40% White, and 20% Hispanic. The population percentage at School C exceeded 100% in ethnicity because some students reported affiliation with more than one ethnic descriptor.

Hughes et al. (2013) developed the Student Self-Determination Survey (SS-DS). The SS-DS contained 18 interview items relating to involvement in the IEP process and the use of self-determination strategies. The survey questions were read to participants. Participants were asked several questions relating to how active they were in the IEP process. In addition, several questions were read to the participants relating to self-determination skills such as goal setting. The interviewers recorded participant responses on the survey protocol.

Data were evaluated using four steps. The first step incorporated numerically coding educational programing and student responses and analyzing the data with a chi-square test using the Statistical Package for Social Sciences (SPSS). Second, Hughes et al. (2013) compared the results of School A to the results of schools B and C together because of the significant difference in demographics. Third, the resulting histograms were visually inspected to ensure data normality. After normality was determined, two *t* tests were used to compare the mean of the responses to the reported level of involvement in the IEP process and the reported use of self-determination strategies. Finally, the authors combined qualitative statements collected during the process and reported selected examples.

Hughes et al. (2013) conveyed their results in the following five areas: (a) participation in the IEP process, (b) statistical analysis of IEP participation, (c) self-determination skills, (d) statistical analysis of self-determination skills, and (e) post-school goals. The participants indicated low levels of participation in their IEP process. This level did not differ significantly across schools, according to the authors. Many participants did not know what an IEP was (n = 21), and only five students reported having led their own IEP meeting. Twelve students across all schools reported that they evaluated their progress on their IEP goals in some manner. Finally, only 13 students said they had ever discussed their IEP goals with their teachers. The researchers

used a two-tailed *t* test to evaluate the responses to IEP participation and found no significant difference between School A and schools B and C combined.

School A students in the study by Hughes et al. (2013) reported a significantly less frequent use of self-determination skills than did schools B and C combined. The six self-determination areas evaluated were: (a) self-advocacy, (b) choice making, (c) self-reinforcing, (d) self-monitoring, (e) self-evaluating, and (f) problem solving. The participants reported self-advocating usually occurred in defending themselves from bullying (e.g., saying *no* when being accused of doing something they did not do). Participants' responses to choice-making questions usually related to their life outside of school (e.g., I choose what CD I want to listen to.). Answers to the self-reinforcing questions showed participants felt self-reinforced both at school and away from school (e.g., Telling myself I did good when I made the honor roll or telling myself I did good playing soccer). Participants' responses to self-monitoring questions generally referred to exercising or vocational training (e.g., I have to run five laps or I need to wash five tables before break.). Self-evaluation was reported by the participants in academic and work performance (e.g., I can read and write now, or I get along well with my family.). Problem solving was reported primarily to be used outside of school (e.g., losing a house key and deciding what to do about the situation). No significant difference appeared among participants at the schools in the following three self-determination skills areas: (a) goal setting, (b) self-instruction, and (c) decision making. The two-tailed *t* test showed a significant difference in the self-determination skills of the participants at School A when compared to schools B and C.

Participants at all three schools were asked open-ended questions concerning what they would like to do after they graduate. Thirty of the students indicated they would like to have a job after school. Nine students reported they would like to continue their education. Seven

students said they would like to stay home, and three did not respond to the question (Hughes et al., 2013).

Hughes et al. (2013) found significant differences in the degree participants participated in inclusive settings and transition activities. Students who were educated in self-contained classrooms for the majority of the school day were significantly less self-determined than students who had more inclusive opportunities at school and in the community. The authors also discovered the amount of participation in the IEP process increased as the number of inclusive opportunities increased for the participants. Hughes et al. (2013) therefore suggested an empirical association between self-determination and participation in the IEP process. In addition, because the authors had included a diverse group of participants across the three schools included in this study, Hughes et al. stopped short of suggesting a relationship between high poverty schools, inclusion opportunities, and transition activities.

Hughes et al. (2013) noted the following limitations to their study. First, no direct observation of participants occurred. Next, the SS-DS survey instrument used was developed by the authors for use in this study. Further studies need to occur to evaluate the validity of the SS-DS. Third, no control was employed for the IQ of the participants. Fourth, the sample size was relatively small (n = 47). A larger sample size may produce different results.

Promoting Active Engagement in the General Education Classroom and Access to the General Education Curriculum for Students With Cognitive Disabilities

Agran et al. (2010) designed a study to evaluate the effects of the Self-Determined Learning Model (SDLM) on three junior high school students with cognitive disabilities. The study focused on skills in three areas of self-determination: (a) public speaking skills, (b) asking questions in class, and (c) food preparation skills.

One male and two female junior high school students were included in the study. Participant 1 was a 15-year-old girl in the eighth grade and needed pervasive supports throughout the school day. She was included in the general education environment for four out of seven classes, and her only area of challenging behavior was in noncompliance. Participant 2 was a 14-year-old girl in eighth grade who needed only limited supports. She, like Participant 1, was included in the general education environment for four out of seven classes, and the only area of challenging behavior listed was being easily distracted. Participant 3 was a 15-year-old boy in the ninth grade who required limited to extensive supports. He was included in the general education environment for two out of seven classes and had challenging behaviors in the areas of attention, opposition, and aggression towards peers.

The authors (Agran et al., 2010) selected two junior high schools for the study setting. The two female participants were in a school district serving approximately 2,100 students; the male, in a neighboring school district that served approximately 4,500 students. Participant 1 (girl) and Participant 3 (boy) participated in a consumer science class and were accompanied by an aide to the class. Participated 2 (girl) was in a speech class and did not require an aide to attend class. The other general education classes in which each participant participated were not described.

The dependent measure used for this study was the percentage of occurrence of target behaviors completed by each student. Several people collected data throughout the study. Agran et al. (2010) designated several people to be data collectors including the researcher (fourth author), paraprofessionals, and a general education teacher.

Observers went through a training process consisting of three steps. First, the definitions of the behaviors and the recording systems were described to the observers. Second, the

observers were given the opportunity to observe participants in the general education classroom and practice recording data. Third, the observers and investigator were allowed to collect data simultaneously and compare collection results. This simultaneous data collection continued until at least an 80% agreement in the data collected occurred. After 80% agreement was reached, data collection began.

A multiple baseline design across students study was implemented to examine the effects of the intervention on participant performance. The researchers (Agran et al., 2010) used the SDLM as the intervention. The SDLM consists of teaching participants how to set goals, self-evaluate the process of their goals, and modify goals as needed.

Baseline data were collected on all participants during the designated general education classroom identified for the intervention. The intervention was implemented after a participant's performance was stable for three observations. During the intervention, researchers (Agran et al., 2010) developed action plans to assist each participant in reaching his or her goals based on a preferred method of learning chosen by the participant (self-instruction or picture cues). Participant 1 chose picture cues that included symbols of eye contact, speaking loud and clear, and keeping hands at her side. Participants 2 and 3 chose self-instruction as their preferred learning method. Six questions were developed for Participant 2 to ask herself to assist in her questioning process in the general education classroom. Seven self-instructions were developed for Participant 3 to assist him in following directions in his general education class. On completion of the intervention, data were collected on skill maintenance. Maintenance data were collected until the semester class was over. After the maintenance phase was completed, the participants were asked several social validity questions regarding the intervention.

Data were analyzed by Agran et al. (2010) through visual inspection of the graphical displays for each participant. During baseline, Participant 1 had a range of 20%-33% for her public-speaking skills. Participant 2 had a range of 0%-12% for her questioning skills; Participant 3, 15%-28% for his direction-following skills. During the intervention, an increase was evident across all three participants. During intervention, Participant 1 had a range of 56%-90% and an average of 80% in public-speaking skills. Participant 2 had a range of 43%-92% and an average of 76% in her questioning skills, and Participant 3 had a range of 73%-90% and an average of 81% in his direction-following skills. The maintenance phase for Participant 1 lasted 1 week, maintaining her skills at a level of 84%. For Participant 2, the maintenance phase lasted 5 weeks, and she had a range from 83%-93% and an average of 87% in her questioning skills. The maintenance phase for Participant 3 lasted 2 weeks, and his range was 85%-92% with an average of 89% in his direction-following skills. On the social validity questionnaires, all three participants indicated this intervention helped them achieve their goals. Two of the participants' (Participant 1 and Participant 2) general education teachers reported seeing an improvement in their public-speaking and questioning skills, respectively.

Agran et al. (2010) indicated all of the participants achieved mastery of their target skills and were able to maintain these skills through the maintenance period. The authors further noted the social validity data collected from the participants and their general education teachers were generally positive. As a result of their findings, Agran et al. suggested the SDLM can promote access to the general education curriculum for students with significant needs for support.

The authors (Agran et al., 2010) also noted five limitations with this study. First, due to the small number of participants, the findings of this study may be specific to the participants. Second, data useful for generalization were not collected. Third, the participants' progress in

meeting goals does not provide a measure of their progress in the general education curriculum. Fourth, no procedural fidelity data were collected. Fifth, even though the data suggested the SDLM was effective in helping the participants acquire the target skills, it is uncertain if the SDLM had an impact on the participants' overall self-determination skills.

Summary of Research Relating to Self-determination

In terms of global self-determination, Chambers et al. (2007) found perceptions to be incomplete. The authors completed a literature review and located several studies showing teachers value self-determination in their students, but this value for some reason or a combination of reasons does not translate into practice. These researchers also found people with disabilities value self-determination more than parents or professionals. Chambers et al. found intervention studies positively impacted global self-determination; however, too few studies measured global self-determination. Further research was suggested in self-determination focusing on needed teacher supports, curriculum that provides opportunities to teach self-determination, the role of the family in developing self-determination, and self-determination in early childhood.

Guay et al. (2008) also completed a literature review targeting self-determination in education. The authors found that intrinsic and extrinsic motivation can be reliably assessed in educational contexts. They found the more autonomous the motivation, the more desirable the outcomes. For example, grades improved, persistence improved, and the subjects reported feeling more satisfied. Guay et al. learned parents and teachers contributed to autonomous motivation by providing autonomy throughout the day.

Hughes et al. (2013) examined participation in inclusive settings and active involvement in the IEP process. The authors found that students who were educated in inclusive settings for

the majority of the school day scored much higher on self-determination scales than students who were educated in their self-contained classrooms for the majority of the school day. Hughes et al. also discovered students who participated in their own IEP process had higher levels of self-determination than students who did not.

Agran et al. (2010) found SDLM can promote access to the general education curriculum for students who require significant supports. The authors also observed social validity data collected from the students and professionals were positive regarding the use of the SDLM. The researchers further suggested the SDLM can be useful in teaching students with significant needs for supports skills that align with district standards and are naturally seen in the general education environment.

Activity Schedules

Use of Activity Schedule to Promote Independent Performance of Individuals With Autism and Other Intellectual Disabilities: A Review

Koyama and Wang (2011) completed a literature review examining the effectiveness of activity schedules. The authors summarized existing research and outcomes. Koyama and Wang also wanted to determine for what populations the use of activity schedules may be effective, settings where activity schedules may be appropriate for use, and what behavior changes could be expected from the use of activity schedules.

The authors (Koyama & Wang, 2011) used PsycINFO and Google Scholar to search the key words “activity schedule,” “visual schedule,” and “picture schedule.” Publications had to meet the following six criteria to be included in the literature review: (a) published in peer-reviewed journals, (b) be experimental in design, (c) have activity schedules as the primary intervention or have activity schedules be presented in a combination with other interventions,

(d) use an activity schedule to represent multiple activities (e.g., activity schedules that were used to show many steps with one cooking activity were excluded), (e) attempt to teach learners self-management skills, and (f) the participants must be unfamiliar with the use of activity schedules at the beginning of the intervention.

Koyama and Wang (2011) located 23 studies meeting the inclusion criteria. Sixty-nine participants were included across all studies, and the authors analyzed 11 different factors in each study. The factors analyzed in each study were as follows: (a) age, (b) number of participants, (c) diagnosis, (d) IQ, (e) type of symbol used, (f) setting, (g) activity, (h) behavior change, (i) generalization, (j) maintenance, and (k) social validity.

Participant characteristics were divided into age, diagnosis, and intellectual functioning. The participants were then divided by Koyama and Wang (2011) across four age categories: (a) preschool (n = 17), (b) elementary (n = 15), (c) middle and high school (n = 21), and (d) adults (n = 16). The participants were identified with five diagnoses across all studies: (a) cognitive impairment (n = 14), (b) autism (n = 41), (c) developmental disability (n = 5), (d) other (n = 5), and (e) not specified (n = 4). Participant IQ was divided into five levels: (a) > 70 (n = 1), (b) 50-69 (n = 8), (c) 35-49 (n = 17), (d) 20-34 (n = 2), and (e) not specified (n = 41).

Koyama and Wang (2011) divided teaching formats into symbols, setting, and activities. The symbols used in the studies were: (a) objects (n = 0), (b) photographs (n = 12), (c) line drawings (n = 9), and (d) words (n = 8). The following five settings were identified: (a) home (n = 4), (b) group home (n = 2), (c) school (n = 14), (d) job site (n = 1), and (e) other (n = 2). Activities within the studies were divided into five categories: (a) academic (n = 3), (b) leisure or play (n = 6), (c) self-help (n = 2), (d) vocational tasks (n = 3), and (e) various (n = 9).

Behavior change was reported across four areas, and multiple entries from single studies were allowed. Most studies were reported to address several outcomes related to behavior change. The four areas of behavior change reported were: (a) on-task behavior (*n* = 15), (b) self-injurious behavior (*n* = 8), (c) task initiation or transition (*n* = 7), and (d) self-scheduling (*n* = 7) (Koyama & Wang, 2011).

Koyama and Wang (2011) then divided their literature review into seven different aspects: (a) participant characteristics, (b) teaching formats, (c) behavior change, (d) reduction of prompt dependency, (e) maintenance and generalization, (f) social validity, and (g) implications for future research. Activity schedules were reported to be used successfully with individuals ranging in age from preschool to adulthood. Although autism was the major diagnoses of participants (59%), the authors reported activity schedules were successful with participants across many disability categories. Koyama and Wang found activity schedules can be a useful tool in promoting independence and self-determination.

In the study conducted by Koyama and Wang (2011), activity schedule formats varied among photographs, line drawings, and written words. The authors also noted no study used objects (e.g., tennis shoes to represent going outside). They suggested this may be the result of participants' requiring a minimum level of cognitive ability to use activity schedules productively. Koyama and Wang also reported the majority of studies were conducted in school settings (60.9%) and noted activity schedules were used in group homes and participants' homes. The authors further proposed activity schedules can be used to improve the quality of life for individuals with disabilities and may also help children who struggle with completing daily routines.

Koyama and Wang (2011) found activity schedules were typically used in school for play choices in younger children, academic tasks for middle- and high-school students, and vocational tasks for adults. These researchers further reported when activity schedules were used in group homes, they could improve task performance and help participants complete self-help tasks. Many of the studies implemented activity schedules throughout the day. When activity schedules addressed more than one task, the activity schedules were used to help participants transition between activities, and the activity schedules were not used to teach activities.

Four areas of behavior change were examined in the studies selected by Koyama and Wang (2011): (a) on-task behavior, (b) disruptive or self-injurious behavior, (c) self-scheduling, and (d) task initiations and transitions. The most frequent behavior studied was on-task behavior (n = 15). The authors stated this may be due to research suggesting on-task behavior is positively correlated with increases in communication and social skills and negatively correlated with stereotypical behavior. Two of the studies reviewed by Koyama and Wang indicated positive changes in behavior maintained only in the presence of activity schedules and returned to baseline when activity schedules were removed. Eight studies were located examining self-injurious behavior. Five reported a decrease in self-injurious behavior with the implementation of activity schedules; three studies found either no change or an increase in self-injurious behavior. The authors suggested more time spent on on-task behavior may also lead to less maladaptive behavior. Seven studies were located by Koyama and Wang examining self-scheduling. The authors discovered following activity schedules made by another person is only a form of compliance, and independence and self-determination are achieved when people plan and follow activities independently. The researchers also said providing choice-making opportunities to participants resulted in increased engagement in activities. Koyama and Wang

also located seven studies examining task initiations and transitions. The authors learned activity schedules may be an effective tool for supporting transitions and provided an example of a 3-year-old boy whose disruptive behaviors decreased and compliance increased during transitions with the use of activity schedules.

Koyama and Wang (2011) discussed the decrease in prompt dependency as the mastery level of activity schedules increases by participants. The authors stated researchers typically provide instruction, support, and physical guidance when teaching the use of activity schedules and fade the support as participants learn to use activity schedules on their own. Koyama and Wang suggested this independence allows participants to engage in a sequence of activities by returning to the activity schedule when a task is completed and moving on to the next task without adult prompting. Along these lines, six studies were located examining maintenance and eight studies examining generalization. Koyama and Wang found when generalization was examined, participants were able to use activity schedules in novel situations without additional instruction. They also reported that a small number of studies suggested participants who learn to use activity schedules may apply the use of the schedules in different situations. In addition, seven studies were located examining social validity. All seven studies reported the participating adults found activity schedules to increase positive outcomes for participants. The authors learned activity schedules are well-accepted by practitioners.

Koyama and Wang (2011) suggested future research about activity schedules should include a social validity measure. The authors noted only 30.4% of the studies located included a social validity measure. Only one study was located where activity schedules were taught and implemented by parents in the home environment. The authors believed further research is needed in the home environment to bridge the gap between research and practice. Finally,

Koyama and Wang suggested further research using technology to create activity schedules is needed and recommended using an iPhone or an iPad to enhance the acceptance of activity schedules.

Promoting Task Accuracy and Independence in Students With Autism Across Educational Setting Through the Use of Individual Work Systems

Hume et al. (2012) designed this study to examine the effectiveness of individual work systems, which are sets of visual information that inform students about participation in work areas, as a strategy to increase task accuracy. Three first-grade students with autism participated in the study. All participants met the following criteria: (a) be identified as eligible for special education services, (b) be included in the general education classroom for a portion of the school day, (c) require frequent adult prompting to stay on task, and (d) have no prior experience with work systems. Three 7-year-old White boys were identified for participation in the study. All participants had received special education services since age 3 and spent the majority of their school day in a self-contained classroom for students with moderate to severe disabilities. In addition, all participants received some academic instruction outside their self-contained classroom.

All three participants in the study by Hume et al. (2012) were enrolled in the same self-contained classroom that served a total of six students, and the intervention was administered there. One teacher and three instructional assistants were also in the classroom. Different areas in the classroom were clearly marked with furniture or tape on the floor. Participants used visual schedules with representation of the different areas of the classroom to organize their school day. Probes in the general education environment were administered for each participant. Participant 1 attended a combined first- and second-grade classroom with 40 students and 2 teachers.

Participants 2 and 3 attended a first-grade classroom with 20 students, 1 teacher, and 1 student teacher. An instructional assistant accompanied each student to the general education classroom to facilitate participation.

A multiple probe across participants design was implemented by Hume et al. (2012) to evaluate the effectiveness of the intervention on the accuracy of participants when completing tasks. Prior to baseline, the classroom teacher was asked to select discrete skills from the students' IEPs that were similar to skills required in the general education setting. The skills selected for participants 1 and 2 were using letters to form consonant-vowel-consonant (CVC) words and 12 sight words. The skill selected for Participant 3 was sorting and classifying objects or photo representations by one attribute. A task analysis was developed for each skill. The steps required to complete the skill ranged from 8-23. Each participant was trained in completing his tasks until he reached a 50% criterion for mastery.

During baseline, participants were observed completing the recently acquired skills. Participants were prompted in the same manner they were normally prompted. For example, when it was time to begin the activity, the participants would be told it was time to start work. Baseline probes were taken over five sessions, and the required tasks were limited to control for the number of exposures. The staff provided accuracy feedback and noted the number of cues the participants required (Hume et al., 2012).

The intervention took place in the special education classroom during independent work time. Independent work time took place in the morning and typically lasted between 10 and 20 minutes. A left-to-right work system was established for each participant. The participants would take work from the left of the table at which they were seated and place the finished product in a receptacle to the right. The work system in this study communicated four pieces of information

to the participants through a picture activity schedule: (a) the tasks, (b) the amount of work to be completed, (c) the required signal on completion, and (d) instructions for the next activity. The work systems for each participant were set up in an independent work area of the classroom. Data were collected on the accuracy of the completed projects while participants were engaged in the work system. Participants 1 and 2 completed 14 probes during the intervention phase; Participant 3, 12 probes (Hume et al., 2012).

Generalization probes occurred in the participants' general education classroom. The participants attended a reading and writing workshop in the afternoon each day, and generalization probes were taken on the same days intervention probes were provided. Approximately 3½ hours separated each intervention session and generalization session. The general education classroom used different materials for the work system than were used in the special education classroom. During generalization probes, instructions for the work system were given by the general education teacher and not the special education teacher. Generalizations across settings and people were measured (Hume et al., 2012).

The same tasks were used in the maintenance phase of the intervention. After stable task accuracy data were collected in the special education classroom, the intervention was stopped. Only maintenance data in the general education classroom were collected after the intervention was stopped in the special education classroom. Data on six maintenance probes were collected for participants 1 and 2, and data on five maintenance probes were collected for Participant 3 (Hume et al., 2012).

A secondary observer collected data on 25% of the sessions in the study conducted by Hume et al. (2012). This secondary observer was trained in what to look for in task accuracy, but was not informed of the purpose of the study. Inter-observer agreement was calculated separately

for teacher prompting and task accuracy. The investigator used video recordings of the intervention sessions, generalization probes, and maintenance probes to determine treatment fidelity. The researchers reported 100% accuracy across all settings.

Social validity was addressed by Hume et al. (2012) through the use of pre- and postquestionnaires. Special education professionals were given pre- and postquestionnaires; general education professionals were given only postquestionnaires. The questionnaire addressed three areas: (a) the goals of the treatment, (b) procedures, and (c) participant outcomes. A 5-point Likert-type scale was used in the questionnaires ranging from 1 (*agree*) to 5 (*disagree*).

The multiple baseline graphs across participants were visually analyzed by Hume et al. (2012). Mean percentage increase or decrease was reported for task accuracy and required adult prompting. Effect size was also determined by calculating the percentage of non-overlapping data. Hume et al. reported the effect size to be 100% for accuracy and an effect size for the number of prompts needed between 80% for Participant 2 and 100% for Participant 3. Hume et al. also reported an increase in accuracy and a decrease in adult prompting as a result of the intervention. In addition, the intervention was found to generalize across settings (special education classroom to general education classroom) and people (special education teacher to general education teacher).

In the study conducted by Hume et al. (2012), Participant 1's accuracy levels increased during the intervention to 86.5% in the special education classroom and 86.9% in the general education classroom. Participant 2's accuracy levels increased during the intervention to 95.3% in the special education classroom and 89.6% in the general education classroom; Participant 3's, to 84% in the special education classroom and 76.8% in the general education classroom. All three participants' accuracy level continued to rise during the maintenance phase: Participant 1 to

95.3%, Participant 2 to 96%, and Participant 3 to 81.4%. During baseline, Participant 1 was prompted 51% of the time in the special education classroom and 92% of the time in the general education classroom. During intervention, Participant 1's prompting requirements fell to 2.7% and 18%, respectively. The prompting requirements for Participant 1 continued to fall during the maintenance phase to 3.2%. Participant 2 required prompting 77.2% of the time in the special education classroom and 89.2% of the time in the general education classroom during baseline. During the intervention phase, Participant 2 required prompting 33% and 48% of the time, respectively. The prompting requirement for Participant 2 continued to drop in the maintenance phase to 20.5%. Participant 3, during baseline, required prompting 56.4% of the time in the special education classroom and 71.2% of the time in the general education classroom. During the intervention phase, prompting requirements for Participant 3 dropped to 12.8% and 19.5% of the time, respectively. The prompting requirements for Participant 3 dropped to a mean of 0% during maintenance.

The social validity data collected by Hume et al. (2012) contained questions in the following three areas: (a) goals, (b) treatment procedures, and (c) outcomes. The results of the social validity survey showed staff member believed generalization, increased accuracy, and increased independence were important goals for the intervention. Staff members also agreed that the participants with whom they worked could be taught a way to work more independently. Staff completing the survey agreed participants' independence increased, accuracy improved, generalization occurred, and the number of required prompts decreased.

Hume et al. (2012) concluded individual work systems helped to improve accuracy while decreasing required adult prompting. The authors also noted that previous research evaluated the effectiveness of work systems to promote independence of previously mastered skills. In this

study, the researchers evaluated the effectiveness of work systems to promote independence on skills still in the acquisition phase. The authors also discussed the decreased levels of required adult prompting required by all participants. The findings of Hume et al. supported previous research suggesting work systems (visually oriented work spaces) decrease required adult prompting. Hume et al. further discussed the shift from adult prompting to the use of visuals for prompting. The visuals provided the participants with required information (e.g., the number of activities to be completed, what to do with the activities when they are completed, and what the participant should do when the activities are completed). The authors found this prompt shift from adults to visuals has also been studied in the field of applied behavior analysis using activity schedules, tactile prompts, automated prompting, and video prompting.

Hume et al. (2012) discussed three limitations of this study. First, no protocol was in place to address incorrect responses or the type of adult prompting used in the study. Staff members were told to prompt participants as they typically would in other situations. The type of prompting received from different adults varied and was dependent on the adults' method of prompting. Second, individual differences were evident in the data collected that required further investigation. Adult prompting in the general education setting varied significantly among participants and specifically with Participant 3. The authors attributed this to the general education classroom's being less controlled than the special education classroom. The accuracy levels for Participant 3 were also significantly lower (15%) than for the other two participants. The authors attributed this difference to Participant 3's cognitive level in comparison with the other two participants. Finally, Hume et al. noted the work system consisted of a number of components, and the authors were not sure if an individual component was responsible for the change in behavior, or the entire system was responsible. The components in question listed

were: (a) minimizing auditory and visual distractions, (b) reducing mobility in the classroom, (c) organizing materials, (d) using visual cues, (e) reducing the number of choices, and (f) introducing the concepts of "finished" and "next." Hume et al. also discussed the possible introduction of other empirically-based strategies such as: (a) the use of multiple exemplars, (b) common stimuli, and (c) natural consequences to have an effect on outcomes.

Teaching On-Task and On-Schedule Behaviors to High-Functioning Children With Autism Via Picture Activity Schedules

Bryan and Gast (2000) designed this study to replicate and extend a study completed by MacDuff, Krantz, and McClannahan (1993). Bryan and Gast's (2000) study was different from MacDuff et al.'s (1993) in the following five ways: (a) participants' ages, (b) participants' functioning level, (c) setting, (d) type of visual prompt, and (e) experimental design. This study was designed to evaluate the effectiveness of a two-component teaching package in teaching students with autism to increase on-task and on-schedule behavior. Two research questions were asked: (a) Does the teaching package (visual activity schedules and graduated guidance) teach students with autism on-task and on-schedule behaviors, and (b) Will these behaviors generalize to novel activities?

Four students with autism were selected to be included in this study (Bryan & Gast, 2000). The participants' ages ranged from 7 years 4 months to 8 years 11 months. All of the participants spent half their school day in a resource classroom designed for students with autism; the other half, in the general education environment with support. The one female and three male participants functioned academically between 1 year below grade level and grade level. All four participants received pull-out support in the areas of language arts and speech therapy. Two of the participants also received pull-out support in the areas of math and

occupational therapy. All participants demonstrated picture-object correspondence, limited visual activity schedule experience, and no experience with graduated guidance.

The intervention took place in the participants' resource class during language arts instruction. In the classroom were individual desks arranged in rows in front of a small whiteboard. The whiteboard was located at the front of the classroom. At the back of the classroom were tables set up for small group instruction. Four literacy centers were set up during language arts instruction: (a) a writing center, (b) a reading center, (c) a listening center, and (d) an art center (Bryan & Gast, 2000).

A small photo album measuring 4 in by 6 in was used as their activity schedule. One activity picture was placed on each page, and the participant would flip through the pages as each activity was completed; four activities in total were included in the album. Each participant's activity schedule was placed on a table in the middle of the classroom prior to language arts instruction.

Four different literacy materials were chosen for the intervention phase of the study. File folder games, handwriting worksheets, puzzles, and books on tape were placed in a visible location at each of the four classroom centers. These activities were chosen because they were already known to the participants. Materials selected for generalization were: (a) pattern blocks, (b) coloring sheets, (c) puzzles, and (d) general books. These materials were selected because they were similar to the materials used in the intervention, but were also novel to the participants (Bryan & Gast, 2000).

Data sheets, inter-observer data sheets, and procedural reliability data sheets were used in this intervention. Bryan and Gast (2000) used a vibrating timer to cue the data recording intervals. In the participants' resource classroom, the staff consisted of the special education

teacher and two paraprofessionals. The special education teacher served as the experimenter, and the paraprofessionals assisted with data collection. After the teacher gave instructions to the participants, the teacher would circulate throughout the classroom supervising students. The paraprofessionals would sit in a corner of the classroom and collect data.

Bryan and Gast (2000) defined the on-schedule variable as completing each step of the activity listed on a task analysis. *Off-schedule* was defined as not completing a step within the task analysis or not completing the steps appropriately. The on-task with scheduled materials dependent variable was defined as attending to appropriate scheduled materials, looking at the picture activity schedule, manipulating scheduled materials, or transitioning from one scheduled activity to another scheduled activity. The off-task with nonscheduled materials dependent variable was defined as the participant's not being on schedule and attending to any work materials, looking at his or her picture activity schedule, manipulating work materials, or transitioning between activities. Off task was scored if the participant was using materials inappropriately, manipulating but not attending to materials, engaging in inappropriate behavior, or not engaging in actives or materials.

The paraprofessionals collected data throughout the training session. To record the number of on-task and off-task behaviors, a 1-minute momentary time recording was used. The paraprofessionals also used a continuous interval recording system to track the number of times teacher prompts were delivered to participants to maintain on-task behavior. The on-task and off-task behaviors were totaled during each intervention session, and a percentage was calculated. The number of required prompts was also calculated for each intervention session (Bryan & Gast, 2000).

Participants were observed on a daily basis during their language arts instruction. Each intervention session began with the teacher's calling all students to a general area, informing the students they would begin their literacy centers, and informing each participant which centers he or she would be completing. General praise was given to each participant every 3 minutes the student was on task or on schedule. During the intervention, the teacher would circulate throughout the classroom monitoring participants, but would not interact with the participants except for giving praise or prompting. Paraprofessionals sat in a corner of the classroom where they could see all participants, but would not be obtrusive to the environment (Bryan & Gast, 2000).

A withdrawal design (A-B-A-B) was used for this study conducted by Bryan and Gast (2000) to evaluate the effectiveness of picture activity schedules to keep participants on-task and on-schedule. The picture activity schedule was considered to be the independent variable. Baseline data were collected without the picture activity schedule's being used in the general education classroom and the resource classroom. After baseline, graduated guidance was used to teach the use of the picture activity schedule. Following the graduated guidance phase, a picture activity schedule followed. Then the picture activity schedule was withdrawn from the participants, and a no book phase was recorded. The participants were then returned to a picture activity schedule phase. Following this phase was a generalization posttest phase.

The study (Bryan & Gast, 2000) was designed to have reliability data collected during 22% of the sessions. The mean agreement across all participants and sessions was 100%. Mean procedural reliability was also collected across all participants and sessions. The procedural reliability was also reported to be 100%. The on-schedule data were entered on a graphic display and visually analyzed. A significant change was evident between the no book and graduated

guidance phases of the study as well as between the no book and book only phases of the study across all participants. On-schedule behaviors increased during the graduated guidance phase and stabilized at 100%. The on-schedule behaviors stayed at a 100% correct level for the rest of the intervention except when the picture activity schedule was withdrawn. When the picture activity schedule was withdrawn, on-schedule behaviors returned to baseline levels.

On-task data were entered by Bryan and Gast (2000) on a graphical display, and the results were visually inspected. The on-task results were much the same as the on-schedule results when placed on a graphical display. During the baseline phase, the participants were using nonscheduled materials more than they were using scheduled materials. During graduated practice and book only phases, the participants quickly started using scheduled materials more (leveling at 100%) and stopped using nonscheduled materials (leveling at 0%). This was true throughout the study except when the picture activity schedule was withdrawn. When the picture activity schedule was withdrawn, the participants returned to baseline conditions and were using nonscheduled materials more than scheduled materials. The participants went back to using scheduled materials when the picture activity schedule was introduced.

Bryan and Gast (2000) reported generalization data of the participants to novel activities in the general education classroom. During the generalization pretest, the participants' on-schedule activities were low (ranging from 3.3% to 21.5%). In the generalization posttest, the on-schedule activities increased to 100% across all participants. The on-task behaviors of the participants during the generalization pretest was also low (ranging from 5% to 31.5%). During the generalization posttest, the on-task behaviors increased to 100% across three participants and 99.5% for the fourth participant.

A 7-question social validity questionnaire was given to the general education teacher, speech and language pathologists, and paraprofessionals. Bryan and Gast (2000) used a 5-point Likert-type scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). The questionnaire results showed the respondents were divided on their belief that the picture activity schedule was responsible for the participants' learning. The respondents were also divided in their opinion that students with autism could only learn with one to one support. The respondents agreed picture activity schedules promoted student independence and believed picture activity schedules could be used for all students and were a useful classroom tool.

Bryan and Gast (2000) concluded visual activity schedules were effective for high-functioning students with autism. Their findings supported the findings of MacDuff et al. (1993) in that participants quickly learned the use of activity schedules, maintained high levels of independent behavior through the use of activity schedules, and increased the number of on-task behaviors while the number of off-task behaviors decreased through the use of visual activity schedules. Bryan and Gast (2000) also concluded the desired behaviors generalized to the general education environment without additional teaching. Further, they noted this ease of generalization may have been aided by the random presentation of pictures during all sessions of the intervention. Bryan and Gast also indicated that occasionally, two of the participants would prompt a third participant who was off-task. The off-task participant would then respond to the others and return to task. The authors felt this was an example of how activity schedules can foster positive communication between students with autism.

Effects of Visual Activity Schedules on Independent Classroom Transitions for Students With Autism

This study, completed by Pierce, Spriggs, Gast, and Luscre (2013), replicated and extended a study by MacDuff et al. (1993) and another study completed by Bryan and Gast (2000). The Pierce et al. (2013) study was designed to evaluate the effectiveness of visual activity schedules on transitions in a self-contained classroom for students with autism. Pierce et al. answered the research questions: (a) Will independent transitions increase between and within activities as a result of using visual activity schedules, and (b) Will independent transitions generalize to novel pictures and materials?

Four participants in a self-contained classroom for students with autism were selected to be included in this study (Pierce et al., 2013). All four participants were male, ranging in age from 9 years 10 months to 11 years 1 month. All of the participants had developmental age scores that fell 5-8 years below their chronological ages.

Participant 1 was able to match pictures to objects and had experience using whole-day visual activity schedules. He required both verbal and physical prompting to walk to the whole-day schedule, pull off a picture, and transition to the next activity. Participant 1 communicated using one-word utterances and gestures to convey meaning. In contrast, Participant 2 was able to follow two-step directions; however, he needed prompting between transitions. Participant 2 was familiar with using a whole-day visual activity schedule. This participant was able to communicate verbally, but required prompting to transition between activities (Pierce et al., 2013).

Participant 3 in the study conducted by Pierce et al. (2013) was able to match pictures to activities and follow an activity schedule with prompting. Participant 3 communicated using

simple phrases and gestures, and could follow two-step directions. He would often yell or refuse to participate when transitioning within the classroom. Participant 4 was able to match pictures to activities and follow a visual activity schedule with prompting. He could follow two-step directions and communicated using phrases and sentences. Participant 4 was easily distracted by external stimuli within the self-contained classroom and often required redirection to remain on task.

A self-contained classroom for students with autism was selected by Pierce et al. (2013) as the setting for this study. The participants spent the majority of their school day in this classroom leaving only for nonacademic classes (e.g., physical education, art, and music). The classroom was approximately 27 ft by 21 ft. Within the classroom were a kidney-shaped table, a round table, six study carrels, and a literacy section. The study carrels were located at a flat table that had 1½ ft high partitions for privacy during independent work activities.

As in the previous studies, a withdrawal design (A-B-A-B) was implemented by Pierce et al. (2013) to evaluate the effectiveness of using visual activity schedules to facilitate independent transitions within the self-contained classroom. The researchers chose this design in an attempt to show a functional relationship between the independent variable (visual activity schedule) and dependent variable (independent transitions). External validity was achieved when the A-B-A-B withdrawal design was replicated with similar participants in similar conditions.

Intervention sessions were scheduled once per day for 5 days per week. Each intervention session lasted approximately 30 minutes. Center time in the classroom began with all participants sitting at a table in the center of the room. The teacher gained participants' attention and announced it was center time. After announcing center time, the teacher reviewed the centers for the day and let the participants know they had 5 minutes at each center to complete the

designated tasks. After the review was completed, the teacher instructed the participants to begin their center activities. Five minute timers were started when each participant sat down at each activity. The 5-minute timer was used as a cue to inform the participants they needed to transition to the next activity using their visual activity schedules. The participant was prompted to transition to the next activity using a system of least to most prompts. Specific verbal praise was given to the participants during an average of 1-minute intervals throughout all conditions (Pierce et al., 2013).

Generalization across stimuli using novel visual activity schedule pictures and activities was assessed. Generalization was assessed using a pretest/posttest method. Visual activity schedules were present during the pretest generalization phase; however, instruction in the use of visual activity schedules did not occur. Visual activity schedules were also made available during the posttest phase, but the use of the visual activity schedules was neither required nor prompted. The same general procedures were used to begin center activities during the generalization phase that were used in the intervention phase as described (Pierce et al., 2013).

Baseline data were collected by Pierce et al. (2013) until data were stable for three consecutive sessions. The procedures were the same as the generalization session, but the visual activity schedule was not present. The baseline phase was implemented to measure independent transitions between and within activities without the use of a visual activity schedule.

Pierce et al. (2013) explained the purpose of the intervention phase of the study was to teach the participants how to use the visual activity schedule and to evaluate the effectiveness of the visual activity schedule on between activity and within activity transitions. Each intervention session following the same general procedures already described and a system of least to most prompting was used to teach the use of visual activity schedules. The intervention phase was

implemented until participants transitioned for at least three sessions at 90% or above accuracy. The dependent variables (transitioning between and within activities) were scored as correct when the participant stopped working on the present task within 5 seconds of the timer's sounding, cleaned up the task by placing task materials in the box provided, stood up within 5 seconds of cleaning up, walked to the next correct center, and sat down at the correct center. Pierce et al. used event recording to measure the number of correct transitions between and within activities.

Reliability was recorded in the study conducted by Pierce et al. (2013) by a variety of professionals trained in data collection and study procedures. The professionals were trained in study procedures until a mean inter-observer agreement of 90% was obtained. Reliability data were collected in the following six areas: (a) delivering a cue for the participants to begin center activities, (b) verbally stating the sequence of centers to be completed, (c) giving a verbal direction to begin the center activities, (d) following the system of least to most prompts, (e) waiting 5 seconds between prompts, and (f) providing verbal praise at 1-minute intervals.

Pierce et al. (2013) collected inter-observer data on 21.6% of study sessions across all participants. The mean inter-observer agreement on student performance across all participants was 99% during the generalization and no schedule sessions. The mean student performance agreement during the intervention (visual activity schedule) was 100%. The mean procedural reliability was 99% across all students and conditions.

Graphical displays were constructed for each participant measuring the percentage of steps completed independently. Pierce et al. (2013) measured intra-subject and inter-subject replications of behaviors. No (0%) overlapping data were evident when comparing the second no schedule phase and the second visual activity schedule phase of the study across all participants.

Participant 1's mean performance during the first no schedule phase was 33% of transitions completed independently. During the first visual activity schedule phase, his level of performance reached 90% or better for three consecutive sessions. When the second no schedule phase was introduced, Participant 1's performance returned to a mean of 71% for transitions completed independently. During the second visual activity schedule phase, Participant 1's mean total steps completed independently rose to 93%. Participant 2's graphical display showed a mean of 32% independent transitions. His mean independent transitions rose to 86% during the first visual activity schedule phase. When the second no schedule phase was introduced, Participant 2's mean independent transitions returned to a level of 51%. On introduction of the second visual activity schedule phase, Participant 2's mean independent transitions level rose to 96% (Pierce et al., 2013).

Participant 3's graphical display showed 37% of steps completed independently during the first no schedule phase. During the first visual activity schedule phase, his mean steps completed independently showed a mean performance of 82%. On returning to the second no schedule phase, Participant 3's mean independent transitions returned to 70%. During the second visual activity schedule phase, his mean level returned to 91% transitions completed independently. Participant 4 showed a mean of 22% during the first no schedule phase. During the first visual activity schedule phase, his mean independent transitions rose to 65%. When the visual activity schedule was removed in the second no schedule phase, Participant 4's mean independent transitions fell to 39%. Once the visual activity schedule was reintroduced in the second visual activity schedule phase, his independent transitions returned to 85% (Pierce et al., 2013).

Pierce et al. (2013) reported during the pretest generalization phase, the mean transitions completed independently across participants were 14% with a range from 0% to 40%. During the generalization posttest, the mean transitions completed independently across participants rose to 95% with a range of 80% to 100%. The results were the same for within activity steps completed and between activity steps completed.

Social validity data were collected from persons who knew and worked with the participants. A 5-question survey was given using a 5-point Likert-type scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). The means and ranges of the responses were calculated and reported by Pierce et al. (2013). All respondents agreed (mean = 5, range = 5) visual activity schedules were a useful tool for teaching independent transitions. Most respondents agreed (mean = 4.75, range = 4-5) independent behavior was increased in the presence of visual activity schedules. Most respondents also agreed participants were able to generalize the use of activity schedules to novel tasks (mean = 4.75, range = 4-5) within the classroom and novel pictures (mean = 4.75, range = 4-5) on the visual activity schedules. All respondents agreed (mean = 5, range = 5) visual activity schedules are a socially acceptable method of teaching transitions inside and outside the classroom (Pierce et al., 2013).

Pierce et al. (2013) concluded visual activity schedules increased transition behaviors within and between activities, and these behaviors generalized across activities and pictures. The authors noted all participants did not return to baseline levels when the visual activity schedules were withdrawn and attributed this to the participant's acquiring some of the skills necessary to complete independent transitions. The researchers indicated if another single-subject design (e.g., multiple baseline across participants) were selected, the need to return to a no schedule phase would have been removed.

Pierce et al. (2013) identified some limitations to their study. First, the language levels of the participants were not established using a standardized assessment, and the authors noted this may have been helpful information to have. Second, verbal praise was used to reinforce behavior. If more preferred reinforcers were identified and used, the number of sessions needed to reach criterion levels may have been reduced. Finally, Pierce et al. indicated generalization occurred to novel pictures and materials. Generalization to different locations and inclusive settings may strengthen support for the use of activity schedules outside the self-contained classroom.

Comparing Pictorial and Video Modeling Activity Schedules During Transitions for Students With Autism Spectrum Disorders

Cihak (2011) designed a study to compare the effectiveness of a picture activity schedule to the effectiveness of a video activity schedule during transitions for students with autism spectrum disorder. Four participants were selected from two middle-school self-contained classrooms for students with autism. Both teachers had at least 5 years of experience working with students with autism. Three boys and one girl were selected to participate in this study. Participants 1 and 2 were in the same classroom, which had a total of seven students. Participants 3 and 4 were in the same classroom of six students. Both classrooms were staffed with a special education teacher and a full-time paraprofessional.

Cihak (2011) used pictures of the participants engaging in five different activities for use with the picture activity schedule. The pictures were displayed horizontally and were located at a central location in the classrooms near the computer area. Videos of the participants independently transitioning between tasks were taken with a camera and edited using Microsoft Windows Movie Maker software. The participants and teachers role played transitioning

independently between tasks. After the role-playing sessions, videos were made, and any inappropriate behaviors were edited out. This role-playing and videoing process occurred prior to collection of baseline data. The videos were filmed using video self-modeling showing the participant successfully making the transition independently and point-of-view video modeling showing the participant's vantage point when he or she reached the desired transition station in the classroom. The videos ranged from 10-15 seconds in length depending on the distance between locations. Participants were able to access these videos on a centrally located computer with a touch screen monitor and Windows Microsoft Media Player. Participants would touch a thumbnail on the computer screen that would show a video of the participant transitioning to the next activity. The thumbnails were arranged horizontally on the computer monitor.

Event recording was implemented by Cihak (2011) to collect data on the number of times participants transitioned to a new task independently during the school day. If the participant did not begin to transition within 5 seconds of a request from the teacher or the participant displayed the target inappropriate behavior during the transition, then the transition was marked as inappropriate. The inappropriate behavior for Participant 1 was physical aggression, defined as hitting or throwing materials at another person. The inappropriate behavior for Participant 2 was also physical aggression, but defined as pushing another person. The inappropriate behavior for Participant 3 was vocalizations, defined as loud vocalizations that could be heard from 10 ft away. The inappropriate behavior for Participant 4 was noncompliance, defined as sitting on the floor.

An independent transition was defined by Cihak (2011) as physically moving to the desired task within 5 seconds of being asked by the teacher without the presence of the targeted inappropriate behavior. Each participant was given the opportunity to transition 10 times per day

equally divided between morning and afternoon. The use of the picture activity schedule and video modeling recordings were counterbalanced across all participants. For example, Participant 1 used the picture activity schedule in the morning while Participant 2 used the video modeling recordings. The participants would then switch in the afternoon. The number of independent transitions was divided by the number of transition opportunities to determine the percentage of independent transitions for each participant.

An alternating treatments design was implemented to evaluate the differential effects of picture activity schedules and video modeling on the independent transitions of each participant. Cihak (2011) attempted to account for carryover effects by counterbalancing the presentation methods to the participants. The transition tasks were the same for the participants in the same classroom; however, the transition tasks differed across classrooms.

During baseline, the teachers were instructed to record the number of independent transitions for all participants. The same transition tasks were used during the baseline phase that would be used in the intervention phase of the study. The teacher would ask the participant to transition to a new task. If the participant did not begin to transition within 5 seconds or engaged in targeted behaviors, the transition was marked as incorrect. The teacher would then use a least to most prompting strategy to assist the participant with the transition. Baseline data were collected for all participants until a stable trend was established for five sessions (Cihak, 2011).

During intervention, the teachers informed all participants which activity schedule they would be using. Participants completed five activities using the activity schedules both in the morning and afternoon. Prior to the start of the session, the participants would be seated at their desks. The teacher would inform the participant which type of activity schedule he or she would be using and then ask the participant to check the activity schedule. When the student was

informed he or she would be using the picture activity schedule, the student was required to move to the center of the room, look at the picture activity schedule, move to the task, and begin the activity. When the participant was informed he or she would be using the video modeling activity schedule, the student was required to move to the computer located in the center of the room next to the picture activity schedule, select the appropriate thumbnail icon, watch the video, move to the task, and begin the activity. The teacher provided each participant contingent praise on completion of the transition. In the event the participant stopped transitioning at any time, the teacher would mark the transition as incorrect and use a system of least to most prompting with the participant. Intervention sessions continued until the participant met the criterion of 100% correct for three consecutive sessions. A preferred activity schedule phase after the participant reached criterion in the intervention phase was implemented. If the participant reached criterion in both the picture activity schedule and video modeling, the selection of the preferred phase was left up to participant and teacher preferences (Cihak, 2011).

Cihak (2011) found as a group, 17 (8.5%) independent transitions occurred during baseline. When the participants used the picture activity schedule, 118 (69%) independent transitions happened, and participants required assistance during 52 (31%) transitions. When the participants used the video modeling activity schedule, 124 (73%) independent transitions were observed, and participants required assistance 46 (27%) times. Two participants reached criterion using the picture activity schedule, one participant reached criterion using the video modeling schedule, and one participant reached criterion using both the picture activity schedule and the video modeling schedule.

Participant 1 had mean independent transitions during baseline of 2% (n = 1). During intervention using the picture activity schedule, Participant 1 had independent transitions 63% (n

= 25) of the time and required assistance 38% (*n* = 15) of the time. Using the video model schedule, Participant 1 transitioned independently on 65% (*n* = 26) of trials and required assistance on 35% (*n* = 14) of the trials. Participant 1 reached criterion using the picture activity schedule (100% correct over three consecutive sessions), and the picture activity schedule was selected for use in the preferred treatment phase. During the preferred treatment phase, Participant 1 had independent transitions 100% of the time (Cihak, 2011).

During baseline, Participant 2 transitioned independently 8% (*n* = 4) of the time. During intervention using the picture activity schedule, Participant 2 transitioned independently 69% (*n* = 31) of the time and required assistance 31% (*n* = 14) of the time. Using the video model schedule, Participant 2 transitioned independently 51% (*n* = 26) of the time and required assistance 49% (*n* = 22) of the time. Participant 2 reached criterion using the picture activity schedule, and the picture activity schedule was used during the preferred treatment phase. During the preferred treatment phase, Participant 2 transitioned independently 100% of the time (Cihak, 2011).

Participant 3, during baseline, transitioned independently 12% (*n* = 6) of the time. During intervention using the picture activity schedule, Participant 3 transitioned independently 82% (*n* = 37) of the time and required assistance during eight transitions (percentage of transitions was not reported). Using the video model schedule during intervention, Participant 3 transitioned independently 91% (*n* = 41) of the time and required assistance 9% (*n* = 4) of the time. Participant 3 reached criterion using both the picture activity schedule and the video model schedule. The video model schedule was selected for Participant 3 during the preferred treatment phase because fewer assisted transitions were observed using this method. During the preferred

treatment phase, Participant 3 had 100% independent transitions using the video model schedule (Cihak, 2011).

Participant 4, during baseline, had 12% (*n* = 6) independent transitions. During intervention using the picture activity schedule, Participant 4 had 63% (*n* = 25) independent transitions and required assistance 38% (*n* = 15) of the time. Using the video model schedule, Participant 4 had 85% (*n* = 34) independent transitions and required assistance during 15% (*n* = 6) of transitions. Participant 4 reached criterion using the video model schedule, and the video model schedule was selected for use during the preferred treatment phase. During the preferred treatment phase, Participant 4 had 100% independent transitions using the video model schedule (Cihak, 2011).

Following the intervention, Cihak (2011) found two participants completed more independent transitions using the video model schedule, one participant performed better using the picture activity schedule, and one participant performed equally well using the picture activity schedule or the video model schedule. The author reported each participant improved transitioning skills using both types of activity schedules. Cihak concluded because both activity schedules improved transitioning across all participants, the type of schedule selected for use with particular students should be determined based on their preference.

Cihak (2011) offered some limitation to his study. First, the author cautioned against carryover effects, stating even though different transitions were used with the picture activity schedule and the video model activity schedule, he could not be certain the transitioning skills learned using one type of activity schedule did not carry over to the other type of activity schedule. Unfortunately, a third set of transitions without an activity schedule was not implemented. This third set of transitions would have been used to evaluate carryover effects.

Cihak further noted because the morning transitions always received the same type of activity schedule support, a cyclic effect may have occurred. Due to the structure of the intervention, he was not able to randomize what activity schedules were presented during the morning and afternoon sessions.

The Effects of a Picture Activity Schedule for Students With Intellectual Disability to Complete a Sequence of Tasks Following Verbal Directions

Duttlinger et al. (2013) used picture activity schedules to answer two research questions: (a) What affect does a picture activity schedule, created by the student, have on his or her independent completion of a series of tasks, and (b) Once acquired, will the creation and use of a picture activity schedule generalize to other settings and tasks? Four participants were selected for inclusion in this study. Participant inclusion was based on the following seven criteria: (a) be in the age range of 11 to 15 years old, (b) have a cognitive level in the mild to moderate range of intellectual functioning, (c) have visual and auditory functioning in the average range, (d) have the ability to complete tasks used in the study independently, (e) have goals in their IEP emphasizing independence, (f) have no prior experience setting up picture prompts for use as a self-management activity, and (g) have parental permission to participate in the study. All participants received special education services in a self-contained classroom focusing on functional academics and life skills.

Participant 1 was a 13-year 7-month-old girl. She was receiving services under the categories of other health impaired and mild intellectual disability. She received an achievement measure score on the Woodcock-Johnson (3rd edition) of 60 in reading, an adaptive behavior score on the Vineland Adaptive Behavior Scale (2nd edition) of 57, and a cognitive score of 70 using the Differential Ability Scales (2nde edition). She was diagnosed with Angelman

syndrome and participated in a general education science class with special education teacher support. Participant 1 had difficulty maintaining focus and typically required prompting to stay on task (Duttlinger et al., 2013).

Participant 2 was a 13-years 6-month-old girl. She was receiving services under the categories of autism and mild intellectual disabilities. Participant Two received achievement scores using the Woodcock-Johnson (3rd edition) of 31 through 78 across all subtests, an adaptive behavior score of 61 using the Adaptive Behavior Assessment System (2nd edition), and a cognitive score of 53 using the Stanford-Binet Intelligence Test (5th edition). She was included in a sixth-grade general education class (subject area was not provided) without the support of a special education teacher or a paraprofessional. The special education teacher did provide supports and modifications for Participant 2 to access the sixth-grade general education curriculum. Participant 2 could navigate the school campus during class transitions with minimal assistance (Duttlinger et al., 2013).

Participant 3 was a 14-year 8-month-old boy. He was receiving services under the category of mild intellectual disabilities. Using the Wide Range Achievement Test (3rd edition), Participant 3 scored in the first-grade range on the reading and spelling tests and in the third-grade range on arithmetic. Using the Vineland Adaptive Behavior Scales (2nd edition), he scored 65. Participant 3 also scored 58 on cognitive measures using Stanford-Binet (5th edition). He participated in an eighth-grade science class with paraprofessional support. Participant 3 did not require the assistance of the special education teacher or the paraprofessional to participate in general education elective classes (Duttlinger et al., 2013).

Participant 4 was a 13-year 6-month-old boy. He was receiving services under the categories of mild intellectual disabilities and orthopedic impairment. Using the Wechsler

Individual Achievement Test (2nd edition), he scored in the range of 59 through 81 across all subtests. Participant 4 also received an adaptive behavior score of 57 using the Adaptive Behavior Assessment System (2nd edition) and a cognitive score of 67 using the Differential Ability Scales (2nd edition). Participant 4 was diagnosed with a lower extremity orthopedic impairment requiring him to use a wheelchair. He was included in a sixth-grade science class with special education teacher support. Participant 4 could participate in general education elective classes without assistance (Duttlinger et al., 2013).

All study participants attended the same middle school located in a suburban community made up of middle- to upper-middle SES families in the state of Georgia. All four participants received special education services in a self-contained classroom for students with intellectual disabilities. The study took place in the participants' self-contained classroom, the hall outside the classroom, and the bathroom located approximately 54 ft from the classroom. The generalization phase of this study took place in the food court of a local mall. This particular food court was selected because all participants frequented the mall on a regular basis with their families (Duttlinger et al., 2013).

Baseline, instruction, and intervention phases of the study took place using a one-to-one format beginning at the participants' desks. The classroom teacher (first author) began the sessions when the teacher placed the picture activity schedule materials in front of the participant. A withdrawal design was implemented to evaluate the relation of a picture activity schedule and the percentage of tasks completed independently in sequence (Duttlinger et al., 2013).

The picture activity schedule was the independent variable. The picture activity schedule was constructed by using a laminated 15.2 cm x 30 cm piece of heavy card stock as the base.

Boardmaker® symbols were glued to index cards, cut into 4 cm squares, and laminated. Velcro® buttons were used to attach the Boardmaker® symbols to the base. The picture activity schedule was vertically divided into two sections. The left section was labeled “tasks”; the right, “to-do.” Prior to each session, the teacher would semi-randomly place five to eight Boardmaker® symbols on the “tasks” section of the picture activity schedule. The Boardmaker® symbols corresponded to the tasks that would be used in the upcoming session. The picture activity schedule was placed on the participant’s desk. The session began when the teacher gained the participant’s attention and told the participant the teacher wanted him or her to “do a few things for me.” The teacher would then tell the participant what task to complete first. The participant would move the Boardmaker® symbol associated with the requested task to the first position on the “to-do” side of the picture activity schedule. The teacher would repeat this process for the remaining tasks, and the participant would place the tasks on the “to-do” side of the picture activity schedule in the order requested. The teacher would provide non-contingent praise at two varied times during each session. As the participant finished the final task, the teacher waited by the participant’s desk and offered the participant a preferred snack when the task sequence was completed (Duttlinger et al., 2013).

The dependent variable was defined as the percentage of tasks completed independently in the order they were given to the participant by the teacher. The independent variable was the picture activity schedule. During each intervention session, the teacher requested the participants to complete a series of three to five tasks depending on the participant and his or her ability. A task was marked as independent if the task was initiated within 3 seconds of the teacher’s directions or completion of the previous step and the task was completed within 10 seconds or a reasonable duration for the task (Duttlinger et al., 2013).

Inter-observer agreement and procedural reliability data were collected on 29% of the sessions for each participant. The fourth author acted as the second observer. A task analysis was used to provide a point-by-point method to measure inter-observer agreement. The mean inter-observer agreement across all conditions and participants was 96%. Procedural fidelity was across the following conditions: (a) stating the participant's name, (b) waiting 3 seconds for the participant to respond, (c) teacher's waiting by the participant's desk for task series completion, and (d) teacher's providing a preferred snack at session conclusion. Procedural reliability ranged from 86%-100% with a mean of 99% (Duttlinger et al., 2013).

Prior to beginning the intervention, Duttlinger et al. (2013) identified tasks each participant could complete independently in school and community settings. The teacher verified the participant's ability to view the Boardmaker® symbol and complete the task associated with the symbol independently. In the observational period, if the participant could complete the task independently but could not correlate the task to the Boardmaker® symbol, the teacher would use a system of least to most prompts to teach correlation to the student.

Study sessions occurred only during class periods where the participants were receiving functional skills training. Each session lasted approximately 12 minutes and occurred 4-5 times per week. The total number of sessions was either 23 or 24, depending on the participant, and no more than three sessions took place in any one day. Each session was separated by at least 10 minutes. Task sequence was not repeated for any session, and no more than two tasks per session required the participant to leave the classroom (Duttlinger et al., 2013).

The generalization phase assessed the participant's ability to use picture activity schedules in the food court of a local mall. Pre- and post-intervention generalization data were collected. A table in the food court was chosen as the starting point for a session. Pre-

intervention generalization data were collected prior to baseline, and post-intervention data were collected after the second picture activity schedule phase. No prompts were provided during either generalization condition (Duttlinger et al., 2013).

Data from the study were graphed and visually inspected by Duttlinger et al. (2013). Replication of results was achieved within and between participants. The authors reported the withdrawal design allowed for experimental control by introducing and withdrawing the picture activity schedule repeatedly.

Participant 1 had low percentage correct scores during baseline and when the picture activity schedule was removed. Her performance with the picture activity schedule ranged from 60% to 100% correct. The mean percentage correct for Participant 1 was 85%. Participant 2 also had low percentage correct scores during baseline and when the picture activity schedule was removed. Her percentage correct with the picture activity schedule ranged from 20% to 80% with a mean percentage correct of 65%. Participant 3 had low percentage correct scores during baseline and when the picture activity schedule was removed. The percentage correct for Participant 3 ranged between 85% and 100% with the use of a picture activity schedule, and the mean percentage correct for him was 96.25%. Participant 4 had low percentage correct scores during baseline and when the picture activity schedule was removed. In the presence of the picture activity schedule, Participant 4's percentage correct ranged from 71% to 86%; the mean percentage correct was 78.5%. The generalization pretest percentage correct for Participant 1 was 0%; for Participant 2, 0%; for Participant 3, 11%; and for Participant 4, 11%. Posttest intervention scores were 100% correct across all participants (Duttlinger et al., 2013).

Social validity data were collected by Duttlinger et al. (2013) by surveying professionals who were directly involved with the participants: the special education teacher, two

paraprofessionals, and the speech language pathologist. The survey used a 5-point Likert-type scale ranging from 1(*strongly disagrees*) to 5 (*strongly agrees*). The mean score across respondents was calculated and reported. The professionals agreed the participants learned how to complete three of five task directions using picture activity schedule (M = 5), participants became more independent while using picture activity schedules (M = 4.93), and implementing a picture activity schedule would be feasible (M = 4.69). In addition, each participant was given a survey using a 3-point Likert-type scale ranging from 1 (*I do not agree*) to 3 (*I agree a lot*). The mean response was calculated across participants and reported. The participants agreed they learned how to use a picture activity schedule to follow their teacher's directions (M = 3), picture activity schedules helped them to remember activities that were assigned (M = 3), and picture activity schedules might help other students complete tasks assigned by their teacher (M = 2.75).

Duttlinger et al. (2013) did find a functional relationship between picture activity schedules and independent task completion. The authors reported not only was an increase in the participants' ability to complete tasks independently with picture activity schedules evident, but the participants completed the tasks in the order assigned. Duttlinger et al. stated that completing tasks in sequence may be essential and is often required in employment settings where a supervisor requests a series of tasks to be completed.

Duttlinger et al. (2013) reported the participants had positive feelings about being able to complete a series of tasks without adult intervention or guidance. The authors based this comment on the social validity data and anecdotal comments made to the teacher by the participants. According to the authors, using a picture activity schedule to follow multitask verbal directions could have positive implications across school, home, and vocational settings.

Duttlinger et al. (2013) identified three limitations to this study. First, the authors said all sessions took place in the self-contained classroom with all participants in attendance and suggested even though participants were kept engaged in other activities while other participants were being worked with, participants not actively involved in a study session may have seen or overheard portions of another participant's session, which may have aided in the learning process. A second limitation presented was not knowing if manipulation of the Boardmaker® symbols while the participants were making their "to-do" list or carrying the picture activity schedule with them was responsible for the increase in the number of tasks completed independently. A final limitation presented by the authors was the teacher was responsible for collecting social validity data from the participants and professionals. Because of this, the participants and professionals may have filled out the surveys in such a way that supported the teacher's efforts. Duttlinger et al. concluded their discussion of the study with the statement that strengthening self-management skills is one step in becoming a more self-determined individual.

Summary of Research Relating to Activity Schedules

Koyama and Wang (2011) conducted a literature review focusing on the effectiveness of activity schedules. The authors found activity schedules increased positive outcomes for students with disabilities. Students with disabilities could generalize the use of activity schedules to novel situations. Activity schedules led to a decrease in prompt dependency. The authors further reported activity schedules support transitions and reduce maladaptive behavior while increasing time on task.

Hume et al. (2012) reported social validity data suggesting activity schedules increase independence, improve accuracy, and promote generalization. The authors also noted activity

schedules reduce the need for adult prompting. Hume et al. also suggested work systems (organized visual work spaces) aid in skill acquisition.

Bryan and Gast (2000) found visual activity schedules to be effective for students with autism. Students with autism also learned how to use visual activity schedules quickly and were able to maintain independent behavior with their use. In addition, the authors found activity schedules increased on-task behaviors, decreased off-task behaviors, and generalized to novel situations without additional teaching.

Pierce et al. (2013) found visual activity schedules increased independent transition behaviors within and between activities. The authors also suggested using a withdrawal design provided both intra- and inter-subject replications of effect. Pierce et al. also made a number of suggestions for future research.

Cihak (2011) completed a study implementing an alternating treatments design with initial baseline and final preferred treatment phase comparing a video modeling activity schedule and a picture activity schedule. The author found both treatments increased transition behaviors and reduced disruptive behaviors. Cihak further suggested the preferred type of schedule implemented should be based on participant factors.

Duttlinger et al. (2013) completed a study designed to evaluate the effects of picture activity schedule on-task completion of students with intellectual disabilities. The authors found picture activity schedules increased students' ability to complete tasks independently. In addition, the authors found the presented tasks were completed in the order assigned.

Review of Literature Summary

The ability to make choices and determine the fate of an individual's own life (self-determination) has been valued by many people throughout history. Self-determination theory

was formally introduced by Deci and Ryan (1985) in a book entitled *Intrinsic Motivation and Self-Determination in Human Behavior.* In self-determination theory, Deci and Ryan attempted to discriminate among various types of human motivation. Generally speaking, the types of motivation are divided into extrinsic and intrinsic motivational forces. Guay et al. (2008) found intrinsic and extrinsic motivation can be reliably assessed. An empirical association was found by Hughes et al. (2013) between self-determination and inclusion in the IEP process. It has been documented the more self-determined a person is, the better quality of life he or she enjoys as an adult (Chambers et al., 2007).

Whether they are called pictorial modeling (Cihak, 2011), picture activity schedules (Bryan & Gast, 2000; Duttlinger et al., 2013), activity schedules (Koyama & Wang, 2011; Pierce et al., 2013), or a "what's next" schedule (Hume et al., 2012), little debate has occurred among the researchers reviewed that placing a series of tasks in sequential order helps students with disabilities complete more tasks independently and reduces required adult prompting. Activity schedules have been used to help people with disabilities become less prompt-dependent (Koyama & Wang, 2011) while increasing overall independence (Hume et al., 2012). In addition, activity schedules have simultaneously increased on-task behaviors and decreased off-task behaviors (Bryan & Gast, 2000).

Unfortunately in the research reviewed, no researchers examined the link between self-determination and the implementation of activity schedules. Choice making is one of the central aspects of self-determination (Wehmeyer et al., 1996). A student's ability to choose the order of tasks on an activity schedule was not examined in any of the research reviewed. Further research needs to be conducted examining the link between choice making and the effectiveness of activity schedules.

CHAPTER 3

METHODOLOGY

The purpose of this study was to use activity schedules to evaluate the effectiveness of two treatments on the number of tasks completed independently in sequence for middle school students with autism. More specifically, this study answered the following four research questions:

1. Do activity schedules increase the number of tasks that can be independently completed in sequence by a middle school student with autism?
2. Is there a difference in the number of tasks correctly completed in sequence when the teacher selects the order of tasks as compared to when the student selects the order of tasks?
3. Do middle school students with autism find activity schedules more socially valuable when the sequence of tasks is chosen by the student or chosen by the teacher?
4. Do the teachers of middle school students with autism find activity schedules more socially valuable when the sequence of tasks is chosen by the student or chosen by the teacher?

Experimental Design

An alternating treatments design (Barlow, Knock, & Hersen, 2009) with initial baseline and final best treatment phase was used to evaluate the effectiveness of two treatments on the participants' ability to complete tasks correctly independently in sequence. The two treatments evaluated were as follows: (a) the teacher selecting the order of tasks on an activity schedule and (b) the participant selecting the order of tasks on an activity schedule. The alternating treatments design with initial baseline and best treatment phase was selected for a variety of reasons. First,

this alternating treatment design controls against threats to internal validity by administering the two treatments to one participant. Since the participant received both treatments, an allowance of participant differences was not necessary. Second, the alternating treatments design protects against order effects by presenting Treatment 1 and Treatment 2 in a random fashion (Barlow et al., 2009). Twelve random numbers were generated. Treatment 1, teacher selecting the order of tasks, was assigned to all even numbers, designated *E*, and Treatment 2, participant selecting the order of tasks, was assigned to all odd numbers, designated *O*. During the intervention session, no more than three consecutive even or odd numbers were allowed, and a return to baseline, designated *B*, occurred every third session. The treatments were presented in an E-O-B-E-E-B-O-E-B-O-O-B order for participants 1 and 2. Participants 3 and 4 received the treatments in the reverse order (O-E-B-O-O-B-E-O-B-E-E-B). Third, carryover effects were controlled for by implementing a preferred treatment phase at the end of the intervention so that the preferred treatment could be evaluated without the presence of the non-preferred treatment.

Random Number Sequencing

All random numbers used during this study were obtained from the random number generator at RANDOM.ORG (2015). Random numbers were generated for use in the experimental design section to determine the order of treatments delivered and in the task sequencing section to determine the task delivered during each session. In addition, random numbers were generated to determine the intervention sessions during which the inter-observer would collect data.

Participants

Four participants were selected for inclusion in this study. Inclusion criteria were adapted from Duttlinger et al. (2013) because their inclusion criteria were targeted for middle school

students with intellectual disabilities. This study replicated and extended Duttlinger et al. specifically to middle school students with autism. The participant change facilitated some inclusion criteria changes to target the new participant pool. Specific inclusion criteria and changes to Duttlinger et al. are listed in Table 1.

Ken. Ken is a 14 years 1-month-old boy. His disability is autism spectrum disorder. According to the Kaufman Test of Educational Achievement (KTEA), Ken reads at a sixth-year first-month reading level, writes at a Kindergarten fourth-month level, and has math ability at a first-grade third-month level. According to the Vineland Adaptive Behavior Scale-2, Ken had an adaptive behavior rating of 53.

Sally. Sally is a 12 years 2-months-old girl. Her disability is autism spectrum disorder. According to the Kaufman Test of Educational Achievement (KTEA), Sally reads at a third-year third-month reading level, writes at a first-grade eighth-month level, and has math ability at a second-grade seventh-month level. According to the Vineland Adaptive Behavior Scale-2, Sally has an adaptive behavior rating of 67.

John. John is a 13 years 2-months-old boy. His disabilities are intellectual disabilities and autism spectrum disorder. According to the Stanford-Binet Intelligence Test (SB-5), John has an IQ of 57. According to the Vineland Adaptive Behavior Scale-2, John has an adaptive behavior rating of 49.

Tom. Tom is an 11 years 5-month-old boy. His disability is autism spectrum disorder. According to the Kaufman Test of Educational Achievement (KTEA), Tom reads at a first-year second-month reading level, writes at a Kindergarten third-month level, and has math ability at a Kindergarten sixth-month level. According to the Gilliam Autism Rating Scale (GARS), Tom has a sum of standard scores of 20 and a very likely probability of autism.

Table 1

Study Inclusion Criteria Changed From Duttlinger et al. (2013)

	Inclusion criterion per Duttlinger et al. (2013)	Change
1	Subjects must receive special education services in self-contained autism program.	Participants in a self-contained autism program were targeted.
2	Age range 11-15 years	No change to target middle school students
3	Within the average range of visual and auditory functioning	No change
4	Have goals in their IEP emphasizing independence	No change
5	Cannot complete more than three chained tasks independently without prompting	Added to ensure participants do not have mastery of the dependent variable (completing five chained tasks without prompting)
6	Will comply with requests from the classroom teacher a minimum of 8 out of 10 times	Added to ensure participants would comply with teacher requests during the study
7	Ability to complete preselected tasks independently and without supervision	No change
8	No prior training in setting up a picture schedule as a self-management activity	No change
9	Parental permission obtained	No change
10	Participant assent	Added to ensure participants were informed of the study

Settings

Pretraining, baseline, and intervention were completed in a public middle school in a large metropolitan city located in the southwestern United States. All phases of the study were conducted in each participant's self-contained classroom during functional skills instruction. Each baseline and intervention session lasted approximately 5 minutes and occurred on Monday, Wednesday, and Friday of each week. The intervention was presented during the morning between 9:52 and 10:44 a.m. and in the afternoon between 12:07 and 1:15 p.m. The self-contained classroom contained a teacher desk, eight student desks, four 4 ft by 6 ft tables with

two chairs at each table. Two of the tables had two computers set up for student use. The other two tables were set up for the students to work in pairs or individually with the teacher or paraprofessional. Two bookcases contained books of various genres and reading levels. In the center of one wall was a Smart Board. Three filing cabinets each with four drawers were present; one cabinet was designated for teacher use and two cabinets were designated for student use. Each student had a designated drawer in one of the student filing cabinets to hold his or her backpack and additional personal items. No more than eight students were in the self-contained classroom at any one time.

Materials

Activity schedule. Non-copyrighted clip art pictures were used to identify the activities required of the participants. The pictures used in this study are provided in Appendix B. Pictures were approximately 1 in by 1 in, printed out, cut into squares, laminated, and had Velcro® buttons attached to the back of the pictures. The 1 in-square pictures were placed onto a base made from heavy card stock measuring 9 in by 12 in. The base was divided vertically down the middle; the left two-thirds of the base was labeled “tasks”; the right one-third was labeled “to-do.”

The “to-do” section of the picture schedule was sequential and numbered 1-5. The card stock base was laminated, and Velcro® buttons were placed underneath each heading to allow the activity schedule pictures to be affixed to the base. Any activity schedule pictures not used in the current session were securely stored by the teacher for future use. Figure 1 provides an example of the picture activity schedule.

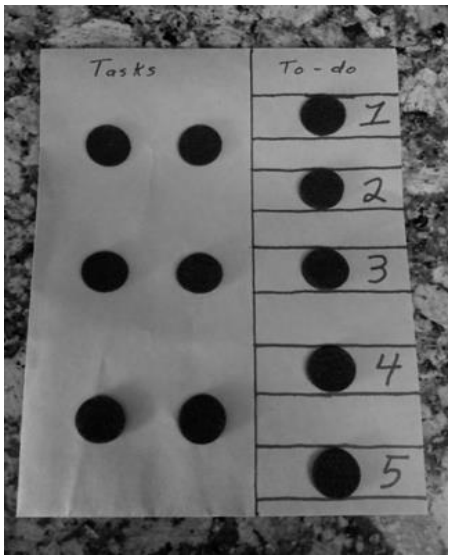


Figure 1. Example of a Student Activity Schedule. Pictures are added to the "Task" section by the teacher and moved to the "To-do" section by the participant.

Data sheets. A data sheet (Appendix C) was used for each participant in this study. Data for each session were recorded on one line of the data sheet. First, the task sequence was recorded. Second, the time of day was noted by the teacher by writing *A* for a.m. or *P* for p.m. In the next box, the session date was indicated. Following the session date, tasks 1-5 for that session were listed. Each task was divided into two columns. In the first column labeled *TC* (Task Complete), the participant received a check mark if the task was completed independently. In the second column labeled *IS* (In Sequence), the participant received a check mark if the task was completed in sequence. Last, the total amount of time to complete all tasks was recorded. This format was used during each session for each participant.

For example, a participant was given a set of five tasks to complete in sequence. The participant completed the first task correctly in sequence, so both the TC and IS boxes under Task 1 were checked. The participant moved on to the second task in the sequence. The participant completed the second task correctly, so both the TC and IS boxes under Task 2 were checked. The participant then skipped Task 3 and proceeded to Task 4. The participant

completed Task 4 correctly, so the TC box under Task 4 was checked; however, the task was not completed in sequence, so the IS box under Task 4 was not checked. The participant then returned to Task 3. The participant completed Task 3 correctly, so the TC box under Task 3 was checked; however, Task 3 was not completed in sequence, so the IS box under Task 3 was not checked. The participant then attempted to complete Task 5, but did not complete the task correctly, so the TC box under Task 5 was not checked, and the IS box under Task 5 was not checked because a task prior to Task 5 was not completed in sequence. Once a task was completed out of sequence, the remaining tasks were not to be marked as in sequence. A representation of how this example would look on a data sheet is given in Table 2.

Table 2

Example of Session Data Collection

Session #	Sequence	a.m./p.m.	Date	Task 1		Task 2		Task 3		Task 4		Task 5		TOTAL
				TC	IS	TC	IS	TC	IS	TC	IS	TC	IS	
5				X	X	X	X	X		X				

Task analyses. A task analysis was used by the teacher during each session to help ensure the intervention was implemented with fidelity. The same task analyses used by the teacher were also used by the inter-observer to calculate procedural fidelity (see Appendix D). Four separate task analyses were used: (a) one task analysis during baseline, (b) two task analyses during the intervention (one for teacher-selected task order and one for participant-selected task order), and (c) one task analysis during the preferred treatment phase.

Procedures

Teacher pretraining on intervention and data collection procedures. Teacher pretraining sessions occurred with the researcher and the teacher. The training sessions consisted of selecting participants for the intervention, selecting tasks all participants were capable of completing independently within 1 minute, teacher instruction on intervention implementation procedures, and data collection procedures. After participant and task selection was finalized, the researcher instructed the teacher on specific intervention and data collection procedures. The procedural task analyses (see Appendix D) and data collection sheet (see Appendix C) were used in teacher instruction, and the teacher was allowed to practice the procedures using the task analysis as a guide and the researcher as a subject. The teacher and researcher practiced the intervention five times, and the teacher scored 100% correct on both intervention procedures and data collection during the fourth and fifth practice sessions.

Task identification. The teacher identified tasks the participants were capable of completing independently prior to beginning the intervention (e.g., wipe off desk or get a book from the bookshelf). One set of 10 tasks was identified for all four participants. Only tasks participants could complete independently prior to the study were used. The researcher observed participants completing each task independently to verify each participant's ability to complete tasks within 1 minute.

After independent tasks were identified, the researcher verified mastery of all tasks. Verification took place by the teacher's asking each participant to complete each task. As the participants completed the tasks, the researcher observed the participant completing the task. Participant tasks are listed in Table 3.

Table 3

Participant Tasks

Task #	Task	Completion criteria
1	Sharpen a pencil	Pencil is placed in sharpener
2	Open Safari on iPad	iPad is turned on and a Safari browser is open
3	Put note in backpack	Note is in backpack; backpack is zipped closed
4	Use the hand sanitizer	Sanitizer is pumped into hands, and hands are rubbed together
5	Blow nose	Tissue is placed to nose and then thrown away
6	Erase dry-erase board	Attempt is made to erase the board with eraser
7	Throw a piece of trash away	Piece of trash is in trash can
8	Turn on the LCD projector	Button is pushed, and green power indicator light turns on
9	Get a book from the bookshelf	Book is removed from bookshelf
10	Wipe off desk	Wipe is rubbed across desk surface

Some tasks in the self-contained classroom required more time to complete than others. For example, a task of taking a note to the teacher next door would take longer than 1 minute to complete because the participant would be required to take the note from the teacher, exit the classroom, locate the classroom next door, knock on the door, wait for the knock to be answered, enter the classroom, locate the teacher, give the teacher the note, exit the classroom, return to the participant's classroom, knock on the door, wait for the knock to be answered, enter the classroom, locate the teacher, and inform the teacher the note was delivered to the teacher next door. To adjust for the varying completion time, only tasks that could be completed in 1 minute or less were selected. The 10 tasks were assigned an identifying number as shown in Table 3.

These identifying numbers were used in the randomization of task presentation during the intervention.

Dependent variable. The dependent variable in this study was the number of tasks correctly completed in sequence by the participant. This study examined the effect the independent variables had on the dependent variable. During each session, the teacher presented the participant five tasks to be completed.

The tasks selected for this study were discrete in nature and were measured using event recording. All tasks were selected by the teacher and agreed to by the researcher prior to the beginning of the study. The teacher and researcher determined what constituted a complete task. For example, “blowing nose” was complete when the tissue was deposited in the trash can.

Task sequence presentation. Each set of task sequences was randomly generated, and tasks were presented in the order shown in Table 4 during Treatment 1. The participant was allowed to choose the order of tasks during Treatment 2, but could choose only from the tasks designated for that particular session.

Baseline. All sessions of baseline and intervention were conducted during the third and fifth periods of the school day. These are periods when functional skills were the primary focus of instruction. Two sessions on each training day took place and were separated by at least a 1½-hour period. Two data points per day were collected per participant. While each participant was involved in the intervention (baseline, pretraining, or intervention), the other participants were taken to the classroom next door so they could not observe anything that was happening during the intervention with another participant. The classroom next door contained another autism program that was also targeting functional skills during periods 3 and 5.

Baseline data were collected over six sessions prior to any participant pretraining. During baseline, the participants were asked to complete a series of five tasks. The participants were not allowed to use an activity schedule or pictures during baseline. For example, each participant was verbally told to complete a sequence of five tasks. Data were collected on the tasks correctly completed and tasks correctly completed in sequence. No prompting was offered during baseline or any other phase of this study. Baseline tasks came from the same group of tasks the participants used during the intervention. The order of tasks presented in baseline was repeated throughout the intervention. For example, the order of tasks completed in sessions 1-6 was repeated in sessions 7-12 and repeated again for sessions 13-18, and then repeated again for sessions 19-24. See Table 4 for order of task presentation. During baseline, the participant was allowed to select the order of task completion.

Participant pretraining. Pretraining sessions were held with all participants following baseline data collection. The participants were taught to match a specific picture with a specific task. Without using an activity schedule, the teacher (with the researcher observing) told the participant at the beginning of the training session, “I am going to show you a picture of a task, and I want you to complete the task in the picture when I show it to you.” The teacher then showed the participant the picture and asked the participant to complete the task. The teacher used a system of least to most prompting if the participant did not begin the assigned task within 3 seconds from being verbally told to complete the task. See Table 5 for the prompting schedule. The teacher used the system of least to most prompts and repeated instruction until the participant could match all pictures to the corresponding tasks.

Table 4

Order of Task Presentation

	Session #	Treatment	Tasks presented
Baseline	1	NT	4,6,7,9,3
	2	NT	6,5,8,7,4
	3	NT	3,7,1,10,8
	4	NT	2,10,1,3,5
	5	NT	4,2,3,8,7
	6	NT	1,4,5,10,9
Intervention	7	T	4,6,7,9,3
	8	S	6,5,8,7,4
	9	NT	3,7,1,10,8
	10	T	2,10,1,3,5
	11	T	4,2,3,8,7
	12	NT	1,4,5,10,9
	13	S	4,6,7,9,3
	14	T	6,5,8,7,4
	15	NT	3,7,1,10,8
	16	S	2,10,1,3,5
	17	S	4,2,3,8,7
	18	NT	1,4,5,10,9
Preferred Treatment	19	PT	4,6,7,9,3
	20	PT	6,5,8,7,4
	21	NT	3,7,1,10,8
	22	PT	2,10,1,3,5
	23	PT	4,2,3,8,7
	24	NT	1,4,5,10,9

Note. NT = No Treatment, PT = Preferred Treatment, T = Teacher Selected Task Order, S = Student Selected Task Order. During Treatment 1, tasks were sequenced in the order shown. During Treatment 2, tasks were sequenced in participant preference.

Table 5

Order of Least to Most Prompts

Prompt type	Prompt description
Gestural	Teacher points to the assigned task picture.
Verbal	Teacher says, “This picture means to (blank).”
Gestural/Verbal pair	Teacher pairs the verbal prompt, “This picture means to (blank),” while motioning the participant to begin the task.
Model	Teacher tells student, “Watch me; I am going to do what you are supposed to do.” Teacher then looks at the picture and says, “This picture means to (blank); I am going to do what this picture says. Watch me as I complete this task.”

Intervention. The intervention occurred during periods 3 and 5 when the participants were receiving functional skills training. Each session lasted approximately 5 minutes. The sessions followed one of two formats depending on the treatment delivered.

Treatment 1, teacher selecting the order of tasks to be completed, was implemented by the teacher’s putting the assigned tasks on the “Tasks” section of the activity schedule. The teacher gained the participant’s attention, called the participant to his or her desk, and placed the activity schedule on the participant’s desk. When the participant arrived at his or her desk, the teacher told the participant, “I want you to do a few things for me.” The teacher said, “First, I want you to do (task).” While pointing at the picture associated with the desired task, the teacher said, “Put that picture on the ‘to-do’ side of the activity schedule in the first space.” The teacher waited for the participant to move the picture of the task from the “task” side of the activity schedule to the first space on the “to-do” side of the activity schedule for 3 seconds before prompting. In the event the participant did not begin to move the desired picture to the “to-do”

side of the activity schedule within 3 seconds, the teacher followed a system of least to most prompts. The process was repeated until all five pictures were moved to the “to-do” side of the activity schedule in the desired sequence. When all five pictures were moved to the “to-do” side of the activity schedule, the teacher told the participant, “Please do the tasks.” The teacher monitored the participant while he or she completed the requested tasks. On the participant’s data sheet, the teacher checked the TC and IS boxes, as appropriate, while the participant was completing the task sequence.

Treatment 2, participant selecting the order of tasks to be completed, was implemented by the teacher’s putting the desired tasks on the “task” section of the activity schedule. The teacher gained the participant’s attention, called the participant to his or her desk, and placed the activity schedule on the participant’s desk. When the participant arrived at the desk, the teacher told the participant, “I want you to do a few things for me.” The teacher told the participant, “Put the picture of the first thing you want to do on the ‘to-do’ side of your activity schedule,” while pointing to the “task” page on the activity schedule. When the participant moved the first task to the “to-do” side of the activity schedule, the teacher told the participant, “Put the next task you want to do on the ‘to-do’ side of the activity schedule.” This process was repeated until all five tasks were placed on the “to-do” side of the activity schedule in the order the participant wanted. The teacher then recorded the task sequence chosen by the participant on the participant’s data sheet. The teacher then told the participant, “Please do the tasks.” The teacher monitored the participant while he or she completed the requested tasks. The teacher checked the TC and IS boxes, as appropriate, on the participant’s data collection sheet while the participant completed the task sequence.

In both treatments, the teacher provided praise such as “good job” or “nice work” to the participants when they informed the teacher the task sequence was complete. Each participant’s best method was evaluated during the final phase of the study. The participant’s best method was the method that produced the highest number of correct tasks completed in sequence. In the event a best method during the intervention was not evident, the participant’s selecting the order of tasks was chosen as the preferred method to promote self-determination. The participant’s best treatment method was presented for four sessions, and baseline data were collected twice during the final best treatment phase. The same procedures were used in the final best treatment phase as in the intervention phase.

Reliability

Inter-observer agreement (IOA) data were collected on 25% of sessions for each participant. The sessions the inter-observer attended were randomly selected. A random number generator was used to determine inter-observer sessions. The inter-observer attended the following sessions: 1, 7, 11, 13, 15, and 20.

The inter-observer recorded data on a separate data recording sheet from the teacher’s data recording sheet. The IOA percentage for the number of tasks completed correctly was calculated; the IOA was also calculated for the tasks completed correctly in sequence. The reliability was calculated using the following formula: Percent IOA = (total agreements/total opportunities) * 100. The IOA was reported for each participant.

Fidelity

A task analysis was used by the inter-observer during observations (Appendix D) to evaluate the number of intervention steps completed correctly. A point-by-point comparison of the task analysis was used to provide a measure of fidelity. Procedural fidelity was determined

using the following formula: Percent fidelity = (number of agreements/number of opportunities) * 100. The reliability percentage was reported for each participant.

Social Validity

Social validity questionnaires (Appendix E) were given to each participant and the teacher. The participant surveys asked participants if they agree (*yes*) or disagree (*no*) with a statement made. The first two questions of the participant questionnaire addressed how participants felt about using activity schedules. Questions 3 and 4 of the participant surveys directly related to the dependent variables by asking the participants if they thought activity schedules helped them to do things for themselves. Questions 5 and 6 of the participant questionnaire addressed the independent variables by asking the participants if they liked it better when they got to choose the task sequence or when the teacher chose the task sequence. The last question on the participant survey asked if participants would use activity schedules in the future. Space was left at the end of the survey for any comments the participant wanted to make.

Additional social validity data were collected by surveying the participating teacher. The teacher survey used a 5-point Likert-type scale ranging from 1 (*strongly agrees*) to 5 (*strongly disagrees*). The first two questions addressed the ease of intervention implementation. Questions 3 and 4 of the teacher questionnaire addressed the dependent variables by asking if activity schedules helped participants complete tasks independently. Questions 5 and 6 of the teacher questionnaire addressed the independent variables by asking the teachers if they thought it was more beneficial for teachers to select the order of tasks or for participants to select the order of tasks. The last question on the teacher questionnaire asked the teachers if they would be willing to implement an intervention of this type in the future. Space was left at the end of the survey for any comments the teacher would like to make.

Treatment of Data

Graphic displays for task completion in sequence and time on task were completed for each participant. The graphical displays were visually examined, and mean independent task completion data and data ranges were reported for all participants. Data from the independent task completion graphical display (Figure 2) were used to answer research questions 1 and 2. Research question 1 asked, "Do activity schedules increase the number of tasks that can be correctly and independently completed by a middle school student with autism?" This research question was examined by comparing baseline and preferred treatment independent task completion data. Research question 2 asked, "Is there a difference in the number of tasks correctly completed when the teacher selects the order of tasks as compared to when the student selects the order of tasks?" This research question was examined by comparing the independent task completion data of Treatment 1 and Treatment 2 during the intervention phase.

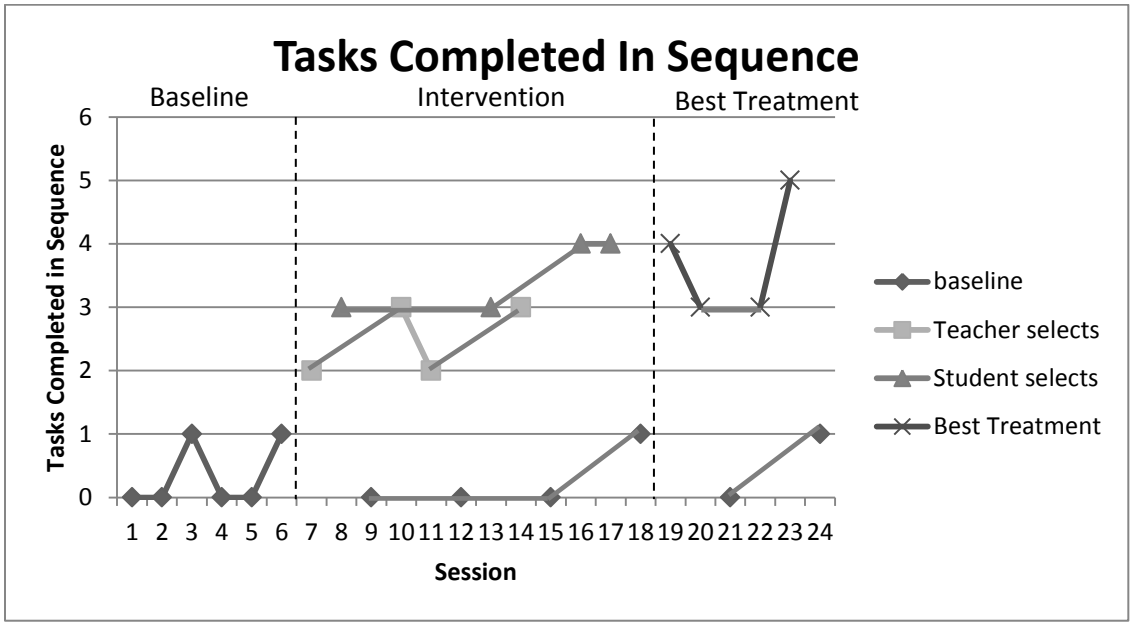


Figure 2. Sample Tasks Completed in Sequence.

Data from the social validity questionnaires (Appendix E) were used to answer research questions 3 and 4. Research question 3 asked, “Do middle school students with autism find activity schedules more socially valuable when the sequence of tasks is chosen by the student or chosen by the teacher?” Questions 5 and 6 of the participant questionnaires examined research question 3. Research question 4 asked, “Do the teachers of middle school students with autism find activity schedules more socially valuable when the sequence of tasks is chosen by the student or chosen by the teacher?” Questions 5 and 6 of the teacher questionnaire examined research question 4. The answers for the participant and teacher questionnaires were reported. Results of the study appear in the next chapter.

CHAPTER 4

RESULTS

The purpose of this study was to examine the effectiveness of picture activity schedules on the number of tasks completed in sequence by middle school students with autism. A total of four research questions were answered in this study. The remainder of this chapter is organized to address these questions and is centered on each of the four participants. For each question, the data analysis procedures are discussed and results reported. Procedural fidelity results are reported next, and then inter-observer agreement data are reported. The chapter ends with a discussion of social validity data and a summary of results.

Analysis of Tasks Completed Independently in Sequence

Overall, the four participants completed 17 tasks (*M* = 4.25) during baseline. During the intervention when the teacher selected the order of tasks, the four participants completed 30 tasks (*M* = 7.5) and 28 tasks (*M* = 7) when the participants selected their own task sequence. During the best treatment phase, the participants completed 67 tasks (*M* = 16.75). Overall, the four participants showed an increase of 60 tasks (*M* = 15) when comparing baseline to best treatment. Overall, for the four participants, when averaged, the percent non-overlapping data (PND) for tasks completed when the teacher selected the order of tasks was 43.75% and 25.0% when the participants selected the order of tasks. The overall PND for the best treatment phase was 43.75%.

Overall, the four participants completed six (*M* = 1.5) tasks in sequence during baseline. During the intervention phase when the teacher selected the order of tasks, the four participants completed 16 (*M* = 4) tasks in sequence and 17 (*M* = 4.25) tasks in sequence when the participants selected the order of tasks. During the best treatment phase, the four participants

completed 46 (*M* = 11.5) tasks in sequence. Overall, the four participants showed an increase of 40 (*M* = 10) tasks completed in sequence when comparing baseline to best treatment. Overall, for the four participants, when averaged, the PND for tasks completed in sequence when the teacher selected the order of tasks was 25.0% and 37.5% when the participants selected the order of tasks. The overall PND for the best treatment phase was 75.0%. Individual graphic displays of the number of tasks completed and the number of tasks completed in sequence are presented for each participant.

Ken

As shown in Figure 3, Ken was able to complete most tasks during baseline (*M* = 2.5). A slight improvement in the number of tasks completed during the intervention was evident when the teacher selected the order of tasks (*M* = 5); no difference in the number of tasks completed appeared when Ken selected the order of tasks (*M* = 3.75) when compared to baseline samples collected during the intervention phase (*M* = 3.75). The teacher's selecting the order of tasks was chosen as the preferred treatment for Ken because Ken was able to complete all tasks assigned more often when the teacher selected the order of tasks compared to when Ken selected the order of tasks. During the best treatment phase, a slight increase appeared in the number of tasks completed when the teacher selected the order of tasks (*M* = 4.75) when compared to baseline samples collected during the preferred treatment phase (*M* = 4).

Ken showed difficulty completing the assigned tasks in sequence during the baseline phase (*M* = 0.83). He demonstrated an improvement in the number of tasks completed in sequence when the teacher selected the order of tasks (*M* = 2.5) and when the participant selected the order of tasks (*M* = 2.25) when compared to baseline samples collected during the intervention phase (*M* = 0). During the best treatment phase, Ken showed an increase in the

number of tasks completed in sequence when the teacher selected the order of tasks (*M* = 2) when compared to baseline samples collected during the preferred treatment phase (*M* = 0.5).

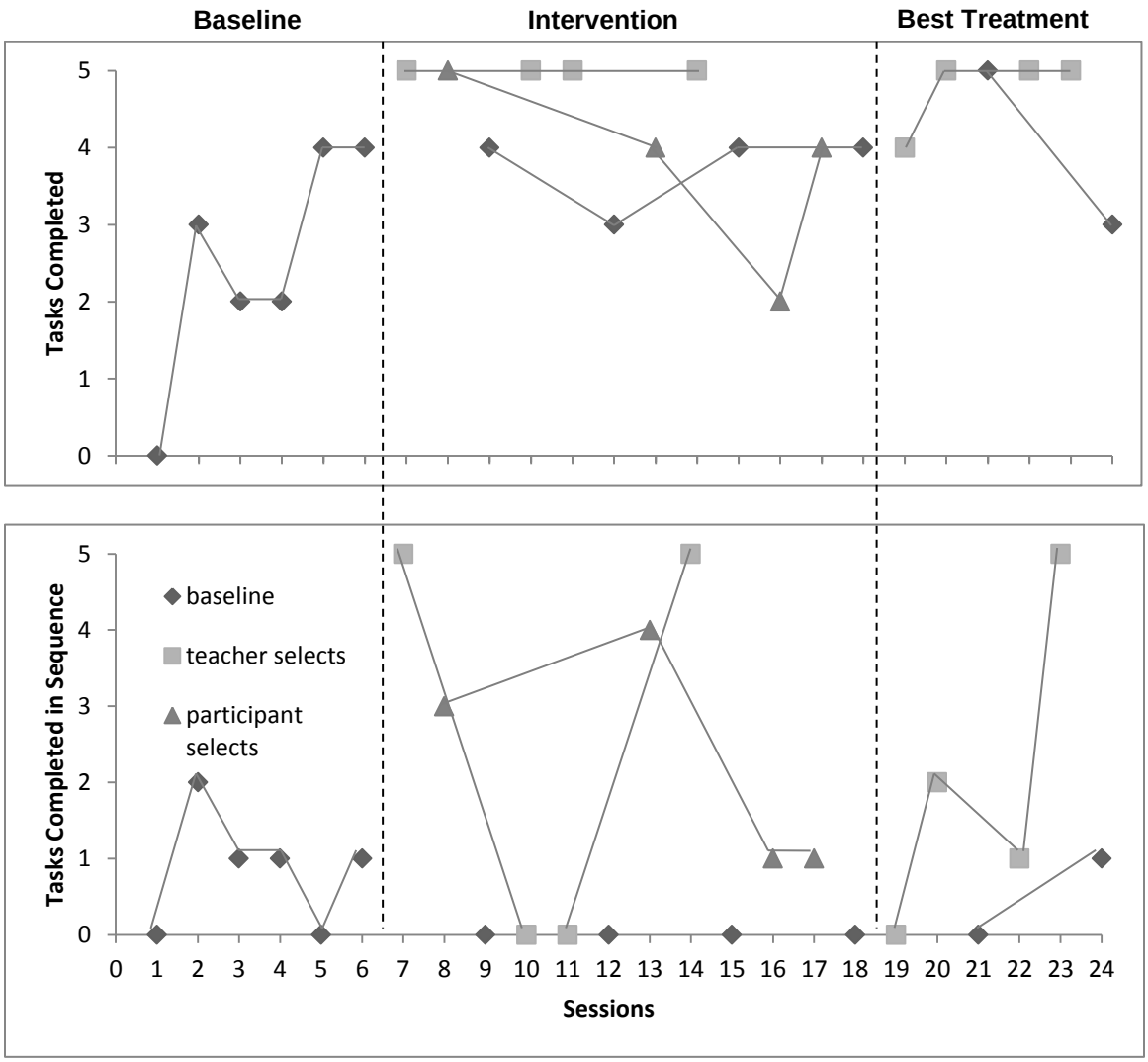


Figure 3. Ken's Task Completed and Task Completed in Sequence Data.

Ken's PND for the number of tasks completed when the teacher selected the order of tasks was 100% and 25% when he selected the order of tasks. During Ken's best treatment phase, the PND was 0% for the number of tasks completed. Ken's PND for the number of tasks completed in sequence when the teacher selected the order of tasks was 0% and 25% when he

selected the order of tasks. During Ken's best treatment phase the PND was 50% for the number of tasks completed in sequence.

Sally

As shown in Figure 4, Sally was not able to complete most tasks during baseline (*M* = 0.17). She demonstrated no improvement in the number of tasks completed during the intervention phase when the teacher selected the order of tasks (*M* = 0.25); however, a large improvement was seen when Sally selected the order of tasks (*M* = 2.5) when compared to baseline samples collected during the intervention phase (*M* = 0.25). Sally's selecting the order of tasks was selected as the best treatment. This method of task selection was chosen because Sally was able to complete more tasks more often when she selected the order of tasks.

Sally was not able to complete any tasks in sequence during baseline (*M* = 0). No improvement was evident in the number of tasks completed during the intervention when the teacher selected the order of tasks (*M* = 0); however, an improvement appeared in the number of tasks completed in sequence when Sally selected the order of tasks during intervention (*M* = 1.25) when compared to baseline samples collected during the intervention phase (*M* = 0). During the best treatment phase, a substantial increase appeared in the number of tasks completed in sequence (*M* = 5) by Sally compared to baseline samples collected during the preferred treatment phase (*M* = 0).

Sally's PND for the number of tasks completed when the teacher selected the order of tasks was 0% and 50% when she selected the order of tasks. During Sally's best treatment phase, the PND was 100% for the number of tasks completed. Sally's PND for the number of tasks completed in sequence when the teacher selected the order of tasks was 0% and 25% when she

selected the order of tasks. During Sally's best treatment phase, the PND was 100% for the number of tasks completed in sequence.

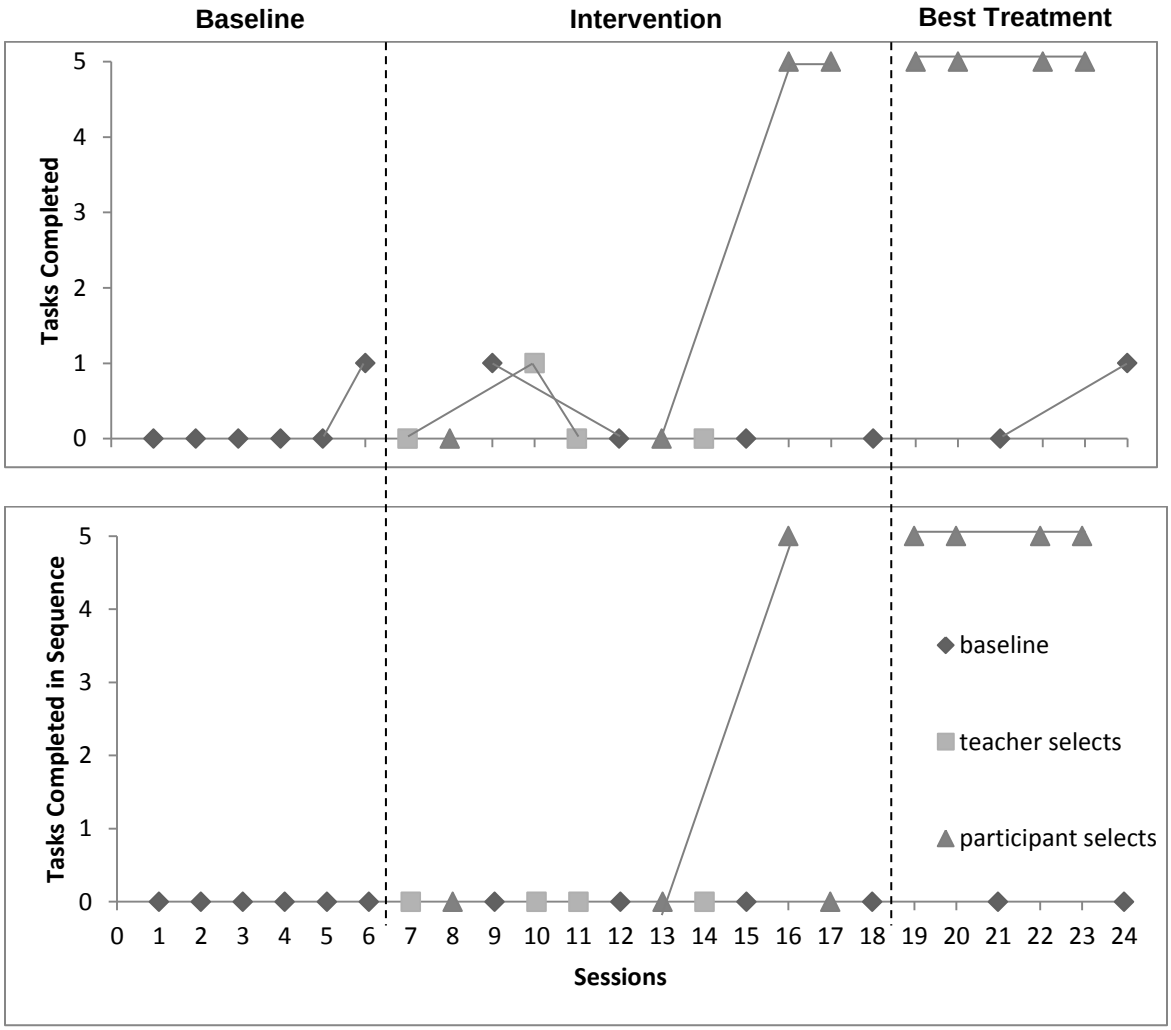


Figure 4. Sally's Task Completed and Task Completed in Sequence Data.

John

As shown in Figure 5, John was not able to complete any tasks in baseline (*M* = 0). A slight improvement was evident in the number of tasks completed by John during the intervention phase when the teacher selected the order of tasks (*M* = 2) and a slight decrease in the number of tasks completed when John selected the order of tasks (*M* = 0.75) when compared

to baseline data collected during the intervention phase (*M* = 1.25). The teacher's selecting the order of tasks was chosen as the best treatment for John because the teacher's selecting the order of tasks was the only condition in which John was able to complete all assigned tasks.

John was not able to complete any tasks assigned in sequence during baseline (*M* = 0). An improvement was evident in the number of tasks completed in sequence for John when the teacher selected the order of tasks (*M* = 1.25) and a slight improvement in the number of tasks completed in sequence when John selected the order of tasks (*M* = 0.75) compared to baseline samples collected during intervention (*M* = 0). During the best treatment phase, John showed a substantial increase in the number of tasks completed in sequence (*M* = 3.75) compared to baseline samples collected during the preferred treatment phase (*M* = 0).

John's PND for the number of tasks completed when the teacher selected the order of tasks was 50% and 25% when he selected the order of tasks. During John's best treatment phase, the PND was 0% for the number of tasks completed. John's PND for the number of tasks completed in sequence when the teacher selected the order of tasks was 25% and 25% when he selected the order of tasks. During John's best treatment phase, the PND was 75% for the number of tasks completed in sequence.

Tom

As shown in Figure 6, Tom was not able to complete most tasks during baseline (*M* = 0.17). A slight improvement was evident in the number of tasks completed during the intervention when the teacher selected the order of tasks (*M* = 0.25). No difference appeared in the number of tasks completed during the intervention phase when Tom selected the order of tasks (*M* = 0) when compared to baseline data collected during the intervention (*M* = 0). Tom's selecting the order of tasks was chosen as the best treatment in order to promote self-

determination. During the best treatment phase, an increase in the number of tasks completed (*M* = 2.25) was evident when compared to baseline data collected during the best treatment phase (*M* = 0).

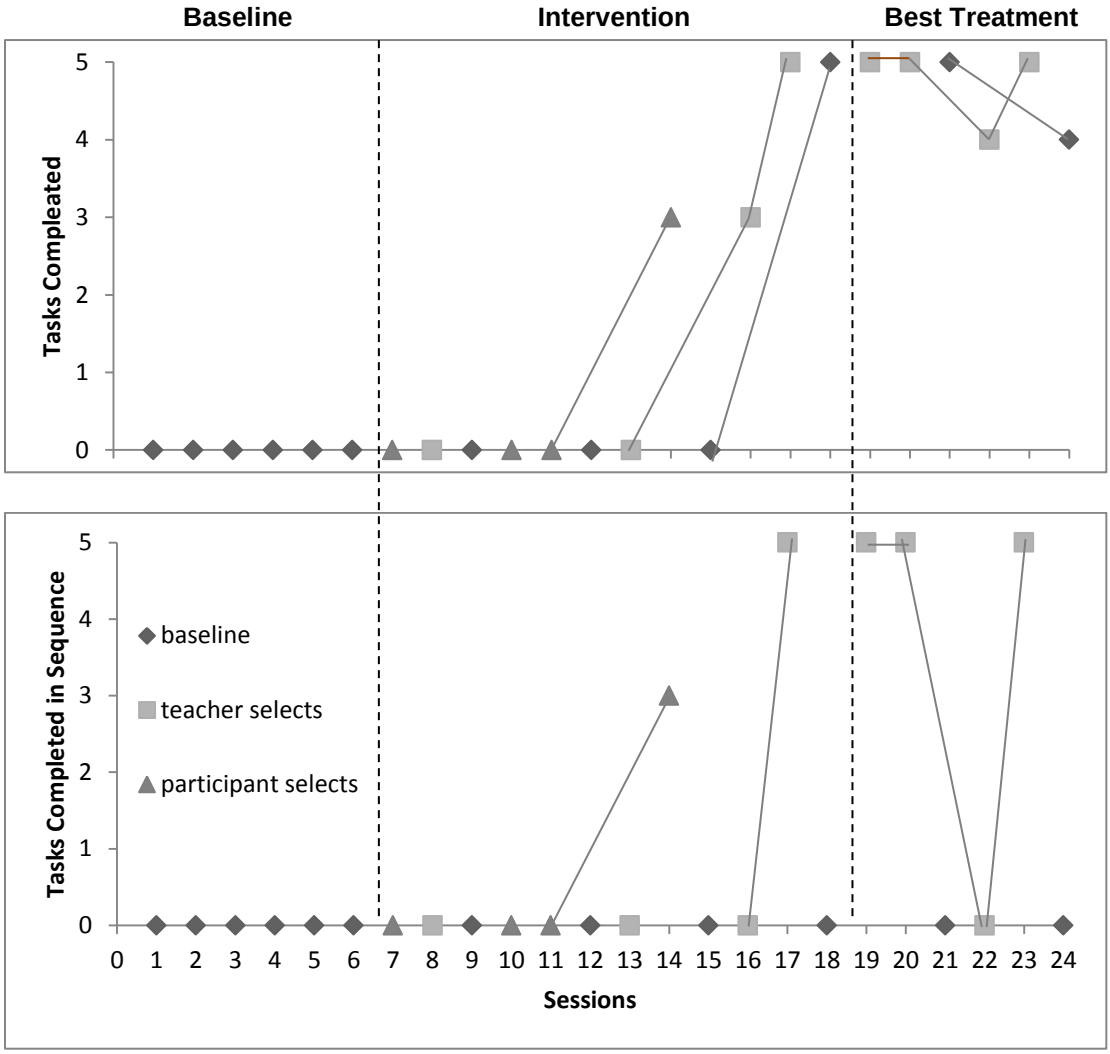


Figure 5. John's Task Completed and Task Completed in Sequence Data.

Tom showed difficulty in completing tasks in sequence during baseline (*M* = 0.17). An improvement was evident in the number of tasks completed in sequence during intervention when the teacher selected the order of tasks (*M* = 0.25) and no difference appeared in the number

of tasks completed in sequence when Tom selected the order of tasks (*M* = 0) when compared to baseline data collected during the intervention phase (*M* = 0). An increase was evident in the number of tasks completed in sequence during the best treatment phase (*M* = 0.75) when compared to baseline data collected during the best treatment phase (*M* = 0).

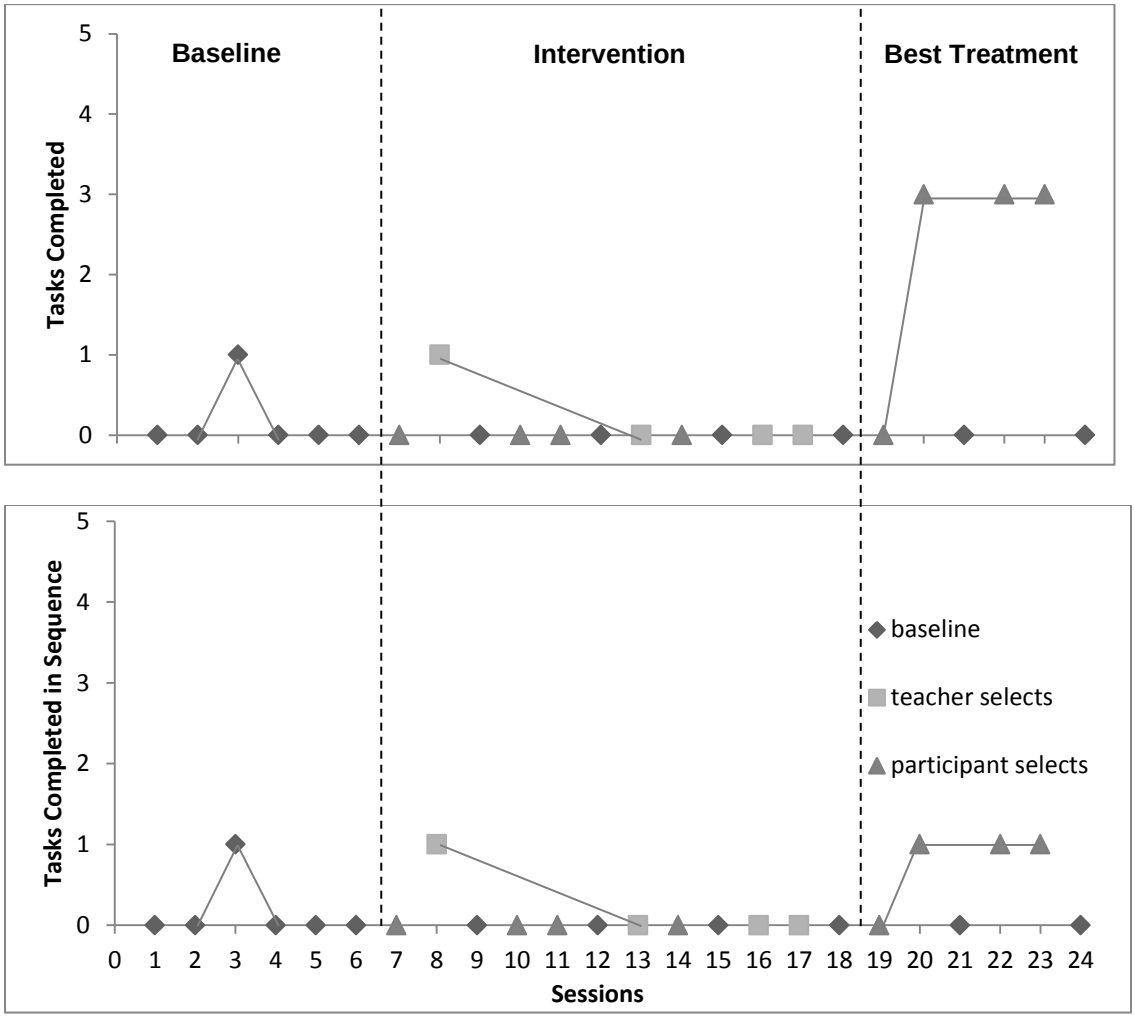


Figure 6. Tom's Task Completed and Task Completed in Sequence Data.

Tom's PND for the number of tasks completed when the teacher selected the order of tasks was 25% and 0% when he selected the order of tasks. During Tom's best treatment phase, the PND was 75% for the number of tasks completed. Tom's PND for the number of tasks

completed in sequence when the teacher selected the order of tasks was 25% and 0% when he selected the order of tasks. During Tom's best treatment phase, the PND was 75% for the number of tasks completed in sequence.

Analysis of Teacher-Selected and Participant-Selected Order of Tasks

In this section, the difference in the number of tasks completed in sequence when the teacher selects the order of tasks compared to when the participant selects the order of tasks is evaluated. The focus of this section is on data collected during the intervention phase of the study.

Ken. During the intervention phase, Ken was able to complete all five tasks in each of the four sessions the teacher selected the order of tasks (M = 5). Ken was able to complete all five tasks once during the intervention when he selected the order of tasks (M = 3.75). Ken was able to complete 1.25 more tasks per session during the intervention when the teacher selected the order of tasks.

Ken was able to complete all five tasks in sequence twice during the intervention phase when the teacher selected the order of tasks (M = 2.5). Ken was not able to complete all five tasks in sequence when he selected the order of tasks during the intervention phase (M = 2.25). Ken was able to complete 0.25 more tasks in sequence per session when the teacher selected the order of tasks.

Sally. During the intervention phase, Sally was not able to complete all five tasks in each of the four intervention sessions when the teacher selected the order of tasks (M = 0.25). Sally was able to complete all five tasks during two intervention sessions when she selected the order of tasks (M = 2.5). Sally was able to complete 2.25 more tasks per session when she selected the order of tasks.

During the intervention phase, Sally was not able to complete any of the tasks in sequence when the teacher selected the order of tasks (*M* = 0). Sally was able to complete all five tasks in sequence once during the intervention phase when she selected the order of tasks (*M* = 1.25). Sally was able to complete 1.25 more tasks in sequence per session when she selected the order of tasks.

John. During the intervention phase, John was able to complete all five tasks once when the teacher selected the order of tasks (*M* = 2). John was not able to complete all five tasks during the intervention phase when he selected the order of tasks (*M* = 0.75). John was able to complete 1.25 more tasks per session when the teacher selected the order of tasks.

John was able to complete all five tasks in sequence once during the intervention phase when the teacher selected the order of tasks (*M* = 1.25). John was not able to complete all five tasks in sequence during the intervention phase when he selected the order of tasks (*M* = 0.75). John was able to complete 0.50 more tasks in sequence per session when the order of tasks was selected by the teacher.

Tom. During the intervention phase, Tom was not able to complete five tasks when the teacher selected the order of tasks (*M* = 0.25). Tom was also not able to complete all five tasks when he selected the order of tasks (*M* = 0). Tom was able to complete 0.25 more tasks per session during the intervention phase when the teacher selected the order of tasks.

Tom was not able to complete all five tasks in sequence during the intervention phase when the teacher selected the order of tasks (*M* = 0.25). Tom was not able to complete any tasks in sequence during the intervention when he selected the order of tasks (*M* = 0). Tom was able to complete 0.25 more tasks in sequence per session during the intervention phase when the teacher selected the order of tasks.

Reliability and Fidelity

Reliability and fidelity data were collected during 25% of sessions. Reliability data were collected using study data sheets (Appendix C). Reliability and intervention fidelity were calculated by the formula: Percent reliability (or fidelity) = [(total number of agreements)/(total number of opportunities)] * 100. Reliability of 100% was calculated across all four participants. This percentage indicates acceptable data reliability. Procedural fidelity was calculated by using the study task analyses (Appendix D) for each session observed and comparing the inter-observer's task analysis to the teacher's data task analysis. Procedural fidelity was calculated at 96% for Ken, Sally, and John. Procedural fidelity was calculated at 99% for Tom. These percentages indicate acceptable levels of procedural fidelity.

Social Validity

Teacher. The teacher was asked seven questions at the end of the intervention. The teacher strongly agreed with the following two survey questions: (a) The intervention was easily implemented, and (b) I would be willing to implement this type of intervention again. The teacher agreed with the following three survey questions: (a) The amount of time the intervention required was reasonable when compared to student outcomes, (b) Activity schedules helped the student complete tasks independently, and (c) The intervention made an impact on student time on task. The teacher was neutral with the following two survey questions: (a) I found it more beneficial for the teacher to select the order of tasks, and (b) I found it more beneficial for the students to select their own order of tasks.

Participants. One participant chose not to respond to the questionnaire at the end of the study. The remaining three participants were asked seven questions and could answer *yes* or *no* to each question. Two of the three responding participants answered *yes* to the statement:

Activity schedules take too long to use. All three responding participants answered *yes* to the question: Activity schedules are easy for me to use. Two of the three responding participants answered *no* to the question: Activity schedules helped me complete tasks by myself. Two of the three responding participants answered *yes* to the question: Activity schedules help me complete tasks without getting distracted. All three responding participants answered *yes* to the question: I like using activity schedules better when the teacher selects the order of tasks. Two of the three responding participants answered *yes* to the question: I like using activity schedules better when I select the order of tasks. All three responding participants answered *yes* to the question: I want to use activity schedules again.

Summary of Findings

The purpose of this study was to use activity schedules to evaluate the effectiveness of two treatments on the number of tasks completed independently in sequence for middle school students with autism. Ken showed an increase of 2.25 more tasks completed per session between the initial baseline phase (M = 2.5) and the best treatment phase (M = 4.75). Sally showed an increase of 4.83 more tasks completed per session between the initial baseline phase (M = 0.17) and the best treatment phase (M = 5). John showed an increase of 4.75 more tasks completed per session between the initial baseline phase (M = 0) and the best treatment phase (M = 4.75). Tom showed an increase of 2.08 more tasks completed per session between the initial baseline phase (M = 0.17) and preferred treatment phase (M = 2.25). Activity schedules helped all participants complete more tasks.

Ken showed an increase of 1.17 more tasks completed in sequence per session between the initial baseline phase (M = 0.83) and the best treatment phase (M = 2). Sally showed an increase of five more tasks completed in sequence per session between the initial baseline phase

(M = 0) and the preferred treatment phase (M = 5). John showed an increase of 3.75 more tasks completed in sequence per session between the initial baseline phase (M = 0) and the best treatment phase (M = 3.75). Tom showed an increase of 0.58 more tasks completed in sequence per session between the initial baseline phase (M = 0.17) and the preferred treatment phase (M = 0.75). Activity schedules helped all participants complete more tasks in sequence.

No discernable preference was evident regarding who selected the order of tasks for the activity schedule. Ken seemed to prefer the teacher's selecting the order of tasks. Ken was able to complete all assigned tasks more often when the teacher selected the order of tasks, and he evidenced a slight increase in the number of tasks completed in sequence when the teacher selected the order of tasks. Sally seemed to prefer to select her own order of tasks. Sally was able to complete all assigned tasks only when she selected the order of tasks, and Sally was able to complete all tasks in sequence only when she selected the order of tasks. John seemed to prefer the teacher's selecting the order of tasks. John was able to complete more tasks when the teacher selected the order of tasks, and he completed more tasks in sequence when the teacher selected the order of tasks. Tom showed no preference in task selection during the intervention. Tom was able to complete one task only when the teacher selected the order of tasks, and he was not able to complete any tasks during the intervention phase when he selected the order of tasks. A preferred method of task selection was not made evident from this study.

CHAPTER 5

DISCUSSION

Self-determination is the freedom to make choices that impact an individual's life. Many people would agree that self-determination leads to an enhanced quality of life (Wehmeyer & Palmer, 2003). Choice making is considered to be a central element in self-determination. Most people learn choice making through a gradual release of responsibility by caregivers throughout their childhood and adolescence. Many times, this is not the case for students with autism. Completed research examining choice making and people with autism has shown promising results (Bryan & Gast, 2000; Hume et al., 2012; Pierce et al., 2013); however, one of the primary traits of autism, the need for structured routines, often does not lend itself to evaluating choice making.

Activity schedules are one way to incorporate choice making into an already structured routine. Activity schedules provide a schedule for daily events or specific routines. Choice making is embedded in activity schedules when people who use activity schedules are allowed to choose the sequence of events within the schedule. Past research has suggested activity schedules are an effective way to teach task completion to people across disability areas.

This study was designed to directly replicate and extend Dutlinger et al. (2013). In Dutlinger et al. (2013) picture activity schedules were used to measure the number of tasks completed in sequence. The researchers found that across all participants the number of tasks completed in sequence increased. This study supported the findings in Dutlinger et al. (2013) such that all participants in this study increased the number of tasks completed in sequence with the use of activity schedules.

Effectiveness of Picture Activity Schedules on Completing Tasks in Sequence

The first research question asked in this study was: Do activity schedules increase the number of tasks that can be independently completed in sequence by a middle school student with autism? The findings of this study suggest that the use of picture activity schedules can increase the number of tasks completed in sequence by middle school students with autism. The participants in this study, four students with autism, showed varying degrees of success using picture activity schedules to complete a series of five tasks in sequence; however, all participants showed improvement in the number of tasks completed in sequence during the best treatment phase when compared to the baseline phase.

In addition, the elapsed time it took participants to complete the series of tasks in sequence decreased from a mean of 5 minutes during baseline to 3 minutes during the best treatment phase when measured across all participants. Students with autism who cannot complete tasks in sequence can use picture activity schedules to improve their ability to complete tasks in sequence. These results support and extend the findings of Duttlinger et al. (2013) to students with autism.

Comparison of Teacher-Selecting and Participant-Selecting Order of Tasks

The second research question asked in this study was: Is there a difference in the number of tasks correctly completed in sequence when the teacher selects the order of tasks as compared to when the student selects the order of tasks? The findings of this study suggest when the participant selects the order of tasks (M = 1.06) slightly more tasks are completed in sequence than when the teacher selects the order of tasks (M = 1). The preference of task selection was

evenly divided among the participants, however. Participants 1 and 3 completed more tasks in sequence when the teacher selected the order of tasks. Participant 2 completed more tasks in sequence when she selected the order of tasks for herself, and Participant 4 showed no difference in the number of tasks completed in sequence when the teacher selected the order of tasks or when he selected the order of tasks.

The elapsed time it took participants to complete the tasks in sequence, when measured across all participants, was almost 1 minute less when the teacher selected the order of tasks compared to the participants' selecting the order of tasks. Although elapsed time was not a dependent variable in this study, picture activity schedules may help middle school students with autism complete a series of tasks in sequence more quickly than if a picture activity schedule is not used. These findings suggest picture activity schedules may increase the rate at which a series of tasks in sequence can be completed by middle school students with autism.

Participant Perceptions Regarding Picture Activity Schedules

The third research question asked in this study was: Do middle school students with autism find activity schedules more socially valuable when the sequence of tasks is chosen by the student or chosen by the teacher? The participants were asked in two separate questions if they liked using picture activity schedules better when the teacher selected the order of tasks or when they selected the order of tasks? One participant refused to respond to the survey. Two participants answered *yes* to both questions, and one participant indicated a preference for teacher task order selection. Interestingly enough, the one participant who reported preferring using activity schedules when the teacher selected the order of tasks also completed more tasks and completed more tasks in sequence when the teacher selected the order of tasks. It is unclear

if a preferred method of task selection is truly evident because only one participant reported reliable preference data.

Teacher Perceptions Regarding Picture Activity Schedules

The fourth research question asked by this study was: Do the teachers of middle school students with autism find activity schedules more socially valuable when the sequence of tasks is chosen by the student or chosen by the teacher? The teacher was asked two separate questions regarding the participants' or the teacher's selecting the order of tasks. The teacher answered neutral to both questions, suggesting task selection is not an important consideration. The teacher did say activity schedules helped his students complete tasks independently, and he would like to implement activity schedules in the future with his students.

Limitations

A few limitations of this study were made evident during its implementation. First, direct instruction in the use of activity schedules was not provided prior to asking students to use activity schedules. Approximately one half of the research studies reviewed provided direct instruction in the use of activity schedules (Bryan & Gast, 2000; Duttlinger et al., 2013); the other half of the studies did not provide any direct instruction in the use of activity schedules (Hume et al., 2006; Pierce et al., 2013). Due to time constraints, it was decided not to provide direct instruction in the use of activity schedules for this study. As a result of this non-instruction, the participants required several intervention sessions to teach themselves how to use activity schedules and did not start showing results until close to the end of the study. Direct instruction in the use of activity schedules may have produced different results for this study.

Second, the limited number of participants may have affected the results of this study. The effectiveness of the teacher's selecting the order of tasks or the participant's selecting the

order of tasks was not clear in this study. Two participants showed better results in completing tasks in sequence when the teacher selected the order of tasks, one participant demonstrated better results in completing tasks in sequence when the participant selected the order of tasks, and one participant showed no difference in results when the tasks were selected by both the participant and the teacher. A study conducted with more participants may have led to a definitive task selection preference.

Another limitation of this study concerned the data collected from the participants' social validity questionnaires. One participant refused to answer the social validity questionnaire. Two participants may have answered questions in a manner that seemingly tried to predict what the person asking the questions wanted to hear. It was noted before and after these two participants answered each question, they would look at the person collecting the data, seemingly gauging his response to the answer. The last participant seemed to answer the questions in a manner that could be supported from the data collected. For example, the last participant said he liked it better when the teacher selected the order of tasks, and this participant actually completed more tasks in sequence when the teacher selected the order of tasks. It is therefore possible the majority of social validity data collected from the participants was erroneous.

Recommendations for Practice

A few recommendations for practice arose from this study. One recommendation would be to provide instruction in the use of activity schedules to students with autism prior to expecting their use. Another recommendation would be to increase gradually the number of expected tasks.

Direct instruction would help students using activity schedules become proficient in a shorter amount of time and perhaps avoid feelings of frustration by the students with autism who

are using the activity schedules. As seen in graphical displays of this study, three of the four participants were not able to improve the number of tasks completed in sequence until several sessions were completed (14-20 sessions). It was the opinion of the teacher the participants felt discouraged during the intervention sessions prior to the participants actually beginning to complete tasks in sequence. Direct instruction after the baseline phase and prior to the intervention phase may have helped the participants to avoid these feelings of discouragement and helped them to reach mastery in a shorter period of time.

Prior to the beginning of this intervention, it was verified by the teacher and researcher that all participants could complete the tasks presented in this study. An additional study inclusion criterion was each participant was not able to complete more than three chained tasks independently without prompting. None of the participants in this study could complete more than two chained tasks independently as evidenced by the baseline phase of the graphical displays. Often the participants would only complete the first or last task given by the teacher and then look to the teacher for guidance. At that point, the teacher would respond, “Do your best.” It was the teacher’s opinion when the participants were given a series of five tasks to complete in sequence, they would seemingly go into “information overload” and not attempt to complete any assigned tasks. The teacher suggested a gradual increase in the number of required tasks may produce better results. For example, if the participant could complete only two tasks in sequence, then he or she should be given three tasks until all three tasks could be completed reliably. Once the three tasks could be completed reliably, a fourth task could be introduced. This gradual increase of tasks was suggested by the teacher to help prevent the feeling of “information overload.”

Recommendations for Future Research

Future research could evaluate the impact picture activity schedules have on the amount of time to complete a series of tasks in sequence, whether direct instruction in the use of activity schedules affects student performance, and the impact of increasing gradually the number of tasks required from participants. Although elapsed time was not a research question in this study, participants seemed to take much less time to complete tasks at the end of the study than at the beginning. The researcher questioned whether picture activity schedules were the cause of this decrease in required time.

The review of related literature did not suggest a preferred method of introduction of picture activity schedules. As a result of this ambiguity and time constraints, it was decided not to provide direct instruction in the use of activity schedules. Future research could evaluate whether direct instruction in the use of activity schedules can improve participant results.

The teacher involved with this study suggested a gradual increase in the number of required tasks may improve participant outcomes. This study was not designed to examine differences in task presentation. Future research could examine various task presentation methods and student outcomes.

Summary

This study contributes to the field of special education and visual supports by addressing student preference in the use of picture activity schedules. To accomplish this, the researcher replicated and extended a previous study completed by Duttlinger et al. (2013). This study supported the findings of Duttlinger et al. (2013) in finding that picture activity schedules increased the number of tasks completed in sequence for middle school students with autism. In addition, this study evaluated the number of tasks completed in sequence when the teacher

selected the order of tasks and when the student selected the order of tasks. The findings of this study were not conclusive to determine a preferred method of task selection.

APPENDIX A

STEPS TO DEVELOPING AND IMPLEMENTING ACTIVITY SCHEDULES

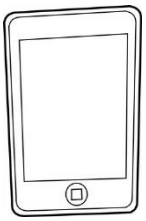
Steps to Developing and Implementing Activity Schedules

Steps		
Number	Action	Description
1	Identify and target behaviors.	Collaborate with others to identify difficult behaviors at specific times during the day, specific situations, or specific activities.
2	Collect baseline data.	Prior to implementing an activity schedule, collect frequency and/or duration data for 2-3 days.
3	Choose a between-activity or within-activity schedule.	Between-activity schedules show each activity for a portion of or an entire day. Within-activity schedules show the steps for a single activity in order.
4	Choose a presentation mode.	An activity schedule can take many forms such as a notebook, picture strip, or a series of written words.
5	Choose a medium for the activity schedule.	Activity schedules can take many forms. These forms can include line drawings, photos, or actual objects.
6	Choose a location for the activity schedule.	Place the activity schedule in a place that is familiar to the student and easy to see.
7	Train the student to use the activity schedule.	After each activity or each step in an activity (depending on the type of schedule used), direct the student to the schedule for the next desired step.
8	Collect intervention data.	Collect data on the intervention and desired outcomes.
9	Add new pictures or words.	As the student becomes proficient with using the activity schedule, add additional pictures or words to extend the use of the activity schedule.
10	Fade prompts.	As the student becomes more independent in the use of the activity schedule, reduce any required prompts.
11	Fade the prominence of the activity schedule.	Make the activity schedule more socially and age-appropriate. The teacher could, for example, remove the activity schedule from being taped on the top of the student's desk and place the activity schedule in the student's binder.
12	Promote generalization.	Apply activity schedules to as many transitions in as many settings as possible.

APPENDIX B

PICTURE ACTIVITY SCHEDULE PICTURES

Sharpen a pencil

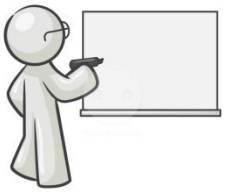


Open Safari on iPad

Put note in backpack

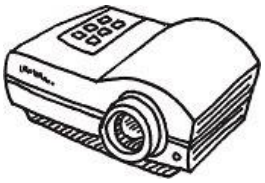
Use the hand sanitizer

Blow nose

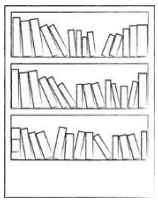


Erase dry-erase board

Throw a piece of trash away



Turn on the LCD projector



Get a book from book shelf

Wipe off desk

APPENDIX C

DATA RECORDING INSTRUMENT

Participant Identifier _____	Session #	Sequence	a.m./p.m.	Date	Task 1		Task 2		Task 3		Task 4		Task 5		TOTAL
					TC	IS	TC	IS	TC	IS	TC	IS	TC	IS	
Baseline	1														
	2														
	3														
	4														
	5														
	6														
Intervention	7														
	8														
	9														
	10														
	11														
	12														
	13														
	14														
	15														
	16														
	17														
	18														
Preferred Treatment	19														
	20														
	21														
	22														
	23														
	24														

APPENDIX D

TASK ANALYSES

Task Analysis (Baseline)

Y – Yes, the step was completed | Participant Identifier:

N – No, the step was not completed | Session Number:

N/A – Not Applicable (used only for if-then statements)

_____ Teacher writes participant identifier and session number on task analysis.

_____ Teacher checks what tasks are to be completed for this session.

_____ Teacher writes task numbers on data sheet.

_____ Teacher positions himself or herself next to the participant's desk.

_____ If participant is not seated at desk, then teacher tells participant, "_____ (insert participant's name here), please sit at your desk."

_____ Teacher tells participant, "_____ (insert participant's name), I want you to do a few things for me."

_____ Teacher asks participant, "_____ (insert participant's name), are you ready?"

_____ Teacher waits for participant's response.

_____ If no response in 5 seconds, then teacher asks participant again, "_____ (insert participants name), are you ready?"

_____ Teacher tells the participant, "_____ (insert participant's name), I want you to _____ (insert tasks to be completed) in that order."

_____ Teacher tells the participant, "_____ (insert participant's name here), please start now."

_____ Teacher starts the stopwatch.

_____ Teacher monitors student for task completion and records data on data sheet.

_____ If student asks teacher for direction prior to completing all five tasks, then teacher responds with, "Do your best, _____ (insert participant's name here)."

_____ Teacher stops recording data when the student completes all five tasks or 5 minutes have expired.

_____ Teacher records elapsed time on data sheet.

Task Analysis (Teacher Selects)

Y – Yes, the step was completed | Participant Identifier:

N – No, the step was not completed | Session Number:

N/A – Not Applicable (used only for if-then statements)

_____ Teacher writes participant identifier and session number on task analysis.

_____ Teacher checks what tasks are to be completed for this session.

_____ Teacher writes task numbers in sequence on data sheet.

_____ Teacher places pictures of tasks on the "tasks" side of the activity schedule.

_____ Teacher positions himself or herself next to the participant's desk.

_____ If participant is not seated at desk, then teacher tells participant, "_____ (insert participant's name here), please sit at your desk."

_____ Teacher tells participant, "_____ (insert participant's name), I want you to do a few things for me."

_____ Teacher asks participant, "_____ (insert participant's name), are you ready?"

_____ Teacher waits for participant's response.

_____ If no response in 5 seconds, then teacher asks participant again, "_____ (insert participants name), are you ready?"

_____ Teacher tells the participant, "_____ (insert participant's name), I want you to _____ (insert task to be completed), put that picture on the 'to-do' side of your activity schedule."

_____ Teacher repeats previous step for tasks 2-5.

_____ Teacher tells the participant, "_____ (insert participant's name here), please start now."

_____ Teacher starts the stopwatch.

_____ Teacher monitors student for task completion and records data on data sheet.

_____ If student asks teacher for direction prior to completing all five tasks, then teacher responds with, "Do you best, _____ (insert participant's name here)."

_____ Teacher stops recording data when the student completes all five tasks or 5 minutes have expired.

_____ Teacher records elapsed time on data sheet.

Task Analysis (Participant Selects)

Y – Yes, the step was completed | Participant Identifier:

N – No, the step was not completed | Session Number:

N/A – Not Applicable (used only for if-then statements)

_____ Teacher writes participant identifier and session number on task analysis.

_____ Teacher checks what tasks are to be completed for this session.

_____ Teacher places pictures of tasks on "tasks" side of the activity schedule.

_____ Teacher positions himself or herself next to the participant's desk.

_____ If participant is not seated at desk, then teacher tells participant, "_____ (insert participant's name here), please sit at your desk."

_____ Teacher tells participant, "_____ (insert participant's name), I want you to do a few things for me."

_____ Teacher asks participant, "_____ (insert participant's name), are you ready?"

_____ Teacher waits for participant's response.

_____ If no response in 5 seconds, then teacher asks participant again, "_____ (insert participants name), are you ready?"

_____ Teacher tells the participant, "_____ (insert participant's name), put the picture of the first thing you want to do on the 'to-do' side of your activity schedule."

_____ Teacher tells the participant, "_____ (insert participant's name here), put the picture of the next thing you want to do on the 'to-do' side of your activity schedule.

_____ Teacher repeats previous step for tasks 3-5.

_____ Teacher records sequence of tasks on data sheet.

_____ Teacher tells the participant, "_____ (insert participant's name here), please start now."

_____ Teacher starts the stopwatch.

_____ Teacher monitors student for task completion and records data on data sheet.

_____ If student asks teacher for direction prior to completing all five tasks, then teacher responds with, "Do your best, _____ (insert participant's name here)."

_____ Teacher stops recording data when the student completes all five tasks or 5 minutes have expired.

_____ Teacher records elapsed time on data sheet.

APPENDIX E

SOCIAL VALIDITY QUESTIONNAIRES

Teacher Questionnaire

Please answer the following questions regarding the student intervention just completed.

1) The amount of time the intervention required was reasonable when compared to student outcomes.

Strongly Agree Agree Neutral Disagree Strongly Disagree

2) The intervention was easily implemented.

Strongly Agree Agree Neutral Disagree Strongly Disagree

3) Activity schedules helped the student complete tasks independently.

Strongly Agree Agree Neutral Disagree Strongly Disagree

4) The intervention made an impact on student time on task.

Strongly Agree Agree Neutral Disagree Strongly Disagree

5) I found it more beneficial for the teacher to select the order of tasks.

Strongly Agree Agree Neutral Disagree Strongly Disagree

6) I found it more beneficial for the students to select their own order of tasks.

Strongly Agree Agree Neutral Disagree Strongly Disagree

7) I would be willing to implement this type of intervention again.

Strongly Agree Agree Neutral Disagree Strongly Disagree

8) Comments:

Participant Questionnaire

Please answer the following questions.

1) Activity schedules take too long to use.

Yes No

2) Activity schedules are easy for me to use.

Yes No

3) Activity schedules help me complete tasks by myself.

Yes No

4) Activity schedules help me complete tasks without getting distracted.

Yes No

5) I like using activity schedules better when the teacher selects the order of tasks.

Yes No

6) I like using activity schedules better when I select the order of tasks.

Yes No

7) I want to use activity schedules again.

Yes No

8) Comments:

APPENDIX F

LETTERS OF AUTHORIZATION

Michael Morrisett <morrise3@unlv.nevada.edu>

direct replication premission

Kevin Ayres <kayres@uga.edu> Tue, Sep 9, 2014 at 8:02 AM
To: Michael Morrisett <morrise3@unlv.nevada.edu>
Cc: "tom.pierce@unlv.edu" <tom.pierce@unlv.edu>

Hey Michael
Thanks for contacting me. I have no problem what so ever in your plans. To me, in science, no one needs permission to try to replicate someone else's results. Please let me know if there is anything you want to know about that study which may assist you in your work. Best of luck.
Kevin

On Tue, Sep 9, 2014 at 9:27 AM, Michael Morrisett <morrise3@unlv.nevada.edu> wrote:

Dr. Ayres,

My name is Michael Morrisett and I am a doctoral candidate at the University of Nevada Las Vegas. I am contacting you because you are listed as the corresponding author in a study I would like to complete a direct replication of as my dissertation. The study I am referring to is titled "The Effects of a Picture Activity Schedule for Students with Intellectual Disability to Complete a Sequence of Tasks Following Verbal Directions" and was completed by Cari Duttlinger, MEd, Kevin M. Ayres, PhD, Alicia Bevill-Davis, PhD, and Karen H. Douglas, PhD, (2013). I have attached a copy of the study for your convenience.

I am asking your permission to complete a direct replication of this study to middle school students with autism. In addition to extending your previous study to a new student population, I will also be examining the differences in the number of tasks completed in sequence when the teacher selects the order of tasks and when the student selects the order of tasks. Along with completing a direct replication I would like permission to adapt the inclusion criteria of your study. I have listed my proposed inclusion criteria below.

Study inclusion criteria

be in the age range of 11 through 15 years old

receive special education services in a self-contained autism program

within the average range of visual and auditory functioning

ability to complete pre-selected tasks independently and without supervision

cannot complete more than three chained tasks independently without prompting

will comply with requests a minimum of eight out of ten times as reported by teacher

have goals in their Individualized Education Plan (IEP) emphasizing independence

no prior training in setting up a activity schedule as a self-management activity

participants will give their assent.

parental consent will be obtained

Thank you for your time and consideration.

Sincerely,

Michael Morrisett Med.

Doctoral candidate

Department of Educational and Clinical Studies

University of Nevada Las Vegas

Dr. Thomas Pierce, PhD., examination committee chair

Kevin W. Ayres, Ph. D., BCBA-D
Associate Professor
Department of Communication Sciences & Special Education
The University of Georgia
509 Aderhold Hall
Athens, GA 30606
kayres@uga.edu

Personal: https://sites.google.com/site/kevinayres/
iSkills: http://iskills.uga.edu
BCBA: http://ugabcba.myweb.uga.edu/index.htm

UNLV

Social/Behavioral IRB – Expedited Review
Approval Notice

NOTICE TO ALL RESEARCHERS:

Please be aware that a protocol violation (e.g., failure to submit a modification for any change) of an IRB approved protocol may result in mandatory remedial education, additional audits, re-consenting subjects, researcher probation, suspension of any research protocol at issue, suspension of additional existing research protocols, invalidation of all research conducted under the research protocol at issue, and further appropriate consequences as determined by the IRB and the Institutional Officer.

DATE: February 11, 2015

TO: **Dr. Tom Pierce**, Educational and Clinical Studies

FROM: Office of Research Integrity - Human Subjects

RE: Notification of IRB Action
Protocol Title: **Effects of Picture Activity Schedules on Tasks Completed**
Protocol #: 1411-4994M
Expiration Date: February 10, 2016

This memorandum is notification that the project referenced above has been reviewed and approved by the UNLV Social/Behavioral Institutional Review Board (IRB) as indicated in Federal regulatory statutes 45 CFR 46 and UNLV Human Research Policies and Procedures.

The protocol is approved for a period of one year and expires February 10, 2016. If the above-referenced project has not been completed by this date you must request renewal by submitting a Continuing Review Request form 30 days before the expiration date.

PLEASE NOTE:
Upon approval, the research team is responsible for conducting the research as stated in the protocol most recently reviewed and approved by the IRB, which shall include using the most recently submitted Informed Consent/Assent forms and recruitment materials. The official versions of these forms are indicated by footer which contains approval and expiration dates.

Should there be *any* change to the protocol, it will be necessary to submit a **Modification Form** through ORI - Human Subjects. No changes may be made to the existing protocol until modifications have been approved by the IRB. Modified versions of protocol materials must be used upon review and approval. Unanticipated problems, deviations to protocols, and adverse events must be reported to the ORI – HS within 10 days of occurrence.

If you have questions or require any assistance, please contact the Office of Research Integrity - Human Subjects at IRB@unlv.edu or call (702) 895-2794.

Office of Research Integrity - Human Subjects
4505 Maryland Parkway • Box 451047 • Las Vegas, Nevada 89154-1047
(702) 895-2794 • FAX: (702) 895-0805 • IRB@unlv.edu

Clark County School District

Dell H. Robison Middle School

825 Marion Drive Las Vegas, NV 89110

Office of Research Integrity – Human Subjects
University of Nevada Las Vegas
4505 Maryland Parkway Box 451047
Las Vegas, NV 89154-1047

Subject: Letter of Authorization to Conduct Research at Dell H. Robison MS.

Dear Office of Research Integrity – Human Subjects:

This letter will serve as authorization for the University of Nevada, Las Vegas ("UNLV") researcher/research team, Dr. Thomas Pierce Ph.D. (principal investigator) and Michael Morrisett M.Ed. (student investigator) to conduct the research project entitled **Effects of Picture Activity Schedules on Tasks Completed** at Dell H. Robison MS 825 Marion Drive Las Vegas, NV 89110 (the "Facility").

The Facility acknowledges that it has reviewed the protocol presented by the researcher, as well as the associated risks to the Facility. The Facility accepts the protocol and the associated risks to the Facility, and authorizes the research project to proceed. The research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board.

If we have any concerns or require additional information, we will contact the researcher and/or the UNLV Office of Research Integrity – Human Subjects.

Sincerely,

Elena Baker — 12/3/2014

Facility's Authorized Signatory — Date

Elena Baker, Principal
Printed Name and Title of Authorized Signatory

Focus on Learning

Office: (702) 799-7300 — Fax (702) 799-7302

Elena G. Baker, Principal — *Jaqueline Lee-Sit, Assistant Principal*
Cheryle Trupp, Dean of Students

Assessment, Accountability, Research, and School Improvement • Research Dept.
4212 Eucalyptus Ave. • Las Vegas, NV 89121 • (702) 799-5195 • FAX (702) 799-0292

CCSD
CLARK COUNTY
SCHOOL DISTRICT

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Pat Skorkowsky, Superintendent

March 18, 2015

Michael Eric Morrisett
4490 Wilder Place
Las Vegas, NV 89121

Dear Michael:

The Research Review Committee office of the Clark County School District has received your request entitled: *Effects of Picture Activity Schedules on Tasks Completed.* We are pleased to inform you that your sponsored proposal has been approved with the following provisos:

1. Participation is strictly and solely on a voluntary basis.
2. Provide letter of acceptance from any additional principals who agree to be involved with the study.

This research protocol is approved for a period of one year from the approval date. The expiration of this protocol is March 17, 2016. If the use of human subjects described in the referenced protocol will continue beyond the expiration date, you must provide a letter requesting an extension *one month* prior to the date of expiration. The letter must indicate whether there will be any modifications to the original protocol. If there is any change to the protocol it will be necessary to request additional approval for such change(s) in writing to the Research Review Committee.

Please provide a copy of your research findings to this office upon completion. We look forward to the results. If you have any questions or require assistance please do not hesitate to contact this office at (702) 799-5195 or e-mail at lapitch@interact.ccsd.net.

Sincerely,

Lisa A. Pitch, M.A.
Coordinator III
Department of Accountability & Research
Co-Chair, Research Review Committee

Kent E. Sabo, Ph.D.
Coordinator III
Department of Accountability & Research
Co-Chair, Research Review Committee

clk
c: Elena Baker SPONSOR
Research Review Committee

RRC 40-2015

APPENDIX G

INFORMED CONSENT FORMS

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

ASSENT TO PARTICIPATE IN RESEARCH

EFFECTS OF PICTURE ACTIVITY SCHEDULES ON TASKS COMPLETED

1. My name is Robyn Rowland.
2. We are asking you to take part in a research study because we are trying to learn more about how activity schedules help you to complete tasks.
3. If you agree to be in this study you will complete tasks on an activity schedule. Sometimes you will choose the order of the tasks and sometimes your teacher will choose the order.
4. The only risk you face is someone finding out who you are. Only three people, including your teacher, will know how you did during the study.
5. You may learn how to better use activity schedules to finish things you need to do.
6. If you choose to participate in this study, it will take a little over two hours of your time. Ten minutes to make sure you can do what we are asking. Thirty minutes for your teacher to show you how to use an activity schedule. One hundred minutes completing tasks that you normally do in the classroom, like getting a book from the bookshelf or turning on the overhead projector. The last thing you will need to do is answer a few questions about how you liked the study. This will take about ten minutes.
7. Please talk this over with your parents before you decide whether or not to participate. We will also ask your parents to give their permission for you to take part in this study. But even if your parents say "yes" you can still decide not to do this.
8. If you don't want to be in this study, you don't have to participate. That is OK. Your grades or student evaluations will not be affected. Remember, being in this study is up to you and no one will be upset if you don't want to participate or even if you change your mind later and want to stop.
9. You can ask any questions that you have about the study. If you have a question later that you didn't think of now, you can call me at (702) 799-7300 or ask me next time. If I have not answered your questions or you do not feel comfortable talking to me about your question, you or your parent can call the UNLV Office of Research Integrity – Human Subjects at 702-895-2794 or toll free at 877-895-2794.
10. Signing your name at the bottom means that you agree to be in this study. You and your parents will be given a copy of this form after you have signed it.

_____ _____
Print your name Date

_____
Sign your name

Approved by the UNLV IRB. Protocol #1411-4994M
Received: 12-18-14Approved: 02-11-15Expiration: 02-10-16

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

PARENT PERMISSION FORM

Department of Educational and Clinical Studies

TITLE OF STUDY: EFFECTS OF PICTURE ACTIVITY SCHEDULES ON TASKS COMPLETED

INVESTIGATOR(S): Dr. Thomas Pierce, Ph.D. (principal investigator), Michael Morrisett (student investigator)

CONTACT PHONE NUMBER: Dr. Thomas Pierce, Ph.D. at (702) 895-3205 or Michael Morrisett at (702) 759-9564.

Purpose of the Study
Your child is invited to participate in a research study. The purpose of this study is to evaluate the effects of picture activity schedules on tasks completed by middle school students with autism.

Participants
Your child is being asked to participate in the study because they receive education in a self-contained classroom for students with autism.

Procedures
If you allow your child to volunteer to participate in this study, your child will be asked to do the following: complete various tasks and answer questions at the end of the study.

Benefits of Participation
There may not be direct benefits to your child as a participant in this study. However, your child may learn to use activity schedules to increase the number of tasks they can complete in sequence.

Risks of Participation
There are risks involved in all research studies. This study may include only minimal risks. This study incorporates accepted teaching practices (picture activity schedules). This study will ask your student to complete tasks in sequence using picture activity schedules. All interventions will take place when functional skills are scheduled to be taught. Because of this there are only minimal risks to students from participation. These minimal risks include breach of confidentiality. To minimize this you're your student will be given fictitious identifier (i.e., Student A). Only the Principal Investigator, Student Investigator, and Teacher will know the actual identity of the participants. Once data collection is complete any forms linking your student identity to their fictitious identifier will be destroyed.

Approved by the UNLV IRB. Protocol #1411-4994M
Received: 12-18-14Approved: 02-11-15Expiration: 02-10-16

Cost /Compensation

There *will not* be financial cost to you to participate in this study. Your child *will not* be compensated for their time. This study will take approximately 2 ½ hours of you child's time at school (10 minutes to verify tasks can be completed in one minute, 30 minutes activity schedule instruction, 100 minutes compleating tasks during the study, 10 minutes compleating the survey at the end of study)

Contact Information

If you or your child have any questions or concerns about the study, you may contact Dr. Thomas Pierce Ph.D. at **(702) 895-3205** or Michael Morriscett at **(702) 759-9564.** . For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted you may contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-895-2794, or via email at IRB@unlv.edu.**

Voluntary Participation

Your child's participation in this study is voluntary. Your child may refuse to participate in this study or in any part of this study. Your child may withdraw at any time without prejudice to your relations with the university. You or your child is encouraged to ask questions about this study at the beginning or any time during the research study. If your child chooses not to participate in the study, their grades and evaluations will not be affected.

Confidentiality

All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link your child to this study. All records will be stored in a locked facility at UNLV for three years after completion of the study. After the storage time the information gathered will be destroyed. Only the principal investigator, student investigator, and teacher will have knowledge of how your child performed during the study.

Parent Consent:

I have read the above information **and** agree to allow my child to participate in this study. I am aware of the associated risks involved with this study. A copy of this form has been given to me.

Signature of Parent	Child's Name (Please print)
Parent Name (Please Print)	Date

Participant Note: Please do not sign this document if the Approval Stamp is missing or is expired.

Approved by the UNLV IRB. Protocol #1411-4994M
Received: 12-18-14Approved: 02-11-15Expiration: 02-10-16

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

INFORMED CONSENT – TEACHER

Department of Education and Clinical Studies

TITLE OF STUDY: EFFECTS OF PICTURE ACTIVITY SCHEDULES ON TASKS COMPLETED

INVESTIGATOR(S): Dr. Thomas Pierce, Ph.D. (principal investigator), Michael Morrisett (student investigator)

For questions or concerns about the study, you may contact Dr. Thomas Pierce, Ph.D. at **(702) 895-3205** or Michael Morrisett at **(702) 759-9564.**

For questions the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, contact **the UNLV Office of Research Integrity – Human Subjects at 702-895-2794, toll free at 877-895-2794 or via email at IRB@unlv.edu.**

Purpose of the Study
You are invited to participate in a research study. The purpose of this study is to evaluate the effects of picture activity schedules on tasks completed by middle school students with autism.

Participants
You are being asked to participate in the study because you fit this criterion: you teach in a middle school self-contained classroom for students with autism.

Procedures
If you volunteer to participate in this study, you will be asked to answer questions pertaining to the intervention on study completion. Data pertaining to you will only be collected on your answers to the questionnaire at the end of the study.

Benefits of Participation
There may not be direct benefits to you as a participant in this study. However, we hope to learn if activity schedules benefit middle school students with autism.

Risks of Participation
There are risks involved in all research studies. This study may include only minimal risks. These minimal risks include breach of confidentiality. To minimize this risk you (the teacher) will be given fictitious identifier (i.e., Teacher 1). Only the Principal Investigator and Student Investigator will know your actual identity. Once data collection is complete any forms linking your name to your fictitious identifier will be destroyed.

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Cost /Compensation

There may not be financial cost to you to participate in this study. You will not be compensated for your time. The questionnaire you will be asked to complete will take approximately ten minutes of your time.

Confidentiality

All information gathered in this study will be kept as confidential as possible. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at UNLV for three years after completion of the study. After the storage time the information gathered will be destroyed.

Voluntary Participation

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with UNLV. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Participant Consent:

I have read the above information and agree to participate in this study. I have been able to ask questions about the research study. I am at least 18 years of age. A copy of this form has been given to me.

Signature of Participant _____ Date _____

Participant Name (Please Print) _____

Approved by the UNLV IRB. Protocol #1411-4994M
Received: 12-18-14Approved: 02-11-15Expiration: 02-10-16

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Yammiyavar, P., Clemmensen, T., & Kumar, J. (2008). Influence of cultural background on non-verbal communication in a usability testing situation. *International Journal of Design*, *2*(2) 31-40.

CURRICULUM VITAE

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EDUCATION

M.Ed. (2008) Special Education
University of Nevada, Las Vegas
Specialization: Learning Disabilities

B.S. (2006) Special Education
University of Nevada, Las Vegas
Endorsement: Generalist

PROFESSIONAL EXPERIENCE

Clark County School District, Las Vegas, NV
Special Education Instructional Facilitator (August 2012 – present)
Special Education Teacher (August 2006 – August, 2012)

HONORS AND AWARDS

CCSD RAVE Review (February 2012)

PUBLICATIONS

Proceedings

Morrisett, M. (2015, August). *Effects of picture activity schedules on tasks completed.* Doctoral Summit, University of Nevada, Las Vegas.

Morrisett, M. (2012, November). *Accessing the community with video modeling.* TASH Notional Conference, Long Beach, CA.

Morrisett, M. (2010, June). *Practical ways to include students with intellectual disabilities.* American Association of Intellectual and Developmental Disabilities National Conference, Providence, RI.

PRESENTATIONS

Refereed Presentations

Morrisett, M. (2012, November). *Accessing the community with video modeling.* TASH National Conference, Long Beach, CA.

Morrisett, M. (2010, June). *Practical ways to include students with intellectual disabilities.* American Association of Intellectual and Developmental Disabilities National Conference, Providence, RI.

Invited Presentations

Morrisett, M. (2015, September). *Responsible use of iPads in a school environment.* Clark County School District, Las Vegas, NV.

Morrisett, M. (2015, August). *Effects of picture activity schedules on tasks completed.* University of Nevada, Las Vegas.

Morrisett, M., Oh-Young, C., Marsh, R., Williamson, D. (2015, August). *The dissertation phase of your Ph.D. – What to expect*, University of Nevada, Las Vegas.

Morrisett, M., Siller, C., Haney, P., Dunn, M., Bell, S., Weatherman, T., & Cortez, D. (2015, August). *Effective inclusion of students with disabilities in general education classrooms*. Clark County School District, Las Vegas, NV.

Morrisett, M. (2015, August). *Teacher of record encore training.* Clark County School District, Las Vegas, NV.

Morrisett, M., Liles, D., & Thacker, B. (2014, November). *Effective co-teaching in the middle school classroom.* Clark County School District, Las Vegas, NV.

Morrisett, M. (2014, August). *Teacher of record encore training.* Clark County School District, Las Vegas, NV.

Morrisett, M. (2013, August). *Co-teaching models and strategies.* Clark County School District, Las Vegas, NV.

Morrisett, M. (2013, November). *Working with other professionals in the co-taught classroom.* Clark County School District, Las Vegas, NV.

Morrisett, M. (2012, March). *AAC devices promoting communication.* University of Nevada, Las Vegas.

Morrisett, M. (2012, August, 2012). *Effective co-teaching in the middle school classroom.* Clark County School District, Las Vegas, NV.

Morrisett, M. (2012, November). *Implementing co-teaching models.* Clark County School District, Las Vegas, NV.

Morrisett, M. (2011, February). *Intellectual disabilities: An overview.* University of Nevada, Las Vegas.

Morrisett, M. (2011, March). *AAC devices and the nonverbal middle school student.* University of Nevada, Las Vegas.

Morrisett, M. (2011, March). *Lesson planning in the co-taught classroom.* Clark County School District, Las Vegas, NV.

Morrisett, M. (2010, March). *Practical ways to include students with intellectual disabilities.* University of Nevada, Las Vegas.

Morrisett, M. (2010, April). *Lesson planning in the co-taught classroom.* Clark County School District, Las Vegas, NV.

UNIVERSITY CLASSES TAUGHT

Graduate

ESP 704 *Adaptive Curricular Programming for Persons with Intellectual Disabilities*, University of Nevada, Las Vegas

Undergraduate

EDSP 411 *Students with Disabilities in General Education Settings*, University of Nevada, Las Vegas

COMMITTEES

Clark County School District

School Improvement Committee (2012-present)
Student Intervention Committee (2010-present)
Finance Committee (2008-2012)
Social Committee (2007-2012)
Staff Development Committee (2008-2009)
School Inclusion Process Committee (2008)
Discipline Committee (2007-2008)

PROFESSIONAL MEMBERSHIPS

American Association of Intellectual and Developmental Disabilities (2011-present)
Council for Exceptional Children (2011-present)
National Education Association (2006-present)