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Effective Supports Used to Increase Independence in Individuals with Autism Spectrum Disorder

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Effective Supports Used to Increase Independence in Individuals with Autism Spectrum Disorder

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Chapter 1: Introduction

Autism Spectrum Disorder, or ASD, is growing in prevalence. Back in the year 2000, one in 150 children were diagnosed with ASD. According to the Centers for Disease Control and Prevention (CDC) (2022a), currently, one in 44 children have been diagnosed with ASD. In addition, one in six children between the ages of three and 17 years old were diagnosed with a developmental disability during the years of 2009-2017 (CDC, 2022b). Autism and other developmental disabilities are becoming more and more common.

Autism is hard to define as it has so many aspects that vary from person to person. The CDC defines Autism as a developmental disability caused by differences in the brain (2022). Not one Autistic person is the same as the next. Some individuals are verbal, can live alone, and are extremely intelligent. Others may use augmentative and alternative communication (AAC) to advocate for themselves, need extra support in daily living, and may have lower cognitive functioning.

Autism and other developmental disabilities have unique qualities and challenges. A unique trait of ASD is the ability to hyperfocus on a topic and be very knowledgeable about it, yet struggle with other, seemingly simpler tasks. This is known as splintered skills or abilities. For example, I had a student who knew a lot about history and could share just about any fact, but was unable to complete a 10 piece puzzle. Some of the challenges of ASD include difficulties in social interactions, lack of behavior regulation, and dependence on others in various aspects of life.

The level of dependence an individual with ASD has can vary. Some students with ASD need eating and toileting support while others need job or community support. No matter the support needed, it is our job as educators to help them become as independent as possible in these areas.

Research Question

What effective interventions and supports can be used to increase independence in individuals with Autism Spectrum Disorder?

Focus of the Paper

One of the most critical aspects of special education, especially as the students get older, is their independence. Over the years, researchers and teachers have come up with interventions that help students gain more independence. The focus of this paper is to review research and highlight effective interventions and supports to help students with ASD increase their independence. While many supports and interventions exist, this paper will focus specifically on visual supports, prompting, and task analysis.

Importance of the Topic

As a special education teacher working in a transition setting, I see the need for independence now more than ever. I was recently part of a meeting with a vocational rehabilitation counselor. We were discussing customized employment for one of my students that is aging out of transition programming. After this meeting, I realized how much more important independence is for individuals with disabilities in terms of what life will look like for them after school. The goal of customized employment is to find the individual a job that fits their abilities, but that often comes with a need for independence in various ways, including communicating wants/needs, following a work routine,

etcetera. The individual needs to display as much independence as possible to be considered for the job. I am learning that there are not a lot of options for individuals after they age out of transition services. The number of day and work programs have dwindled. Most students are left with a lot of free time once they age out of school if they do not get into a day program or receive customized employment. Speaking from experience with my own students and their families, some day programs have over two-year waiting lists while others will not accept individuals due to their need for extra support. Having independence in a variety of areas will help them live the best life they can, while also providing them with an improved quality of life. This independence could look like advocating their wants/needs to others, choosing activities to occupy their time, or working through a job out in the community.

The interventions and supports that will be reviewed are important for these individuals as the opportunities for individuals with severe-profound disabilities continue to decrease over the years. It has now become my mission to learn about and implement as many supports and interventions as I can to help my students become as independent as possible before they are no longer in my classroom and to provide information to others who may be working with individuals with disabilities.

Definition of Terms

Autism Spectrum Disorder (ASD): a developmental disability caused by differences in the brain (CDC, 2023).

Augmentative and Alternative Communication (AAC): all of the ways that someone communicates besides talking (American Speech-Language- Hearing Association, 2013).

Backward Chaining: teaching a sequence of behaviors in reverse order, starting with the last step in the sequence (Family Centered Practices Group, 2019).

Behavioral Skills Training: a treatment package that consists of several treatment components that have been proven effective for training a wide variety and simple and complex skills (Tarbox & Granpeesheh, 2014).

Behavior Specific Praise: gives students positive, specific verbal feedback showing approval of specific social or academic behavior (Johns, 2015).

Customized Employment: an approach to hiring, retention and return to work that matches a job seeker's strengths, the conditions under which they will be successful and their interests to the needs of an employer (National Disability Institute, 2019).

Developmental Disability (DD): a group of conditions due to an impairment in physical, learning, language, or behavior areas. These conditions begin during the developmental period, may impact day-to-day functioning, and usually last throughout a person's lifetime. (CDC, 2023).

Evidence Based Practice: refers to any concept or strategy that is derived from or informed by objective evidence (Sabbott, 2016).

Generalization: observed when learners engage in the skills we teach them in untrained, but similar conditions (Najdowski, 2017).

Forward Chaining: involves teaching the learner to initially complete only the first step of the task analysis and requires independence of that step in order to receive a reinforcement (Family Centred Practices Group, 2019).

Intervention: a set of steps a teacher takes to help a child improve in their area of need by removing educational barriers (Lynch, 2019).

Prompting: a means to induce an individual with added stimuli (prompts) to perform a desired behavior (Kansas Technical Assistance System Network, 2023).

Self-Contained Classroom: a classroom that is characterized by a smaller setting, lower staff/student ratios, taught by a special education teacher and paraprofessionals (Chanh, 2021).

Splintered Skill/Ability: abilities that are disconnected from their usual context and/or purpose (Rudy, 2020).

Supports: a wide variety of instructional methods, educational services, or school resources provided to students in an effort to help them accelerate their learning progress, catch up with their peers, meet learning standards, or generally succeed in school (The Glossary of Education Reform, 2013).

Target Behavior: the behavior identified to be changed, the prescribed behavior (Bendiske, 1970).

Task Analysis: a task analysis is used to break complex tasks into a sequence of smaller steps or actions (Pratt, 2020).

Total Task Chaining: occurs when the entire skill is taught, and the learner is only given support for the steps they have difficulty with (Family Centered Practices Group, 2019).

Transition Program: designed to teach independent living skills, including vocational skills, to students receiving special education services, ages 18-22 (Colorado Department of Education, 2019).

Video Modeling: a video showing someone performing a skill or behavior (Raising Children Network, 2022).

Visual Supports: any tool presented visually that supports an individual as he or she moves through the day (Rao & Gagie, 2006).

Work System: a systematic and organized presentation of tasks and materials that visually communicates information to the student (Sreckovic, Hume, & Regan, 2020).

Chapter 2: Literature Review

This literature review will look at interventions and supports that can be implemented to increase independence in individuals with Autism Spectrum Disorder (ASD). In chapter one, ASD was defined along with the importance of the topic. Chapter two will review literature related to specific interventions and supports that have been used with individuals with ASD. This chapter format will be in chronological order based on when the article was written and what support the article discusses. The support and intervention topics of the articles will be centered around visuals, task analysis, and prompts. I located 10 articles that will be discussed within this chapter.

Table 1

Visual Supports

Authors & Year	Study Design	Participants	Procedure	Findings
Rao & Gagie (2006)	Qualitative	Individuals with ASD. No specific ages were included.	Using visual supports to increase independence.	Visual supports can help individuals with Autism Spectrum Disorder in a variety of environments including school, home, work, and in the community.
Breslin & Rudisill (2011)	Quantitative	22 students between the ages of 3.5 years to 10 years old, with an ASD diagnosis.	Each participant received a “20-minute acclimation period” to become familiarized with the assessment environment and procedure. The assessment (TGMD-2) was	The results of this study showed statistically significant differences between the three protocols. The picture task card produced higher gross motor scores on the TGMD-2 than the traditional protocol and the picture activity

			administered three times with a different protocol (traditional, picture task card, and picture activity schedule). Over the span of three consecutive school days, the child completed the TGMD-2 under one of the protocols. The order of the conditions was randomly assigned to avoid influencing the results.	schedule. The results propose that more accurate gross motor quotient scores on the TGMD-2 by children with ASD can be obtained using the picture task card protocol.
Meadan, Ostrosky, Triplett, Michna, & Fettig (2011)	Qualitative	Individuals with ASD. No specific ages were included.	Using visual supports to increase independence.	Visual supports are a nonintrusive intervention that can aid in behavioral and social learning.

Rao & Gagie (2006): Learning Through Seeing and Doing: Visual Supports for Children with Autism

Grandin, the author of *Thinking in Pictures and Other Reports from My Life with Autism,* was included in this Rao and Gagie (2006) article as she promoted the use of visual supports. She shared how simple words had no meaning to her until she had a visual image to accompany them in her brain. “... the importance of providing visual support that is essential so that the student with autism can process the whole message” (p. 26). Not only do visuals give individuals support with words, but they also help with understanding messages.

Five main reasons to use visual supports were included in this article. The first is that they are part of most people's communication systems. Non-autistic people use visuals in their everyday lives too. The second reason to use visual supports is that they can attract and hold a student's attention. Like in the Temple Grandin example, she had no concept of the meaning of words if she did not have an image to accompany them in her brain. If a child cannot make sense of something, they may quickly lose interest. The third reason is that they allow the student to focus on the message and reduce anxiety. One example is you need to give a speech and you forgot your notecards. You may become anxious and lose your train of thought. The note cards were intended to keep you on track. Visual supports work in the same way for some individuals. They help them stay on track in the conversation because they have something to look back at. The fourth use of visual supports is to make abstract concepts more concrete for individuals. The visual allows them to focus on the details of what is in front of them rather than some big idea. The fifth and final reason included within this article is that visual supports help the individual express their thoughts. Language difficulties are a common aspect of ASD. Visual supports allow the individual to engage in some sort of conversation with others despite not being able to produce words verbally.

At the time that this article was written, not many studies on visual supports had been published. Research was new and many did not know how to effectively implement them. Below you will find an article titled *Using Visual Supports with Young Children with Autism Spectrum Disorder* where visual support implementation is further discussed.

Breslin & Rudisill (2011): The Effect of Visual Supports on Performance of the TGMD-2 for Children with Autism Spectrum Disorder

Visual supports are intervention that can be used with individuals. Breslin and Rudisill (2011) shared the findings of a study that examined the outcome of using visual supports compared to not. The purpose of this study was to look at how visual supports, specifically picture task cards and picture activity schedules, would affect a student's performance during a gross motor assessment. The assessment, Test of Gross Motor Development (TGMD-2), was used to assess the fundamental motor skills of young children with an ASD diagnosis. The assessment included locomotor skills consisting of running, galloping, hopping, jumping, leaping, and sliding, as well as object control skills of striking a stationary ball, stationary dribbling, catching, kicking, overarm throwing, and underhand rolling. This assessment was primarily administered through verbal instruction, but as time went on, educators learned that individuals with ASD have difficulty with processing and interpreting auditory information and benefitted from visual information. It was also determined that children with ASD may have delays in motor skill development (Breslin & Rudisill, 2011). Adapting assessments and learning materials has shown to be beneficial to individuals with ASD. The study to be described provides data that justifies this statement.

This study described three protocols to be used with the assessment. The first protocol was referred to as the 'traditional protocol' and was simply giving verbal directions to each part of the assessment. The second protocol involved picture cards. According to Breslin and Rudisill (2011), "a picture card is a pictorial representation of a person, place, thing, or action that an individual may provide to another individual to exchange information when verbal communication is different."

The third protocol involved picture activity schedules. By definition, “activity schedules are visual depictions of the sequence of behaviors and activities in which the student is to engage to complete the desired task” (Breslin & Rudisill, 2011, p. 344). Picture activity schedules provide more information than picture cards such as the order of the tasks to be completed.

Typically when administering the TGMD-2, two demonstrations were allowed along with verbal instructions. However, over time, people learned that auditory instructions are difficult for individuals with ASD and that created deficits in their assessment performance (Breslin & Rudisill, 2011). This study was done to determine if visual supports were more effective for individuals rather than just auditory instruction.

The participants of this study included 22 children, aged three and a half to 10 years of age, all with an ASD diagnosis. The children assessed were given a score of either a 1 or a 0. These numbers indicated that the child performed the skill or did not perform the specific criterion for the skill correctly. The numbers were then added up and that sum was used to determine a subtest standard score. These scores were adjusted for age and sex and for both locomotor and object control and ranged from 1 to 20. Both of the scores were then added together and compared to a table within the TGMD-2 manual to determine a gross motor quotient score ranging from 46 to 160.

The procedure consisted of the assessment being administered three times using the different protocols, on three consecutive days. Each child was asked to complete the assessment under one of the three protocols described previously. The protocols were randomly assigned to the participants. For the children that were participating in the assessment with the traditional protocol, the directions from the

TGMD-2 manual were explicitly followed. Verbal instructions were given using complete sentences, a demonstration of the skill, and a second demonstration if requested or indicated through behavior. For the picture task card protocol, the children were given a few verbal instructions (two or three-word commands) in addition to a laminated card with a line drawing of the skill to be done. For the picture activity schedule protocol, the children were given the same limited verbal instructions along with several line drawings presented vertically in a specific order on a poster. The image would be removed from the board and then presented to the participant before each skill.

The results indicated that the picture task card protocol proved higher gross motor quotient scores than the traditional protocol and the picture activity schedule protocol. The article mentioned that the picture activity schedule could have been providing too much information during the assessment, whereas the picture task card provided just enough (Breslin & Rudisill, 2011).

There were some limitations in this study including taking into consideration "...how many of the differences in the TGMD-2 performance can be attributed to the visual supports that were used as compared with the minimization of the verbal instruction" (Breslin & Rudisill, 201, p. 351). It would be beneficial if future studies included the verbal instruction and concise commands in conjunction with the TGMD-2.

Meadan et al. (2011): Using Visual Supports with Young Children with Autism Spectrum Disorder

Some visual supports work better for individuals with ASD, than others. Meadan et al. (2011) shared the types of visual supports that can be implemented with individuals with ASD. Visual supports can include real objects, photographs, line

drawings, and words. These supports may be used in a visual schedule, to structure an environment, for task analysis cards, and as reminders.

According to Meadan and colleagues, there is a guideline for developing visual supports for young children and includes a six-step process: identify the purpose for using visual supports, identify the type of visual support, assess the type of visual representation, create the visual support, teach the child how to use the visual support, and assess and adjust the visual support. Each of the six steps is important to help the child be successful. The first step of identifying the purpose is to allow the teacher or caregiver to identify a specific goal for using the visual support and what behavior they expect from the child. Will it be to help the child determine what is next in their daily schedule? Help with a specific routine? Learn the expectations of their environment? By determining the goal for the child, you are better able to evaluate the effectiveness later on. The next step of identifying the type of visual support comes after determining the goal for using the visual support. For example, if a parent's goal is for their child to be able to get ready for bed on their own, a visual support that could be the most appropriate for the target behavior may be task analysis. By using a task analysis that includes the steps of bedtime, the child can follow the steps and succeed in the goal of independently getting themselves ready for bed. After determining what type of visual support will be used, it is important to choose how that visual support will be represented. Sticking with the bedtime task analysis visual, consider how the steps will be represented. The bedtime task analysis could include pictures of each step, words for each step, or even a combination. It really depends on the ability and needs of the individual child. Creating the support is up to the teachers or caregivers and the child

themselves. Allowing the child to help create the visual may help with understanding and give them a sense of ownership. Once the goal and target behaviors have been determined, the support has been decided and created, it is time to teach the child how to use it. One cannot assume the child knows what to do. It is best to use the visual with them until they grasp how to use it. Finally, assess the effectiveness of the support. Observe the amount of time it takes for them to complete the intended task. Do they need prompting? Are they able to follow the visual support on their own? Make adjustments as needed.

Table 2

Task Analysis

Authors	Study Design	Participants	Procedure	Findings
Parker & Kamps (2011)	Quantitative	Two nine year old students with Autism attending public schools.	Baseline included students staying in an area with the activity and materials. A timer was set for 15 minutes. Students were instructed to select an activity that they were going to do after the timer went off. The intervention consisted of a written task analysis that was given to the child as a guide for the activity. Peers were used in the intervention to prompt the students with	The use of self-monitoring on the task analysis resulted in an increased level of task-completion. The engagement within the activities and verbalizations also increased from the baseline.

			Autism. Prompting was used to follow the task analysis and to teach self-monitoring.	
Nuernberger, Ringdahl, Vargo, Crumpecker, & Gunnarsson (2013)	Quantitative	Three individuals with ASD. Two of them were 19 years old and the other was 23 years old.	The procedure consisted of determining a baseline of the individuals when it came to having a conversation with a peer and initiating conversations. A task analysis was created that included vocal and non-vocal steps to initiating and maintaining appropriate conversations with others. Participants also received behavioral skills training to help them with the tasks represented in the task analysis.	The results of the study indicated that the task analysis, combined with behavioral skills and reinforcement was quickly effective in teaching the participants conversation skills that matched what was in the task analysis.
Baker, Rivera, Devine, & Mason (2019)	Qualitative	Primary grade students with Autism Spectrum Disorder learning emergent literacy skills.	A task analysis was used to teach emergent literacy skills to young children in elementary school that have ASD. The task analysis is used as a tool for teachers to help students (with ASD) to build	A task analysis is an evidence-based practice that provides consistency through systematic instruction as discussed throughout the article.

			literacy skills. This is done by aligning instruction in areas of missing skills to the curriculum standards.	
Randall, Johnson, Adams, Kiss, & Ryan (2020)	Quantitative	Four young adults with an intellectual disability in a postsecondary education program.	The four participants were given a smartphone with a task analysis application. The app breaks down tasks into steps by providing a picture, audio, and video. A baseline was determined for each of the participants followed by the intervention of using the app.	All four participants had success with the application. Using the task analysis on the smartphone was a highly effective intervention for completing office tasks.

Parker & Kamps (2011): Effects of Task Analysis and Self-Monitoring for Children with Autism in Multiple Social Settings

A written task analysis is one tool that is used to teach a variety of concepts to individuals with ASD. This includes functional skills and communication with others. According to Parker and Kamps (2011), “researchers have explored interventions specifically to improve verbal communication in social activities with peers” (p.131). The research on interventions is important because it helps determine what tools can be used to increase independence in individuals with ASD in many areas of life.

The purpose of this study was to examine the effectiveness of using a task analysis to help children with ASD interact with peers. It was also used to determine

maintenance and generalization as the task analysis tool faded out. The participants in this study included two nine year old students with an ASD diagnosis. They both attended public school. They had their own peer groups that were used during the study. The task analysis materials consisted of a task analysis with sequential outline steps needed to complete an activity. Three activities were used within the study. Each step in the task analysis had a number followed by a written instruction. There was a box next to each step so the student could check off as they went. The three activities included a game, cooking, and a restaurant activity, all with varying numbers of steps for each. The game activity had eight steps, cooking had 22, and the restaurant activity had 12. One example from the game task analysis was, “talk to friends.”

The first step in the study was to determine the baseline for the two students. Baseline determination consisted of the students and peers being directed to stay at a table that contained needed materials for both the game and cooking activities. A timer was set for 15 minutes. During that time, the students went about their routine. The restaurant baseline determination was a little different. This one consisted of giving the participants money and instruction on the food and drinks they could purchase at the restaurant. The experimenter only intervened during the baseline if the students did not make a purchase during the three to five minute time period.

The next step was to teach the participants how to use the task analysis for each of the three activities. The training was one 45 minute session and included the participants and their peers. The experimenter used verbal prompts and positive feedback when teaching how to use the task analysis. Data was not collected during the task analysis training phase.

Scoring included only marking the step after the participant did it independently. During the intervention, the experimenter gave verbal and physical prompts to the participants to use the task analysis. The sessions lasted about 30 minutes. Prompting from both the experimenter and peers was used in addition to the task analysis for all three activities. After each session ended (task analysis completed), the participants were given choice time.

Once the participants showed that they were able to successfully use the task analysis during the activities, the support faded. This was done by eliminating the last few words from each step within the task analysis. Each fade included fewer words within the steps.

The data collection involved a camera to record all of the sessions so that nothing was missed and the video could be reviewed at a later time. A plus sign was given if the participant initiated the step within 30 seconds of the previous step and had successful completion, including engaging with a peer. Data was also collected on the prompting needed from the peers and factored in.

The overall results of the study concluded that both participants had higher levels of task completion using the task analysis for all three activities. Engagement within the activities and with peers also increased for both participants.

This study did come with a few limitations such as the small sample size. This makes it difficult to predict the results of the success of others with higher or lower functioning and different social deficits.

Nuernberger et al (2013): Using a Behavioral Skills Training Package to Teach Conversation Skills to Young Adults with Autism Spectrum Disorders

Social skills are a common area that individuals diagnosed with ASD have difficulty with. These difficulties may look like lack of eye contact, trouble initiating and maintaining a conversation, and inability to appropriately interact with others. It is important for these individuals to develop these skills as they grow up and pursue more independent social interactions and situations such as employment, continued education, and living on their own. There are many ways to teach social skills such as task analysis, social stories, script fading, and prompting. The key to demonstrating social skills effectively is by doing so in a natural environment (Nuernberger et al., 2013). Some of these procedures allow these interactions to occur in natural environments.

This study focused on using a task analysis with behavioral skills training to teach vocal and non-vocal conversational skills to individuals with ASD. There were three participants in this study. All three had an ASD diagnosis and were 19, 19, and 23 years old. They all attended a comprehensive rehabilitation facility that provides vocational, behavioral, and transitional services to individuals with both developmental and/or physical disabilities.

The procedure started with determining the participants baseline when it came to initiating and maintaining appropriate conversations with peers. The participant was able to choose the topic of conversation. The peer was unaware of the study. Most of the study was done in the living unit where the participants spent time with others, lived, and made meals. The behavioral skills training was done in a separate observation room.

A task analysis was created that included both vocal and non-vocal steps used in initiating and maintaining an appropriate conversation with peers. The initial task analysis included 10 steps that consisted of a step number, a description, and a definition. For example, step 1 → Stand/sit at least an arm's length away with body towards the other person. → Participant stood or sat at least an arm's length away with body facing toward the other person (Nuernberger et al., 2013). The participants received behavioral skills training based on the task analysis. During the behavioral skills training, the participants were provided instructions, modeling, rehearsal and feedback during each of the sessions. The experimenter read the task analysis, including the descriptions, aloud to the participants. A conversation was modeled and then the participants rehearsed having a conversation with an experimenter. Feedback was then given. The rehearsal was repeated if the participant did not perform 100% of the steps within the task analysis correctly. After 100% accuracy in the rehearsal, the participant returned to the living area to then have a conversation with a peer.

The results of the study showed that the behavioral skills training paired with a task analysis was immediately effective for the three participants when it came to conversation skills. While the study did show success, there were some limitations. These included a distracting environment, inability to observe conversations when an experimenter was not present, and a lack of follow-up data. Future research may include examining areas such as response maintenance, generalization, and social validity (Nuernberger et al., 2013).

Baker et al. (2019): Teaching Emergent Literacy Skills to Students with Autism Spectrum Disorder

A task analysis is an evidence-based practice that can be used in many ways. It is a tool that allows an individual to work on a task and increase their independence and understanding. It can be used to teach a variety of skills from life skills to academic skills. This article focuses on a task analysis being used to teach emergent literacy skills to young children with ASD. In this case, the task analysis is used to build literacy skills by aligning instruction in areas the child was not meeting the curriculum standards.

As stated in chapter one, individuals with ASD have varying levels of cognitive abilities. This causes a need for teachers to carefully plan and implement supports to help the individuals, and to also be able to collect data. Breaking a task down into smaller tasks not only makes it easier for the learner to follow, but it also allows for more data collection. This is because the teacher or paraprofessional can see what step the child may be stuck on within the task analysis and intervene from there.

There is a process when it comes to creating a task analysis. According to Baker et al (2019), “before a task analysis can be developed, an instructor must identify the targeted behavior and determine how this behavior can be broken into smaller units of instruction” (p. 167). In other words, the teacher needs to know where the student is at with the content before they can start breaking it down into those smaller steps of a task analysis.

As stated previously, the main focus of this article includes using a task analysis to teach emergent literacy. There are six fundamental steps for using a task analysis to teach this concept to young learners with ASD. Once the literacy concept has been determined, the teacher will follow the six steps. The steps include: organizing the correct responses, considering the instructional presentation, considering systemic

prompting techniques, piloting and updating the task analysis, and teaching and collecting data (Baker et al. 2019). The teacher determines how many steps will be needed in the task analysis and how they want to break down the content. It is important to focus on the skills that are the most important to the individual learner to get them as close to the typical expectation as possible. Determining how the information will be presented is important and will be individual to the student and their needs. In order for the task analysis to be effective, the teacher will need to make adjustments as needed. Collecting data along the way will help with knowing what and when changes are necessary.

There are three ways that a task analysis can be taught: forward chaining, backward chaining, and total task presentation. According to Baker et al. (2019), previous research suggests that the most beneficial way to teach a task analysis would be through total task presentation. This is due to the fact that learners can see the progression of steps from beginning to end in a natural sequence. It also helps guide students through steps that may be more difficult for them and helps them proceed to the next step in the sequence.

Ms. Diaz, a teacher mentioned in the article, used a task analysis to teach her early learners with ASD. Her goal was to get the students to participate in her literacy lesson and respond to various questions regarding the book. Before she introduced the lesson, Ms. Diaz thought through her sequence of delivery. After determining how she was going to gain student attention, she began to determine which students knew how to orient a book as well as locate author and title. Some students could tolerate these skills combined together, while others needed support individually locating the items.

Ms. Diaz used her task analysis to further the lesson into comprehension questions pertaining to the story. As the students made success, Ms. Diaz would introduce other stories using the same task analysis technique to help the students generalize the foundational literacy skills and in return, create more independence in literacy.

Randall et al. (2020): Use of a iPhone Task Analysis Application to Increase Employment-Related Chores for Individuals with Intellectual Disabilities

One area of independence that may be overlooked is independence in employment. Only 17% of individuals with an intellectual disability have a paid community job (Randall et al., 2020). Independence and employment give individuals with intellectual disabilities and ASD an improved quality of life. “Completing a job independently and correctly while feeling connected to others at work helps to fill basic psychological needs for individuals with ID” (Randall et al., 2020, p. 26).

The purpose of this study is to explore the effectiveness of a task analysis used on a smartphone to complete office tasks independently and effectively. The participants and setting include four young adults with an intellectual disability that attend a four year postsecondary education program. The four participants were male and were 19-20 years of age.

First, the baseline was determined. This consisted of a trial of each of the three office tasks (copying, scanning, and shredding). The participants were asked to complete the task without any instruction or prior training. After determining the baseline, the participants were introduced to the intervention of the task analysis on the smart device. Participants were given training on the application, and once they demonstrated understanding and success with the device, they were given the

independent practice tasks. The intervention included one session per day and one trial for each of the three tasks assigned. The participants were given the option as to how they wanted to use the task analysis app (step-by-step instructions or overall recording). Verbal instructions were then given to the participants. Least to most prompting was used if the participant did not begin the task within 15 seconds, if the step was done incorrectly, or if they asked for help. A maintenance phase was discussed and included the participants completing the three tasks after not using the task analysis app or doing the task for about two weeks. The maintenance phase mimicked the intervention phase.

The data recording and analysis included responses being marked as correct if they completed the task accurately, did not receive any prompting, and the task was completed in the correct order. This data was entered into a spreadsheet and converted to percentages and then graphed. The data displayed the performance of the four individuals over the course of a five week span. Each of the four participants were successful with the task analysis intervention. The outcomes showed that all four participants showed large amounts of success and gained independence for completing the copying, scanning, and shredding tasks. The rapid increase in success across all participants and tasks indicated that the intervention was effective.

One limitation of this study included its small sample size. While the results showed the task analysis to be an effective support, it cannot be assumed that the data can be generalized to all young adults with ASD. A bigger sample size will be a benefit in future research of the use of a task analysis.

Table 3

Prompting

Authors	Study Design	Participants	Procedure	Findings
Mays & Heflin (2011)	Quantitative	Four students with ASD. Two males and two females ages six to 11 years old. All four students were enrolled in a self-contained classroom.	The procedure involved determining a baseline for the participants, an intervention using the tape player to follow a task, and data recording to track what was done independently.	For handwashing- Two of the students performed the task 100% independently, one student reached 94%, and one reached 88% independence. For toothbrushing- Two students were <80%, but still showed marked improvement, one participant hit 100%, one hit 82%. Intervention was considered to be "highly effective."
Bereznak, Ayres, Mechling, & Alexander (2012)	Quantitative	Three male participants between the ages of 15 and 18 years old with and ASD diagnosis. All three had IEP goals in the areas of daily living, self-help, and vocational skills.	Multiple probes were used to evaluate the effects of video prompting on skill acquisition. One student used video-prompting and the other two students used video self-prompting. Baseline was determined by the participants completing tasks without the video prompts.	The results of this study showed that using a phone as a self-prompting device is effective when it comes to teaching daily living and vocational skills to adolescents with ASD.

			Intervention involved using the video for task completion.	
Toelken & Miltenberger (2012)	Quantitative	Two paraprofessional staff, each working one-on-one with a child diagnosed with ASD in an inclusive classroom setting.	Baseline observations occurred during the set task. Paraprofessionals were trained on least to most prompting. A SWAT (Say-Wait-Watch-Act Out) model was used. 'Say' included the therapist presenting the task, 'wait and watch' included the therapist waiting 3-5 seconds for the child to initiate or complete the task, and 'act out' occurred if there was no initiation by the child. Behavior specific praise was used as reinforcement.	After the training was implemented, the children completed the tasks with more or complete independence.

Mays & Heflin (2011): Increasing Independence in Self-Care Tasks for Children with Autism Using Self-Operated Auditory Prompts

Some individuals with ASD have more skills when it comes to independence than others. Achieving as much independence as possible is important for individuals with a disability for many reasons. Most importantly, it gives the individual a feeling of self-

worth. There are a lot of expectations from society for members to perform certain everyday tasks independently. It may come easier for some individuals, while others need extra supports to achieve that independence. Prompting is a common intervention or support used with individuals with ASD. However, there are occasions where the individual may become too dependent on the prompts and therefore are still dependent on the teacher or provider. Mays and Heflin (2011) includes a study on a particular support, self-operated audio prompting, to determine its effectiveness in children gaining independence with hand-washing and toothbrushing. While this intervention still uses prompting as a way to support the individual, it does so in a way that the individual has control over the prompting. This study was created to learn the effects of a self-operated auditory prompting (SOAP) system when it comes to following both a hand-washing and toothbrushing task. Pre-recorded verbal prompts were recorded and used rather than the teacher giving verbal prompts.

There were four participants of this study. Two males and two females, all between the ages of six and 11 years old. All participants had an ASD diagnosis and were enrolled in a self-contained classroom. Each of the participants had been given opportunities to perform self-care tasks using picture symbols, but all had little to no success.

All of the sessions were located within the restroom that was inside the students' classroom. It contained all materials needed for hand-washing and toothbrushing, along with a battery operated cassette tape player with the 'play' button marked with a green smiley face sticker. All four children were familiar with how to use the tape player as it was also used in the classroom to listen to stories. No training was needed on the

device. A camcorder was also used to record the sessions for later assessment and data collection.

The tasks were determined based off the childrens' daily living IEP goals. A task analysis was created for each of the tasks. Hand-washing included 17 steps and toothbrushing included 22 steps. The teacher pre-recorded each step of both tasks analysis. The children had brief training in a few steps of the hand-washing routine when applying lotion at school.

A baseline was determined for each of the four children. All materials were set up in the restroom for both tasks. Each step for both tasks was recorded as independent (done correctly) or absent (missed step). The children were taken into the restroom one at a time and given a verbal prompt (i.e. "wash hands" or "brush your teeth") to complete the task. A task was still marked as independent, even if it was not in the order listed on the data sheet.

For the intervention phase, the materials were all in place again in the restroom. One at a time, the children were called in to complete the self-care tasks. The teacher pointed to the tape player while giving the verbal cue to either wash hands or brush teeth. Data collection consisted of marking 'independent' if the step was completed independently. It was still marked 'independent' even if it was out of order on the collection sheet. If the child missed a step that was needed for the next step, the teacher prompted the child, and then wrote 'prompted' on the data sheet. A step was marked as 'absent' if it was considered to be unnecessary to move onto the next step (i.e. not replacing the toothpaste cap).

All four participants had a baseline between 18%-47% for handwashing. After the intervention, their percentages moved up to 88%-100% task independence. The four participants had a baseline of 25%-55% for toothbrushing. After the intervention, their percentages moved to 68%-100% task independence. The target for task completion was 80%. While some of the children did not quite reach that 80% mark for toothbrushing, the data still showed improvement after the intervention was in place. See table 4 for exact percentages for each participant.

Table 4

IOA Results

	Todd	**Yasmin**	**Henry**	**Rebecca**
Handwashing				
% of sessions	28.57	30.77	28.57	26.67
% agreement	98.5	88	100	100
Range	94-100	82-100	–	–
Toothbrushing				
% of sessions	33.33	28.57	31.58	36.36
% agreement	100	95.25	100	92
Range	–	91-100	–	86-100

After the data was collected and analyzed, the teacher sent home a questionnaire asking parents whether they had seen an improvement in handwashing and toothbrushing at home. All four mothers of the participants returned the survey with answers stating that her child was showing more independence with the self-care tasks at home than they were prior to the intervention.

While the study showed increased improvement in independence with these four participants, there were still some limitations. The study only involved four students, all of which had some exposure to these self-care tasks, likely at home. These four participants in particular were reported to respond well to verbal prompts. These types of prompts may not yield success with all types of learners.

Bereznak et al. (2012): Video Self-Prompting and Mobile Technology to Increase Daily Living and Vocational Independence for Students with Autism Spectrum Disorders

Modeling and prompting is a common support used to help individuals with disabilities such as ASD. Like stated in previous article reviews, there are many types and variations of modeling and prompting. Bereznak et al. (2012) takes a closer look at video instruction as an intervention form. Video instruction is a tool that can be helpful when it comes to teaching functional, social, and behavioral skills to those with ASD. It also has many benefits such as allowing multiple individuals to learn a concept at once, allows them to be able to rewatch the material multiple times, and requires minimal staff training. Video instruction can also be time and cost efficient.

There are two types of video instruction discussed in this article. The first is video instruction is called video modeling which is defined as, “the viewing of a video of a peer or instructor successfully performing a chained task that participants are required to view at the beginning of a training session” (Bereznak et al., 2012, p. 270). The second video instruction is called video prompting which means, “the viewing of a video to watch a model perform steps of a task; however, the student does not watch the entire task, rather he/she watches specific steps as needed” (Bereznak et al., 2012, p. 270).

Some students may benefit from one type of video instruction over the other, however both are a visual process which may be an area where an individual with ASD has strength. Many individuals with ASD are highly motivated by TV and videos which could be another way this support is successful (Bereznak et al., 2012).

The following research questions were addressed within this study:

1. *Will students with ASD learn to use an iPhone as a video self-prompting tool to teach themselves vocational and independent living tasks?*
2. *Will students with ASD learn to independently complete daily living and vocational tasks when using video prompting?*

The participants included three young men between the ages of 15 and 18 years old. All participants had a moderate ASD diagnosis and attended school in a self-contained classroom. They all had IEP goals related to vocational skills, daily living, and self-help amongst other things. The tasks used within this study included using a washing machine, making noodles, and making a copy. The sessions took place in one of two environments depending on the skill being worked on. The environments included the school living center and the teacher work room. An iphone was used to display the videos used. The students were taught to use the iPhone appropriately by using one finger to touch the screen. The participants did not need to navigate the iPhone at the time of this study other than to press pause or play. The necessary videos were pulled up for each session. The videos used were of adult models and shot from the performer's perspective. At the beginning of each individual step, a word was displayed on the screen that described the step. After, a short clip of the step was performed with audio accompanying it. Finally, a stop sign appeared which is where the participant was to press the pause button and complete the step that had just been shown. Once the step was completed, the video was resumed and the sequence was

repeated for each step. All necessary materials were provided and pre-arranged for each session. All tasks were organized into a task analysis. Data collection consisted of recording whether the step was completed correctly or incorrectly. A correct response was marked if the participant initiated the next step within five seconds and completed it within 10 seconds after pausing the video. There were a few responses that would be considered as incorrect. These include not initiating the response within five seconds, initiated task within five seconds, but failed to complete within 10 seconds, step was completed out of order, or if response was initiated within five seconds, but failed to complete the step correctly. The percentage of correct responses was calculated by dividing the number of correct responses by the total number of steps within the task analysis. One task was completed during a session and one to two sessions were completed each day for each participant.

The participants were given training on the iPhone before the baseline data was determined. A different task was modeled using the video on an iPhone to help the participants become familiar with how to use the iPhone videos for the tasks used within the study. The training continued until all three participants were able to perform tasks using the iPhone and videos without any verbal prompts from the instructor.

When determining the baseline, all participants were evaluated on their ability to perform the tasks without any prompting from the instructor. All tasks took a minimum of three sessions to determine the baseline data. The instructor interrupted the student if the step was performed incorrectly, or if the student failed to initiate the step.

During the intervention sessions, the students were given the iPhone with the video already up and running. The student was given a verbal task direction to start the

specific task. If the participant completed a step incorrectly, the instructor blocked his view of the task, completed it, and then verbally prompted the student to press the play button and continue the steps. Specific verbal praise was given an average of every three minutes for correct responses.

The baseline data showed that each participant was able to do a small portion of the task prior to the video intervention. The baseline data was stable aside from one session ending due to a student's aggressive behavior.

This first set of data points is for participant 1. His baseline data includes 10-20% correct for making a copy, 5-35% correct in making noodles, and 10-30% correct for using a washing machine. Once the intervention was in place, participant 1's data included up to 90% correct for making a copy, up to 100% correct when making noodles, and up to 100% correct when using a washing machine. During the maintenance phase, participant 1's percentages of correct steps/responses decreased until the iPhone was returned.

Participant two is identified as 2. His baseline percentages included 18-45% correct when making noodles, 10-20% correct when using a washing machine, and 20% correct when making a copy. Once the intervention was in place, participant 2's correct response percentages included up to 100% correct when making noodles, up to 100% correct when using a washing machine, and up to 100% correct when making a copy. During the maintenance phase, participant 2's percent correct stayed fairly steady when making noodles, slightly decreased when using a washing machine, and decreased significantly when making a copy. His percentages increased after the iPhone was returned.

The final participant was 3. Participant 3's baseline percentages included zero percent correct when using a washing machine, 0-10% correct when making a copy, and 0-8% when making noodles. During the intervention, participant 3 had up to 100% correct (needed an extra verbal prompt during one session) when using a washing machine, up to 90% correct when making a copy, and up to 100% correct when making noodles. Participant 3 needed extra support during his intervention. This support included the instructor pressing the pause and play buttons. During maintenance, participant 3 stayed consistent with using a washing machine, decreased significantly in correct responses when making a copy, and had some decrease in success when making noodles. His percentages increased after the iPhone was returned.

The results of this study concluded that using video modeling and/prompting on an iPhone is an effective way to increase independence with daily living and vocational tasks for individuals with ASD. However, there are some limitations within this particular study. These limitations include lack of generalization data beyond these three tasks, ability to use iPhone and only using the video to self-prompt. It may be beneficial to include within the study, the participants operating the iPhone from start to finish.

Toelken & Miltenberger (2012): Increasing Independence Among Children Diagnosed with Autism Using a Brief Embedded Teaching Strategy

This article took a different approach than other articles I reviewed. While the article includes a study on the use of prompting to increase independence in children with ASD, it focused more on the staff learning to use the strategy rather than the strategy itself. It does, however, explain how prompting can be an effective tool for increasing independence. The study evaluated the effects of paraprofessionals using

least-to-most prompting in an inclusive setting. The information in this article provides an important aspect of working with individuals with ASD and that is knowing how to implement the tools and supports effectively. “Sometimes staff working with children with disabilities do not have the skills needed to do their job effectively because they have not been properly trained to use procedures that have a substantial impact on these children” (Toelken & Miltenberger, 2012, p. 94).

The participants included two paraprofessionals who both had Bachelor’s degrees in psychology and two young children with an ASD diagnosis. The study was done during lunch time for one child and paraprofessional and during an end of day routine for the other child and paraprofessional. The target behaviors included the level of prompting delivered from the staff and the students’ task completion. Each of the two children had their own set of tasks to do while working with their paraprofessional. The tasks for student 1 included hand washing, opening a lunch box, and wiping the table while putting papers in a backpack, putting on a backpack, and opening the door were the tasks for the other child. The data on staff was collected according to the level of prompt used and the independence level of the child they were working with. A zero (0) was marked if the staff completed the task for the child and no independent behavior was exhibited. A one (1) was recorded if staff used full physical prompting with the child to complete the task. A two (2) was recorded if partial physical prompting was used. This would mean the child did part of the task on their own. A three (3) was given if the staff only used verbal prompting and no physical guidance. Finally, a four (4) was recorded if no prompting was used and the child completed the task on their own.

A baseline was determined during the childrens' individual tasks. The paraprofessionals knew about the study, but did not know they were being observed. The children were not given any verbal or physical direction while the baseline was being determined. During the baseline, the paraprofessionals completed each of the specific tasks for the two children.

The training for the paraprofessionals was done before school for 10 minutes at a time. They were taught the 'SWAT' acronym which stands for 'Say', 'Wait and watch', 'Act out', and 'Touch to guide' (Toelken & Miltenberger, 2012). 'Say' meant the staff presented the task or demand. 'Wait and watch' involved the staff waiting three to five seconds for the child to initiate or complete the task. 'Act out' happened when the child did not initiate or complete the task. 'Touch to guide' occurred when the child did not perform the task even with a gestural prompt and involved the use of a partial physical prompt. After learning 'SWAT', the staff were taught about behavior-specific praise to use with the children.

After the training was done and implemented with the children, the results showed that both children completed their specific tasks with more independence or even complete independence. The 'SWAT' model proved effective with teaching the staff how to use least-to-most prompting to increase task independence in children with ASD. The paraprofessionals stopped completing the tasks for the children and continued the progress in other natural areas within the classroom.

This study included three limitations. The first limitation was that the researcher was visible to staff in the room and may or may not have influenced the participants' behavior. The second limitation includes the 'Say' step of the SWAT model. It is unclear

whether the students would have executed the task if that piece was not there. The final limitation includes not knowing if the skills assessed are able to be generalized across other tasks or environments.

Chapter Two Summary

I reviewed 10 studies in the chapter that examined the effectiveness of using visual supports, prompting, and task analysis to increase individual's independence of individuals who are diagnosed with ASD. Conclusions and recommendations are discussed in Chapter III.

Chapter 3: Conclusions and Recommendations

The purpose of this paper is to provide educators and caretakers with supports they could use to increase the independence of individuals with ASD. Three specific supports were researched. Chapter 1 included an introduction to what Autism Spectrum Disorder is and talked about the importance of independence in individuals with ASD. Chapter 2 summarized the findings of 10 research articles that took a closer look at one of the three specific supports used to increase independence. In this chapter, I will discuss the studies and findings in terms of conclusions, recommendations for future research, and implications for practice.

Conclusions

The studies examined in this paper were categorized into three sections for the purpose of this review. The studies examined three different supports that can be used to increase independence in individuals with ASD at all different ages and stages of life. The studies included a variety of research designs, age groups, and learners.

Three of the 10 studies examined visual supports and how they can be implemented to increase independence in individuals with ASD. Two of the studies, Rao and Gagie (2006) and Meadan et al. (2011), were mainly informational about what visual supports are and the different types that can be used. While these two articles did not include a study determining the effectiveness of visual supports, they provided a lot of information that could be used for new teachers or families that are not familiar with what visual supports are or how to use them. The third study, Breslin and Rudisill (2011), included information about visual supports, but took it a step further by including

a study to increase the readers understanding of how the visual support was used and whether or not it was beneficial to the participants in the study.

Four of the 10 studies examined the use of a task analysis with individuals with ASD. One of the studies, Baker et al. (2019), provided information on how a task analysis is an evidence-based practice and gave information on what a task analysis is and how it should be used. This study focused on explaining how a task analysis could be used in the primary grades, but did not include a study where data was collected to determine the effectiveness. A second study in this section, Parker and Kamps (2011), also included individuals in the primary grades. The participants included two nine-year-olds, each with an ASD diagnosis. This study looked at how these two students used self-monitoring through the use of a task analysis. The data showed that both participants had an increase in both their engagement and verbalizations from the baseline data taken, and therefore was effective. The other two studies had young adult participants. Nuerenberger et al. (2012) examined a study where a task analysis was combined with behavioral skills and reinforcements to increase conversation skills. The data determined that the task analysis was effective. The other study with young adult participants, Randall et al. (2020), used a smartphone with a task analysis application to complete office tasks. While the studies both included young adult participants, they had different intentions with the outcome of the task analysis. One wanted increased conversations while the other wanted successful office tasks completed. The task analysis proved to be an effective tool for both situations.

The final three of the 10 studies examined the various types of prompting and how they could be used to increase independence. One of the studies, Mays and Heflin

(2011), included four young participants between the ages of six and 11 years old. All four children were in a self-contained classroom. This study used auditory prompting through the use of pre-recorded tapes to increase handwashing and toothbrushing independence. The data concluded that the audio prompting was effective. The second study in this section had older participants working on daily living and vocational skills. This study, Bereznak et al. (2012), used a smartphone so the participants could use self-prompting. The data concluded that self-prompting with a smartphone was effective. The final study in this section, Toelken and Miltenberger (2012), took a different approach than the other two studies. This one took data on two paraprofessionals being trained on independence techniques through specific training. After the training was implemented with the paraprofessionals, the children were either more or completely independent in the tasks used within the study.

Recommendations for Future Research

Throughout my research on effective supports to increase independence in individuals with ASD, I found that the data within the studies showed that the use of visual supports, a task analysis, and prompting were all effective strategies. There were a variety of participants including different ages to different ability levels. However, most of the studies only had a few participants within them which was typically one of the limitations listed within the articles.

Since the recurring limitations within the studies included the small group size of participants and the limited number of tasks used within the interventions, future research could focus on expanding the number of participants within the study or a larger number of tasks. Another limitation was that there was no data showing whether

the participants were able to generalize their skills after the interventions took place. While the data showed the supports were effective for a certain task, there was no information stating whether the participants were able to use those same skills across other tasks.

Implications for Practice

The longer I am a teacher, the more I learn and the more my teaching evolves. When I first entered special education, I was working with transition aged students. The focus revolved around developing work skills for future employment. While I still feel that work skills are important, I realized that not all students will be in the workforce after they leave my classroom. I began thinking about their futures and what will be the most beneficial for them when they leave my classroom. I have seen firsthand the toll the pandemic took on the options available to individuals with disabilities. There are fewer day programs. Customized employment is extremely competitive. It made me realize that I needed to set my students up for success by determining what they need to be the most successful in whatever their future brought.

I have two students aging out of the transition program this year. I specifically took them into consideration when I started writing this paper. I talked frequently with their parents and the IEP team about what we really wanted their last year of school to look like. One student is on a two year waiting list for a day program and will be spending the wait at home. For him, we have worked hard on increasing his independence with his daily living tasks, including increased independence in the bathroom, putting his belongings away, and making requests have been our focus. The other student is in the customized employment process. I have learned that customized

employment works to find jobs that meet the student's ability, but is very competitive. The jobs are ones that anyone could apply for. I have spent the last several months working with this student to increase his independence in all aspects so that he can obtain one of these jobs. Prompting and visual supports have been a big factor in increasing his independence in his work skills. He is able to package products with less support by using visuals that depict the steps that need to be done.

The future of our students may be unknown. It is up to us to determine what supports they need and could benefit from. These tools will allow individuals to become as successful and independent as possible no matter where their life takes them.

Summary

The supports discussed within the article summaries all demonstrated to be beneficial for students with ASD (and other cognitive disabilities). While they can be used separately, many supports are used in combination with other supports and can even be classified as the same support. A task analysis could be called a visual support because it may use visual pictures to break down a task. That doesn't mean all visual supports are a task analysis. A lot of supports will use prompting along with it. For example, a task analysis may be used to help an individual get ready for the end of the school day. While they are practicing the task analysis, gestural or verbal prompts may be used to guide them in initiating the task or with completing one of the steps. It is important for teachers and caregivers to be familiar with many different kinds of supports so they can best serve their student and help them to become as independent as possible.

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