USING THE POWER CARD STRATEGY TO INCREASE SOCIAL SKLLS: A SYSTEMATIC REVIEW

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ABSTRACT

This systematic review of the literature examined the effectiveness of the Power Card strategy to increase social skills in studies conducted with individuals with autism or other intellectual disabilities. Database searches conducted identified 12 studies that met the inclusion criteria with a total of 30 participants who had a diagnosis of autism spectrum disorder (ASD) or an intellectual disability (IDD). The majority of the Power Card studies (*n*= 7) targeted social skills, while other targeted skills include direction following, on-task behaviors, latency to teacher cues, executive functioning, and personal space. All 12 studies were reviewed and analyzed for their intervention procedures such as the use of a scenario card, access to the Power Card after reading, if a functional behavior assessment (FBA) was completed, and how the special interest item (SIA) was chosen. Results of the review highlight the need for more research to evaluate which steps of the Power Card strategy are most effective, the need for a greater variety of target behaviors, and the need to focus on the maintenance and generalization of skills learned via the Power Card strategy. Relevant suggestions for future research and practice are discussed.

DEDICATION

I would like to dedicate this paper to my late grandmother Mary Rose, who was one of the strongest and toughest women I have ever met. She gave the me strength and motivation I needed to complete this paper. I would also like to dedicate this paper to my parents, and my sisters who all were my constant sounding boards and my sources of inspiration. I could not have achieved this without each and every one of you. To my mom and dad, who have raised me to be the person I am today, thank you for your unconditional love and guidance through the ups and downs. Lindsay and Kiley thank you for your constant words of encouragement and your unwavering support and belief in me. And to Thomas, my rock, thank you for cheering me on when I was discouraged, wiping away my tears, cracking jokes when I needed a laugh, and for your continuous love and support.

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REVIEW OF LITERATURE

Background

Autism spectrum disorder (ASD) is classified as an developmental disorder that affects an individual's communication and behavior (National Institute of Mental Health, 2018). According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), characteristics such as deficits in social communication, restricted areas of interest as well as repetitive behaviors are common among individuals with ASD. These characteristics can hurt an individual's ability to function at school, work, and in other areas of life (American Psychiatric Association, 2013). More specifically, individuals with ASD need explicit and systematic instruction to learn how to initiate conversations, maintaining reciprocal conversations, engaging in appropriate nonverbal behaviors, and developing and maintaining relationships.

Communication deficits experienced by individuals with ASD impact their lives in a number of ways (Wing, 1991; Bohlander et al. 2012; National Institute on Deafness and Other Communication Disorders, 2012; Rao, Beidel, & Murray, 2008). Communication is whar individuals to express their wants and needs and gives them a way to interact with their community. According to Weitz et al. (1997) within the ASD population, 25-61% of individuals have no zero communication, and when children with ASD have the ability to communicate, they communicate in ways that can be seen as uncommon (Ramdoss et al. 2011). As children grow, social environments such as home or school, become more complex and the need for individuals with ASD to understand themselves, and their surroundings increases (Davis et al. 2010). Without the ability to

effectively communicate, individuals miss opportunities to interact appropriately with their peers, request their wants and needs, and struggle to build and maintain relationships (Duffy and Healy, 2010). This lack of effective communication can lead to the development of challenging behaviors, the presence of which can affect an individual's ability to be an active member in their school and community (Sigafoos et al. 2006). According to the following researchers (Church, Alisanski, & Amanullah, 2000; Downs & Smith, 2004; Gutstein & Whitney, 2002; Wing, 2005) social skills deficits can represent themselves in a number of ways, they include discussing atypical content, lack of inflection or a monotone voice, absence of facial expressions, and restricted interests in specific objects or topics (Davis et al. 2010). Other observed social deficits present in individuals with ASD include lack of eye contact, failure to initiate and maintain reciprocal social interactions, and odd mannerisms or speech patterns (Matson, Matson & Rivet, 2007).

Research on Common Social Skills Interventions

Applied researchers have focused on developing effective interventions for improving social skills of individuals with ASD (Ramdoss et al. 2011). Krasny, Williams, Provencal, and Ozonoff (2003) proposed important "ingredients" to include when teaching social skills, they include ensuring the target skill has a specific operational definition, the use of visual aids and a consistent routine, activities that facilitate the use of language, peer focused interactions and self-awareness, and lastly generalization of the target skill. Social skills interventions can be conducted in a school or clinic by therapists and teachers, and can be individual, or group based. These social skills interventions typically include visuals such as pictures or videos and can also incorporate the

individual's family members and peers to aid in facilitating social interactions across different settings and individuals (Bohlander et al. 2012). In the past, researchers have used several common intervention programs that have shown promise for teaching social skills to individuals with ASD, they include but are not limited to: social stories, scripts, peer-mediated strategies, pivotal response training (PRT), social skills groups, and self-management training.

Gray and Gerrand (1993) developed the social story technique to help individuals better understand social situations they encounter in everyday life. They described social stories as "short stories that describe social situations in terms of relevant social cues, and often define appropriate responses" (Gray and Gerrand, 1993). While some studies have used social stories to decrease negative behaviors, few have examined the role of social stories as the sole intervention to increase appropriate social behaviors (Schreiber, 2011). Scattone et al. (2006) found that social stories increased prosocial skills in two of three participants with autism and Sansosti and Powell-Smith (2006) found that while social stories increased social skills in each participant, the skills were not maintained once the social story was removed. While social stories have shown positive effects on individuals with ASD, they commonly used in combination with other methods such as prompting and modeling (Crozier & Tincani, 2007). This fact makes it difficult to determine how much of the effect is attributed to the social stories and how much is attributed to the other interventions.

Similar to social stories are social scripts, which are defined as pictures and written cues that guide individuals through a specific social situation (Rao et al. 2007).

Research shows that when children with autism are taught social scripts through modeling, prompting, and reinforcement, their social interactions increase (Ganz et. al. 2008). Krantz and McClannahan (1993) used scripts to facilitate peer initiations in children with autism. Written instructions as well as scripts with statements and questions were introduced alongside a script fading procedure. As a result of the intervention, each participant's independent interactions increased significantly. According to Reagon, (2012) the following studies have displayed that scripts introduced via audiotape have also been used to increase social interactions in children with autism (Betz et al., 2011; Dotto- Fojut et al., 2011; Howlett et al., 2011; MacDuff et al., 2007; Reagon & Higbee, 2009; Stevenson et al., 2000). Stevenson, Krantz, and McClannahan (2000) used audiotaped scripts to increase conversational skills of young boys with autism. After the introduction of the scripts, each participant mastered each the five social scripts presented. While social scripts are an effective intervention to teach social skills, there are limitations. Similar to social stories scripts are often used in conjunction with other interventions, therefore, it is difficult to assess the impact the scripts had on the behavior change (Wichnick-Gills et. al. 2016).

Similar to scripts, which provide written cues and pictures, video modeling involves the demonstration of desired or appropriate behaviors through a video representation of the desired behavior (Bellini & Akullian, 2007). Video modeling is used with peers, siblings, adults, or self as a model, also referred to as video self-modeling (Akullian, 2007). Maione & Mirena (2006) employed a multiple baseline design to examine the effects of video modeling and video feedback for teaching a young child with autism to use appropriate social language with his peers during play. They found

that video modeling was effective in increasing appropriate language across two of three activities. In a similar study Charlop and Milstien (1989) used video modeling to teach reciprocal interactions to children with autism. Each participant viewed a videotaped conversation of two people discussing specific toys, and when the criterion was met (two of three consecutive repetitions of the viewed conversation), generalization of skills was assessed with untrained topics of conversation (new toys, unfamiliar people, different settings, etc.). The results showed that all participants obtained conversational speech after viewing the video model, and the conversational skills generalized across all probes (topics of conversation, conversant, settings, conversant and setting, stimuli (toys), abstract conversations, and maintenance). While video modeling has shown be an effective intervention for teaching social skills to individuals, attention and motivation are essential to video modeling. If the child is not motivated to improve social skills, they will not attend to the video model and thus will not be able to imitate the behavior (Akullian & Bellini, 2007). Other barriers to video modeling include developmental age and communication deficits.

While lack of motivation is a limitation to video modeling, pivotal response training (PRT) works to increase a child's motivation while teaching important skills, such as social skills, to children with autism. Important aspects of PRT include turn taking, reinforcing attempts at responding, task variation, allowing the child to make choices, and using natural consequences (Stahmer, 1997). Pierce and Schreibman (1995) used peer implemented PRT to increase complex social behaviors in children with autism. Typical peers were taught to implement PRT strategies by didactic instruction, modeling, and role playing. After this training was completed, the peers implemented the

procedures in the classroom environment without direct supervision. Results of this study showed that participants with autism maintained prolonged interactions with the peer, initiated conversations, and play, and increased engagement in language and joint attention behaviors. While PRT has demonstrated positive effects on social skills and joint attention skills for children with autism, it does have some limitations: some children learn better in structured environments and may struggle with a more naturalistic model, some skills can be difficult to teach in an environment that is led by the child, some parents or teachers may find it challenging to incorporate behavioral interventions into their interactions with their child, and because PRT involves more parent participation than other interventions, some may not find it a feasible intervention option (Minjarez et al. 2011).

PRT encompasses a more naturalistic approach to teaching. Social skills groups consist of planned lessons to target specific target behaviors or goals in a small group of children, evaluating the effectiveness of the instruction, and adjusting lesson plans based on student progress and data (Gresham et al., 2001; Hurth, Shaw, Izeman, Whaley, & Rogers, 1999). Social skills groups are frequently used as an intervention option for individuals with ASD, especially for individuals with above average cognitive skills (Reichow & Volkmar, 2012). Social skills groups consist of between two and six individuals with ASD in a session led by one or multiple therapists. A typical social skills group session consists of lesson of a specific social skill this can include appropriate eye contact, reciprocal conversations, appropriate greetings, etc. The lessons can include modeling the appropriate skills, practicing, and feedback. The social skills discussed and taught often depend on the groups age and level of functioning but can include topics

such as emotional regulation, understanding social cues, problem solving, and appropriate social communication (White, 2007; Rao, 2008; Riechow et al. 2012). Social skills groups can also be activity-based. Owens et al. (2008) had children build different Lego projects while working together, being polite, and sharing. Results showed that social skills improvements were more significant in the activity-based social skills group (building with Legos) than the lesson-based social skills group. While recent studies on social skills groups have found evidence of its effectiveness, it is not clearly indicated if skills learned in social skills groups generalize across settings and individuals, also if these skills are maintained over time (Reichow & Volkmar, 2010). In addition, due to the fact that there is no one clear procedure on how to conduct a social skills group, the effectiveness depends on the therapists and the interventions used.

Another way to incorporate an individual's peers into an intervention is through peer mediation (Maheady et al., 2001; Utley & Mortweet, 1997; Harrower & Dunlap, 2001; Dungan et. al., 1995; Kamps et al., 2002). Peer mediation is a type of social skills intervention in which typically developing peers are trained to initiate, prompt, and reinforce social interactions. Peer mediated interventions include peer modeling, peer initiation training, peer tutoring, and cooperative learning. Peer modeling includes peers who provide examples of appropriate and inappropriate behaviors, peer initiation training teaches peers how to effectively make social initiations with target students, this creates an opportunity for the target student to respond (Maheady et al., 2001; Utley & Mortweet, 1997). Peer tutoring entails groups of students working together on an academic task (Harrower & Dunlap, 2001), and cooperative learning consists of students working together in small groups to complete projects, problem solve, or common goals

(Dungan et. al., 1995; Kamps et al., 2002). A variety of strategies are used to train peers that include direct instruction, brief peer trainings, and training participants along with peers. Training typical peers to model and reinforce appropriate social skills for children with ASD has been shown to be an effective strategy for increasing social skills for students with ASD, results also suggest that the target skills generalize and are maintained over time across other settings and children (Bass & Mulick, 2007; Laushey & Heflin, 2000; DiSalvo & Oswald, 2002 & Rodgers, 2000). While peer mediation strategies yield promising results to assess social skills in children with ASD, there are unaddressed areas, such as the effectiveness of peer mediated strategies in lower functioning or minimally verbal individuals with ASD, and generalization and maintenance of the target skills (Chang & Locke, 2016). Also, more research is needed to determine which interventions are most effective as well as which components of interventions result in positive results (Pollard, 1998).

While peer mediation and social skills groups depend on individuals' peers to model, practice, and reinforce appropriate social behaviors, self-management strategies allow the individual to track and reinforce their own behaviors (Koegel & Koegel, 1990; Pierce & Schriebman, 1994; Stahmer & Schreibman, 1992; Lee, Simpson & Schogren, 2007). Self-management interventions aim to help individuals to become more independent by teaching individuals' distinctive skills such as distinguishing between behaviors that are appropriate and inappropriate, how to effectively monitor and take data on their own behaviors, and how to reinforce themselves for successfully engaging in the target behavior (Nebraska Autism Spectrum Network, 2010). Self-management strategies empower students to keep track of their own behavior as opposed to relying on prompts

or other external interventions. Koegel et al. (1992) taught children with autism to monitor the frequency of their responses and receive a reward when the set criterion was reached. Self-management has also been used to build play behaviors in children with autism. Stahmer and Schreibman (1992) taught three children with autism to play appropriately without an adult present. While there are many benefits to self-management, it is not without its limitations. First, self-management can fail due to due to student and teacher resistance, lack of adequate training, the use of non-motivational reinforcers (Cole et al., 2000). Lastly, self-management interventions are not appropriate for every child or student, some of the procedures will not meet the needs of some individuals, for example, a child exhibiting challenging behaviors may require a more inclusive approach using a combination of several different interventions as opposed to only using self-management procedures. (Wilkinson, 2008).

Special Interests

Another way to increase positive social interactions in individuals with ASD is to engage them through their interests (Angell et al., 2011). In addition to significant impairments in social interactions, individuals with ASD often display areas of intense focus or interest, also referred to as a special interest area (SIA; Davis et al., 2010). The special interest area can be tangible, such as collecting cars and ornaments or topical, such as knowing everything about the Civil War or vacuum cleaners (Gagnon, 2011). Research supports incorporating special-interest items, or activities into interventions for students with ASD (Campbell & Tincani, 2011). Charlop-Christy, and Haymes (1996) they assessed the effectiveness of using children's special interest in order to reduce their inappropriate behaviors. Their results showed that special interest items alone were

highly potent as reinforcers and inappropriate behaviors decreased. Again, in 1998, Charlop-Christy and Haymes examined the effectiveness of using special interest items as token reinforcers to increase task performance in children with autism. Results showed that the students' percentage of accurate task completion was higher when objects of interest tokens were used compared to when typical tokens were used. Other relevant studies include the work of Baker, Koegel and Koegel (1998), they assessed whether using a child's special interest item would increase appropriate social interactions during age appropriate games. Results showed an increase in appropriate social interactions, which were maintained after prompts were removed. Lastly, Visma & Lyons (2007) used the motivational aspects of PRT combined with participants special interests to increase joint attention initiations for social sharing. Results showed an immediate increase in joint attention initiations when special interests were incorporated with the motivational aspects of PRT. Also, researchers found increases in joint attention initiations towards less preferred interests. Research suggests that not only are participants less likely to satiate on special interest items as reinforcers compared to other reinforcers such as food or specific toys (Charlop-Christy & Haymes, 1998; Prince, 2018) but that incorporating special interest items into an intervention increases the likelihood that the behavior will be maintained once the intervention is removed. Research incorporating special interests also suggests that the learned skill will generalize across other areas. (Baker et al., 1998; Prince, 2018).

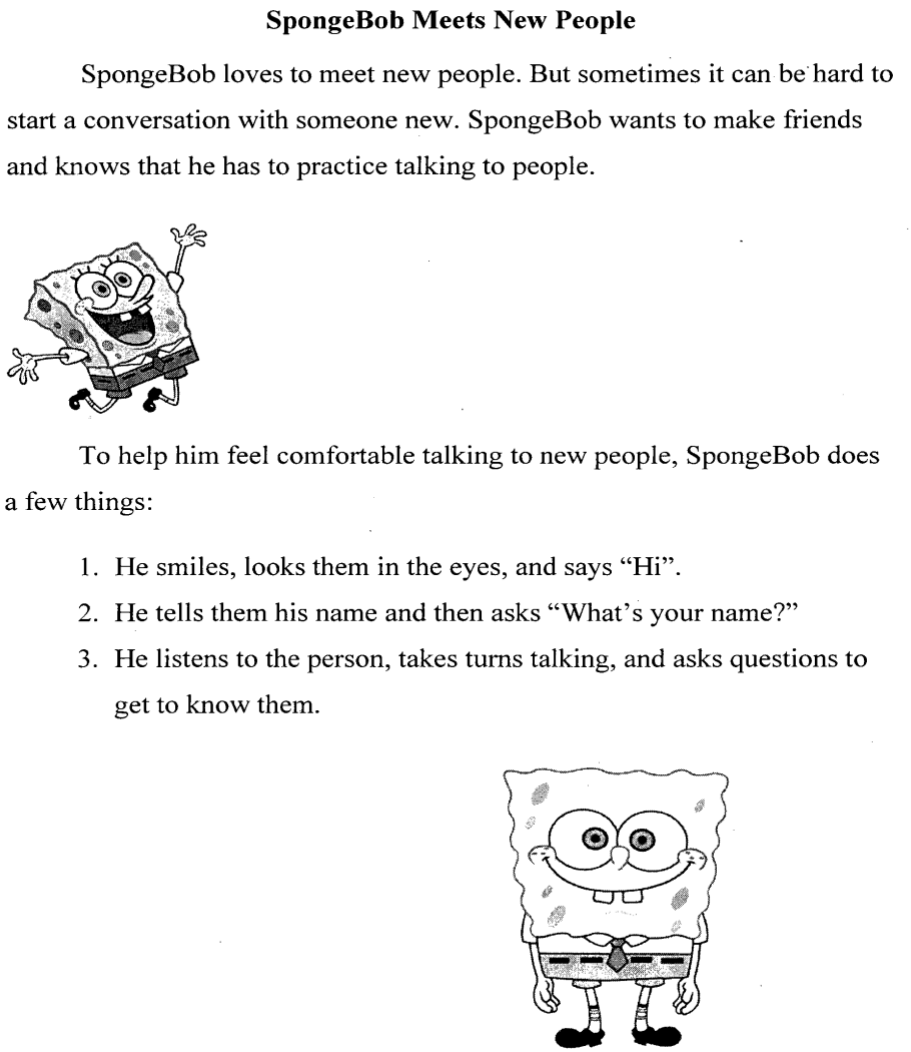
The Power Card Strategy is a visual aid that incorporates an individual's special interest item, it is used to assist individuals to make sense of social situations, routines, language, and the implied social rules or "hidden curriculum" in everyday life (Gagnon,

2001). Power Cards can be implemented to teach students how to appropriately navigate in specific social situations (Campbell & Tincani, 2011). The Power Card strategy is an antecedent intervention that utilizing principles such as priming. Schreibman, Whalen & Stahmer (2000) described priming as a way to set up establishing operations so future events become more predictable. The Power Card uses priming by presenting the scenario and Power Card to the individual right before an activity or task and having the Power Card model how the individuals special interest behaves in the specific situation. The Power Card acts as a discriminative stimulus. A discriminative stimulus is an antecedent stimulus correlated with the availability of reinforcement for a specific response (Cooper, Heron & Heward, 2007). Presenting the Power Card prior to the target activity or task signals that there is reinforcement is available for the individual. When the individual engages in the behaviors addressed on the Power Card, they unlock natural reinforcers such as social engagement and playing with peers. In the case of the Power Card, the special interest can act as stimulus in which the individual is very interested (Prince, 2018). While Gagnon (2001) stated that children with ASD are often difficult to motivate, which often makes it challenging to understand their reinforcers, individuals with ASD often have a different type of motivation (Baker, 2000). Due to this, the use of a special interest item can act as a motivating variable that can increase the students desire to perform tasks (Angell et al. 2017). What sets Power Cards apart from scripts or social stories is that Power Cards incorporate the use of the individual's special interest, and they are made specific for the individual utilizing them (Prince, 2018; Gagnon, 2001; Daubert, Hornstien, & Tincani, 2014).

Research on Power Card Strategy

The Power Card strategy was created by Elisa Gagnon (2001) and are a visual aid that is used to assist students with autism in making sense of social situations, routines, and language in everyday situations (Gagnon, 2001). The Power Card Strategy harnesses the reinforcing aspects of a child's special interest item and combines it with specified rules that outline behaviors that are appropriate in a social scenario that has previously proven to be problematic for the individual (Campbell & Tincani, 2011). The Power Card strategy has specific steps that explain how the child should behave in order to meet their targeted goal (Gagnon, 2001; Campbell & Tincani, 2001; Prince, 2018). The first step is to identify the problem behavior or problematic situation, and to identify the student's special interest. This can be accomplished through interviews with parents, teachers, and school staff as well as observations and student interviews. Next, a functional behavior assessment (FBA) is conducted to determine the function of the problem behavior. Then, a brief scenario card (Figure 1) is created; this card features the child's special interest and describes solutions to the problems that have been difficult for the child. Next, the Power Card (Figure 2) is created; this card contains a picture of the special interest item and summarizes the rules and guidelines stated in the scenario in three to five steps. Then, intervention can then be implemented. The intervention consists of three phases: the scenario card and Power Card, the Power Card only, and the fading and removal of the Power Card. In Phase 1, the scenario card and the Power Card are reviewed with the student prior to the target situations. In Phase 2, the scenario card is removed and only the Power Card is read to the student prior to the target situation, the decision to fade and remove the scenario card will vary based on each students' individual needs. In Phase 3,

the Power card is faded and removed to promote the individual's independence with the target skill, similar to the fading of the scenario card, the removal of the Power Card will vary from student to student. Gagnon (2001) recommended allowing the student to decide when to remove the scenario card and Power Card. In order for Power Cards to be an effective intervention, the card must be written at the child's reading level, incorporate their special interests, and include the target behavior in order to be successful in reaching their goals (Campbell & Tincani, 2011).



SpongeBob Meets New People

SpongeBob loves to meet new people. But sometimes it can be hard to start a conversation with someone new. SpongeBob wants to make friends and knows that he has to practice talking to people.

To help him feel comfortable talking to new people, SpongeBob does a few things:

1. He smiles, looks them in the eyes, and says "Hi".
2. He tells them his name and then asks "What's your name?"
3. He listens to the person, takes turns talking, and asks questions to get to know them.

Figure 1. Scenario card example (Kuligowski, 2010).

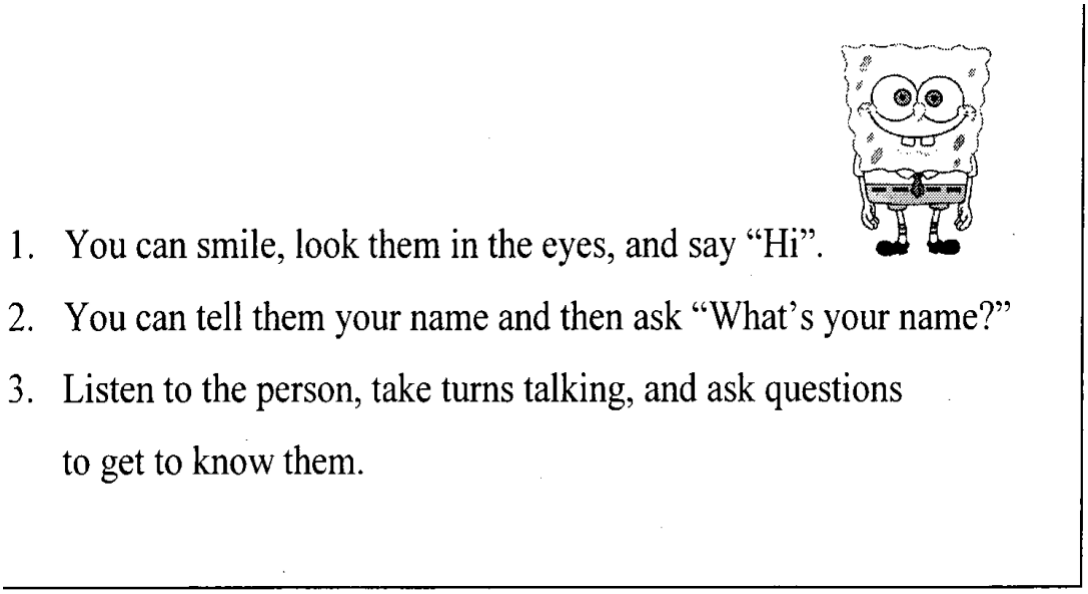


Figure 2. Power Card example (Kuligowski, 2010).

Research supports using the Power Card strategy to increase social skills for individuals with ASD. Communication deficits experienced by individuals with ASD can affect their lives in a variety of ways, and unfortunately few children receive suitable and effective social skills programming (Hume, Bellini, & Pratt, 2005; Bellini et al., 2007). Research shows that incorporating an SIA into an intervention has a profound positive effect on target behaviors such as appropriate social skills, following directions, and on-task behaviors. Considering the effect that social deficits can have on other aspects of one's life, such as poor performance in school, lack of social interaction and significant relationships, anxiety, depression, substance abuse, and a wide range of other mental health disorders (Bellini et al. 2007), the use of Power Cards to improve social skills in individuals with ASD should attract the attention of both researchers and practitioners. There are many aspects of the Power Card strategy that make it an appealing intervention for children with ASD. First, compared to social stories or scripts Power Cards

incorporate the use of the individuals special interest item and are individualized for the student using them. Power Cards also act as a motivating variable, by including the special interest item it increases the value of reinforcement. They also have a short narrative and are small in size, which allows them to be transported between locations with ease. Due to their small size, they can be used as a cue or reminder for the child to engage in the target behaviors in the specific social situation. The Power Card can also be written ambiguously to aid in generalizing the target behaviors across different settings, tasks, and people whereas other interventions follow a predetermined format. Lastly, The Power Card is small enough in size to be used discretely to not draw unwanted attention to the student or individual from peers (Daubert et al., 2014).

While research conducted on the Power Card Strategy has demonstrated positive outcomes, studies that have utilized the Power Card did not use a consistent set of procedures (no scenario card, access to the Power Card, determining special interests, etc.). Also, to date, a systematic review on the Power Card strategy as an intervention to improve social skills in students with ASD has not been conducted. The goal of this review is to determine the most effective way to implement the Power Card strategy to improve social skills for children with ASD. Therefore, the intention of this systematic literature review was to: (1) to identify and analyze literature that utilizes the Power Card Strategy, (2) to examine different intervention procedures used within the Power Card Strategy (3) and to create relevant suggestions for future research and practice.

CHAPTER 2

METHOD

Inclusion Criteria

Due to the small number of studies that have been conducted using the intervention of the Power Card Strategy, this review included all studies published in English language journals as well as thesis and dissertations that have evaluated the effectiveness of Power Cards or utilized tactics similar to the Power Card strategy. There were no exclusion criteria pertaining to target behaviors, study design, age of participants, participant's diagnoses, study setting, or the study's dependent variables. All studies that have evaluated the efficiency of the Power Card Strategy were used for this review, regardless of the year of publication.

Search Procedure

A computerized multi-database literature search was conducted in June of 2020. First, ERIC, *Psych*INFO, PsycArticles, and education source were searched online using a combination of the following search terms: The Power Card Strategy, Power Card* Power Card* + social skills, The Power Card Strategy + social skills, and Power Card* + autism, social skills (Table 1). Ancestral searches, or searching of each study's reference list, were completed to identify any additional studies to be included in this review. This search looked for studies containing: the use of the Power Card Strategy procedures, and previous literature or systematic reviews focusing on the Power Card Strategy. Studies of interest were identified and reviewed to see if they met the inclusion criteria for this review. Once a comprehensive list of relevant studies was created (n = 89), the author

reviewed each article to determine if each study met the criteria to be included in this systematic review.

Table 1. Combination of search terms for this review.

Search Matrix				
	Autism	Social Skills	Autism + Social Skills	None
The Power Card Strategy	10	7	7	11
After Duplicates Removed*	7	5	5	10
Power Card*	14	9	8	37
After Duplicates Removed	10	8	7	37
Data Bases: ERIC, APA PsycArticles, and Education Source, *Psych*INFO				
Limiters: Academic journals and dissertations & English language				
Folder Name: The Power Card Strategy Search June 2020. Search conducted 6/30/20				
Final number of articles after aggregation and removal of duplicates: 89				

Results of the PRISMA search and article extraction are shown in Figure 3. 1. Of the 89 articles identified through the initial database searches and targeted journal searches, 76 were excluded because of characteristics indicating that they did not meet the inclusion criteria for this review (did not utilize the Power Card Strategy). The resulting 12 articles were analyzed, and all necessary data were extracted into a table. Each article was analyzed for the following information: (a) participant characteristics (age, gender, background, etc.), (b) description of diagnosis, (c) study setting, (d) description of dependent variables, (e) description of independent variable / study procedures, (f) limitations, and (g) study results. Once articles were identified for

inclusion, the quality of each study was assessed by the author. Each single subject research design was analyzed using the What Works Clearinghouse (WWC) handbook(Kratochwill et al., 2010) (APPENDIX A). The purpose of the WWC is to review research evidence in the field of education and to provide important information to practitioners to aid in making evidence-based decisions (Ledford, Lane, & Tate, 2018). The following rules are used to determine if the study's design *Meets WWC SCD Standards Without Reservations, Meets WWC SCD Standards With Reservations, or Does Not Meet WWC SCD Standards.* In order to meet the standards, the following design criteria must be present: data availability – SCD studies must provide data in graphical or tabular form, independent variable – the independent variable must be systematically manipulated, interassessor agreement – the outcome variable must be measured systematically by more than one assessor, and residual treatment effects.

To determine whether studies in this review met the WWC SCD design standards the author followed the three steps outlined by Byiers et al. (2014). First the author assessed the adequacy of the experimental design, if the design met the standards (IV actively manipulated by researcher, DV measured over time, IOA data collected for at least 20% of data points in each phase, IOA meets minimal percentage), the author moved on to the second step to conduct an analysis of the graphed data to determine if there was an experimental effect. If the study did not meet all of the design standards, then no further action was needed, and it was determined the study did not meet WWC SCD Standards.

PRISMA 2009 Flow Diagram

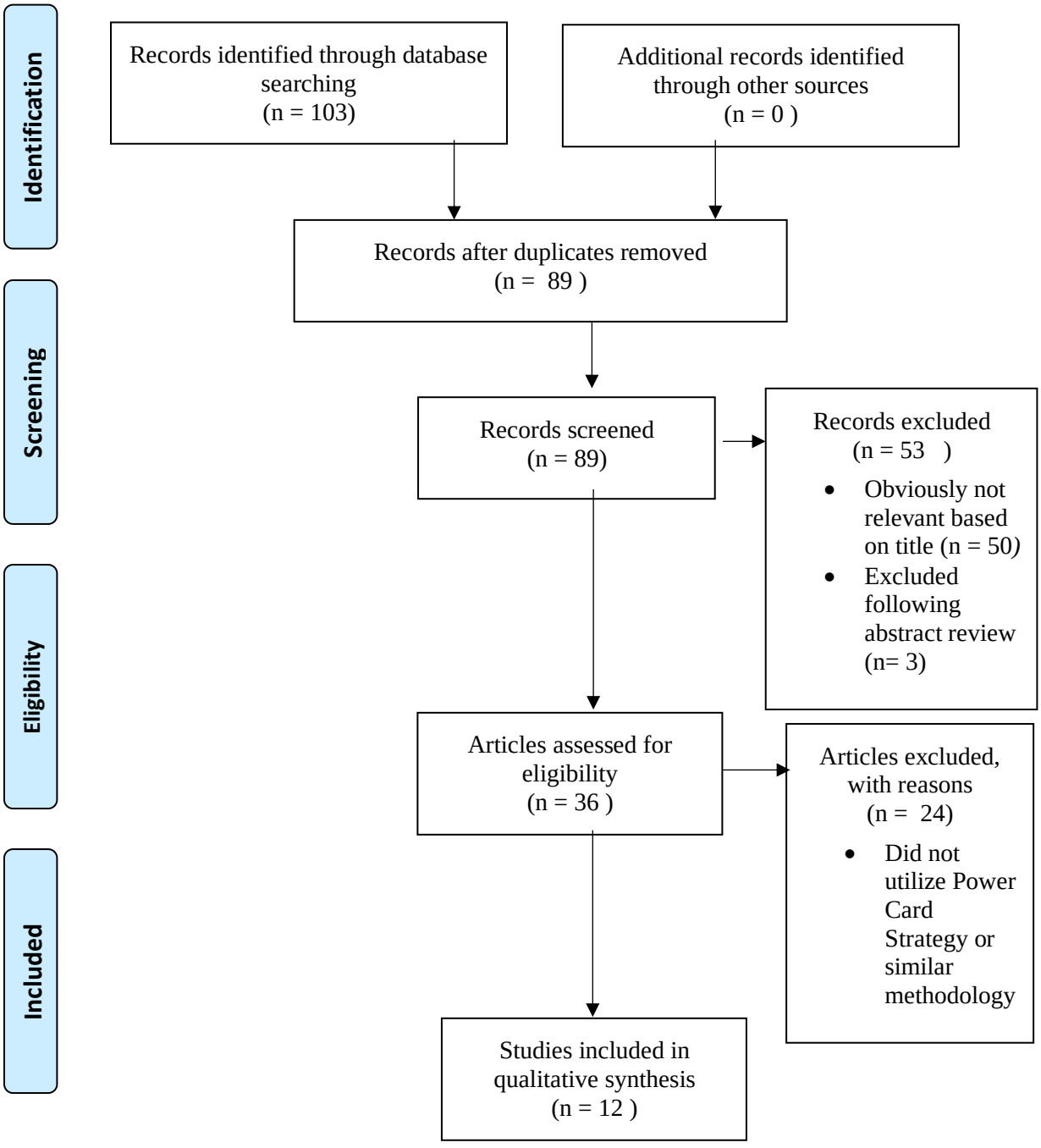


Figure 3. Results of the article extraction procedure

In step two, graphed data were analyzed to determine an experimental effect, in order to meet standards graphed data must have at least five data points per phase, meeting standards with reservations must have three to four data points per phase, and anything less than three data points per phase does not meet design standards. If the study displays the appropriate amount of data points (no less than 3 per phase), the author can move on to the third and final step, if the study does not display the appropriate data, it is determined the study does not meet WWC SCD standards and no further action is needed. The third step was to determine the replication of effect over time. Depending on the design used a certain number of phases must be present to meet design standards with or without reservations. A reversal/withdrawal design must have at least four phases, a multiple baseline design must display at least six phases, and an alternating treatment design must display at least four data points per condition with no less than two points per phase. If a study did not meet all standards it was determined that it does not meet WWC SCD standards, if a study displayed all appropriate criteria it was determined to either meet WWC SCD standards without reservations or WWC SCD standards with reservations. If a study met design standards with reservations, the study met all criteria (IV actively manipulated by researcher, DV measured over time, IOA data collected for at least 20% of data points in each phase, IOA meets minimal percentage) but did not include the appropriate number of data points per phase based on the type of experimental design used. For example, the WWC standards for a multiple baseline design a minimum of six phases with at least five data points in each phase to meet design standards without reservations. But, for a multiple baseline design to meet design standards with reservations it must have a minimum of six phases with at least three data

points in each phase. This three step process was conducted for study included in this review. Results of the study ratings are displayed in Figure 6 and included in the results.

In addition, Horner et al. (2005) created quality indicators to determine if a study meets the acceptable rigor needed to be determined as an example of credible single subject research. Horner lists 21 quality indicators (APPENDIX B) for single subject research in seven areas. They include descriptions of participants and settings, dependent variable measurement, independent variable measurement, baseline, experimental control, external validity, and social validity (Horner et al. 2005). To determine if the studies included in this review met the 21 quality indicators the author searched Horner's quality indicators table section by section for each included study. If the study included that standard, such as the independent variable being described with replicable precision, the author would mark it with a '+,' if the study did not include that standard, it was marked with an 'x.' Once the author went through the entire checklist the number of '+'s were added up, divided by 21, and multiplied by 100 to achieve a percentage. This was completed for all 12 studies included in this review, and results are included in the results section of this paper.

Interobserver Agreement

Interobserver agreement (IOA) data were collected for all database search term combinations. The secondary researcher was trained on how to conduct online database searches. The primary researcher modeled twice how to input search terms, select appropriate databases, select limiters, remove duplicates, scan articles, and select appropriate articles. During this modeling session, the secondary researcher was able to

ask any questions about the procedures. Before the database search was conducted, a practice search was conducted by the secondary researcher. The secondary researcher was given a topic to search, and the primary observer took notes on the secondary researchers search procedures and gave feedback. Next, another practice session was conducted. This time, the primary researcher and the secondary researcher each searched articles on the same subject, both researchers searched "animal intervention and autism and animal assisted activity and autism," for the sake of this practice there were no exclusion criteria presented. The primary researcher explained that no exclusion criteria means that all articles that discuss animal interventions and autism can be selected, there is no exclusion criteria pertaining to publish date, age of participants, setting, specific intervention components, etc.

After the search was concluded, the researcher and secondary observer got together to compare number of articles chosen for inclusion as well as agreements and disagreements. An agreement was defined as any instance in which the primary researcher and secondary observer both selected an article to be included in the review. A disagreement was defined as any instance in which the primary researcher and secondary researcher did not both select an article to be included in the review. For example, if the primary researcher concluded an article met the inclusion criteria and the secondary researcher does not. IOA data for database searching and selecting articles were calculated by, dividing the number of agreements the divided by the number of total studies, 12, then multiplying by 100. Training was concluded after IOA reached 100%, approximately two sessions. Then IOA data was collected for the Power Card database search combinations, initial agreement was obtained for 12 of 12 or 100% of articles.

After articles were identified as meeting design standards with or without reservations, IOA was calculated on quality of articles and strength of evidence. The secondary researcher was trained on how to assess articles using the What Works Clearinghouse handbook (Kratochwill et al., 2010) and the Horner et al. (2005) quality indicator checklist. The secondary researcher was presented first with the WWC quality indicator checklist first, the primary researcher went through the checklist, explained each step and how articles were determined to either *Meet WWC SCD Without Reservations, Meet WWC SCD With Reservations, or Does Not Meet WWC SCD,* the secondary researcher was allowed to ask questions during this time. Next, the secondary researcher was given a practice article and was asked to determine if the article met design standards without reservations, with reservations or did not meet standards. During this time the primary researcher answered any questions about the article or checklist. The primary researcher then reviewed the article and discussed sections of the checklist, if any, the secondary researcher did not analyze correctly. IOA was then training was conducted on another practice article. Both the primary and secondary researcher had to determine if the article met the WWC design standards, any disagreements on the studies quality standards were discussed until 100% agreement was reached. Agreements were calculated by dividing the number of agreements by the total number of articles (12), and then multiplied by 100. Training concluded when 100% IOA was reached, approximately one session. IOA for the WWC quality standards was calculated at 91.7%.

Training for the Horner et al. (2005) quality checklist identical to the WWC training. The primary observer went over the checklist step by step and explained how

each portion of the checklist received a '+' meaning it was identified in the study or a 'x' meaning it was not identified in the study. Next the secondary researcher was given a practice article was able to ask question about the article or specific quality indicators, then the primary researcher reviewed their checklist and went over any sections, if any, the secondary researcher did not analyze correctly. Then, IOA training was conducted on another practice article, both the primary and secondary researcher had to determine how many quality indicators, out of 21, were identified in the study. An agreement was defined as any instance in which the primary and secondary researcher both putting a (+) for each of the 21 criteria listed, and a disagreement was defined as the primary and secondary researcher having different mark (- or +) for each of the 21 criteria listed. Any disagreements were discussed, and training was conducted until IOA reached 100%, approximately two sessions. IOA data was calculated by dividing the number of agreements by the number of studies included (12) and multiplied by 100. IOA data for the Horner et al. quality checklist was calculated at 91.7%.

CHAPTER 3

RESULTS

This author reviewed 12 articles published in six different journals: *Journal of Positive Behavior Interventions* (*n* = 1; 8%), *Focus on Autism and Other Developmental Disabilities* (*n* = 3), *TEACHING Exceptional Children* (*n* = 1; 8%), *Journal of Graduate Theses and Dissertations* (*n* = 1; 8%), *Journal of Developmental and Physical Disabilities* (*n* = 1; 8%), *Intervention In School and Clinic (n* = 1; 8%), *Theses and Dissertations – Early Childhood, Special Education, and Rehabilitation Counseling* (*n* =1; 8%), one published master's thesis, and two PhD dissertations. All articles that met established criteria were published between 2003 and 2018. Table 2 summarizes and displays each study according to the following: (a) participant characteristics (age, gender, background, etc.), (b) description of diagnosis, (c) study setting, (d) description of dependent variables, (e) description of independent variable / study procedures, and (g) study results.

Table 2. Extracted data from reviewed studies.

Participant Description			Power Card Intervention Description			
Citation	**Age / Gender**	**Disability / Setting**	**Independent Variable**	**Design**	**Dependent Variable**	**Results and Certainty of Evidence**
McGee, 2017	Female – 14 Male – 17	ASD; In a general education high school classroom	Conducted FBA on both participants. Participants were given verbal prompts to talk about partners interests. Probed every 5-7 sessions (no materials during probe condition). Read scenario out loud to participant (had opportunity to ask questions**).** Removed scenario card but left power card in front and provided task direction.	Multiple Probe Across Settings Design IOA: 98.3% for conversation behaviors, 93.3% for frequency of comments and 50% of Power Card condition.	Conversational skills / behaviors (a) greeting, (b) conversation, (c) waits, and (d) ending	*Results*: While both participants results indicate an increase in conversational behaviors, both participants met mastery right after the implementation of the Power Card. Due to this covariation, it cannot be determined that the Power Card caused the increase in conversational skills. *Certainty:* Does not meet design standards While Participants, setting; DV, and IV are described with precision, IOA for one condition does not meet minimal thresholds (80%).

Table 2 Continued.

Spencer, Simpson, Day & Buster, 2008	Male – 5 years old	ASD; General Education Playground	Lightning McQueen Power Card was read and discussed before going out on the playground. If participant hid behind a tree or bench a visual prompt was provided by showing the student, the Power Card. Participant was able to read the Power Card to himself if he hid. Data was taken on the amount of time spent on and off the playground with five classmates and on playground with 110 classmates.	AB Design with Maintenance *No IOA data collected.	Appropriate social skills on the playground	*Results*: Participant spent more time on the playground going down the slide, climbing, and participating in reciprocal conversation with classmates. Time on playground increased by eight minutes. Results were maintained over time. *Certainty*: Does not meet WWC SCD design standards. No IOA data collected.
Keeling, Myles, Gagnon & Simpson, 2003	Female – 10 years old	ASD; General Education Playground	Power Puff Girls Power Card was introduced before they played a gross motor game, board game, or card game. Participant read script / Power Card. In subsequent sessions participant was able to choose between reading entire script and only reviewing the power card before each game.	Multiple Baseline Across Conditions Design *No IOA data collected	Social skills / sportsmanship – duration of whining and screaming when losing a game	Results: Power Card decreased screaming / whining after losing a game from a baseline of 18.2 seconds to an average of 1.3 seconds across conditions. *Certainty*: Does not meet WWC SCD design standards. No IOA data collected.

Table 2 Continued.

Devenport, 2004	One male – 10 years old	ASD; general education classroom	Power Card script and Power Card were introduced to the participant and then Power Card was placed in close proximity to the student.	A-B-C-A Reversal Design IOA: 100% on teacher fidelity protocol	On task behavior	*Results:* During baseline participant was on task for 35.2% of sessions, Power Card phase showed a mean on task average of 87.2% an increase of 52%. *Certainty:* Meets design standards with reservations. Described participant, DV, IV, and setting with precision.
Daubert, Hornstein & Tincani, 201	Two males – 9 years old & 10 years old	PDD-NOS & ASD; self-contained classroom	No scenario card was used, teacher presented Power Card for each corresponding game and was placed next to student. Power Card was used as a prompt for student if they failed to initiate a turn. If student did not respond to prompt, a verbal prompt was provided.	Multiple Probe Across Conditions Design IOA: for both students averaged 93% across all three games.	Social skills - Initiating a turn, appropriately relinquishing a turn, and appropriate commenting.	Results: The Power card was effective in increasing students appropriate initiating and relinquishing a turn during game play. Both students saw increases in all three target behaviors. *Certainty*: Meets Design Standards with No Reservations. Participant, settings, DV, and IV were described with replicable precision.

Table 2 Continued.

Davis, Boon, Cihak & Fore, 2010	One male – 11th grade Two males – 12th grade	ASD; special education resource room and a conferenc e room	The Power Card script was read aloud by the student, then teacher presented Power Card while seated in the conversation area with conversation partner – prior to conversation partner sitting down, teacher prompted student to read Power Card. Following conversation reviewed pre-training conversational skills and answered student questions.	Multiple Baseline Across Participants IOA: 91% for each student.	Conversational skills - time engaged in others focused conversations	*Results*: Prior to intervention each student exhibited difficulty in initiating and maintaining conversations with peers. Time spent in others focused conversations increased 213% after the use of the Power Card. *Certainty*: Meets Design Standards with No Reservations. Described participants, setting, DV, and IV with replicable precision.
Kuligows ki 2010	Four males – 9, 11, 12 & 12 years old One female- 10 years old	ASD & PDD-NOS; communit y clinic – social skills group	Each participant read Power Card before social skills group and kept it near them for the entire session. Participants were sporadically reminded to read power card.	AB (pre / post) design IOA: 84% for frequency of target behaviors.	Social skills (a) engaging with conversations with others, (b) speaking off topic, (c) interrupting others, (d) tolerance for others	*Results*: Participant A & C did not increase conversational skills; Participant D decreased interrupting behavior and participant E showed a reduction in intolerance towards others. *Certainty:* Does not meet design standards, AB design is not a valid experimental design.

Table 2 Continued.

Prince, 2018	Two males – 6 & 7 years old One female – 9 years old	ASD; basement office of behavior consultation company	First, scenario card and Power Card were introduced to student. Child was prompted to read the scenario and Power Card prior to sitting at game table. Participants had the opportunity to ask questions and was given the option to place Power Card on game table. Data were collected on comments made to peers during a 10-minute game session. Socially appropriate comments were reinforced, but only comments made toward their peer. Once Power Card was removed, conditions for the Power Card only condition were identical.	Multiple Probe Design Across Participants IOA: 97% for commenting to peers	Appropriate social comments made to peers during gameplay	*Results*: Prior to intervention students were making an average of two comments per 10 minute game. After intervention made an average of 10.7 comments per 10 minute game and engaged in novel comments. All participants maintained high levels of commenting once Power Card was removed. *Certainty:* Meets design criteria without reservations. Described participants, DV, IV, and setting with replicable precision.

Table 2 Continued.

Angell, Nicholson, Watts & Blum, 2011	Two males – 10 & 11 years old One female – 11 years old.	ASD & IDD; Self-contained classroom	Classroom teacher produced adapted Power Card – no scenario card was used in this intervention. Latency recording did not begin until power card was read and the teacher gave verbal cue to check schedule and stopped when student physically engaged with schedule. Given verbal praise when checked schedule.	A-B-A-B-A-B withdrawal design IOA: 95.7% on transitions	Latency of directive and physically checking schedule.	*Results*: Adapted power card strategy decreased latency of response to teacher cues to classroom interactivity transitions. *Certainty:* Meets design standards with reservations. Participants, setting, IV, and DV described with precision.
Campbell and Tincani, 2011	Two males – both 6 years old One female- 6 years old	ASD & PDD-NOS; self-contained special education classroom	In the first intervention phase, immediately before the play session the scenario card was read with student and they were allowed to ask questions. In the second intervention phase, scenario was withdrawn, and Power Card was introduced. Card was again read prior to play session and was placed near student in play area so it was accessible for review .	Multiple baseline across participants IOA: 95.3% for all following direction phases.	Directions followed during unstructured play situations.	Direction following increased for each student during the intervention phases, with effects more apparent for James and Shawn. Results were maintained after power card was withdrawn. *Certainty:* Meets design standards with reservations. IV, DV, participants, and setting described with precision.

Table 2 Continued.

Darley, 2014	Three males – 4, 4 & 3 years old. Two females – both 4 years old	ASD; self-contained preschool classroom	Video modeling, Power Card, and social stories were randomly assigned to participants. Power Cards were read to the student when they got to school.	Multiple baseline across behaviors IOA: average 97% per each condition	Social competence during peer play. Executive functioning (joint attention, imitation of a peer and responding to a peer).	*Results:* Power cards showed significant increase in intervention phase. Behaviors were maintained above baseline level for 3/5 participants. Certainty: Meets design standards with reservations. Participants, setting, IV and DV described with precision.
Lanou, Hough, and Powell, 2012	One male-*no age listed	ASD; general education classroom	Intervention team wrote a scenario about the iceberg that sank the titanic. Story discussed thoughts and feelings of others when personal space is invaded. Story ended with verbal cue "iceberg right ahead!" After story participant received card with a picture of an iceberg on the front and an abbreviated story on back. Was able to review the story daily and auditory and visual cues were used to reinforce the strategy throughout the day. Copies of the card were posted by his line up spot and desk to access them when necessary.	No design listed* No IOA data collected*	Self-awareness and peer interaction	*Results:* Dramatic decrease in number of complaints regarding Jimmy invading peers' personal space. *Certainty:* Does not meet design standards. Does not adequately explain IV, DV participant, setting, or design. No visual representation of results.

Participant Demographics

Across the 12 studies, there were a total of 30 participants who received the Power Card intervention, of the 30 participants 22 were male and 8 were female. The average age of the 30 participants in the 12 studies included in this review was 8.5 years old (range, three - 17 years old). The majority of the studies analyzed (*n* =8; 67%) included individuals with only diagnoses of autism, the remaining studies (*n*=4; 33%) included individuals diagnosed autism, intellectual or developmental disabilities (IDD) and pervasive developmental disorder – not otherwise specified (PDD-NOS). Information regarding the participant's race/ethnicity was provided in four studies (33%), none of the evaluated studies reported the socioeconomic status of the participants. Of the studies that described participants race or ethnicity, 75% of participants were Caucasian and 25% of participants were African American.

Setting

Of the 12 studies that were included in this review, one took place on an elementary school playground, two were conducted in a conference room/office, (one study was conducted in both in a self-contained classroom and an office) one office was located in a school and one was located in an office building, three were conducted in general education classrooms, and six studies took place in self-contained classrooms. Nine studies (72%) took place at the elementary level, two studies (18%) took place at the high school level, and one study (9%) took place at the preschool level. As far as who implemented the Power Card strategy in each study, five of 12 (42%) studies were

implemented by the participants teacher or classroom assistant and seven of 12 (58%) were implemented by the study's researchers.

Dependent Variable

In studies that utilized the Power Card intervention, the dependent variables were related to appropriate social skills and following directions. The most common measure was social skills which included: conversation skills / general appropriate social skills (*n* = 4; 33%). Additional dependent variables included appropriate commenting, initiating, and turn taking during game play (*n* = 3; 25%), sportsmanship (*n* = 1; 8%), following directions (*n* =1; 8%), on-task behavior (*n*= 1; 8%), latency to teacher cues (*n*=1; 8%), and executive functioning (*n* =1; 8%).

Summary of Studies by Dependent Variable

Social Skills

Seven out of the 12 studies (58%) used the Power Card Strategy to improve social skills. Two studies evaluated appropriate social commenting, relinquishing a turn, and initiating a turn during game play (Daubert et al., 2014; Prince, 2018). A multiple probe across conditions design was used to demonstrate an increase in students appropriately initiating and relinquishing a turn during game play with the use of Power Cards (Daubert et al., 2014). Both participants displayed an increase in all target behaviors (initiating a turn, appropriately relinquishing a turn, a turn, and appropriate commenting) Some limitations of this study include: only two participants were utilized, game play skills could have been learned by peer modeling and not through the Power Card strategy, and

this study did not evaluate whether turn taking skills generalized across different games and activities.

The second study conducted in a game play setting used multiple probe across participants design to analyze what effect the Power Card strategy would have on increasing socially appropriate comments made by children with ASD during gameplay, and if these skills would generalize (Prince, 2018). Results showed an increase in appropriate social comments made during game play also, all participants maintained high levels of commenting once the Power Card was removed. While this study displayed positive results, there are some limitations. First, the study included only three participants therefore, future replication of this study is needed to verify the results. Second, due to the intervention being conducted during a social skills group, there were many distractions in the environment such as other peers playing games, tantrum behaviors and this made it difficult to control for extraneous variables.

Four studies examined conversational or general social skills (McGee et al. 2017; Davis et al. 2014; Spencer et al. 2008 & Kuligowski, 2010). One such study used a multiple probe across settings design to evaluate if there was a functional relationship between the use of the Power Card strategy and the increase of conversational skills for high schoolers with ASD (McGee et al., 2017). They found a significant increase in conversational skills for both participants following the introduction of the Power Card. After evaluating the results of this study, several limitations were determined. First, covariation occurred for both participants across untrained peers, conversational behaviors are not a reversible behavior and therefore the experimental control of the

study was weak. Second, there was only one conversation partner used in each setting; therefore, it is possible that participants became satiated with having conversations with the same partner and caused percentages to fall back to baseline levels. Last, participants did not have a say in choosing their SIA; instead, SIA's were chosen by the participants teachers. This choice could have had an effect on the reinforcing aspect of the Power Card if the SIA chosen was in fact not the participants most significant interest.

Similarly, Davis et al. (2014) conducted a multiple baseline across participants design was used to examine whether the Power Card strategy would be effective in increasing time spent in conversations that focused on the other person. Prior to the intervention, each participant exhibited difficulty initiating and maintaining conversations with their peers. In the intervention phase and generalization probes, the average time spent in others focused conversations increased 200%. While this study exhibited positive results, there were some limitations. First, the small number of participants makes it difficult to generalize the results, future research and empirical studies are needed to verify these results. Last, every participant was highly corporative and highly motivated which may have produced intervention novelty effects; therefore, evaluations of results over a long period of time are desired.

In a similar study, an AB design with maintenance was used to examine if the Power Card strategy would be effective in increasing appropriate social skills on the playground (Spencer et al. 2008). After the introduction of the Power Card the participant averaged an eight-minute increase on the playground, these results were maintained during the maintenance phase. The participant also engaged with his peers by playing tag

and appropriately took turns on the slide. While this study yielded positive results, some limitations were identified. First, an AB design was used for this study which is not a valid experimental design as it cannot control for threats to a study's internal validity. Second, no interobserver agreement (IOA) data were collected for this study and there is no way to determine the accuracy of data. Last, there was no description of how the participants SIA was chosen.

A third study used an AB design to examine whether the Power Card strategy is effective in a social skills training group to improve targeted social skills (Kuligowski, 2010). Results of this study indicated that the Power Card may have decreased disruptive behavior in two of four participants but saw a decrease in participants engaging in conversations with peers. The study had a number of limitations. First, this study utilized an AB design which is not a valid experimental design as it is unable to control for threats to internal validity. Second, the small number of participants and lack of diversity makes it difficult to generalize the results. Also, attendance was an issue: participants were absent for a number of sessions which may have affected results. Throughout the intervention, new peers and new social skills group leaders were introduced, this may have also affected the study outcomes. One last limitation was the low frequency of target behaviors. The behaviors targeted were based on suggestions from social skills group leaders and participants parents, however, when the researcher observed the session, it was concluded that alternative behaviors may have been more beneficial to target.

Finally, one study examined teaching sportsmanship skills to a young girl with ASD (Keeling et al. 2003). A multiple baseline across conditions design to evaluate whether the Power Card strategy would be effective in decreasing the duration of whining and crying after losing a game. Results of this study indicated that the Power Card was effective in teaching appropriate sportsmanship skills ("maybe next time," "good job"), the duration of whining and screaming after losing a game was decreased to zero seconds in two of three conditions. The skills learned during the intervention also generalized across settings and people. Some limitations were identified in this study. For example, this study only utilized one participant making it difficult to generalize the results. Second, no maintenance or generalization phase was conducted; therefore, there is no way to determine if these results were maintained over time or generalized across different games and settings. Finally, after the fourth intervention session the participant was offered the choice to ether read the full script and Power Card or just the Power Card, and each time the participant chose to read only the Power Card. This decision to fade the scenario card was not determined based on data and may have affected the study results.

Direction Following

One study studied the use of the Power Card Strategy to improve direction following. Campbell and Tincani (2011) used a multiple baseline across participants design to assess if the Power Card strategy would be an effective intervention in teaching direction following to elementary students with ASD, and whether the skills are maintained once the Power Card was removed. Results of this study displayed an

increase for each student during the intervention phase, but effects more significant for two out of three participants. Also, results were maintained eight weeks after the Power Cards were removed. It should be noted, that while direction following was the target behavior in this study, social skills were more specifically targeted. For example, when a participant's refusal to clean up lead to her having more time with preferred activities, she was taught to ask, "when can I have another turn?" Improving social skills was important to increasing the student's following teacher directions. While the results of this study are positive, there are some limitations, the first being the small number of participants included in this study. Second, the lack of generalization data across settings. Due to the fact that the Power Card intervention is fairly new, future research should focus on target skills generalizing across different behaviors when using the Power Card strategy. A third limitation is that the target behaviors in this study were only occurring during the play period, each participant was recorded to follow teacher directions in other school settings, which indicates that experimental control was strong for structured activities. A fourth limitation is the target behavior selected: direction following. Students with ASD have a wide range of social and communicative deficits, therefore direction following represents and narrow range of behaviors that could have been targeted.

On-task Behaviors

Only one study evaluated utilizing the Power Card strategy to increase on-task behaviors. Devenport (2004) used an A-B-C-A reversal design to examine if the Power Card strategy is effective in promoting successful classroom functioning in a general education classroom with an elementary student with ASD. Results of this study showed

that during the intervention phase there was an 52% increase in on-task behaviors. Following the intervention phase, the baseline phase was reintroduced, on-task behaviors were maintained when the Power Card was removed. While this study yielded positive results, there were some limitations. First, this study only had one participant which makes it difficult for results to generalize across different populations. Next, this study used a reversal design for the behavior of on-task behaviors, one limitation with reversal designs is irreversibility of the behavior, it can be impossible to unteach a behavior. When the baseline condition was reintroduced, the participants duration of on-task behavior remained high, therefore the researcher was unable to establish experimental control.

Latency to Teacher Cues

Angell et al. (2011) evaluated latency to teacher cues. They utilized a ABABAB withdrawal design to determine if the Power Card strategy effectively decreased latency in responding to teacher cues to check a visual schedule in response to transitions in the classroom for students with developmental disabilities. Results of this study showed that the Power Card decreased the latency of response to teacher cue "check you schedule" and the student physically checking their schedule. Mean latency periods for each participant were maintained during each withdrawal phase. Although this study was effective in decreasing latency to teacher cues, there were limitations identified. First, the results can only be generalized to students with similar characteristics. Second, this study did utilize an adapted Power Card strategy (no scenario card included), while data trends displayed a decrease in latency data for some students was extremely variable. More

research is needed on the effectiveness of the adapted Power Card strategy. Also, this study used verbal positive praise for completion of transitions in combination with the adapted Power Card strategy, it is possible that this may have acted as a positive reinforcer and the results may have been attributed to this positive reinforcement, instead of the Power Card (or a combination of both). Last, this study did not conduct any generalization or maintenance data collection, so it is impossible to know if behaviors learned from an adapted Power Card strategy are maintained over time and generalized across different settings, individuals, and behaviors.

Executive Functioning (EF)

Darley (2014) compared three forms of external structure (social stories, video modeling, and Power Cards) for the ability to increase executive functioning (imitation, joint attention, and responding) in preschoolers with ASD. Results of this study showed that overall all students were able to increase their executive functioning using all three external forms of structure. Social stories showed the most significant, steady gains throughout the study. Power Cards also showed significant increases in executive functioning, and results were maintained above baseline level for three of five participants. Last, video modeling showed significant and consistent gains for responding behaviors but resulted in little imitation behaviors that fell below baseline levels. This study did have its limitations, first a multiple baseline design was used to compare three strategies across three different behaviors as opposed to the same target behavior across three different individuals. This makes it difficult to replicate the study's findings which is imperative for a study to show strong evidence of an effective intervention (Horner et

al. 2012; Kratochwill et al. 2013). Also, the intervention phase lasted only eight to 13 days each, more time with these interventions may have shown different results, meaning that more time with these interventions could have had a positive impact on results.

Personal Space

Lanou, Hough, and Powell (2012) used the core ideas of the Power Card strategy to teach personal space and awareness to a young boy with ASD. Due to the participants interest in the Titanic, the team wrote a short story about the icebergs that caused the Titanic to sink. The story highlighted the thoughts and feelings of others when their personal space is violated. The results of this study showed an immediate decrease in complaints about personal space during a social interaction with peers and staff, as well as an increase in appropriate social interactions. There were several imitations identified in this study. First there was no numerical data or graphs presented therefore there is no way to verify the positive results reported by the researchers. Second, there was no mention of which experimental design was used, and there was no mention of IOA data collected. There is also no description of the participants demographics or the setting in which the intervention took place, this makes it difficult for this study to be replicated.

Intervention Strategies

Scenario Card

The Power Card strategy consists of two main phases, the first phase consists of using the scenario card plus the Power Card, and the second phase consists of only using the Power Card. The scenario card consists of two paragraphs, the first has the special

interest item or hero attempting to find a solution to the problem and finds success. The second paragraph encourages the student to attempt the new behavior which is broken down into three to five convenient steps. The Power Card consists of a small picture of the special interest item along with the solutions to the problem behavior or situation broken down into three to five steps. The Power Card is provided to aid in generalization (Gagnon, 2001). The majority of the studies (n = 9) in this study utilized the Power Card strategy without any augmentation or modifications to steps proposed by Gagnon (2001). Campbell & Tincani (2011), Davis et al. (2010), Devenport (2004), Prince (2018), Spencer et al. (2008), Mcgee (2017), Lanou et al. (2012), Kuligowski (2010), and Darley (2014) all utilized both the scenario card and the Power Card in their studies. Three studies utilized a modified Power Card strategy, Angell et al (2011) omitted the scenario card and only presented students with the Power Card when decreasing the latency between transitions for students with ASD. Each Power Card included a directive sentence stating that the student should check his or her schedule along with a picture of their special interest item. Daubert, Hornstien, and Tincani (2015) used a modified Power Card strategy on turn taking and social commenting while playing board games. Due to the fact that this study was focused on three target behaviors, the Power Card strategy was simplified to omit the scenario card and to only include the three to five step problem solving strategies. The student's special interest was printed on one side of the card and the other side contained instructions on how to play each game written from the characters point of view. Lastly, Keeling et al. (2003) used a modified Power Card strategy to teach sportsmanship to a young child girl with autism. In this study while the participant was read the both the scenario and the Power Card during the first three

sessions, beginning with session four of the intervention the participant was allowed to choose between reading the entire script and reviewing the Power Card, or just reviewing the Power Card. They chose to read only the Power Card on every occasion.

Access To Power Card

Of the 12 studies presented in this review, three (25%) allowed the participant to ask questions after the Power Card was read to them and placed the Power Card within close proximity of the student after it was read to them, making it available to review (Campbell & Tincani, 2011; Prince, 2018; & McGee, 2017). Four studies (33%) placed the Power Card within close proximity of the student after it was read to them, making it available to review (Devenport, 2004; Davis et al., 2014; & Daubert et al., 2015, Lanou et al., 2012), one study (8%) had the classroom teacher hold on to the card after it was read, but the participant was offered the opportunity to review the Power Card if they engaged in the target behavior (Spencer et al., 2008). Lastly, one study (8%) did not allow the participants to access or review the Power Card after it was read (Angell et al., 2011). Three studies (Keeling et al., 2003; Darley, 2014, & Kuligowski, 2010) did not address whether participants were able to access the Power Card after it was read to the participant.

Functional Assessment (FA)

When listing the steps of the Power Card strategy Gagnon (2001) states that the third step of the strategy is to conduct a functional behavioral assessment (FBA). The purpose of conducting an FBA is to determine the contingencies underlying the student's

social skills deficits or problem behavior (Campbell & Tincani, 2011). Only three studies (33%) in this review conducted an FA to determine the function of each participants target behavior (Campbell & Tincani, 2011 & McGee, 2017, & Darley, 2014). Neither of the eight remaining studies (66%) conducted any form of an assessment to determine the function of the participants target behaviors. Angell et al. (2011) listed not including to include an FBA as a limitation of their study and stated that because of this their results should be "considered with caution."

Special Interest Area (SIA)

In order to determine their participants special interest item, majority of the studies in this review (n = 7; 58%) conducted an interview / survey with each participant's parents and school staff as well as direct observations of each participant during free play/free time (Angell et al., 2011; Campbell & Tincani, 2011; Davis, 2015; & Devenport, 2004). One study utilized only a parent / staff survey to determine their participants SIA (Mcgee, 2017), and one study used only direct observations of participants to determine their SIA (Keeling et al., 2003). Spencer et al. (2008), Kuligowski (2010), Lanou et al. (2012), Darley (2014) & Daubert et al. (2014) did not specify exactly how they determined each participant's SIA, they stated that they used the participants special interest, but did not indicate how they determined that the SIA would be appropriate or motivating enough to be placed on the Power Card. Lastly, there was only one study that applied a parent/staff interview, direct observations of each participants, and a parent / social skills staff survey (Prince, 2018). They stated that the purpose of the survey was to gather more information on the child's special interest.

IOA and Treatment Fidelity

Eight of 12 reviewed studies (67%) calculated IOA (interobserver agreement) on the dependent variables These eight studies reported IOA of the dependent variable for an average of 31% (range 20-47; average 30.8) of sessions across experimental phases. The average IOA of all studies in this review was approximately 96.4% (range 84-100; average 94.46) accuracy with all studies reporting accuracy of more than 80%. It should be noted that at least 80% accuracy is the experimental standard of single-subject research (Horner et al., 2005). The majority of studies (n = 9; 75%) evaluated integrity/procedural fidelity. When treatment fidelity was reported, it was strong, an average of 97.8% fidelity across an average of 37.23% of sessions.

Social Validity

Social validity was measured in seven of the 12 studies (Angell et al., 2011; Campbell & Tincani, 2011; Darley, 2014 Davis et al., 2010; Daubert et al., 2014; Devenport, 2004; Prince, 2018). Three studies utilized a Likert scale (four to seven points) to rate teacher, school staff, and participant opinions on specific questions relation to the efficacy of the intervention (Campbell & Tincani, 2011; Davis et al. 2010; Prince, 2018), while Angell et al. (2011), Daubert et al. (2014), Devenport (2004), & Darley (2014) utilized teacher and student questionnaire's to assess for the Power Cards social validity. Lastly, Angell et al. (2011) measured social validity with a pre and post intervention interview with teachers and school staff. The remaining five studies did not reference any specific measures of social validity regarding teachers, school staff, parents, or study participants perception of the intervention. For the seven studies that did

report social validity, teacher, parent, and participant opinions were positive in regard to efficacy of implementing the Power Card strategy as well as the intervention outcomes.

Reported Study Outcomes

Researchers of the 12 studies in this review reported that the Power Card strategy intervention increased social skills behaviors (e.g., initiating conversations, relinquishing turns, commenting during game play, initiating a turn, reciprocal conversations, etc.) for students with ASD and IDD. For this review, study results evaluated as positive (all participants improved in targeted skills), mixed (some participants improved in targeted skill), and negative (none of the included participants improved in targeted skill) (Knowles, 2014). Almost every study reviewed (n = 11; 92%) reported positive outcomes. Only one reviewed study reported mixed outcomes (Kuligowski, 2010). None of the reviewed studies reported negative outcomes.

Maintenance was assessed in seven of 12 (58%) studies included in this review (Spencer et al., 2008; Davis et al., 2010; Mcgee, 2017; Campbell & Tincani, 2011; Prince, 2018; Daubert et al., 2015; Kuligowski, 2010 & Darley. 2014). Maintenance data were collected between one day to eight weeks after the Power Card was faded and removed; and target skills were maintained in four of the seven (57%) of studies that measured maintenance. Generalization was assessed in two of 12 studies (16%) of studies (Prince, 2018 & Darley, 2014). Darley (2014) carried out the generalization phase in a general education classroom with novel students, adults, and play materials and Prince (2018) utilized generalization probes which were gathered while at a bowling alley, as opposed to playing the game Sorry!. Both studies determined that the target skills taught

using the Power Card strategy generalized across different settings, people, and games. Prince (2018) even noted that participants engaged in making novel comments during game play in the generalization phase.

Percentage of Non-Overlapping Data (PND)

Percentage of non-overlapping data (PND) was collected by the author in a majority (n=11; 92%) of the studies included in this review. It should be noted that Lanou et al. (2012) did not include numerical or graphed data in their case study therefore, PND could not be determined. To calculate PND, intervention data points that exceed the highest or lowest baseline data point are calculated. If a study is aiming to increase an dependent variable, the number of data points that exceed the highest baseline data point are calculated. If the aim of the study is to decrease the dependent variable the intervention data points that fall below the lowest baseline data point are calculated. The number of non-overlapping data points is divided by the total number of intervention data points to determine the PND. PND results are displayed in Figure 5. Of the 11 studies, eight (72%) had a PND between 90 and 100% (Angell et al. 2011; Campbell & Tincani, 2011; Davis et al. 2010; Devenport, 2014; Keeling et al. 2003; McGee, 2017; Prince, 2018 & Spencer et al. 2008), the remaining three studies PND were calculated at 77% (Daubert et al. 2014), 65% (Darley, 2014), and 60% (Kuligowski, 2010) respectively. Scruggs and Mastropieri (1998) provided suggestions for interpreting PND results, they stated that PND scores above 90% signified very effective treatments, scores between 70 and 90% signified effective treatments, scores between 50 and 70% were questionable, and scores below 50% were ineffective.

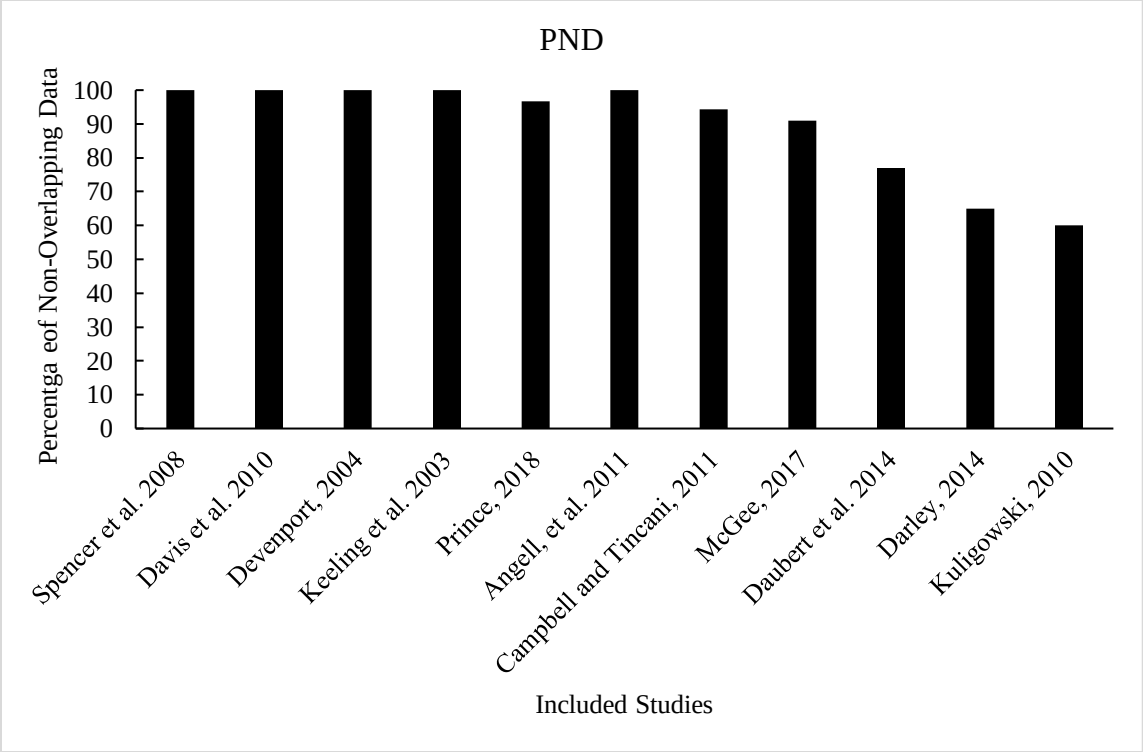


Figure 4. Percentage of non-overlapping data calculated for each study. *Note that Lanou et al. (2012) did not include a graph or results so PND could not be calculated for that study.

Quality of Evidence

Out of the studies chosen for this review five out of twelve (42%) addressed 21 of the 21 quality indicators within single subject research. Two of the remaining studies (17%) addressed 20 of the 21 quality indicators, one study (8%) addressed 19 of the 21 quality indicators, one study (8%) addressed 18 of the 21 quality indicators, two studies (17%) addressed 17 of the 21 quality indicators, and lastly one study (8%) addressed 12 of the 21 quality indicators (Figure 5).

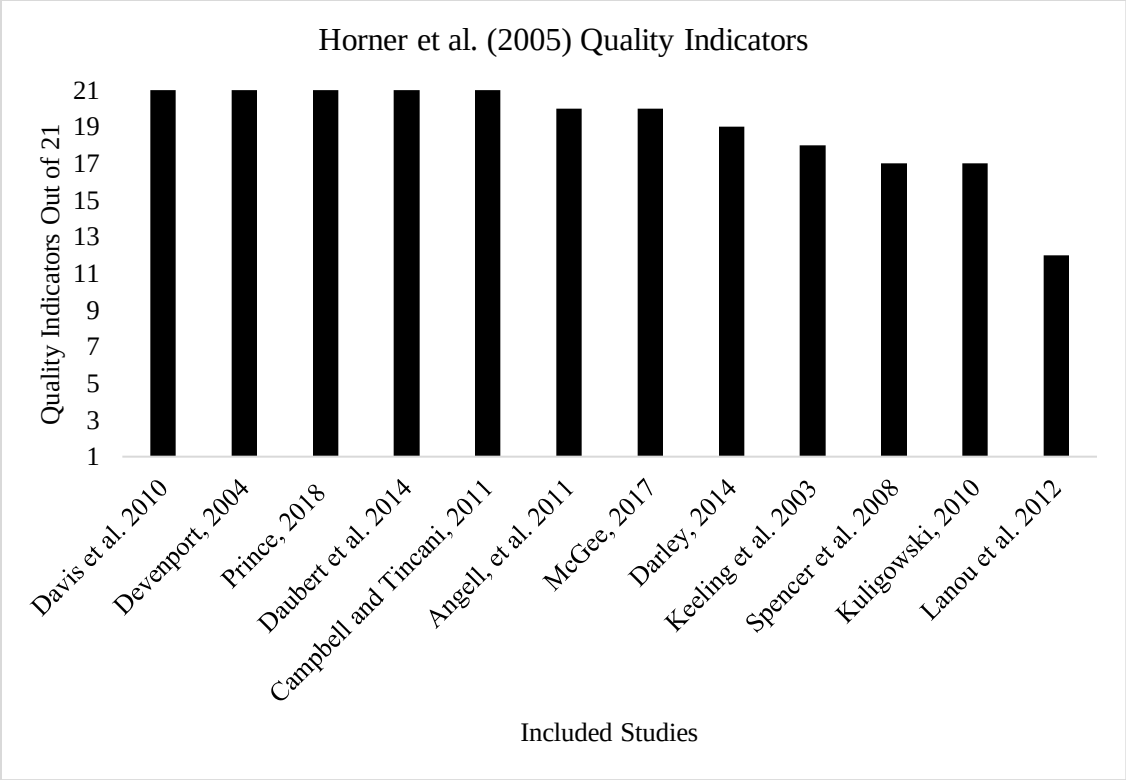


Figure 5. Results of the Horner et al. (2005) Quality indicators within single-subject research. Graph displays results of each study and number of quality indicators presented out of possible score of 21.

Eleven included studies received an acceptable rating (inclusion of five of seven critical characteristics), and one study received an unacceptable rating. Based on the WWC handbook three out of twelve (25%) selected studies met evidence standards without reservations, and four out of twelve (33%) selected studies met evidence standards with reservations (FIGURE 6).The four studies that met evidence standards with reservations did not meet all evidence standards either due to the lack of sufficient number of data points or phases. Five studies (41%) did not meet WWC SCD standards, these studies either did not collect IOA data, the IOA data collected did not meet the minimum standards of 80% agreement, did not utilize valid experimental designs to assess for replication of effect, or did not include graphed data.

Table 3. Results of WWC Quality Indicators For Single-Subject Research. Kuligowski (2010) and Spencer (2008) utilized AB designs, therefore they did not meet design standards.

WWC Quality Indicators For Single-Subject Research (2010)							
Citation	Systematic Replication of the IV	Outcome Variable was measured by more than one assessor	IOA collected for at least 20% of data points in each phase	IOA scores met minimum threshold (80%)	A minimum of three attempts made to demonstrate intervention effect between baseline and intervention at three different points in time	Each phase (baseline and intervention) Include 5 or more data points per phase.	Results
Angell et al. 2011	X	X	X	X	X		Meets Design Standards With Reservations
Campbell & Tincani, 2011	X	X	X	X	X		Meets Design Standards With Reservations
Darley, 2014	X	X	X	X	X		Meets Design Standards With Reservations
Daubert et al. 2014	X	X	X	X	X	X	Meets Design Standards Without Reservations
Davis et al. 2010	X	X	X	X	X	X	Meets Design Standards Without Reservations
Devenport, 2004	X	X	X	X	X		Meets Design Standards With Reservations

Table 3 Continued.

Keeling et al. 2003	X				X	X	Does Not Meet Design Standards
Kuligowski, 2010		X	X	X			Does Not Meet Design Standards
Lanou et al. 2012							Does Not Meet Design Standards
McGee, 2017	X	X	X				Does Not Meet Design Standards
Spencer et al. 2008							Does Not Meet Design Standards
Prince, 2018	X	X	X	X	X	X	Meets Design Standards With No Reservations

CHAPTER 4

DISCUSSION

The purpose of the current review was to identify research that utilized the Power Card strategy or similar procedures to increase social skills in children with ASD. Research has shown that individuals with ASD have difficulty communicating and interacting with people, and these communication deficits can impact their lives in a number of ways. Without the ability to communicate effectively, individuals miss out on opportunities to interact with their peers, request their wants and needs, and struggle to build and maintain meaningful relationships. This review displays that the Power Card strategy is an effective and promising intervention to improve social skills. An electronic search of the literature generated 12 studies with a total of 30 participants. Each study in this review was analyzed by specific intervention procedures, study outcomes, and quality of evidence to develop relevant suggestions for future research and practice.

Results of the quality of evidence assessment identified 11 studies that met design standards with or without reservations, reviewed studies had a high percentage of quality indicators (Horner et al., 2005; Kratochwill et al., 2010). Additionally, authors reported positive results for a majority of participants in the Power Card strategy intervention. Each of the studies reviewed reported an improvement in social skills outcomes due to the implementation of the Power Card strategy. Studies included in this review used a variety of different intervention modalities such as the use a scenario card, access to the Power Card after reading, how special interest items were chosen, etc. to improve social skills and general appropriate classroom behaviors such as following

directions, suggesting that Power Cards are an effective intervention that can be used across other socially significant behaviors.

The Power Card strategy is an antecedent intervention that incorporates an individual's special interest item to assist individuals in making sense of social situations and routines. The Power Card strategy acts as a discriminative stimulus and uses behavioral principles such as priming. The Power Card strategy uses priming by presenting the scenario and Power Card prior to a task or activity and has the Power Card describe and model how the special interest item acts in this targeted situation. By presenting the Power Card prior to the target situation, it acts as an discriminative stimulus. The introduction of the Power Card signals to the individual that there is reinforcement available, when the individual engages in the behaviors presented with their special interest on the Power Card, they access natural reinforcers such as social interaction and playing with peers.

To expand the current intervention literature as it pertains to students with ASD, researchers should evaluate the effectiveness of (a) functional behavioral assessment (FBA) to identify the function of the target behavior, (b) the impact of omitting the scenario card from intervention procedures, (c) access to the Power Card after reading, and (d) how to determine an individual's special interest. In the current review, the Power Card strategy was found to be effective across a variety of different procedural steps. Due to this, additional information is needed to determine which Power Card strategy components are the most effective. When listing the steps of the Power Card strategy Gagnon (2001) states that the third step of the strategy is to conduct a functional behavior

assessment (FBA), but this review identified that only four studies (33%) had conducted an FBA to determine each participants target behavior function prior to writing up their scenario and Power Card. Omitting this step is concerning, considering that the results of the FBA are supposed to be used to develop an individualized and effective Power Card. It also begs the question of would the results of these studies been any different if a functional behavior assessment was conducted. More research is needed to determine the effect conducting an FBA has on the motivating operation of the Power Card.

This review identified that most studies (n = 9; 75%) did not adapt any steps of the Power Card strategy, and used both the scenario card and the Power Card as the intervention. However, three studies (Angell et al., 2011, Daubert et al., 2014 & Keeling et al. 2003) utilized an adapted Power Card strategy in which they omitted the scenario card narrative and only used the Power Card which consists of three to five steps on how to appropriately engage in the target behavior. Angell et al. 2011, Daubert et al. 2014 & Keeling et al. 2003 reported a decrease in latency of response to teacher cues, an increase in appropriate initiating and relinquishing a turn during game play, and a decrease in duration of yelling after losing a game, respectively. This adapted Power Card strategy could be an option for students who would have trouble attending to or understanding a narrative or scenario card, it can also be an option for younger students who are just beginning to read. It could also be an option in an environment where one-on-one attention is not practical such as a large general education classroom. The effectiveness of utilizing an adapted Power Card for students with ASD merits further investigation.

One aspect that was apparent from this review was the lack of a consistent and systematic way to determine participants' special interest items. Given the fact that picking a substantial and motivating special interest item is at the core of the Power Card strategy, there should be a universal checklist interview questions developed for this purpose (Campbell & Tincani, 2011). Due to the fact that only 12 studies have been conducted utilizing the Power Card strategy, there is not enough evidence to determine if selecting a special interest item via teacher interview or via direct observation is the best way to choose the most motivating or reinforcing object for that particular student. There is also not enough evidence to determine if the way the special interest item is selected has a significant effect on study results.

Access to the Power Card is another aspect of Power Card intervention that was not consistent across studies. Three studies (Campbell & Tincani, 2011; Prince, 2018; & McGee, 2017) allowed participants to ask questions after the Power Card was read to them and placed the Power Card in close proximity to the student, making it continuously available to review. Four studies (Devenport, 2004; Davis et al., 2014; & Daubert et al., 2015, Lanou et al., 2012) placed the Power Card in close proximity to the student, but did not allow the student to ask questions, and one study had the teacher hold the Power Card after reading it to the student and would offer the student the opportunity to review the card if they engaged in the target behavior (Spencer et al., 2008). Due to the fact that each of the 12 studies in this review reported positive results from using the Power Card strategy, and majority of studies (n = 9) effect sizes were calculated above 90%, there is not enough evidence to determine if allowing the participants to ask questions, or review

the Power Card after reading has a considerable effect on results. More research is needed on this.

To expand the literature on the Power Card strategy for improving social skills for individuals with ASD, research should be conducted to investigate the effectiveness of the Power Card strategy on different behaviors such as participating and attending to academic tasks, following directions, or challenging behaviors such as aggression or property disruption. Unfortunately, due to the lack of generalization assessed in included studies, this review does not offer the answers to determine if the Power Card strategy would be effective across different behaviors. Also, although it is noted in this review's limitations, it should be noted that only two studies in this review included participants race/ethnicity background. Researchers should include this information to aid in determining if there is an impact on a specific student population.

Limitations

A number of limitations should be considered when interpreting the results of this systematic review. The first limitation is the small number of studies that have utilized the Power Card strategy and therefore were eligible for this review. This small number of studies and thus limited the participant pool and attributes to the lack of generalization of results. Another limitation is that only two studies reported race and ethnicity background of the participants, so this review is unable to identify if students from different backgrounds have participated and if this has any effect study results. Also, IOA data was only collected in nine of the 12 included studies so, the results of the Lanou et al., 2012, Spencer et al., 2008 & Keeling et al., 2003 should be reviewed with caution. One case

study included in this review (Lanou et al., 2012) did not meet the WWC design standards or the Horner (2005) quality indicators, this makes it difficult to be sure that experimental control was demonstrated and the Power Card was the reason for the decrease in personal space invasions, thus it is difficult to determine if the results of this study were positive or negative and the noted results should be considered with caution. Another limitation is that only two studies in this review assessed for generalization of the target behavior, therefore there is a lack of evidence to conclude that an increase in social skills would spread beyond the intervention conditions described in the included studies. One last limitation is that only seven out of 12 studies received a rating of meeting design standards without reservations or meeting design standards with reservations based on the WWC handbook (Kratochwill et al., 2010) and only five studies addressed 21 of 21 quality indicators based on Horner et al. (2005) quality indicators of single subject research checklist. Studies that did not meet WWC standards or did not meet all 21 items on Horner's single subject quality indicator table either did not assess for IOA data, did not effectively manipulate the independent variable, attempt to demonstrate effect of the intervention over time, or demonstrate experimental control. All of these possible variables are imperative to the quality of a study, not including them can not only hinder the accuracy of data but can also have researchers question the validity of study results. This is a limitation due to the fact that while this author did assess and take into consideration the limitations of each individual study, the results of this review were based off the twelve studies included in this paper, and if some studies did not present quality evidence for the Power Card strategy, that could also call the results of this review into question.

Suggestions for Clinicians

Clinicians should be sure to make informed decisions regarding the choice of the special interest item used on the Power Card, this can include using a preference assessment, interviewing teachers, parents, and the participant. When creating the Power Card clinicians should be sure to create the card within the students reading level and comprehension skills and in a print size appropriate for the participant. Clinicians should also be sure to read the Power Card to the student immediately prior to the targeted situation in a quiet location and allow the participant to ask questions. Clinicians should also ensure that they collect generalization data because the research is not clear on if generalization occurs with the Power Card strategy due to the fact that many studies did not include generalization data. The last suggestion for clinicians is to ensure to conduct an FBA prior to creating the Power Card. This is an important step in determining the function of the participants' target behaviors and is information that is needed to write an effective scenario and Power Card.

Future Research

Results of this review suggest the following areas for future research. First, because there have only been 12 studies (only eight of which are peer reviewed) that have analyzed the use of the Power Card strategy, more research is needed to determine the benefits of the Power Card strategy across different participants, settings, and target behaviors. Second, more research is needed on the use of an adapted Power Card strategy, such as omitting the scenario card from the intervention procedures. While Angell et al. (2011) and Daubert et al. (2014) demonstrated that only using the Power

Card can still exhibit positive effects on target behaviors, more research is needed to determine if this is a viable and effective option when using the Power Card strategy. More research is also needed on which components of the Power Card strategy are the most crucial and effective. More research is also needed on how special interest items are identified. Some studies utilized an informal teacher interview to determine special interests and some utilized direct observations, it may be useful for future practitioners to develop a checklist or rating scale to more consistently and systematically determine the motivating qualities of special interests (Campbell & Tincani, 2011). Future research also should be sure to include more detailed information about participants racial and ethnic backgrounds to aid practitioners in determining the impact of the Power Card strategy on of specific populations. Future research should assess for generalization of the target behavior to determine if skills learned using the Power Card strategy are generalized across different treatment conditions. Last, evidence in this review displays that the Power Card strategy can be an effective intervention to increase social skills, future research should explore the effectiveness of the Power Card strategy on other significant target behaviors to not only expand the literature but aid in the research on the Power Card across multiple behaviors.

CHAPTER 5

CONCLUSION

Overall, while all studies included in this review reported positive results and there is evidence to support using the Power Card strategy to improve social skills, more research is needed to identify the most efficient and effective way to implement the Power Card strategy. This review identified that there are gaps in the research relating to procedures when implementing the Power Card strategy, how special interest items are determined, access to the Power Card after reading, an FBA being conducted, and conducting generalization and maintenance. Future research should address these areas of need to help determine the most effective and efficient way to implement the Power Card strategy. It is the hope of this author that once limitations are addressed, the Power Card will be used more frequently as an intervention to help not only improve individuals' social skills, but other socially significant behaviors.

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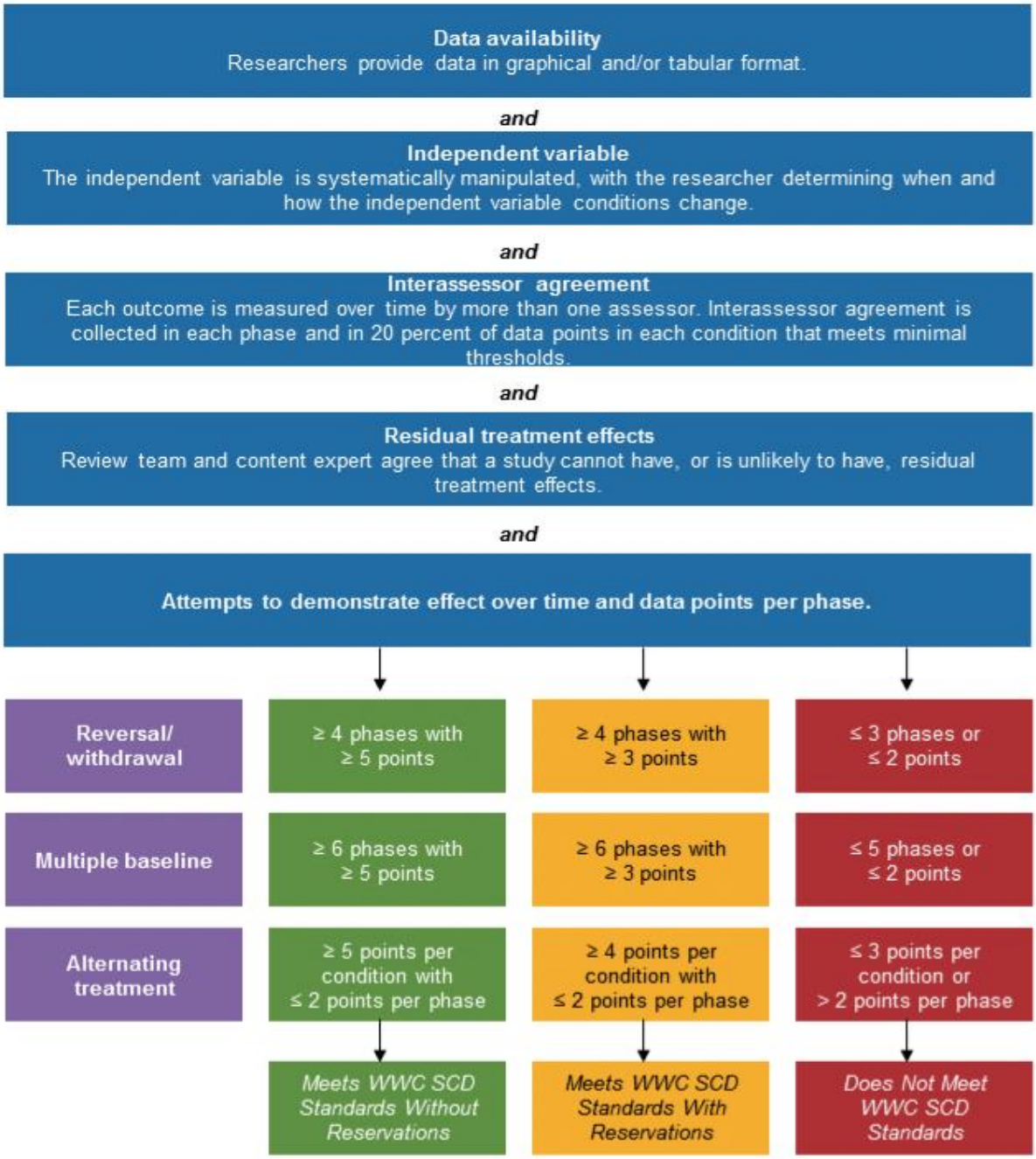
APPENDIX A

WWC QUALITY INDICATORS FOR SINGLE SUBJECT RESEARCH



APPENDIX B

HORNER QUALITY INDICATOR TABLE

Table 1

Quality Indicators Within Single-Subject Research

Description of Participants and Settings

- Participants are described with sufficient detail to allow others to select individuals with similar characteristics (e.g., age, gender, disability, diagnosis).
- The process for selecting participants is described with replicable precision.
- Critical features of the physical setting are described with sufficient precision to allow replication.

Dependent Variable

- Dependent variables are described with operational precision.
- Each dependent variable is measured with a procedure that generates a quantifiable index.
- Measurement of the dependent variable is valid and described with replicable precision.
- Dependent variables are measured repeatedly over time.
- Data are collected on the reliability or interobserver agreement associated with each dependent variable, and

IOA levels meet minimal standards (e.g., IOA = 80%; Kappa = 60%).

Independent Variable

- Independent variable is described with replicable precision.
- Independent variable is systematically manipulated and under the control of the experimenter.
- Overt measurement of the fidelity of implementation for the independent variable is highly desirable.

Baseline

- The majority of single-subject research studies will include a baseline phase that provides repeated measure- ment of a dependent variable and establishes a pattern of responding that can be used to predict the pattern of future performance, if introduction or manipulation of the independent variable did not occur.
- Baseline conditions are described with replicable precision.

Experimental Control/Internal Validity

- The design provides at least three demonstrations of experimental effect at three different points in time.
- The design controls for common threats to internal validity (e.g., permits elimination of rival hypotheses).
- The results document a pattern that demonstrates experimental control.

External Validity

• Experimental effects are replicated across participants, settings, or materials to establish external validity.

Social Validity

- The dependent variable is socially important.
- The magnitude of change in the dependent variable resulting from the intervention is socially important.
- Implementation of the independent variable is practical and cost effective.

- Social validity is enhanced by implementation of the independent variable over extended time periods, by typical intervention agents, in typical physical and social contexts.