

## ABSTRACT

### Visual Schedules in the Home for Children with Developmental Disabilities

Suzannah Avery, Ph.D.

Co-Mentors: Stephanie Gerow, Ph.D.  
Jessica Akers, Ph.D.

Visual supports are often used during interventions for individuals with developmental disabilities to increase independence in the home (Rutherford et al., 2020). Previous reviews of the visual support literature for individuals with developmental and/or intellectual disabilities suggest that visual supports are effective at increasing independence with tasks, such as daily living skills, in the home for children with developmental disabilities; however, caregiver-implemented visual supports may produce different outcomes than non-caregiver implemented visual supports.

The purpose of Study One was to synthesize the research on caregiver-implemented visual supports in the home for individuals with developmental disabilities. This search yielded 16 studies which evaluated the use of caregiver-implemented visual support interventions for individuals with developmental disabilities in the home setting. We evaluated the included articles against the What Works Clearinghouse Single-Case Design Standards (WWC, 2017, 2020) and the social validity quality indicators (Horner et al., 2005; Reichow et al., 2008). Across these studies, researchers identified two

predominantly used visual supports, visual schedules and social interaction supports. The findings of this literature review support the use of caregiver-implemented visual supports for children with developmental disabilities. Furthermore, the results endorse the use of visual supports for promoting independence in routines and for decreasing the amount of challenging behavior during these routines.

In Study Two, researchers evaluated the efficacy of coaching caregivers to teach their child to follow high-tech visual schedules to promote the independent completion of leisure activities via videoconferencing technology. Further, researchers explored the extent to which children continue to complete these leisure activities in the absence of their caregiver. The results from this study indicate that researchers can effectively coach caregivers via videoconferencing technology to teach their child to follow high-tech visual schedules to learn how to complete leisure activities and demonstrates that individuals will continue to complete these leisure activities even when caregiver support is withdrawn.

In Study Three, researchers conducted a phenomenological case study to better understand caregiver experiences with teaching their child follow visual schedules to complete leisure activities in the home. Researchers conducted semi-structured interviews and collected data through field and personal notes using the theoretical framework guided by the works of Wolf (1978), Horner et al. (2005), and Reichow et al. (2008). Interviews provided the researcher the opportunity to understand the essence of this phenomenon from the caregivers' point of view and to describe the meaning of their experiences (Fox, 2009).

Visual Schedules in the Home for Children with Developmental Disabilities

by

Suzannah Avery, B.S., M.A.

A Dissertation

Approved by the Department of Educational Psychology

---

Todd Kettler, Ph.D., Chairperson

Submitted to the Graduate Faculty of  
Baylor University in Partial Fulfillment of the  
Requirements for the Degree  
of  
Doctor of Philosophy

Approved by the Dissertation Committee

---

Stephanie Gerow, Ph.D., Co-Chairperson

---

Jessica S. Akers, Ph.D., Co-Chairperson

---

Tony L. Talbert, Ph.D.

---

Elissa Madden, Ph.D.

Accepted by the Graduate School  
August 2022

---

J. Larry Lyon, Ph.D., Dean

Copyright © 2022 by Suzannah Avery

All rights reserved

## TABLE OF CONTENTS

LIST OF TABLES .....	vii
LIST OF FIGURES .....	viii
ACKNOWLEDGMENTS .....	ix
DEDICATION .....	xi
CHAPTER ONE.....	1
An Overview of Caregiver-Implemented Interventions for Children with Developmental Disabilities .....	1
Prevalence and Characteristics of Children with Developmental Disabilities .....	1
Effects of Children with Developmental Disabilities on Families .....	2
Importance of Caregiver-Implemented Interventions .....	2
Effective Caregiver-Implemented Interventions .....	3
CHAPTER TWO.....	5
The Use of Caregiver-Implemented Visual Supports for Individuals with Developmental Disabilities: A Systematic Literature Review .....	5
Interventions with Visual Supports for Children with Developmental Disabilities ....	5
Caregiver-Implemented Visual Supports .....	6
Research Quality and Social Validity.....	7
Purpose and Research Questions.....	8
Method.....	9
Results .....	18
Discussion.....	25
CHAPTER THREE .....	30
The Use of Caregiver-Implemented Visual Schedules to Teach Leisure Activities for Children with Developmental Disabilities .....	30
Introduction .....	30
Caregiver-Implemented Interventions.....	30
Visual Supports .....	31
Visual Schedules .....	33
Gaps in the Literature, Purpose, and Research Questions.....	33

Method.....	34
Results .....	41
Discussion.....	45
CHAPTER FOUR .....	50
Assessing the Social Validity of Caregiver-Implemented Visual Supports: A Phenomenological Case Study .....	50
Introduction .....	50
Theoretical Framework .....	51
Literature Review .....	54
Research Design and Methodology .....	57
Results .....	65
Discussion.....	75
CHAPTER FIVE .....	80
General Discussion.....	80
APPENDIX A .....	84
Tables .....	84
APPENDIX B.....	113
Figures .....	113
BIBLIOGRAPHY .....	123

## LIST OF TABLES

Table A.1 Researcher-Adapted Operational Definitions of Social Validity Quality Indicators Based on Gerow et al. (2018), Horner et al. (2005), and Reichow et al. (2008) .....	88
Table A.2 Participant and Methodological Characteristics .....	90
Table A.3 Visual Support Characteristics .....	96
Table A.4 Summary of Visual Support Categories for Each Dependent Variable .....	102
Table A.5 Summary of Social Validity Quality Indicators .....	103
Table A.6 Leisure Activity Characteristics .....	107
Table A.7 Sample Task Analyses for Leisure Activities .....	108
Table A.8 Summary of Data Collection and Data Analysis Methods for Each Research Question .....	110
Table A.9 Relating the Interview Questions to the Research Questions.....	111
Table A.10 Summary of Codes Used for Data Analysis.....	114
Table A.11 Cases as Aligned with the Theoretical Framework.....	115

## LIST OF FIGURES

Figure B.1 PRISMA flow-chart diagram .....	117
Figure B.2 Summary of visual support categories according to WWC evidence standards .....	118
Figure B.3 Percent of steps completed correctly across leisure activities for Jordan .....	119
Figure B.4 Percent of time on-task across leisure activities for Jordan .....	120
Figure B.5 Percent of steps completed correctly across leisure activities for Zane .....	121
Figure B.6 Percent of time on-task across leisure activities for Zane .....	122
Figure B.7 Theoretical and interpretive framework based on the work of Wolf (1978), Horner et al. (2005), and Reichow et al. (2008) .....	123
Figure B.8 Hierarchical tree diagram: Layers of analysis .....	124
Figure B.9 Word cloud capturing emergent theme from the cross-case analysis .....	125



## ACKNOWLEDGMENTS

I am immensely thankful for the guidance and support from my mentors and advisors, Dr. Stephanie Gerow and Dr. Jessica Akers. Their mentorship, support, and encouragement have helped me grow into an independent and confidence researcher and practitioner. Additionally, I would like to thank my other committee members, Dr. Tony Talbert and Dr. Elissa Madden for their diligent support. It has been a privilege to have the experience of working with such an esteemed group of faculty members.

I would also like to thank my colleagues and lab mates, Emily Exline, MacKenzie Wicker, Renming Liu, Kristina McGinnis, Providence Lively, Gabby Rivera, Nicole O'Guinn, Remington Swensson, Dr. Supriya Radhakrishnan, and Dr. Marie Kirkpatrick, without whom these last four years would not have been possible. A special thank you to Emily Exline, Renming Liu, and Kristina McGinnis for their assistance with data collection.

These acknowledgements would not be complete if I didn't mention the friendships and family that have inspired me and kept me afloat during this monumental stage in life. Dr. Rebecca Tipton DeClue, thank you for being my inspiration to pursue a PhD. Thank you for your steadfast love and support. My appreciation for our friendship is beyond words. I am also very grateful for Alex Johnson. His encouragement and understanding have helped keep me afloat and motivate me during this entire process. Thank you for your words of encouragement and all the support you have provided. Additionally, I want to thank my mom and Ronald for inspiring me to reach for the stars

and instilling the belief in me that anything is possible. Lastly, I want to thank my mom and dad for both of your unique contributions inspiring me to pursue an education in applied behavior analysis. Without you all none of this would have been possible.

## DEDICATION

To my mom and dad who inspired this journey, “we are fighters to the end”

## CHAPTER ONE

### An Overview of Caregiver-Implemented Interventions for Children with Developmental Disabilities

#### *Prevalence and Characteristics of Children with Developmental Disabilities*

Approximately 1 in 6 children between the ages of 3 and 17 years are diagnosed with one or more developmental disabilities (Centers for Disease Control and Prevention [CDC], 2021a, 2021b; Lindly et al., 2016; Zablotsky et al., 2019). Developmental disabilities refer to mental, physical, language and/or behavioral impairments that persist throughout an individual's lifetime (CDC, 2021a, 2021b; Zablotsky et al., 2019). Typically, children diagnosed with a developmental disability require services to address behavioral and developmental challenges (CDC, 2021a, 2021b; Zablotsky et al., 2019). These challenges may include difficulties with following verbal directions, communicating, social skills, and adaptive behaviors (American Psychiatric Association, 2013; Lory et al., 2020). Additionally, children with developmental disabilities may struggle with completing tasks that require multiple steps, such as following routines or completing leisure activities (Chan et al. 2013; Clarke et al., 1999; García-Villamizar & Dattillo, 2010; Goldman et al., 2018; Kurnaz & Yanardag, 2018). However, individuals with developmental disabilities may benefit from caregiver-implemented interventions for completing these complex skills in the home.

### *Effects of Children with Developmental Disabilities on Families*

Raising a child with a developmental disability largely impacts every member of the household (e.g., caregivers, sibling; Reichman et al., 2008). For example, some research indicates that siblings of children with a developmental disability may score lower on assessments of cognitive development, peer activities, and psychological functioning (Reichman et al., 2008; Sharpe & Rossiter, 2002). Further, having a child diagnosed with a developmental disability can have negative effects on the quality of the family structure (e.g., relationships between parents, family living arrangements; Corman & Kaestner, 1992; Swaminathan et al., 2006; Reichman et al., 2004, 2008). Caregivers of individuals with developmental disabilities frequently report having more unmet needs than caregivers of typically developing individuals (Lindly et al., 2016; Lopez et al., 2019; Vohra et al., 2014). Unmet needs may include health needs and financial needs (Lindly et al., 2016; Lopez et al., 2019). For example, previous research suggests that children with developmental disabilities and their families have more unmet health needs (e.g., access the prescription medication, access to therapy services, etc.) as compared to families of typically developing children (Lindly et al., 2016). Unmet needs among children with developmental disabilities and their families are associated with multiple factors, such as child age and problem behavior, caregiver education and income, and accessibility of skilled service providers for accessing evidence-based interventions (Chiri & Warfield, 2012; Hodgetts et al., 2015; Lopez et al., 2019).

### *Importance of Caregiver-Implemented Interventions*

Coaching caregivers to implement interventions increases a family's access to evidence-based practices. Increasing a family's access to evidence-based practices can

lead to children making more meaningful improvements in their behavior outcomes and increase the likelihood that these improvements will generalize to new settings, situations, or stimuli and maintain across time (Meadan et al., 2014; Kaiser et al., 2000; Kaminski et al., 2008; Roberts & Kaiser, 2015). Previous research has demonstrated the efficacy of training caregivers to implement interventions for improving leisure and play skills, daily living skills, and promoting communication for children with developmental disabilities (Barton & Fettig, 2013; Symon, 2005). Therefore, it is important to continue to identify effective caregiver-implemented interventions that occur in the home to promote the generalization of skills to typical contexts and routines (Gerow et al., 2018; Koegel et al., 2012; Mancil et al., 2006; Sreckovic et al., 2020).

### *Effective Caregiver-Implemented Interventions*

Many researchers have evaluated the efficacy of training caregivers to implement interventions with their child. Among those interventions, research supports the efficacy of caregiver-implemented visual supports in the home for children with developmental disabilities (Meadan et al., 2011, Rao & Gagie, 2006; Rutherford et al., 2020). Teaching children with developmental disabilities to use visual supports is an effective intervention for increasing child independence in the home (e.g., Buschbacher et al., 2004; Clarke et al., 1999; Dettmer et al., 2000; Goldman et al., 2018; Krantz et al., 1993; Meadan et al., 2014; Vaughn et al., 1999). Specifically, prior research has demonstrated that visual supports are an effective intervention component for teaching daily living skills, leisure and play skills, academic skills, and appropriate social interactions (Arthur-Kelly et al., 2009; Ganz & Flores, 2010; Meadan et al., 2014). Within these studies, researchers used prompting procedures (e.g., graduated guidance) and behavior skills training (i.e.,

instructions, modeling, role-playing, feedback) to teach participants how to use the visual supports. For example, Meadan et al. (2014) evaluated the use of a visual schedule for teaching participants to complete morning routines. The study results demonstrated that the caregiver-implemented visual schedule was successful in increasing appropriate communication during morning routines and promoting task completion (Meadan et al., 2014). Researchers also reported that caregivers rated the intervention as socially valid by indicating that the goals were significant, the procedures were acceptable, and the outcomes were important (Meadan et al., 2014). Together, this body of research indicates caregiver-implemented visual support interventions can increase appropriate behaviors and that caregivers report the intervention as socially valid.

## CHAPTER TWO

### The Use of Caregiver-Implemented Visual Supports for Individuals with Developmental Disabilities: A Systematic Literature Review

#### *Interventions with Visual Supports for Children with Developmental Disabilities*

Researchers widely use visual supports in the home to increase a child's independence (Rutherford et al., 2020). Visual supports provide information about a specific routine, activity, or behavioral expectation (Rutherford et al., 2020; Sam & AFIRM Team, 2015). Visual supports are often paired with, or used in place of, verbal cues (Sam & AFIRM Team, 2015). There are four categories of visual supports, (a) visual supports that help individuals understand their environment (e.g., visual schedules), (b) communication supports (e.g., choice boards), (c) visual supports that help individuals understand rules and social expectations (e.g., social scripts), and (d) visual supports that help provide consistency across environments (e.g., communication passports; Rutherford et al., 2020). Visual supports have been used to promote engagement a variety of skills for individuals with developmental disabilities, such as academic tasks (e.g., Bryan & Gast, 2000), appropriate play (e.g., Akers et al., 2016), adaptive skills (e.g., Pierce & Schreibman, 1994), and appropriate transitions (e.g., Stoner et al., 2007). One of the primary benefits of teaching children with developmental disabilities to use visual supports in their home is an increase in child independence (e.g., Buschbacher et al., 2004; Clarke et al., 1999; Dettmer et al., 2000; Goldman et al., 2018; Krantz et al., 1993; Meadan et al., 2014; Vaughn et al., 1999).



Visual supports have been used to teach individuals with developmental disabilities a variety of skills, such as academic tasks (e.g., Bryan & Gast, 2000), appropriate play (e.g., Akers et al., 2016), adaptive skills (e.g., Pierce & Schreibman, 1994), and appropriate transitions (e.g., Stoner et al., 2007). The use of visual supports can increase the predictability of routines and clarify behavioral expectations for individuals with developmental disabilities (Lequia et al., 2012). Additionally, visual supports can facilitate participation, support communication, and increase independence among individuals with developmental disabilities (Rutherford et al., 2020).

### *Caregiver-Implemented Visual Supports*

Caregiver-implemented visual supports may produce different outcomes than non-caregiver-implemented visual supports. For example, caregivers are probably less likely to follow all intervention components (e.g., prompting, reinforcement) because of limited time to allocate towards the implementation of the intervention, differences in education, and sources of reinforcement (Feldman, et al., 2004; Gerow et al., 2018; Moes & Frea, 2000, 2002; Sloman et al., 2005). Despite the potential differences in implementation, caregivers are important stakeholders who spend a significant amount of time with their child; thus, establishing caregiver-implemented interventions targeting child independence and on-task behaviors are essential (Clarke et al., 1999; Fichtner & Tiger, 2015; Gerow et al., 2018). Therefore, it is important for researchers to continue to evaluate the effectiveness of caregiver-implemented visual interventions with visual supports in the home setting.

### *Research Quality and Social Validity*

Researchers should continue to assess and summarize the growing body of literature to identify interventions that are an evidence-based practice. Researchers may use the What Works Clearinghouse (WWC) Standards Handbook to evaluate the strength of the research methodology and the evidence produced using the standards (e.g., Gerow et al., 2018). The WWC Standards Handbook outlines a two-step process to identify evidence-based practices (WWC, 2017, 2020). The first step requires reviewers to evaluate the research methodology of an included study and the second step requires reviewers to evaluate the evidence produced in each study (WWC, 2017, 2020). In addition to evaluating the quality of the literature, it is important to also evaluate the social significance of caregiver-implemented interventions. Past reviews have evaluated the acceptability and feasibility of interventions using the social validity definitions described in Horner et al. (2005). Reviewers extracted data related to the feasibility and sustainability of the intervention, the social significance of dependent variable and outcomes, and caregiver treatment fidelity (Horner et al., 2005). Overall, researchers should review existing literature on caregiver-implemented visual supports for children with developmental disabilities to examine the extent to which these interventions provide evidence suggesting their continued use in natural settings outside the context of research.

Prior research has demonstrated that caregivers are more apt to implement an intervention if they find the intervention to be acceptable and feasible (Gabor et al., 2016; Kazdin, 1980). This finding emphasizes the importance of coaching caregivers to implement interventions in typical settings with typical resources to promote the

generalization and maintenance of child outcomes. Researchers should conduct a systematic literature review examining whether caregivers rate visual support interventions as socially important, acceptable, and effective. Socially valid interventions provide considerable evidence of the intervention's efficacy in typical contexts (Gerow et al., 2018; Horner et al., 2005; Reichow et al., 2008; Snodgrass, 2018; Wolf, 1978). Therefore, researchers should review existing literature on caregiver-implemented visual supports for children with developmental disabilities to examine the extent to which these interventions provide evidence suggesting their continued use in natural settings outside the context of research (Gabor et al., 2016; Gerow et al., 2018; Kazdin, 1980).

### *Purpose and Research Questions*

To our knowledge, one research team has published a scoping review on the topic of visual supports used in the home and community settings for individuals with autism. Rutherford et al. (2020), synthesized the literature on visual supports used in either the home or community setting for children with autism spectrum disorder. The results from this review helped clarify the scope of what is considered a visual support by reviewing the terminology used to classify specific types of visual supports. Rutherford et al. (2020) identified 12 categories of visual supports. Additionally, these researchers sought to evaluate parent and professional's experiences with using visual supports in the home and community settings by conducting questionnaires and focus groups. While this review contributed to the current body of literature by providing categories and definitions of different types of visual supports, limited visual support and methodological characteristics were provided and the scope of the analysis was limited to children diagnosed with autism spectrum disorder. There is a need to summarize the literature

base on visual supports as it has grown considerably in the past few years. The purpose of the current systematic literature review was to synthesize the research on caregiver-implemented visual supports in the home for individuals with developmental disabilities. To further evaluate the research, researchers used the social validity quality indicators (Gerow et al., 2018; Horner et al., 2005; Reichow et al., 2008) and the What Works Clearinghouse Single-Case Design Standards (WWC, 2017, 2020). This study addressed the following research questions:

1. What types of visual supports are used during caregiver-implemented interventions?
2. What is the quality of the research supporting the use of caregiver-implemented visual supports based on What Works Clearinghouse Standards (WWC, 2017, 2020)?
3. To what extent do studies evaluating caregiver-implemented visual supports provide evidence suggesting their continued use in natural settings outside the context of research?

## *Method*

### *Inclusion Criteria*

The following inclusion criteria were applied to all studies in the current review: (a) published in English in a peer-reviewed journal, (b) used a single-case research design (Kennedy, 2005), (c) included at least one participant diagnosed with a developmental disability, (d) the study included a visual support as part of the independent variable, and (e) a caregiver implemented one or more intervention sessions in the home. A single-case design was defined as an experimental design (i.e., systematic manipulation of the independent variable to evaluate its effect on the dependent variable) in which a participant serves as his/her own control (Kennedy, 2005). We limited this review to only include single-case designs studies since the overall aim of this paper was to evaluate the

use of visual supports for individuals with disabilities across multiple points in time. Further, we chose this inclusion criteria because this design is predominately found in educational and behavioral research. Researchers often use visual supports during interventions for individuals with developmental disabilities to provide information about a routine, activity, or behavioral expectation. Visual supports are environmental stimuli that are either use with, or in place of, verbal stimuli (e.g., visual activity schedule, if/then statement board, choice board; Sam & AFIRM Team, 2015). We defined caregivers as any individual described as the parent, legal guardian, or primary caregiver (Gerow et al., 2018). Developmental disabilities were defined as a physical or mental impairment, which negatively impacts typical day-to-day functioning (e.g., adaptive skills, academic skills, daily living skills).

#### *Database Search*

To identify articles that included the use of visual supports during interventions for individuals with developmental disabilities, a databased search was conducted in April of 2021. The databases searched were Academic Search Complete, APA PsychINFO, APA PsychArticles, Education Research Complete, ERIC, and Psychology and Behavioral Sciences Collection. The search terms included synonyms of caregiver-implemented (i.e., parent OR caregiver OR “parent-implemented” OR “caregiver-implemented”), home (i.e., “in-home” OR home OR “natural setting”), visual support (i.e., “visual support\*” OR schedule\* OR “visual cue\*” OR “symbol support\*” OR “picture cue\*” OR “picture symbol\*” OR “discriminative stimul\*” OR “visual stimul\*” OR “picture prompt\*” OR “visual prompt\*” OR “picture stimul\*” OR “activit\* schedule” OR “picture schedule” OR “visual schedule”), and intellectual and

developmental disabilities (i.e., “learning disab\*” OR “development\* disab\*” OR “development\* delay\*” OR “intellectual disab\*” OR ASD OR IDD OR “PDD-NOS” OR PDD OR disab\* OR “mental retard\*” OR “Down\*s syndrome” OR “cognitive disab\*” OR autis\* OR “pervasive developmental disorder” OR Asperger\*). The only limiter included in the database search was that the articles were published in a peer-reviewed journal. The initial search yielded 491 articles, following the removal of duplicates. After applying the inclusion criteria, 9 peer-reviewed articles met the criteria and were included in the review.

We conducted an ancillary search to identify any articles that were not previously identified after the electronic database search. The ancillary search consisted of (a) reviewing the reference lists of included articles, (b) conducting a hand search of the journal with the most included studies—the *Journal of Applied Behavior Analysis*—from 1993 to 2020, and (c) reviewing articles from 11 previous literature reviews pertaining to visual supports and/or caregiver-implemented interventions (Amsbary & AFIRM Team, 2017; Banda & Grimmer, 2008; Hong et al., 2016; Kern et al., 2002; Koyama & Wang, 2011; Lequia et al., 2012; Meadan et al., 2009; Rutherford et al., 2020; Spriggs et al., 2017; Symon et al., 2005; Tomeny et al., 2020). We began the hand search of the journal beginning in 1993 because this is the year the oldest article identified in the electronic search was published. Articles identified during the ancillary searches were assessed against the same inclusion criteria. We identified seven additional articles for inclusion. In total, 16 peer-reviewed studies met the inclusion criteria and were included in this review (see Figure B.1).

### *Descriptive Coding*

We reviewed each article to gather descriptive information. We recorded descriptive data for each participant in the included articles. We gathered the following data from included articles: (a) participant characteristics, (b) methodological characteristics, (c) visual support characteristics, (d) WWC quality review, and (e) social validity indicators. For articles that included some participants who did not meet the inclusion criteria (e.g., participants not diagnosed with a developmental or intellectual disability or participants who did not receive intervention in the home), data were only extracted for the participants who met the inclusion criteria.

*Participant characteristics.* Participant characteristics included age, gender, diagnosis, mode of communication, and caregiver relation to participant. Participant age categories were 0 to 3 years old, 4 to 6 years old, 7 to 9 years old, 10 to 12 years old, 13 to 15 years old, 16 to 18 years old, and 19 years old and older. Gender was recorded as male, female, or not reported. Participant's primary mode of communication was recorded as vocal, sign-language, picture system, speech generating device, gesture, no formal communication, other, or not reported. Raters recorded each participant's diagnosis as well as each caregivers' relation to the participant.

*Methodological characteristics.* We collected methodological information related to the experimental design, setting, caregiver training, caregiver treatment fidelity, and dependent variable. We rated the experimental design as either a multiple baseline design, multiple probe design, alternating treatment design, reversal design, changing criterion design, or embedded or combined design. Data were reported whether

caregivers received any training prior to implementing sessions and the type of training received. For caregiver treatment fidelity, data were extracted related to the percentage of intervention sessions implemented by the caregiver, the percentage of sessions researchers collected treatment fidelity data, and average treatment fidelity using the following codes: 1%-25% of intervention sessions, 26%-50% of intervention sessions, 51%-75% of intervention sessions, and 76%-100% of intervention sessions. Dependent variables were rated as engagement with the routine/activity, tasks or steps completed correctly, length of routine/activity, transitions between activity, challenging behavior, communication, appropriate social interactions, and other. Dependent variable measurement system were rated as frequency, rate, duration, interval, trial, latency, percent of steps or other.

*Visual support characteristics.* We collected visual support information related to the type of visual support, method for identifying the visual support, visual support pre-training, prompting procedures used to promote the use of the visual support. We used the visual support categories described in Rutherford et al. (2020). These categories included visual schedules, reward charts, object signifiers and photographs, choice boards, environmental labels, social interaction supports, timers, and visual rule reminders. Further, we coded whether the visual supports used were high-tech or low-tech. High-tech visual supports were defined as visual supports which required battery power. The method for identifying visual support included caregiver input, researcher selected, or prior experience with the type of visual support used (i.e., whether the participant had previously been exposed to a specific visual support). Data were recorded on whether participants received pre-training on the use of the visual support prior to



implementing sessions and the type of training received. The raters recorded the type of prompting procedure used during intervention as least-to-most prompting, most-to-least prompting, graduated guidance, error correction, or other. Least-to-most prompting procedures were defined as providing the participant the opportunity to independently respond prior to systematically increasing the level of prompting (Libby et al., 2008). Most-to-least prompting (i.e., errorless learning, simultaneous prompt, stimulus shaping, constant time delay, system of least prompts, & progressive time delay) was defined as providing the participant with the most intrusive prompt (typically hand-over-hand physical guidance) and systematically decreasing the level of prompting (Libby et al., 2008). Graduated guidance was defined as the caregiver providing participants with the controlling prompt (i.e., prompt that results in correct responding) and immediately fading to less intrusive prompts (Neidert et al., 2010). Finally, error correction was defined as researcher providing participants with either vocal feedback (i.e., corrective feedback), a model of the correct response, a short time-out (e.g., turning away from the participant), multiple response repetition, or re-presentation of the trial (Carroll et al., 2015; Leaf et al., 2017).

### *Social Validity Quality Indicators*

We evaluated the social significance of the goals, the acceptability of the procedures, and the importance of the outcomes using the researcher-adapted social validity quality indicators defined in Gerow et al. (2018), Horner et al. (2005), and Reichow et al. (2008). First, to evaluate the social significance of the goals, we examined whether interventions occurred in typical settings, with typical implementers, and with typical resources. Given that the inclusion criteria for the present review was caregiver-

implemented interventions in the home setting, each of the included studies met the typical implementer criterion and typical context criterion. We also examined whether researchers used a socially important dependent variable. Second, to assess the importance of the outcomes, we evaluated whether interventions made comparisons with typically developing peers, resulted in clinically significant changes in the dependent variable, and reported generalization and maintenance data. Finally, to evaluate the acceptability of the procedures, we recorded whether studies reported adequate caregiver implementation data, provided evidence to suggest that caregivers could implement the intervention over time, and reported overall caregiver satisfaction with the intervention. See Table A.1 for definitions of the social validity quality indicators.

### *Quality Review and Visual Analysis*

Raters reviewed each article that met inclusion criteria using the WWC Design Standards to assess the quality of the articles (WWC, 2017, 2020). Each article was rated as *Meets Standards without Reservations*, *Meets Standards with Reservations*, or *Does Not Meet Standards*. To meet design standards researchers had to (a) systematically manipulate the independent variable, (b) collect interobserver agreement (IOA) data for at least 20% of sessions across all phases, (c) obtain IOA data with 80% agreement or higher, (d) include at least three attempts to demonstrate a treatment effect (i.e., experimental control), and (e) include at least three data points per phase.

If the design of a study was a combined or embedded design (e.g., multiple baseline with a reversal design), we reviewed the higher-quality design (based on WWC standards). For a reversal design, to be rated as *Meets Standards without Reservations* there must have been at least four phases with a minimum of five data points per phase. If

the reversal design had at least four phases, but had three or four data points per phase, the study was rated as *Meets Standards with Reservations*. Any study that had this design, but did not meet previous criteria was rated as *Does Not Meet Standards*. For an alternating treatment design, there must have been at least five data points per condition with no more than two data points consecutively in a phase to be rated as *Meets Standards without Reservations*. If the study had at least four data points per condition and no more than two data points sequentially in a phase the study was rated as *Meets Standards with Reservations*. Any study that had this design, but did not meet previous criteria was rated as *Does Not Meet Standards*. A multiple baseline design must have at least six phases with at least five data points per phase to be rated as *Meets Standards without Reservations*. If the study had at least six phases but had three to four data points per phase the study was rated as *Meets Standards with Reservations*. Any study that had this design, but did not meet previous criteria was rated as *Does Not Meet Standards*. Multiple probe designs must follow the same initial criterion of a multiple baseline design, but also must meet additional criteria. To be rated as *Meets Standards without Reservations*, there must have been at least three consecutive probes for the first three sessions and at least three consecutive probes immediately before introducing the independent variable. To be rated as *Meets Standards with Reservations*, there must have been at least one probe for the first three sessions and at least one probe immediately before introducing the independent variable. Moreover, there must have been one probe point for the tiers not receiving intervention when a different tier first enters intervention to be rated as *Meets Standards with or without Reservations*. Any study that had this design, but did not meet previous criteria was rated as *Does Not Meet Standards*.

Only studies designated as *Meets Standards with or without Reservations* were assessed for evidence standards. Raters reviewed the level, trend, variability, immediacy of effect, overlap, consistency of data, and demonstrations of effect. First, the raters reviewed the baseline data to identify a stable pattern of responding and an indication that intervention was necessary. Second, raters evaluated the level, trend, and variability of the data. Third, raters evaluated the number of non-effects to the number of effects within the study. Fourth, raters evaluated whether an experiment had a minimum of three demonstrations of effect. To receive a rating of Strong Evidence, the experiment needed at least three demonstrations of an effect and no non-effects. To receive a rating of Moderate Evidence, the experiment needed at least three demonstrations of an effect and up to one non-effect. Experiments with fewer than three demonstrations of an effect and/or more than one non-effect were rated as No Evidence.

#### *Interrater Reliability (IRR)*

Two raters independently conducted 100% of the electronic search (i.e., database search, full-text review, ancillary searches) to ensure inclusion of all appropriate studies. IRR for the electronic search was 88%. All disagreements were resolved through discussion and raters made a mutual decision regarding study inclusion. A second rater provided IRR for 56% of the coded articles. IRR for the descriptive information and social validity quality indicators was 89%. IRR for the WWC Design Standards (WWC, 2017, 2020) was 85%.

## *Results*

### *Descriptive Coding*

We identified 16 studies that met inclusion criteria. Those 16 studies contained 25 experiments across 37 participants. Descriptive information (i.e., participant characteristics, methodological characteristics, visual support characteristics, and social validity indicators) were summarized across participants. See Table A.2 for participant and methodological characteristics.

### *Participant Characteristics*

Raters recorded data related to participant age, gender, diagnosis, mode of communication, and caregiver relation to participant. Most participants were between the ages 4 and 6 years old ( $n = 10$ ; 27%) and 7 and 9 years old ( $n = 9$ ; 24%). Other participants were 0 to 3 years old ( $n = 8$ ; 22%), 16 to 18 years old ( $n = 5$ ; 15%), and 10 to 12 years old ( $n = 5$ ; 14%). Out of the 37 participants, 31 were male (84%) and six were female (16%). Half of participants were diagnosed with autism spectrum disorder ( $n = 19$ ; 51%). Other diagnoses included Down's syndrome ( $n = 5$ ; 14%), attention-deficit/hyperactivity disorder ( $n = 4$ ; 11%), an intellectual disability ( $n = 3$ ; 8%), Angelman syndrome ( $n = 3$ ; 8%), developmental delay ( $n = 3$ ; 8%), visual impairment ( $n = 1$ ; 3%), Landau Kleffner syndrome ( $n = 1$ ; 3%), and agenesis of the corpus callosum ( $n = 1$ ; 3%). Some participants had multiple diagnoses ( $n = 5$ ; 14%), so the percentages sum to greater than 100%. In addition to age and diagnoses, raters also recorded the participants' primary mode of communication. Most participants communicated using vocal communication ( $n = 17$ ; 46%). Other modes of communication included gestures ( $n$

= 3; 8%), picture systems ( $n = 1$ ; 3%), and a microswitch ( $n = 1$ ; 3%). Participants' primary mode of communication was not reported for 20 (54%) participants. We also recorded caregiver relation to the participant. For most participants, caregivers were a parent ( $n = 35$ ; 94%). For other participants, caregivers included an aunt ( $n = 1$ ; 3%) and a grandparent ( $n = 1$ ; 3%).

### *Methodological Characteristics*

We recorded methodological information related to the experimental design, setting, caregiver training, caregiver treatment fidelity, and dependent variable. A multiple baseline design was the most used experimental design ( $n = 31$ ; 84%), followed by a reversal design ( $n = 9$ ; 24%). For three (8%) studies, researchers used a multiple baseline design with an embedded reversal design; therefore, percentages sum to greater than 100%. We recorded the setting in which the intervention sessions were implemented. Due to the inclusion criteria for the present review, all participants received one or more intervention sessions in their home ( $n = 37$ ; 100%). For four (11%) participants, intervention sessions were implemented across multiple settings including the home and university-based clinic ( $n = 2$ ; 5%) and the home and a community setting ( $n = 2$ ; 5%). We also recorded whether caregivers received training on the intervention procedures prior to conducting intervention sessions and the type of training methods researchers used. The majority of caregivers received training prior to implementing intervention sessions ( $n = 31$ ; 84%). Training procedures consisted of behavior skills training (i.e., written and/or verbal instructions, role-playing, modeling, and feedback), interactive computerized training and role-playing. Across six (16%) participants, researchers did not report whether caregivers received training prior to implementing

sessions. Further, we recorded the percentage of sessions implemented by the caregiver. Most caregivers implemented between 76% to 100% of sessions ( $n = 29$ ; 78%). Five percent ( $n = 2$ ) of caregivers implemented between 51% to 75% of sessions and another 5% ( $n = 2$ ) of caregivers implemented between 25% to 50% of sessions. Researchers did not report the percentage of sessions caregivers implement for four participants (11%).

We recorded the percentage of sessions researchers collected treatment fidelity data for caregiver-implemented sessions. Researchers reported average caregiver treatment fidelity across 19 (51%) of the 37 participants. Among those 19 caregivers, researchers observed between 76% to 100% of sessions to collect treatment fidelity for 11 (58%) caregivers and observed between 51% to 75% of sessions to collect treatment fidelity for 4 (21%) caregivers. Additionally, researchers observed between 26% to 50% of sessions to collect treatment fidelity data for three (16%) caregivers and for one (5%) caregiver researchers observed 1% to 25% of sessions to collect treatment fidelity data. Of the 19 caregivers with treatment fidelity reported, 49% ( $n = 18$ ) of caregivers implemented interventions sessions with 76% to 100% average fidelity and 3% ( $n = 1$ ) of caregivers implemented interventions sessions with 51% to 75% average fidelity.

For each participant, data were recorded on the dependent variable and dependent variable measurement system. The most common dependent variable was engagement with the routine/activity ( $n = 12$ ; 32%), followed by appropriate social interactions ( $n = 10$ ; 27%), communication ( $n = 11$ ; 30%), tasks/steps completed correctly ( $n = 9$ ; 24%), transitions between activities ( $n = 4$ ; 11%), and length of routine/activity ( $n = 4$ ; 11%). The most common dependent variable measurement system included interval recording ( $n = 18$ ; 49%), followed by frequency ( $n = 9$ ; 24%), trial by trial ( $n = 2$ ; 5%), duration ( $n$

= 4; 11%), and rate ( $n = 3$ ; 8%). The other dependent variable measurement system included in two studies was latency (5%). For 30% ( $n = 11$ ) of participants, data were collected on both appropriate behaviors and challenging behaviors. Of the 11 participants with challenging behavior, the most common dependent variable measurement system was the percentage of intervals with challenging behavior ( $n = 7$ ; 64%), followed by the frequency of challenging behavior ( $n = 4$ ; 36%). For some participants multiple dependent variables were targeted ( $n = 17$ ; 46%), thus the percentages sum to greater than 100%.

### *Visual Support Characteristics*

Data were recorded for the type of visual support, method for identifying the visual support, visual support pre-training, and the prompting procedures used to promote the use of the visual support (see Table A.3). The most common visual supports were visual schedules ( $n = 21$ ; 57%). Of the studies which evaluated the use of visual schedules, about half of those participants were taught to engage in daily-living skills. All visual schedules were static visual schedules (i.e., included only prints or object-based supports;  $n = 21$ ; 100%). Social interaction supports were used across 27% ( $n = 10$ ) of participants and timers were used as visual supports for 14% of participants ( $n = 5$ ). For example, in one study caregivers wore lanyards with a laminated smiley face around their neck to indicate to their child that social approaches (e.g., hugging, holding hands) would be reinforced (Fitchner & Tiger, 2015). For five (14%) participants visual rule reminders were used as visual supports. Reward charts were used across 11% ( $n = 4$ ) of participants and environmental labels were used across 5% ( $n = 2$ ) of participants. Researchers also evaluated the use of choice boards ( $n = 1$ ; 3%), picture cards ( $n = 1$ ; 3%), and object



signifiers & photographs ( $n = 1$ ; 3%). Other types of visual supports included self-management checklists ( $n = 3$ ; 8%) and token boards ( $n = 1$ ; 3%). For some participants ( $n = 14$ ; 38%) multiple visual supports were used, thus the percentages sum to greater than 100%. For example, Clarke et al. (1999) evaluated the use of a visual schedule to promote the completion of morning routines. Following the morning routine, the participant was able to select and access a preferred reinforcer from a choice board. Further, Dettmer et al. (2000) evaluated the use of visual schedules and timers for teaching academic skills. Combinations of visual supports included (a) visual schedules *and* reward charts, (c) visual schedules *and* object signifiers and photographs, (d) visual schedules *and* timers, (e) timers *and* reward charts, (f) visual schedules *and* token boards, (g) visual schedules *and* visual rule reminders, and (h) visual schedules, timers, environmental labels, choice boards, *and* social interaction supports. Across all participants, all visual supports were low-tech ( $n = 37$ ; 100%). See Table A.4 for a summary of visual support categories for each dependent variable.

We extracted data related to the method for identifying the visual support. The most common method for identifying visual supports was through researcher selection ( $n = 22$ ; 59%), followed by caregiver input ( $n = 13$ ; 35%). For two (5%) participants, visual supports were selected because participants had previous experience with the visual support. If the study did not explicitly state the method for identifying the visual support, we rated the method as researcher selected. Further, raters collected data on the type of prompting procedures used to promote participant use of the visual support. The most used prompting procedure was a least-to-most prompting procedure ( $n = 12$ ; 32%), followed by graduated guidance ( $n = 3$ ; 8%), and verbal prompting ( $n = 3$ ; 8%). For

example, in the study conducted by Srechovic et al. (2020), caregivers used verbal prompting (e.g., “look at your work system”) and gestures (e.g., pointing to the subsequent step in the work system) to promote their child’s use of the visual cues in the work systems. We also recorded whether participants received pre-training on the use of the visual support prior to intervention sessions. Thirty-eight percent ( $n = 14$ ) of participants received training on the use of the visual support prior to intervention sessions. Types of pre-training included least-to-most prompting procedures, graduated guidance, and behavior skills training. Additionally, if participants had prior experience using the visual support, we rated that as a type of pre-training.

#### *Social Validity Quality Indicators*

See Table A.5 for a summary the quality of the social significance of each included study. To assess the social significance of the interventions, we used the 10 quality indicators that were presented in Horner et al. (2005) and Reichow et al. (2008) and operationally defined in Gerow et al. (2018). We extracted participant data to assess the social significance of the goals, the importance of the outcomes, and the acceptability of the procedures. No study met all 10 indicators; however, on average, studies met at least 70% ( $n = 7$ ) of the quality indicators. All participants met the typical implementer indicator ( $n = 37$ ; 100%) and typical context indicator (i.e., participant home;  $n = 37$ ; 100%). Typical resources were used across 16 (43%) participants. We recorded that the researchers targeted socially important dependent variables for all participants ( $n = 37$ ; 100%). Further, researchers reported clinically significant changes in the dependent variable across 97% ( $n = 36$ ) of participants. However, no study reported comparing the participants behavior to that of a typically developing peer. Moreover, data on the

maintenance and/or generalization of treatment effects were reported across 78% ( $n = 29$ ) of participants. We extracted data related to caregiver acceptability. Treatment fidelity data were reported for 19 (51%) caregivers. Of the 19 caregivers with treatment fidelity reported, 49% ( $n = 18$ ) of caregivers demonstrated that they could implement intervention session with adequate fidelity over time. Researchers reported data on caregiver satisfaction for 68% ( $n = 25$ ) of participants. Of these studies, all caregivers ( $n = 25$ ; 100%) reported that the intervention was feasible, effective, and indicated that they would choose to implement the intervention following the offset of the research studies.

#### *Quality Review and Visual Analysis*

We evaluated each of the 25 experiments based on the WWC design standards (WWC, 2017, 2020). Based on WWC design standards (2020), seven (19%) experiments were rated as *Meets Standards without Reservations*, 21 (57%) experiments were rated as *Meets Standards with Reservations*, and nine (24%) experiments were rated as *Does Not Meet Standards*. For five of the experiments that were rated as *Does Not Meet Standards*, IOA was not collected for at least 20% of sessions across all phases throughout the study. Additionally, another three experiments were rated as *Does Not Meet Standards* due to fewer than three attempts to demonstrate intervention effectiveness. Lastly, one experiment was rated as *Does Not Meet Standards* for not including insufficient phases or data points within each phase. Out of the 28 experiments that met quality standards with or without reservations, 19 (68%) experiments provided Strong Evidence, five (18%) experiments provided Moderate Evidence, and four (14%) experiments provided No Evidence (see Figure B.2).

## *Discussion*

Within this review, we synthesized 16 studies with 37 participants to evaluate and identify types of caregiver-implemented visual support interventions being used with individuals with developmental disabilities. We identified two predominantly used visual supports: (a) visual schedules and (b) social interaction supports. Additional types of visual supports, including, (a) visual rule reminders, (b) reward charts, (c) environmental labels, (d) choice boards, (e) picture cards, (f) object signifiers & photographs, (g) self-management checklists, and (h) token boards were identified in the review, but applied infrequently relative to the other techniques.

Several interesting findings were identified. First, approximately 70% of caregivers found visual support interventions in the home setting to be feasible and effective. These caregivers also indicated that they would implement the intervention again in the future. Caregivers are more likely to implement interventions with high fidelity if they perceive the goal of the intervention as significant, the procedures acceptable, and the outcomes important (Lloyd & Heubusch, 1996; Snodgrass et al., 2018). High treatment fidelity increases the internal and external validity of a study, thus making it possible for researchers to draw accurate conclusions about intervention efficacy (Bellg et al., 2004; Resnick et al., 2005). Caregiver treatment fidelity were evaluated to assess the degree to which treatments were implemented as intended. Overall, almost half of the studies within the present review reported high caregiver treatment fidelity, resulting in evidence to suggest caregivers can implement visual supports independently and accurately over time because data on caregiver treatment fidelity speaks to the likelihood that a treatment will be used in the future (Carter &

Wheeler, 2019). It is important for researchers to continue to examine and report caregiver treatment fidelity as a method for evaluating the efficacy of treatment.

Half of the studies evaluated the use of multiple types of visual supports with at least one participant (Buschbacher et al., 2004; Clarke et al., 1999; Dettmer et al., 2000; Goldman et al., 2018; Greene et al., 1999; Harding et al., 2009; Meadan et al., 2014; Vaughn et al., 1997). It is interesting to note that among these eight studies, only one study reported caregiver treatment fidelity data. Conversely, of the studies that used one type of visual supports, at least half reported caregiver treatment fidelity data. While there may be no relation to caregiver treatment fidelity and the number of visual supports used, in one study that used multiple visual supports researchers reported that the caregiver implemented the intervention with 55% fidelity, on average (Goldman et al., 2018). These results may indicate that caregivers need additional coaching when a combination of visual supports are used. Additionally, it is important to note that the findings of the current review do suggest that caregivers found interventions which used multiple types of visual supports to be feasible and effective, and indicated that they would implement this intervention again in the future.

Additionally, very few research teams reported that they included participant and/or caregiver input the selection of the visual support. This is surprising given that interventions were conducted in the home setting with caregivers serving as the primary implementers. Although there are situations where there may not be a choice in what type of visual support is used, there are certainly situations where caregiver and participant preference could, and should, be taken into consideration. Failing to include the caregiver and client in the selection of the type of visual support could affect buy-in from both the

caregiver and client and potentially negatively impact caregiver treatment fidelity. Future studies should include caregivers and clients when selecting treatment procedures including the type of visual support.

Lastly, no studies evaluated the use of high-tech visual supports. High-tech devices are more readily available to families because of the recent advancements in technology (Reinert et al., 2020). Children and caregivers may prefer high-tech visual supports over low-tech visual supports because of the durability of high-tech devices and the ease of transporting the devices across multiple settings. Low-tech visual supports tend to be bulky and cumbersome to carry around which may be stigmatizing for the child (Reinert et al., 2020). High-tech visual supports are less stigmatizing because of their frequent use in both the home and community settings (Reinert et al., 2020). If visual supports are touted to be a solution for increasing child independence, then additional research is needed to determine the practicality of high-tech versus low-tech visual supports for increasing child independence.

### *Implications*

The current review offers several implications for practice. First, the current research indicates the efficacy of coaching caregivers to teach their child to use visual supports in the home setting. Practitioners should be encouraged to continue coaching natural change agents (e.g., caregivers) to use visual supports in applied settings (e.g., home, community). Practitioners should consider caregiver and client input and the dependent variable to inform which type of visual support they use. For example, when promoting communication practitioners may consider using visual rule reminders.

However, when promoting engagement or the number of tasks/steps completed practitioners may consider using visual schedules.

Many of the applications of visual supports summarized in this review targeted daily living skills. This is not surprising since intervention sessions for all participants took place, at least in part, in the home-setting. Additional research is needed to evaluate the effectiveness of caregiver-implemented visual supports for promoting a variety of skills (e.g., leisure skills, academic skills) other than daily living skills. For example, teaching individuals with developmental disabilities to engage in appropriate leisure activities in the home may reduce the overall amount of prompting and redirecting caregivers must provide to keep their children busy (Cannella-Malone et al., 2016).

### *Limitations*

Several limitations are worth noting. First, we only included studies which used a single-case research design. Expanding the inclusion criteria regarding the evaluation procedures for the dependent variable may have resulted in the identification of more studies (Schlosser et al., 2007). Second, many of the articles identified in this review were published prior to 2005, when the single-case research quality standards were published (e.g., Horner et al., 2005; Wong et al., 2015; WWC, 2020). This may have influenced the number of studies we identified as meeting standards with or without reservations. Third, publication bias could have influenced the results of this literature review. Experiments with intended, or optimal, outcomes are more likely to be published, which can cause an overestimation of intervention effectiveness (Sham & Smith, 2014). Therefore, it is important that we note the published studies identified in this review may not be representative of all experimental evaluations. Fourth, during our search, we

identified several studies that included the use of an auditory or tactile support (e.g., Slattery et al., 2016) in conjunction with the visual support; however, we did not extract data specifically related to the auditory or tactile support because the purpose of this review was solely to evaluate the use of visual supports. Therefore, for these studies it is not possible to identify which support exerted more control over the dependent variables.

### *Conclusion*

In conclusion, the findings of this literature review support the use of caregiver-implemented visual supports for children with developmental disabilities. Moreover, the results endorse the use of visual supports for promoting independence in routines and for decreasing the amount of challenging behavior during these routines. However, more research is needed to evaluate the efficacy of caregiver-implemented visual supports for teaching other skills, such as leisure and play skills. Additionally, caregivers rated these interventions procedures as feasible, effective, and indicated that they would continue implementing the intervention after the completion of the research study. For the studies that evaluated and reported caregiver treatment fidelity, the data indicated that caregivers can implement interventions with high fidelity. Future research should continue to evaluate the extent to which caregivers implement these interventions with fidelity. The results of this systematic literature review indicate that caregivers rate these interventions as socially valid. Further these results demonstrate that caregiver-implemented visual supports are effective at increasing target skills, such as daily living skills, in the home for children with autism spectrum disorder or other developmental disabilities.



## CHAPTER THREE

### The Use of Caregiver-Implemented Visual Schedules to Teach Leisure Activities for Children with Developmental Disabilities

#### *Introduction*

Individuals with developmental disabilities often need additional support to engage in leisure activities during their free time (Cannella-Malone et al., 2016). Deficits in leisure skills can be attributed to difficulties with initiating tasks, completing multistep directions, and organizing materials (Fleury et al., 2014; García-Villamisar & Dattillo, 2010; Kurnaz & Yanardag, 2018; Pelios et al., 2003; Rosenthal et al., 2013; Sreckovic et al., 2020). For example, individuals with a developmental disability often find it difficult to identify, access, plan, and participate in leisure and play skills (Kurnaz & Yanardag, 2018). Additionally, individuals with developmental disabilities often have challenges completing the same leisure or play activity across multiple settings, such as at school and at home. Caregivers frequently must provide support to their child to help them engage in leisure activities during their free time and to transition from one activity to another (Spriggs et al., 2017).

#### *Caregiver-Implemented Interventions*

Caregiver-implemented interventions that occur in the home create opportunities for positive treatment effects to occur in typical environments (Sreckovic et al., 2020). Conducting interventions in the individual's typical environment promotes the generalization of skills to typical contexts and routines (Sreckovic et al., 2020).

Moreover, interventions that are part of a family's typical routine are more likely to persist over time (Koegel et al., 1996; Moes & Frea, 2000, 2002). For example, Sreckovic et al. (2020) reported that caregiver-implemented work systems were an effective intervention for decreasing the amount of prompting required to promote the completion of daily-living tasks (e.g., making lunch, doing laundry). Prior research has demonstrated the efficacy of training caregivers to implement behavior analytic interventions (e.g., Gerencser et al., 2017; Gerow et al., 2020). Additionally, prior research has demonstrated that coaching caregivers to implement interventions is effective for increasing the availability and the quality of evidence-based interventions for children with developmental disabilities (Gerencser et al., 2017; Gerow et al., 2020; Symon, 2005).

### *Visual Supports*

Interventions that promote a shift in stimulus control from continuous adult support during instruction (e.g., frequent prompting and socially mediated reinforcement) to an alternative stimulus is important for increasing independence among children with developmental disabilities. Visual supports are an effective intervention component for increasing children's independence (Spriggs et al., 2017). Visual supports are environmental stimuli that are either used with, or in place of, verbal stimuli (e.g., visual activity schedule, if/then statement board, choice board; Sam & AFIRM Team, 2015). Prior research has demonstrated that children with developmental disabilities are often better at remembering visual information compared to information given verbally (Hume et al., 2009; Quill, 1997). Behavior analysts use visual supports to teach individuals with developmental disabilities academic tasks (e.g., Bryan & Gast, 2000), leisure and play skills (e.g., Akers et al., 2016), daily living and adaptive skills (e.g., Buschbacher et al.,

2004), and appropriate transitions (e.g., Stoner et al., 2007). Prior research has demonstrated that caregiver-implemented visual supports are effective at increasing independence with tasks, such as daily living skills, in the home for children with developmental disabilities (Buschbacher et al., 2004; Goldman et al., 2018; Krantz & MacDuff, 1993).

Moreover, prior research has demonstrated the effectiveness of high-tech (i.e., digital) visual supports (e.g., video modeling; Mechling et al., 2010; Mechling & Gustafson, 2009) as well as low-tech visual supports (e.g., visual schedules; Buschbacher et al., 2004; Dettmer et al., 2020; Sreckovic et al., 2020). High-tech visual supports require battery power or electricity, whereas low-tech visual supports typically consist of paper and binders. There is currently an increasing trend in the number of studies evaluating the use of high-tech visual supports (Reinert et al., 2020). Due to new developments in technology, there is more readily available high-tech devices (Reinert et al., 2020). Researchers must consider several factors when deciding to use low-tech or high-tech visual supports. First, low-tech visual supports tend to be bulky and cumbersome to carry around, which may be stigmatizing for the child (Reinert et al., 2020). High-tech visual supports are less stigmatizing because of their more frequent use in both the home and community (e.g., school) across all individuals (Reinert et al., 2020). However, high-tech visual supports are not always readily available because they involve batteries that must be charged.

### *Visual Schedules*

One of the primary visual supports used across research studies are visual schedules. Visual schedules are a sequence of visual cues (e.g., pictures) that prompt an individual to follow a set routine (Meadan et al., 2011; Spriggs et al., 2017).

Visual schedules can depict a series of steps for completing one activity (e.g., use pencil to poke small hole in bottom of the egg carton, place egg carton lid underneath egg carton bottom, add soil to egg carton, etc.) or a series of several activities (e.g., brush teeth, put on pajamas, get a cup of water, go to bed). Behavior analysts may use visual schedules promote the completion of novel skills and/or to increase independence by increasing on-task or on-schedule behavior with skills already in an individual's repertoire (Bryan & Gast, 2000, Koyama & Wang, 2011, Spriggs et al., 2017).

### *Gaps in the Literature, Purpose, and Research Questions*

Caregivers are important contributors to the effectiveness and sustainability of interventions. Empirical evidence supports the notion that caregivers can accurately implement interventions that lead to socially important improvements in behavioral outcomes (Gerow et al., 2018, 2020). Previous research supports the use of caregiver-implemented visual supports in the home (e.g., Buschbacher, et al., 2004; Clarke et al., 1999; Goldman et al., 2018; Krantz & MacDuff, 1993; Vaughn et al., 1997). To our knowledge, 16 studies have evaluated the use of caregiver-implemented visual supports for children with developmental disabilities. Of these 16 studies, nine studies evaluated the use of visual schedules (Buschbacher et al., 2004; Clarke et al., 1999; Dettmer et al., 2020; Gerencser et al., 2017; Goldman et al., 2018; Krantz et al., 1993; Meadan et al., 2014; Sreckovic et al., 2020; Vaughn et al., 1997). However, none of the included studies

used caregiver-implemented high-tech visual supports. It is important for future research to evaluate the efficacy of caregiver-implemented high-tech visual supports for children with developmental disabilities to teach leisure and play skills. The purpose of this study was to evaluate the efficacy of coaching caregivers to teach their child to follow high-tech visual schedules to promote the independent completion of leisure activities via videoconferencing technology. Further, researchers explored the extent to which individuals continue to complete these leisure activities in the absence of their caregiver. Our specific research questions include:

1. Is there a functional relation between caregiver-implemented visual schedules and the independent completion of a leisure activity for individuals with developmental disabilities?
2. Will individuals with developmental disabilities continue to interact with the visual schedule and engage with the leisure activity when the caregiver is no longer present in the room?

### *Method*

#### *Participants and Setting*

After receiving institutional review board approval, families were recruited for participation in this study. Two participants diagnosed with autism spectrum disorder and their caregivers participated in this study. Both participants were recruited through a university-affiliated applied behavior analysis clinic. Jordan was a 14-year-old Hispanic young man, and his mother was a 35-year-old Hispanic woman. Zane was an 11-year-old Hispanic boy, and his father was a 54-year-old Hispanic man. Both participants communicated in complete and complex sentences. Additionally, both participants had advanced visual matching and listener responding skills could tolerate physical contact.

One to two researchers were present for each session. We met with each family twice a week for approximately one hour. Both researchers had training in applied behavior analytic interventions for individuals with developmental and intellectual disabilities and at least one Board-Certified Behavior Analyst<sup>®</sup> was present for every session. We provided coaching during all sessions via videoconferencing technology. All participants and researchers participated from their respective homes.

### *Materials*

Materials included technology required for providing caregiver coaching (e.g., computer, videoconferencing technology), all data collection materials (i.e., data sheets, treatment fidelity checklist, caregiver coaching fidelity checklist, caregiver instructions), and high-tech (i.e., digital) visual schedules. All sessions were conducted through Zoom<sup>™</sup>, a videoconferencing technology. To conduct sessions, researchers used a laptop computer with a microphone, speaker, camera, and the videoconferencing software. Similarly, Jordan and his mother used a laptop computer and Zane and his father used a desktop computer. Both computers had a microphone, speaker, camera, and the videoconferencing software. All visual schedules were made using Google Slides<sup>™</sup> following the procedures presented in Reinert et al. (2020). All visual schedule pictures were taken from a first-person perspective (i.e., from the participant's perspective). Visual schedule pictures depicted each step of the task analysis.

### *Data Collection*

*Dependent measures.* The primary dependent variable was the percentage of steps completed correctly for each leisure activity. We used this primary dependent

variable to make decisions about phase changes. We recorded each step of the leisure activity that participants completed correctly or incorrectly using a task analysis as the data sheet (see Table A.7). Percentage of steps completed correctly was defined as the participant completing each step of the task analysis in the correct order and in the absence of caregiver prompting. We marked a plus for items completed correctly and a minus for items completed incorrectly. We calculated a percentage by dividing the number of steps on the task analysis marked with a plus by the total number of steps on the task analysis (i.e., number of all steps marked with a plus and a minus) and multiplying the sum by 100 to get a percentage. The secondary dependent variable was the duration of each session in seconds for Jordan and minutes for Zane.

*Interobserver agreement (IOA).* We collected trial-by-trial interobserver agreement (IOA) for the percentage of steps completed correctly for 81% of sessions across all phases and conditions for Jordan and 100% of sessions across all phases and conditions for Zane. We collected trial-by-trial IOA by dividing the number of agreements of leisure activity steps completed independently and accurately by the number of agreements plus disagreements and multiplying the sum by 100 to get a percentage. Mean agreement was 97%, (range, 89%–100%) across all leisure activities for Jordan and 94%, (range, 66%–100%) across all leisure activities for Zane.

Additionally, we collected interval-by-interval IOA for the percentage of time the participant was on task for 58% of sessions across all phases and conditions for Jordan and 95% of sessions across all phases and conditions for Zane. We collected IOA interval-by-interval by dividing the number of intervals with an agreement by the total number of intervals (i.e., the number of intervals with agreements plus the number of

intervals with disagreements) and multiplying the sum by 100 to get a percentage. Mean agreement was 93% (range, 83%–100%) across all leisure activities for Jordan and 97%, (range, 60%–100%) across all leisure activities for Zane.

### *Experimental Design*

We used a concurrent multiple probe design across leisure activities to evaluate the effects of the coaching caregivers to teach their child to follow visual schedules to complete leisure activities (Gast, 2010; Kennedy, 2005). Each tier of the multiple probe design consisted of baseline, a visual schedule probe, intervention, and a visual schedule probe without the caregiver. When data in the baseline and visual schedule probe conditions were at low levels and/or stable, the researchers asked the participants which leisure activity they would like to learn to determine the order of the tiers.

### *Caregiver and Participant Interview*

We interviewed each caregiver and participant during the initial visit to identify three potential leisure skills to teach the participant. During this interview, we asked the caregiver what leisure activities they would like their child to learn. We asked the participant what they like to do for fun to create a list of potential leisure activities. We then read each leisure activity to the participant and asked them if it sounded fun or boring. We reviewed the list leisure activities that the participant indicated sounded fun, with the caregiver to select three leisure activities to teach. Jordan was taught to complete 4x4 sudoku puzzles, garden, and bake a corn muffin mug cake in the microwave. Zane was taught to make an origami jumping frog, make homemade playdough, and complete a 50-piece jigsaw puzzle (see Table A.6).



### *Caregiver Coaching*

We provided caregivers with written and verbal instructions, prompting, and feedback to coach caregivers to teach their child to follow visual schedules to complete novel leisure activities. Additionally, we provided caregivers with written and verbal instructions prior to the first session with a new procedure. Written and verbal instructions were similar to the content of the treatment fidelity checklist, but with the caregiver as the intended audience (i.e., free of technical jargon; Gerow et al., 2020). The instructions consisted of stating the purpose of each phase and the general procedures for each phase. During the remaining sessions, the researcher reminded the caregiver of the procedures prior to the onset of the session and answered any of the caregivers' questions. During sessions, contingent upon the participant's incorrect implementation of the procedures, or nonresponding after a 10 s time delay, we verbally prompted the caregiver to use full physical guidance to prompt the participant to implement the correct procedure. We provided the caregiver with brief praise following each session (e.g., "great job today!"). Following intervention sessions, we provided performance feedback (i.e., praise for steps implemented correctly and corrective feedback for steps implemented incorrectly).

### *Treatment Evaluation*

*Baseline.* Similar to previous studies teaching participants to engage in leisure activities, all baseline sessions were single-opportunity sessions (e.g., Cannella-Malone et al., 2016). At the start of the session, we asked the participant which leisure activity they would like to try first. All baseline sessions began with the caregiver providing the

instruction to engage in the leisure activity (e.g., “Go make a jumping frog”). The participant did not receive any additional prompting. Participants were given 10 s to initiate the leisure activity and 10 s to begin any subsequent steps contingent upon the correct completion of the previous step. If the participant did not respond for 10 s or incorrectly responded, the session was terminated. The caregiver provided verbal praise (e.g., “Good trying!”) at the end of every session.

*Visual schedule probe.* These procedures were identical to baseline except that the visual schedule was present.

*Intervention.* All intervention sessions began with the caregiver providing the instruction to engage in the leisure activity. We coached caregivers to use a graduated guidance procedure to teach the participant to follow the visual schedule (Bryan & Gast, 2000; MacDuff et al., 1993). Caregivers physically prompted their child from behind and did not provide any vocal prompting. Participants had 10 s to complete each component of the leisure activity before the caregiver provided a physical prompt. Contingent upon the participant incorrectly responding, the caregiver immediately provided a physical prompt to engage in the appropriate response. Sessions ended after completion of the leisure activity (i.e., participant completing every step on the task analysis). Mastery criterion was the participant independently completing 100% of the components of the visual schedule across three consecutive sessions.

*Visual schedule probe without the caregiver.* Following intervention sessions, we conducted a probe session where the caregiver was not present in the room. At the beginning of these sessions, the caregiver told the participant they had to work in the

other room and provided the instruction to engage in the leisure activity. All other procedures were identical to baseline and visual schedule probe sessions.

#### *Caregiver Implementation Fidelity*

We assessed caregiver implementation fidelity for 100% of sessions across all phases and conditions for Jordan and Zane. We used a task analysis of the procedures for each condition to measure the percentage of steps that caregivers implemented correctly. We calculated caregiver implementation fidelity by dividing the number of correctly implemented steps by the total number of steps and multiplying the sum by 100 to get a percentage. Mean caregiver implementation fidelity was 97% (range, 57%–100%) for Jordan’s mother and 95% (range, 29%–100%) for Zane’s father.

#### *Researcher Coaching Fidelity*

A second independent observer recorded whether the researcher provided prompting to the caregiver for 83% of sessions across all phases and conditions for Jordan and 100% of sessions across all phases and conditions for Zane. Coaching fidelity was calculated by dividing the number of sessions where the researcher provided the caregiver with prompting by the total number of sessions and multiplying the sum by 100 to get a percentage. Mean researcher coaching fidelity was 100% for Jordan and 100% for Zane.

#### *Social Validity*

We evaluated the social validity of the intervention by administering a researcher-adapted version of the Treatment Acceptability Rating Form-Revised (TARF-R; Reimers & Wacker, 1988; Reimers et al., 1991, 1992) with each caregiver. The purpose of the

social validity questionnaire was to gather data on whether caregivers found the use of the visual schedule to be an effective and feasible intervention for promoting participant independence during leisure activities. The questionnaire was administered after the completion of the intervention. Caregivers were asked to rate each of the 16 statements using a 6-point Likert-type scale (Likert, 1932), in which a rating of 1 is *strongly disagree* and a rating of 6 is *strongly agree*. For most items, a higher score indicated greater levels of acceptability. However, for a few items a 1 indicates a position attitude (i.e., negative items). The negative items were reverse scored to calculate the average.

## *Results*

### *Treatment Evaluation*

*Jordan.* Data were collected on the percentage of steps participants completed correctly and independently for each leisure activity (see Figure B.3). During baseline, the average percent of steps completed correctly was 20% for the sudoku puzzle, 4% (range, 0%–11%) for gardening, and 7% (range, 0%–11%) for baking. During the visual schedule probe, Jordan completed 20% of the steps correctly for sudoku, 11% for gardening, and 11% for baking. These results indicate that Jordan would benefit from an intervention where he was taught to complete these leisure activities and that the visual schedule alone was not an effective intervention for the accurate completion of these leisure activities. During the intervention, the average percent of steps Jordan completed correctly increased to 92% (range, 50%–100%) for sudoku, 95% (range, 67%–100%) for gardening, and 100% for baking. Finally, during the visual schedule probe without the caregiver, the percent of steps Jordan completed correctly was 100% for sudoku, 89% for

gardening, and 100% for baking. For each tier, the treatment effects were immediate and there was an increasing trend in the accurate completion of leisure activities throughout the intervention phase. There was no overlap between baseline and intervention conditions. Together, these results suggest a functional relation between the implementation of the intervention and increases in the percentage of steps completed correctly for the leisure activities.

Additionally, data were collected on the duration of sessions in seconds (see Figure B.4). During baseline, the average session duration was 26 s (range, 19–39 s) for sudoku, 15 s (range, 9–30 s) for gardening, and 49 s (range, 10–59 s) for baking. During the visual schedule probe, the session duration was 119 s for sudoku, 9 s for gardening, and 99 s for baking. During the intervention, the average session duration was 92 s (range, 29–300 s) for sudoku, 79 s (range, 29–149 s) for gardening, and 242 s (range, 199–279 s) for baking. Finally, during the visual schedule probe without the caregiver, the session duration was 29 s for sudoku, 179 s for gardening, and 249 s for baking.

Across each tier, we observed an immediate increase in the session duration following the implementation of intervention. The data were slightly variable during the intervention sessions for sudoku and gardening. We hypothesize that these data are a result of Jordan becoming more proficient at following the visual schedules and completing the leisure activities. However, the average session duration during the intervention and visual schedule probe without the caregiver phases remained higher than during the baseline phase. Together, these results suggest a functional relation between the implementation of the intervention and an increase in the session duration for the leisure activities.

*Zane.* Like Jordan, data were collected on the percentage of steps participants completed correctly and independently for each leisure activity (see Figure B.5). During baseline, the average percent of steps completed correctly were 23% (range, 16%–26%) for origami, 13% (range, 0%–18%) for playdough, and 8% for the puzzle. During the visual schedule probe, Zane completed 21% of the steps correctly for origami, and 18% for playdough. We observed an increase in the percentage of steps completed correctly during the visual schedule probe for the puzzle in the initial session. To verify that the participant did not learn how to complete the puzzle from the visual schedule alone, we implemented two additional visual schedule probe sessions (for a total of three visual schedule probe sessions) and observed stable responding ( $M = 30\%$ ; range, 25%–33%) for the puzzle. Overall, these results indicate that Zane would benefit from an intervention in which he was taught to complete these leisure activities and that the visual schedule alone was not an effective intervention for the accurate completion of these leisure activities. During the intervention, the average percent of steps Zane completed correctly increased to 89% (range, 68%–100%) for origami, 88% (range, 45%–100%) for playdough, and 93% (range, 83%–100%) for the puzzle. Finally, during the visual schedule probe without the caregiver, the percent of steps Zane completed correctly was 100% for origami, 92% for playdough, and 100% for the puzzle. Following the implementation of the intervention, there was an immediate increase in the accurate completion of the leisure activities in each tier. There was no overlap between baseline and intervention data. Based on the visual analysis of the data, there was a functional relation between the caregiver teaching the participant to follow the visual schedule and the accurate completion of steps for each leisure activity.

Additionally, data were collected on the duration of sessions in minutes (see Figure B.6). During baseline, the average session duration was 0.77 min (range, 0.65–1 min) for origami, 0.59 min (range, 0.30–1.17 min) for playdough, and 3.18 min (range, 0.53–9.98 min) for the puzzle. During the visual schedule probe, the session duration was 0.92 min for origami, 0.43 min for playdough, and an average of 3.09 min (range, 2.73–3.62 min) for the puzzle. During the intervention, the average session duration was 5.48 min (range, 1.42–11.40 min) for origami, 12.54 min (range, 9.32–16.55 min) for playdough, and 22.53 min (range, 17.40–29.72 min) for the puzzle. Finally, during the visual schedule probe without the caregiver, the session duration was 3.10 min for origami, 10.97 min for playdough, and 18.68 min for the puzzle. We observed an immediate increase in the session duration following the implementation of intervention across each tier. Interestingly, during the intervention phase we observed a decreasing trend in the session duration across each tier. Similar to Jordan, we hypothesize that these data are a result of Zane becoming more proficient at following the visual schedules and completing the leisure activities. The average session duration during the intervention and visual schedule probe without the caregiver phases were higher than the baseline phase. Together, these results suggest a functional relation between the implementation of the intervention and an increase in the session duration for the leisure activities.

### *Social Validity*

Caregivers were asked to rate each of the 16 statements using a 6-point Likert-type scale (Likert, 1932), in which a rating of 1 is *strongly disagree* and a rating of 6 is *strongly agree*. The average score could range from 1 to 6 with a higher score indicating greater acceptability. The average social validity rating for the treatment evaluation was

5.13 (range, 2–6) and 5.34 (range, 2–6) for Jordan and Zane, respectively. In conclusion, caregivers rated the intervention as acceptable and feasible to implement. Additionally, both caregivers agreed that the intervention fit into their existing routine and that they were willing to continue implementing this intervention. Finally, both caregivers reported that the intervention resulted in improved outcomes for the participant.

### *Discussion*

The purpose of this study was to evaluate the efficacy of coaching caregivers to teach the participant to follow high-tech visual schedules to promote the independent completion of leisure activities via videoconferencing technology and to explore the extent to which participants continue to complete these leisure activities in the absence of their caregiver. To our knowledge, this is the first research study that taught participants how to complete leisure activities that they selected. This is the first research study to explore whether participants would continue to complete these leisure activities in the absence of their caregivers.

For this study, two participants with autism and their caregivers participated. We coached Jordan's mom to teach Jordan to follow a visual schedule to learn how to complete sudoku puzzles, to garden, and to bake. We coached Zane's dad to teach Zane to follow a visual schedule to learn how to make an origami jumping frog, homemade playdough, and to complete a 50-piece jigsaw puzzle. Both participants were able to learn how to complete these leisure activities using high-tech visual schedules and continued to complete these leisure activities in the absence of their caregivers. These results demonstrate that coaching caregivers via videoconferencing technology is an effective intervention for teaching individuals with developmental disabilities to engage in leisure



activities. These findings are consistent with prior research studies examining the use of caregiver-implemented visual schedules in the home. For example, Goldman et al. (2018) coached parents to teach their children to follow visual schedules in the home to complete household chores and/or daily living routines. The results from this study demonstrated that coaching parents to teach their child to follow a visual schedule increased the independent completion of household chores and/or daily living routines for two of the three participants (Goldman et al., 2018). This current study extends the literature on caregiver-implemented visual schedules by demonstrating that researchers can coach caregivers to effectively teach their child to follow high-tech visual schedules to complete novel leisure activities in the home.

Furthermore, social validity data collected from the caregivers indicated that researchers addressed a goal that was important for both families. Both caregivers reported that their child engaged in few leisure activities and that this was an area that their child needed to improve on. Both caregivers reported that the procedures were appropriate and that they would continue to follow these procedures after the conclusion of the study. Caregivers and participants aided in the identification of leisure activities. In this study, we asked participants to identify any activities that they thought would be fun to learn and asked caregivers which activities they thought their child would like to learn. This is important because behavior analysts are ethically obligated to involve clients and stakeholders (e.g., caregivers) when selecting goals, assessments, and interventions, and when engaging in progress monitoring whenever possible (Behavior Analyst Certification Board, 2022, Section 2.09). Additionally, it is important to involve caregivers in goal selection because prior research has demonstrated a positive

relationship between caregiver involvement in the intervention process (i.e., planning and executing interventions) and caregiver quality of life (Musetti et al., 2021). Teaching children to complete novel leisure activities also has beneficial outcomes for the child participants. Prior research has demonstrated that there is a positive relationship between promoting the completion of leisure activities and the child's quality of life (Kleiber et al., 1986; Williams & Dattilo, 1997).

### *Limitations and Directions for Future Research*

The current study has some limitations that warrant discussion. Each session consisted of a single opportunity for the participant to engage in the leisure activity. In baseline, the session was terminated following 10 s of non-responding or an incorrect response. It is possible that this method underestimated the percentage of steps the participant could complete for each leisure activity. Furthermore, we collected data on the percentage of steps completed correctly for each leisure activity and did not collect data on the percentage of independently completed schedule components (e.g., open visual schedule, read the text on the visual schedule slide, complete the step, return to the visual schedule, click “next”, etc.). Therefore, it is unclear whether participants used each component of the schedule. Finally, we did not collect maintenance data and there is a need for further research on the maintenance of leisure skills.

In the current study, we created the visual schedules using Google Slides and shared the schedules with the families. All families continued to have access to the visual schedules after the conclusion of the study and were told that they could modify the existing visual schedules to teach their child other skills. However, researchers did not coach caregivers on how to make visual schedules using Google Slides. Reinert et al.

(2020) presented a great resource for caregivers to use to learn how to create visual schedules in Google Slides. Future research should explore coaching caregivers to the create visual schedules using Google Slides, instead of creating it for them. Additionally, this study used a multiple probe design across leisure activities that met What Works Clearinghouse (WWC) Single-Case Design Standards with reservations (WWC, 2020). For the current study to be rated as *Meets standards without Reservations*, there would have needed to be at least three consecutive probes immediately before introducing the independent variable. Future researchers might consider designing their experimental conditions that meet WWC Single-Case Design Standards without reservations. Lastly, future research should take into consideration participant preferences for the leisure activities. Although the current study used participant input in selecting the leisure activities, we did not assess participant preference for the leisure activity once the participant learned how to complete that leisure activity.

### *Conclusions and Implications for Practice*

In sum, this study identified several considerations when promoting leisure skills in children with developmental disabilities. First, this study demonstrates the effectiveness of coaching caregivers to teach their child to follow high-tech visual schedules to promote the completion of leisure activities. Due to new developments in technology, there are more readily available high-tech devices which makes using high-tech visual schedules to teach leisure activities more feasible (Cannella-Malone et al., 2016; Reinert et al., 2020). In the current study, all visual schedules were made using Google Slides, which is a freely available web-based program that works on a variety of digital devices (e.g., computers and tablets) and platforms (Reinert et al., 2020). A benefit

of using Google Slides is that caregivers can continue to access and use the visual schedules after the conclusion of the research study. Additionally, caregivers can modify the visual schedules or use the existing visual schedules as templates to create visual schedules to teach their child other skills. Moreover, another potential benefit for teaching individuals to complete leisure activities is that they can promote increases in other functional skills (Cannella-Malone et al., 2016). For example, learning to use measuring cups to complete the targeted leisure skills will be useful when cooking, baking, or completing science projects. This study incorporated participant and caregiver choice throughout the procedures; practitioners should consider similar procedures to increase participant and stakeholder involvement in the intervention procedures. Overall, the results of the present study suggest that researchers can coach caregivers to teach their child to follow high-tech visual schedules to learn how to complete leisure activities and demonstrates that individuals will continue to complete these leisure activities even when caregiver support is withdrawn.

## CHAPTER FOUR

### Assessing the Social Validity of Caregiver-Implemented Visual Supports: A Phenomenological Case Study

#### *Introduction*

Approximately 1 in 6 children are diagnosed with a developmental disability (CDC, 2021a, 2021b; Lindly et al., 2016; Zablotsky et al., 2019). With the increase in the number of children diagnosed with a developmental disability and the push for evidence-based treatments, a similar increase has been observed in the need for coaching caregivers to implement applied behavior analytic interventions. Caregivers are significant contributors to the efficacy of interventions to increase independence in the home setting for children with developmental disabilities. However, caregivers are less likely to implement all interventions components because of time constraints, differences in training, and varying sources of reinforcement (Feldman, et al., 2004; Gerow et al., 2018; Moes & Frea, 2000, 2002; Sloman et al., 2005). Not implementing all intervention components may lead to poor implementation fidelity (i.e., degree to which treatment was implemented as intended; Moncher & Prinz, 1991; Resnick et al., 2005). Prior research has demonstrated that low implementation fidelity results in poor treatment outcomes (Barton & Fettigg, 2013). Conversely, the existing literature indicates that caregivers can accurately implement interventions that lead to socially important improvements in behavioral outcomes.

Some caregivers may express skepticism about the relevance of behavioral interventions and the real problems of their day-to-day lives (Schwartz, 1995). If

behavior analysts aim to implement socially important interventions, then behavior analysts must use systems that allow for consumers of these interventions to provide feedback about how the interventions relate to their values (i.e., to their reinforcers; Wolf, 1978). Social validity refers to evaluating the amount of acceptance for an intervention program or procedures designed to change behavior (Carter & Wheeler, 2019). The purpose of social validity assessments is to provide behavior analysts with information about the feasibility, sustainability, and effectiveness of interventions (Carter & Wheeler, 2019). Creating a link between behavior analysts and caregivers who implement interventions may inform behavior analysts about the values and needs of the caregiver (Schwartz, 1995). Descriptions of caregiver experiences implementing behavior analytic interventions may be used to better understand how behavior analytic intervention may be most effectively implemented in natural settings (Baer et al., 1987; Schwartz et al., 1995). While research on caregiver-implemented interventions is plentiful, there are few qualitative studies evaluating caregiver experiences during caregiver-implemented behavior analytic interventions for children with developmental disabilities. The purpose of this qualitative phenomenological case study was to better understand caregivers' experiences with teaching their child follow visual schedules to complete leisure activities in the home.

### *Theoretical Framework*

This study was rooted in *a priori* theoretical framework based on the work of Wolf (1978), Horner et al. (2005), and Reichow et al. (2008), to understand the dimensions of socially valid, or practical, applied behavior analytic (ABA) research procedures and findings. We developed the framework based on the work of Wolf

(1978), Horner et al. (2005), and Reichow et al. (2008) to guide the overall research design, frame the research questions, and shape the data collection and data analysis procedures (Creswell & Poth, 2018; Yin, 2014). Wolf (1978), Horner et al. (2005), and Reichow et al. (2008) approach their work with an ABA lens, a framework that seeks to understand the behavior of individuals by identifying relationships between environmental events and socially significant behavior (Cooper et al., 2020). ABA is the scientific approach for identifying environmental variables that reliably influence socially important behavior and developing research-based strategies to improve these behaviors (Cooper et al., 2020). ABA research must be applied, behavioral, and analytic, as well as technological, conceptually systematic, and effective, and it should display some generality. These seven dimensions of ABA set the groundwork for an applied practice of behavior analysis. This framework lays out the importance of caregiver experiences with behavior analytic interventions as a measure of the social importance of behavioral interventions.

Wolf (1978) first introduced the concept of recruiting feedback from consumers of behavioral interventions about how these interventions relate to their values (i.e., reinforcers) as a measure of social validity. Wolf (1978) claimed that for behavior analysts to engage in a practice that results in socially significant behavior change, behavior analysts needed to develop a measure of social validity. Following this notion, Wolf (1978) stated that society would have to measure the social importance of behavioral interventions across three dimensions, (a) significant goals, (b) acceptable procedures, and (c) important outcomes (i.e., effects). In other words, behavior analysts should evaluate whether the specific behavioral goals are what society wants, if the ends

justify the means, and whether the consumers are satisfied with the results, including any unpredicted results. To summarize this framework, behavior analysts should seek feedback on the social significance of the goals, the importance of the outcomes (i.e., treatment effects), and the acceptability of the procedures. Wolf's (1978) essay on social validity provided a framework for future behavior analysts to follow for identifying and creating socially valid interventions.

Both Horner et al. (2005) and Reichow et al. (2008) recognized the importance of socially valid, or practical, applications of behavioral interventions. Like Wolf (1978), Horner et al. (2005) and Reichow et al. (2008) agreed that for behavioral interventions to be socially important, behavior analysts needed to identify socially significant goals (i.e., dependent variables), use acceptable and feasible of intervention procedures, and the intervention needed to result in socially significant intervention outcomes (i.e., effects). These researchers expanded upon Wolf's (1978) three dimensions of social validity by identifying and presenting additional defining features of social valid interventions by offering behavior analysts with an objective criterion for assessing the social importance of interventions (Horner et al., 2005; Reichow et al., 2008). Specifically, Horner et al. (2005) elaborated on Wolf's (1978) three dimensions by expanding the definition of acceptable and feasible intervention procedures. Horner et al. (2005) stated that social validity is enhanced when interventions occur in typical settings (i.e., settings that the client typically attends), with typical implementers (i.e., individual who typically interacts with the client implements the intervention procedures), and with typical resources (i.e., materials needed for the intervention are materials the client already has access to in their typical setting). As a result of these publications, behavior analysts have



a more objective criterion for evaluating the social acceptability of treatment programs. Horner et al. (2005) and Reichow et al. (2008) helped ensure consistency between behavior analysts when they are evaluating the social significance of behavior analytic interventions by providing more objective descriptions of what it means to engage in a socially valid practice.

Overall, the theoretical framework used in this study filled gaps in the literature, concerning caregivers' experiences with teaching their child follow visual schedules to complete leisure activities in the home as this phenomenon has not been evaluated through the framework of Wolf (1978), Horner et al. (2005), and Reichow et al. (2008). The theoretical framework was influenced by the ABA interpretive lens of the researchers. Figure B.7 displays the relationship of the interpretive framework and theoretical framework used to guide this study's research questions, data collection methods, and data analysis methods.

### *Literature Review*

Since 1997 the number of individuals diagnosed with a developmental disability has increased (CDC, 2021a, 2021b; Lindly et al., 2016; Zablotsky et al., 2019). This increase has resulted in a bigger need for the use of evidence-based practices, including ABA. Families of individuals with developmental disabilities often report barriers to receiving ABA services (Zhang & Cummings, 2020). These barriers may be a result of a lack of service providers within private insurance networks, a shortage of ABA service providers, and restricted access to ABA clinics, especially in rural areas (Loughrey et al., 2014; Zhang & Cummings, 2020). Coaching caregivers to implement ABA interventions with high fidelity is one way to increase a family's access to evidence-

based interventions (Loughrey et al., 2014; Sone et al., 2021; Symon, 2005). Moreover, caregiver treatment fidelity speaks to the likelihood that an intervention will continue to be used in the future (Carter & Wheeler, 2019). Therefore, coaching caregivers on how to implement ABA interventions may result in an increase in intervention dosage.

Specifically, children who participate in a caregiver-implemented intervention programs receive an additional 18 hours per week of services compared to traditional behavior analyst implemented interventions (Roberts & Kaiser, 2015; Sone et al., 2021). Increases in the hours of services provided per week yield improvements in child behavior (Sone et al., 2021).

Research on caregiver-implemented interventions indicates that caregivers are effective intervention agents for improving a variety of skills for children with developmental disabilities (Sturmey & Fitzner, 2007; Symon, 2005). However, the success of caregiver-implemented interventions relies on whether caregivers find the intervention components to be feasible, sustainable, and result in socially significant outcomes (Leko, 2014; Lloyd & Heubusch, 1996; Snodgrass et al., 2018). This emphasizes the importance of obtaining consumer feedback on ABA interventions. Types of feedback behavior analysts should be seeking from consumers include examining the significance of the behavioral goals, the procedures used to during the intervention, and the importance of the intervention outcomes (Wolf, 1978). For example, prior research has demonstrated that caregivers are more likely to implement an intervention as intended if they find the intervention to be acceptable and feasible (Gabor et al., 2016; Kazdin, 1980; Leko, 2014). For these reasons, it is important for researchers to identify interventions that society finds socially important in natural settings, with typical implementers, and available

resources for the generalization and maintenance of child outcomes (Horner et al., 2005; Reichow et al., 2008; Snodgrass, 2018; Wolf, 1978).

To our knowledge, four studies have evaluated caregiver perceptions regarding the use of interventions with visual supports for their child with a developmental disability (Donato et al., 2014; Hines et al., 2011; Rutherford et al., 2020; Stoner et al., 2007). Across these studies, researchers used several qualitative analyses to explore caregiver experiences, such as a case study (i.e., Stoner et al., 2007), a narrative analysis (i.e., Hines et al., 2011), and focus groups (i.e., Donato et al., 2014; Rutherford et al., 2020). Researchers also evaluated the effects of these interventions across multiple behaviors (i.e., dependent variables), such as transitions (i.e., Stoner et al., 2007) and communication (i.e., Hines et al., 2011; Donato et al., 2014). For example, Stoner et al. (2007) evaluated caregiver perspectives of strategies and interventions which promote the effective management of transitions for their children with autism spectrum disorder. While these studies have contributed to the extant literature by providing insight into caregiver experiences with interventions that include the use of visual supports for individuals with developmental disabilities, it remained unclear whether these were caregiver-implemented interventions. That is, no study has evaluated the social significance of an intervention where caregivers were coached to teach their child to follow high-tech visual schedules to learn how to complete novel leisure activities in the home using Wolf's (1978) theoretical framework.

With the growing need for ABA services, the number of caregivers implementing ABA interventions has been increasing. It is increasingly important for researchers to evaluate the social significance of caregiver-implemented ABA interventions. There is a

need for a researcher to conduct a qualitative analysis exploring caregiver perceptions of the social significance of ABA interventions where they teach their child to use visual supports using Wolf's (1978) theoretical framework.

### *Research Design and Methodology*

To address the research questions, we conducted a phenomenological case study. Qualitative research is defined as the systematic observation of specific individuals to interpret a phenomenon based on the meanings these individuals attribute to specific events (Bogdan & Biklen, 1992; Creswell & Poth, 2018; Denzin & Lincoln, 2005; Patton, 1990). Qualitative researchers aim to better understand, or interpret, a phenomenon in typical settings. Qualitative researchers use multiple data sources and data collection methods to interpret the phenomenon (Denzin & Lincoln, 2005). Specifically, qualitative researchers seek to better understand how people interpret their experiences, including what meaning they attribute to their experiences, and how people construct their worlds (Crawford, 2016; Merriam & Tisdell, 2015). Since the present study addressed caregiver experiences with teaching their child to follow visual schedules to complete leisure activities, a phenomenological case study was most appropriate. Phenomenologists examine the everyday experiences of individuals to understand and describe the essence of a phenomenon (Moustakas, 1994).

Furthermore, we used a case study approach by examining individual experiences from a select number of participants who have experiences with a specific phenomenon. Case studies allow researchers to observe and analyze data on a small scale to help researchers gain comprehensive understanding of participants experiences (Crawford, 2016; Merriam & Tisdell, 2015). In the present study, the phenomenon in question was

defined as coaching caregivers to teach their children to follow visual schedules to complete leisure activities. Together, a phenomenological case study allowed the researchers to better understand caregivers' experiences with teaching their child follow visual schedules to complete leisure activities. Using a phenomenological case study, we sought to better understand caregiver experiences with teaching their child follow visual schedules to complete leisure activities in the home. Specifically, we wondered:

1. What are caregivers' experiences with visual schedules in the home setting for promoting the independent completion of leisure activities?
2. How do caregivers describe the use of visual schedules in the home setting?
3. What do caregivers identify as barriers for implementing visual schedules in the home?

### *Setting and Participant Sampling*

We selected participants based on a purposive criterion sampling procedure. Purposeful sampling is to intentionally recruit a group of participants based on a set criterion, to best inform the researcher about the problem under examination (Creswell & Poth, 2018; Devers & Frankel, 2000). Specifically, we recruited participants who had previously participated in a single-case research design study where they received coaching on how to implement a behavior analytic intervention that included the use of a visual support in their home. We received institutional review board approval prior to recruiting families for participation in the single-case research design study and the subsequent qualitative analysis.

All participants were recruited through a university-affiliated ABA clinic. Due to the COVID-19 pandemic, participants had the option of completing this study face-to-face or via videoconference technology. All participants chose to complete the study using videoconference technology. Therefore, data collection occurred virtually in the

participants homes. Participants were two caregivers of individuals diagnosed with autism spectrum disorder. Mia was a 35-year-old Hispanic woman. She was the mother of Jordan, a 14-year-old Hispanic young man. Earl was a 54-year-old Hispanic man. He was the father of Zane, an 11-year-old Hispanic boy. Both caregivers received coaching on how to teach their children to follow visual schedules to complete three novel leisure activities in their home. Mia taught Jordan to follow visual schedules to learn how to complete sudoku puzzles, to garden, and to bake mug cakes. Earl taught Zane to follow visual schedules to learn how to make an origami jumping frog, complete a 50-piece jigsaw puzzle, and to make homemade playdough (see Table A.6).

One-to-two researchers met with each family twice a week for approximately one hour to collect field note data. Both researchers had training in ABA interventions for children with developmental and intellectual disabilities and at least one Board-Certified Behavior Analyst® was present for every session. We collected the semi-structured interview data during the last visit with each family.

### *Data Collection Procedures*

Data were obtained through multiple sources of information (Creswell & Poth, 2018; Yin, 2014). We used both semi-structured interviews and field and personal notes (i.e., observations) to thoroughly describe and understand caregiver experiences with teaching their child to follow visual schedules to complete leisure activities in the home setting. All data collection procedures were computer mediated, meaning we were able to type notes and answers to the interview questions. This type of data collection method provides the advantage of time efficiency because of the reduced time researchers must spend transcribing data (Creswell & Poth, 2018). Additionally, we recorded sessions so

they could go back and review data if needed. See Table A.8 for an overview of the data collection and data analysis methods for each research question.

*Semi-structured interview.* We used semi-structured interviews as the primary method for data collection. We conducted all interviews with the caregivers following their completion of the single-case research design study. Interviews took place one-on-one with both the researcher and caregiver talking face-to-face via videoconferencing technology (i.e., virtually). Interviews provided researchers the opportunity to understand the essence of this phenomenon from the caregivers' point of view and to describe the meaning of their experiences (Fox, 2009). The semi-structured interviews included predetermined open-ended questions. See Table A.9 for an overview of the semi-structured interview questions and the research questions associated with each interview question. We kept all questions as open as possible to allow caregivers to provide any information that they thought relevant (Anderson et al., 2021). The semi-structured interview consisted of ten questions, five main questions and five follow-up questions (Roberts, 2020). All research questions aligned with the theoretical framework (i.e., goals, procedures, and outcomes of treatment). Each semi-structured interview was recorded in Zoom™. During each interview, the primary researcher used memoing to record descriptive and reflective notes and the secondary researcher transcribed the interview (Creswell & Poth, 2018).

*Notes.* We recorded field and personal notes during each visit with the caregivers throughout their participation in the single-case research design study. All observation were made virtually using a videoconferencing technology. Field notes included a

running account of observations made during each visit. Field notes were objective descriptions of observations made during each visit. We also recorded data on caregiver implementation of the procedures (i.e., caregiver treatment fidelity data) and whether caregivers reported the procedures as acceptable and feasible, and indicated whether they would continue following the procedures after the completion of the research project. Personal notes included researchers own reflections and impressions during each visit with participants (i.e., reflexive journaling) to make obvious any research bias (Creswell & Poth, 2018; Lincoln & Guba, 1985; Lyst et al., 2005).

### *Data Analysis Procedures*

We used the data analysis spiral presented by Creswell and Poth (2018) to guide our procedures. We separated the activities described in the data analysis spiral into three analysis strategies to create a three-step process for data analysis (Creswell & Poth, 2018). Data analysis in this study included preparing and organizing the data, reducing the data into themes, and displaying the data in figures and tables and representing the data through discussion (Creswell & Poth, 2018).

*Preparing and organizing the data.* To prepare and organize the data, we separated all data by participant and visit number. We organized the semi-structured interview data by research question and the associated interview questions for each caregiver. To do this, we created separate documents, each document contained the research question, associated semi-structured interview questions, and caregiver responses to those questions. Additionally, we summarized all field notes and personal notes. Then we aggregated all the data obtained through notes into two documents, one



document containing the field and personal notes for the first caregiver and one document containing the field and personal notes for the second caregiver. The notes in these documents were organized in ascending order by visit number (e.g., visit 1 to visit 8). Once the data were organized, we familiarized ourselves with the data by reading through all notes and semi-structured interview responses several times.

*Data reduction and analysis.* Data obtained through semi-structured interviews and notes were evaluated using an a priori theoretical framework analysis influenced by the works of Wolf (1978), Horner et al. (2005), and Reichow et al. (2008). That is, we used a list of predetermined codes based on the key concepts of social validity presented in the theoretical framework. Coding is the process of sorting and organizing the data (Creswell & Poth, 2018; Stuckey, 2015).

We used a within-case analysis to review and separate each piece of data against the predetermined codes to cluster data that were similar in meaning (Stuckey, 2015). We identified and clustered significant statements that were relevant to the phenomenon under study. Next, we analyzed all the data within each case a second time to expand upon the predetermined codes and identify any emergent codes (Stuckey, 2015; see Table A.10). Specifically, we engaged in a within-case analysis to seek evidence for the emergence of new codes by comparing these emergent categories across both forms of data (i.e., notes and semi-structured interview) for each caregiver. Throughout the coding process, we used memoing to record how they were developing codes and making decisions about coding (Stuckey, 2015). Memoing served as an audit trail to keep track of how decisions were made (Creswell & Poth, 2015; Stuckey, 2015).

Following these coding procedures, we created a codebook. The purpose of the codebook was to define each code and describe how to evaluate the data against each code using example statements for each code. The use of a codebook played an important role in assessing interrater reliability. The codebook helped ensure there was greater consistency between researchers in the analysis process (Creswell & Poth, 2018). Once we reached a consensus on all codes, the primary researcher finalized the codebook by specify the boundaries of each code by defining the precise meaning of each code.

Finally, we completed the cross-case analysis as part of the thematic analysis. We engaged in a cross-case analysis to discern themes that were common and different to both cases (Creswell & Poth, 2018). We clustered these codes and significant statements into categories based on similarities (Creswell & Poth, 2018; Moustakas, 1994). Each theme captured a central idea. The themes identified during the cross-case analysis served as the primary findings from this qualitative study (Creswell & Poth, 2018).

*Displaying the data.* The themes identified from the data analysis functioned as the primary findings (Creswell & Poth, 2018). We used a composite description (i.e., textual description and structural description) of the phenomenon to describe the essence of the experience (Creswell & Poth, 2018; Moustakas, 1994). We condensed emergent themes into clusters and/or statements that seeks to capture the essence of the phenomenon (Colaizzi, 1978; Morrow et al., 2015). Additionally, we used figures and tables to display the data (Creswell & Poth, 2018; Wolcott, 1994). Results are discussed further below.

### *Validity and Reliability*

We used the terminology suggested by Lincoln and Guba (1985) to discuss the methods used to establish the trustworthiness of the study. These terms include credibility, dependability, transferability, and confirmability. We spent a noteworthy amount of time (i.e.,  $\approx$  6 weeks per participant) in the field to establish credibility. Additionally, we used triangulation of data sources, methods, and researchers. We built rapport with caregivers by spending a great deal of time in the field prior to collecting data using the semi-structured interview. We first conducted a single-case research design study with caregivers prior to the qualitative semi-structured interview. The use of triangulation helps to establish corroboration and validity (Creswell & Poth, 2018). Both the primary researcher and the secondary researcher recorded field and personal notes during each visit with the caregivers establish triangulation across researchers. Additionally, data from the field and personal notes and the semi-structured interview provided multiple forms of information to establish triangulation across data sources. Collecting data across multiple sources provides increased credibility and dependability by corroborating themes (Creswell & Poth, 2018; Lincoln & Guba, 1985; Lyst et al., 2005). We used reflexive journaling to identify personal reactions, experiences, and prejudices that may have influenced data collection and data analysis (Creswell & Poth, 2018; Lincoln & Guba, 1985; Lyst et al., 2005). We also engaged in memoing to serve as an audit of the research process, which enhances both the credibility and dependability of the data (Creswell & Poth, 2018; Lincoln & Guba, 1985; Stuckey, 2015).

Moreover, a second independent rater coded 100% of the semi-structured interview for both caregivers. Prior to obtaining reliability data, we reviewed and

discussed the codebook and reviewed one coded transcription from the semi-structured interview. An agreement was counted if both researchers identified the same codes for the interview responses. We calculated interrater reliability by dividing the total number of agreements by the total number of disagreements plus agreements for all codes and multiplying the sum by 100 to get a percentage. Agreement across the semi-structured interviews was 86%. We discussed all disagreements to come to a consensus.

### *Results*

The purpose of this study was to better understand caregivers' experiences with teaching their child to follow visual schedules to complete leisure activities in the home by answering the following research questions:

1. What are caregivers' experiences with visual schedules in the home setting for promoting the independent completion of leisure activities?
2. How do caregivers describe the use of visual schedules in the home setting?
3. What do caregivers identify as barriers for implementing visual schedules in the home?

To answer these research questions, we engaged in a within-case analysis and cross-case analysis. We conducted semi-structured interviews and collected data through field and personal notes using the theoretical framework guided by the works of Wolf (1978), Horner et al. (2005), and Reichow et al. (2008). We sought to reveal caregiver perceptions of the intervention procedures to seek feedback on the significance of the goals, the acceptability of the procedures, and the importance of the outcomes.

#### *Individual Case Description and Within-Case Analysis*

The current cases within this study are bounded by time and location and represent caregivers' individual experiences with teaching their child follow visual

schedules to complete leisure activities in the fall of 2021 and the spring of 2022 (Creswell & Poth, 2018). Prior to this phenomenological case study, caregivers completed a single-case research design study in which they were coached on how to teach their child to follow visual schedules to complete novel leisure activities. During this study, we recorded field and personal notes. Following the completion of this study, caregivers completed semi-structured interviews. Both caregivers were the parent of a child diagnosed with autism spectrum disorder. We recruited both caregivers through a university-affiliated ABA clinic. Both caregivers participated in this study remotely, via videoconferencing technology.

We analyzed each case using a theoretical framework analysis guided by Wolf (1978), Horner et al. (2005), and Reichow et al. (2008) to identify the emergent themes. During the within-case analysis, caregivers discussed their experiences receiving coaching to teach their child to follow a visual schedule to complete novel leisure activities in the home. Both caregivers shared whether they felt the goals were significant, the procedures were acceptable, and the intervention resulted in important outcomes for their child (Horner et al., 2005; Reichow et al., 2008; Wolf, 1978). Caregivers also identified barriers and facilitators to the intervention outcomes. Below, we present individual case descriptions from the within-case analysis and present the most salient pieces of each participants' experiences and illustrate connections to these experiences and the theoretical framework.

*Mia.* Mia was a 35-year-old Hispanic woman. She was the mother of Jordan, a 14-year-old Hispanic young man diagnosed with autism spectrum disorder. Mia described Jordan as high functioning but stated that he struggles with “processing.” Mia

stated that Jordan loves to play video games, but she only allows him to play on the weekends. She said that Jordan does not like loud noises and prefers to play alone. Mia described using verbal praise to communicate to Jordan when he does something well. When researchers asked Mia about what she would like Jordan to work on, she stated that she would like him to “eat a variety of more foods, stay on task, and retain and recall information.” Mia said that she often must repeat herself and remind Jordan to stay on task. Mia stated that she is willing to try anything and everything with Jordan. Mia emphasized that she wanted to “have things they can implement at home and that she wants him to be as independent as possible.”

We asked Mia and Jordan to identify some activities that they thought would be fun to learn. We asked Mia about Jordan’s interests, what he likes to do for fun, and to identify anything she would like him to learn. Mia described Jordan as loving anything with patterns, she specifically stated that Jordan “enjoys doing word searches” and typically does these when he comes home from school and when he is in the car. He also loves playing with his guinea pigs and feeding them treats. Mia said that recently Jordan has begun watching videos with people cooking and baking in them. When asked about her current concerns with Jordan’s leisure skills, Mia expressed that Jordan is “a little bit on the determination [*sic*] side. He is determined to do things even though he doesn’t comprehend how careful you need to be.” We asked Mia what strategies she currently uses to teach Jordan new leisure skills and she said that she uses “a lot of modeling, she shows him, but he doesn’t always follow the model.” After talking with Mia about Jordan’s interests and her current concerns and strategies regarding leisure skills, researchers met with Jordan. We asked Jordan about his hobbies, what he likes to do in

his free-time, and if there was anything that he wanted to learn. We then created a list of possible leisure activities they could teach Jordan. We read this list to Jordan and asked him to say whether the activity sounded fun or boring. Ultimately, the three leisure activities that Mia and Jordan selected were gardening, baking, and sudoku puzzles.

When asked about her experiences teaching Jordan to follow visual schedules to learn how to complete these leisure activities, Mia shared that “at first it was discouraging.” She said that at first Jordan did not know what to do, he didn’t know how to complete the leisure activities and she just wanted to show him what to do by modeling or do it for him rather than using the visual schedule. Mia shared that in the beginning of implementing this intervention she was “skeptical,” but by the end of the study she described herself as “calm because he (Jordan) knew what to do and (would) request help if he got stuck.” She described Jordan as being discouraged at the start, but she said that she encouraged him to keep going. We then asked Mia to describe what it was like teaching Jordan to use the visual schedule, Mia said that it was “frustrating in the beginning because (he) wouldn’t read the slides, (but) at the end he knew that he needed to attend to the slides to complete the task.” Mia’s initial description of how she felt about the intervention was concerning because Wolf (1978) emphasizes the importance of the intervention resulting in important outcomes and that caregivers should be satisfied with the results. However, Mia ended up saying that she liked the visual schedules because “he (Jordan) could see it”, the visual schedule included pictures showing Jordan how to complete each step of the leisure activity. She said that Jordan normally asks for a lot of help to do things, especially when he sees her, and she liked how she could “step away from him to promote his independence.” In other words, Jordan could still follow the

visual schedule to complete the leisure activity without needing his mom in the room with him. Wolf's (1978) emphasis on selecting goals that are socially important is reflected in Mia's description of her experiences with this intervention. Mia described how Jordan "was more in the kitchen and (would) observe what (she) was doing" after teaching Jordan how to bake using the visual schedule. She restated that Jordan was "previously, somewhat unaware of the dangers in the kitchen, but being in the kitchen with (her) and the (visual) schedule helped." Mia's emphasis on the positive outcomes this intervention has had on Jordan, even outside of learning the three leisure skills, is evidence that the intervention resulted in important outcomes for Jordan and Mia. Lastly, we asked Mia if there was anything else that she felt was important for the researchers to know. Mia expressed her gratitude for the researchers working with Jordan and restated that she liked the intervention. Mia told the researchers to "remind other parents to be patient to help promote independence."

*Earl.* Earl was a 54-year-old Hispanic man. He was the father of Zane, an 11-year-old Hispanic boy. Earl described Zane as having "light spectrum autism." Earl said that Zane loves to draw and described Zane drawing dine-in restaurant and fast-food restaurant logos. Earl said that Zane loves to play video games with him brother and loves to play with magnets. Additionally, Earl stated that Zane enjoys listening to music. Earl described using high-fives, fist bumps, and verbal praise to communicate to Zane when he does something well. When we asked Earl about what he would like Zane to work on, he stated that he would like him to "learn more appropriate play skills, learn to draw pictures based on a story (not just pictures of what he can see), and work on conversations." Earl expressed interest in Zane learning to play with age-appropriate



items. Earl also said that he would like to explore “hobbies” and asked researchers if they had any resources that they could share with him.

Like the conversations with Mia and Jordan, we asked Earl about Zane’s interests, what he likes to do for fun, and to identify anything he would like his son to learn. Earl said that Zane likes to watch anything on PBS KIDS™ and play online computer games. He said Zane’s recently been watching PBS KIDS science videos and has expressed an interest in science activities. Earl said that Zane loves to draw and build things, especially in Minecraft. When asked about his current concerns with Zane’s leisure skills, Earl expressed that “about a year ago, he was concerned because he wasn’t engaging in age-appropriate leisure skills. He was watching baby [television] shows, all the PBS Kids shows is new within the past year.” We asked Earl what strategies he currently uses to teach Zane new leisure skills and he said that he doesn’t have any current strategies. He said that Zane started showing more interest in age-appropriate leisure skills after “learning about PBS KIDS from school [and] using different apps on his tablet at school.” After talking with Earl about Zane’s interests and his current concerns and strategies regarding leisure skills, we met with Zane. We asked Zane to talk about his hobbies, what he likes to do in his free-time, and if there was anything that he wanted to learn. We created a list of possible leisure activities and read them to Zane. Zane was asked to say whether the activity sounded fun or boring. Ultimately, the three leisure activities that Earl and Zane selected were making homemade playdough, jigsaw puzzles, and origami.

We asked Earl about his experiences implementing this intervention in which he was coached to teach Zane to follow visual schedules to learn how to complete leisure activities. Earl shared that the intervention procedure was:

Different from others because it is more ‘fun’ or ‘gamesy’ because we were teaching leisure skills. Also, different because it is more hands off and promotes more independence. As a parent you want to help him more, but you must let him fight it out and do it on his own.

Earl emphasized that sentiment again by stating that the intervention was “different, but (he) liked it, because as a parent you want to help him (Zane), but you need to let him do it on his own.” We then asked Earl to describe what it was like teaching Zane to use the visual schedule, Earl said that “actually it was pretty easy, it was a little different compared to other therapies, but I thought it was very easy and very effective.” Earl said that the visual schedules were “awesome” and that he really liked them, especially for Zane because “he is more of a visual learner.” Earl said that he “loved the way you broke the different steps down. Clicking through the steps (was) almost becoming subconscious or automatic for him (Zane).” Lastly, we asked Earl if there was anything else that he felt was important for the researchers to know and Earl said that he would “continue using these (visual schedules) as examples” to work on other skills. Earl’s description of how he felt about the intervention procedures was encouraging. Not only did Earl describe the intervention procedures as easy to implement, but he also stated that he would continue to use these procedures to teach Zane other skills. This is important because for the intervention to result in important outcomes, caregivers should find the intervention procedures acceptable (Horner et al., 2005; Reichow et al., 2008; Wolf, 1978).

*Summary of within-case analysis.* Both cases described above highlight the works of Wolf (1978), Horner et al. (2005), and Reichow et al. (2008). The use of the within-case analysis provided researchers with insight into caregivers' experiences with teaching their child follow visual schedules to complete leisure activities. Consistent with the theoretical framework, we recruited caregiver feedback on the social significance of this intervention by asking caregivers to describe their experiences of being coached to teach their child to follow a visual schedule to complete novel leisure activities in the home. Caregivers described their reactions to the goals of the intervention, they described how they perceived the outcomes of the intervention, and they specified whether they found the intervention procedures to be acceptable. Collectively, caregivers expressed positive perceptions of the goal, intervention procedures, and outcomes (see Table A.11). Following the conclusion of the within-case analysis, we conducted a cross-case analysis to identify and evaluate themes that emerged as central to the social validity of coaching caregivers to teach their child to follow visual schedules to complete leisure activities in the home.

#### *Cross-Case Analysis and Emergent Themes (Thematic Analysis)*

Following the within-case analysis, we were able to review the data through the theoretical framework to identify categories based on whether caregivers were describing the goals as being significant, or targeting behaviors that they valued, whether they found the intervention procedures appropriate, and whether the intervention resulted in important outcomes for their child and family. Here, we conducted a cross-case analysis to discern themes that were common and different to both cases (Creswell & Poth, 2018).

Across the two caregivers, the emergent theme was promoting independence (see Figure B.8). This theme provided the framework for the thematic analysis.

*Promoting independence.* Both caregivers emphasized the importance of promoting their child's independence. For example, prior to beginning the intervention Mia described independence as one of her goals for Jordan. Although both caregivers had different experiences with the intervention, both caregivers highlighted the importance of teaching their child skills that promote their independence. Additionally, both caregivers described an increase in their child's independence as an important outcome of the study. We identified how the intervention goals, the intervention procedures, and the intervention outcomes contributed to caregivers' feelings of their child's independence being promoted.

Across both cases, caregivers shared instances when they felt that the intervention was promoting their child's independence and instances when they felt there were barriers to independence. When we asked the caregivers what they would like their child to improve on prior to the intervention, Mia described that Jordan was often dependent on prompts from her to complete tasks. She said that that she wanted to "have things they can implement at home and that she wants him to be as independent as possible." Earl didn't initially indicate that increasing Zane's independence was one of his goals prior to the intervention. Instead, Earl described wanting Zane to have more age-appropriate hobbies. Nevertheless, the goals addressed in the single-case study were significant to all caregivers by still addressing concerns that they identified prior to the intervention. The use of the visual schedule promotes independence, and the teaching leisure activities can expand upon one's hobbies. In addition to identifying goals that support independence,

caregivers discussed the importance of intervention procedures that promote independence. Next, Earl provided the following insight about the procedures used within the intervention, “it is more hands off and promotes more independence.” Earl said that he thought the visual schedules were “awesome, the reason being that he (Zane) is more of a visual learner, and I love the way you broke the different steps down.” While Earl only shared positive experiences with the intervention procedures, Mia identified some barriers which initially hindered Jordan’s independence. Mia described how at the beginning of the intervention it was “discouraging because he (Jordan) didn’t know how to do it (the leisure activities) and (she) wanted to provide the step-by-step (directions) rather than use the (visual) schedule” and help Jordan complete the leisure activities. However, as Jordan started learning to “attend to the slides (visual schedule) to complete the task (leisure activity)” Mia described feeling “calm” and wanted to remind other caregivers “to be patient to help promote independence.” Finally, when it came to the intervention outcomes contributing to caregivers’ feelings of their child’s independence being promoted, both caregivers expressed the importance of the child being able to complete the leisure activity using the visual schedule without them in the room. Mia said that Jordan normally asks for a lot of help to do things, especially when he sees her and liked how she could “step away from him to promote his independence” and Earl expressed how the intervention was “hands off and promotes independence (and) as a parent you want to help him more, but you must let him fight it out and do it on his own.”

*Summary of cross-case analysis and emergent themes (thematic analysis).* The use of the cross-case analysis provided researchers with insight into perceptions of teaching their child to follow visual schedules to complete leisure activities.

Independence was described throughout all three components for evaluating when an intervention is socially valid across both caregivers. Figure B.9 displays a word cloud capturing emergent themes from the cross-case analysis. Specifically, we synthesized all the caregiver's answers to each question on the semi-structured interview into a single word or a phrase which captured the central idea. Caregivers expressed the importance of teaching their child skills that promotes their independence, using intervention procedures that promotes their independence, and the intervention resulting in increases in overall independence. Both participants described facilitators to their child's independence and one caregiver described a barrier to independence. We identified how the intervention goals, the intervention procedures, and the intervention outcomes contributed to caregivers' feelings of their child's independence being promoted.

### *Discussion*

The success of caregiver-implemented interventions relies on whether caregivers find the intervention components to be feasible, to be sustainable, and to result in socially significant changes to the dependent variable (Leko, 2014; Lloyd & Heubusch, 1996; Snodgrass et al., 2018). Recently, behavior analysts have become more interested in creating and evaluating social validity assessments. Several common methods for evaluating the degree of acceptance for ABA interventions includes interviews, indirect questionnaires, and surveys. The measurement of social validity provides behavior analysts with a method for identifying features of intervention programs that could lead to consumers discontinuing its use, avoiding it, or even seeking to ban its further implementation.

The current study focused on understanding caregiver experiences with teaching their child to follow visual schedules to complete leisure activities. This phenomenological case study used semi-structured interviews and field and personal notes to interpret and understand the lived experiences of these caregivers. We used a within-case and cross-case analysis to provide insight into the lived experiences of caregivers who were taught to teach their child to follow visual schedules to complete leisure activities in the home. The within-case analysis revealed that both participants found the intervention to be acceptable and feasible and resulted in significant treatment outcomes. Caregivers also identified barriers and facilitators to the intervention outcomes. The emergent theme from the cross-case analysis was promoting independence. Together, the within-case analysis and the cross-case analysis answered the research question focused on exploring caregiver experiences teaching their child to follow visual schedules to complete leisure activities and identifying facilitators and barriers to important intervention outcomes. Overall, this study contributes to the body of literature regarding the social importance of caregiver-implemented visual supports for promoting the completion of leisure activities in the home setting.

One caregiver described being initially skeptical of the intervention procedures because of the slower progress their child was making. Nevertheless, this caregiver ultimately reported that they liked the intervention, but they would encourage other parents to be patient. We hypothesize that the slow progress this caregiver was describing was during the baseline and visual schedule probe sessions where we had not yet introduced the intervention. These findings are similar to the findings of previous research studies. Rutherford et al. (2020) found similar results when conducting focus

groups with caregivers who have had experience with using visual supports. During these focus groups several caregivers reported giving up on using the visual schedules because they felt they did not work. Rutherford et al. (2020) accredited this finding to not identifying goals that were significant or motivating enough to caregivers. This is something future researchers should take into consideration and possibly evaluate regarding caregiver-implemented interventions in the home setting.

Overall, results from this study indicated that caregivers reported positive experiences receiving coaching to teach their child to follow visual schedules to complete leisure activities in the home. Both caregivers stated that the procedures promoted their child's independence and that they would continue using the visual schedules after the completion of the study. Additionally, both caregivers found the intervention to be socially acceptable.

### *Limitations*

There are several limitation worth noting. First, the sample of participants in this study was small, with only two participants who were recruited from the same university-affiliated ABA clinic. This may have influenced the overall experiences of these participants. It is likely that the sample only reflects caregivers who have previous experience with ABA interventions prior to participating in the single-case research design study. The findings from this study may not be generalizable to the broader community of caregivers. Additionally, the use of the same researchers who conducted to single-case research design study and the qualitative analysis may have influenced the results of the qualitative analysis. While using the same researchers for both studies helped to build rapport with the caregivers, it is possible that caregivers may have been



more comfortable to talk more candidly about their experiences being taught to teach their child to follow visual schedules with an independent researcher. Moreover, we used predetermined (i.e., a priori) codes during the data analysis to guide the coding process. The use of predetermined codes can result in researchers limiting data analysis; whereas emergent coding can open the codes to reflect the views of participants (Creswell & Poth, 2018). Data analysis is an iterative process, and we did reflect this by analyzing the data during the within-case analysis and expanding upon the predetermined codes to identify any emergent codes (Stuckey, 2015).

#### *Directions for Future Research*

Behavior analysts should continue to evaluate the social importance of behavior interventions by using quantitative and qualitative acceptability measures and practices. Additionally, behavior analysts should recruit information about the significance of the goals, the acceptability of intervention procedures, and the importance of the outcomes from multiple individuals (e.g., caregivers, clients, practitioners) using multiple sources (e.g., rating scales, questionnaires, interviews, direct observations; Anderson et al., 2021). In addition to evaluating the social significance of behavioral interventions, behavior analysts should also be evaluating whether intervention outcomes are maintained across time, within natural contexts, with natural resources, and with natural implementers as additional indicators of socially valid interventions (Gerow et al., 2018; Horner et al., 2005; Reichow et al., 2008). Furthermore, future studies may continue to use qualitative methods, such as within-case and cross-case analyses, to assess the social validity of interventions for specific problems and populations (e.g., caregivers of children with autism spectrum disorder).

## *Conclusion*

This study evaluated caregiver experiences with teaching their child to follow visual schedules to promote the completion of leisure activities in the home using a phenomenological case study. We evaluated whether caregivers identified the goals as significant, reported the intervention procedures as acceptable, and stated whether the intervention results in important outcomes for their child and family. The results of this study indicated that caregivers found the intervention to be acceptable and feasible and result in socially significant outcomes. Caregivers also expressed how the intervention promoted their child's independence and stated that they would continue to use the visual schedules after the completion of the research study. In sum, this research extends the existing literature on caregiver-implemented interventions by evaluating the social significance of caregiver-implemented visual supports for individuals with developmental disabilities using a qualitative phenomenological case study.

## CHAPTER FIVE

### General Discussion

The current dissertation consisted of three studies. Study One synthesized the current research on caregiver-implemented visual supports in the home for individuals with developmental disabilities. In Study Two, we evaluated the efficacy of coaching caregivers to teach their child to follow high-tech visual schedules to promote the independent completion of leisure activities via videoconferencing technology. Study Three explored caregiver experiences with teaching their child to follow visual schedules to complete leisure activities using semi-structured interviews and notes data.

Together, these studies indicate that visual supports can be used to increase the independence of individuals with developmental disabilities. Similar to prior research studies, the results from these studies add to the existing literature further demonstrating the efficacy of caregiver-implemented visual support interventions (e.g., Buschbacher et al., 2004; Clarke et al., 1999; Dettmer et al., 2000). Caregivers found this intervention to be acceptable and feasible, and resulted in significant outcomes, which is consistent with prior research on caregiver-implemented visual supports (e.g., Meadan et al., 2014; Slattery et al., 2016; Sreckovic et al., 2020). For example, similar to the study conducted by Cannella-Malone et al. (2016), we taught two participants to complete six unique leisure activities (three leisure activities each) in a systematic way using high-tech visual schedules. Together, the extant literature supports to use of high-tech devices for prompting the completion of novel leisure activities.

There are currently few studies which evaluate the use of coaching caregivers to teach their child to follow high-tech visual supports home setting. Moreover, to our knowledge this is the first research study to explore whether participants would continue to complete these leisure activities in the absence of their caregivers. We found that coaching caregivers to teach their child to follow high-tech visual schedules is effective for promoting the completion of leisure activities in the home. Participants and caregivers selected the leisure activities that we taught during this study. Prior research has demonstrated a positive relationship between caregiver involvement in the intervention process (i.e., planning and executing interventions) and caregiver quality of life (Musetti et al., 2021). Leisure activities are also important because of the beneficial effects on social interaction, communication, and over-all quality of life (Cannella-Malone et al., 2016; Schleien et al., 1995).

Furthermore, we explored caregiver perceptions of the intervention procedures and sought feedback on the social significance of the goals, the importance of the outcomes (i.e., treatment effects), and the acceptability of the procedures from the caregivers using both quantitative and qualitative analyses. First, we evaluated the social significance of this intervention using a Likert-type rating scale following the completion of the single-case research design study. Following this, we further evaluated the social significance of this intervention using a qualitative phenomenological case study. Across these analyses, both caregivers rated the intervention strategy as acceptable and feasible to implement. However, data obtained from the qualitative analysis identified possible barriers and facilitators to the social significance of these goals. Despite ultimately reporting positive affects for the goals, intervention procedures, and the outcomes, one

caregiver described that being initially skeptical of the intervention procedures because of the slower progress their child was making. We were able to obtain more detailed data on the social significance following the qualitative analysis. This is something future researchers should take into consideration and possibly evaluate regarding caregiver-implemented interventions in the home setting. The results from these studies contribute to the body of literature regarding the social importance of caregiver-implemented visual supports for promoting the completion of leisure activities in the home setting.

In conclusion, these studies contribute to the extant literature by providing further evidence supporting the use of caregiver-implemented ABA interventions. Caregivers are significant contributors to the efficacy of interventions to increase independence in the home setting for children with developmental disabilities. Similar to prior research studies, the results from these studies add to the existing literature further demonstrating the efficacy of caregiver-implemented visual support interventions (e.g., Buschbacher et al., 2004; Clarke et al., 1999; Dettmer et al., 2000). These studies provide a detailed description of caregiver-implemented visual support interventions to help behavior analysts better understand how ABA interventions may be most effectively implemented in natural settings with natural change agents. Behavior analysts should continue to evaluate the social importance of behavioral interventions by using quantitative and qualitative acceptability measures and practices. Behavior analysts should continue to collaborate with caregivers to design and implement visual support interventions to obtain positive outcomes and increase the social significance of these interventions.

## APPENDICES

## APPENDIX A

### Tables

Table A.1

*Researcher-Adapted Operational Definitions of Social Validity Quality Indicators Based on Gerow et al. (2018), Horner et al. (2005), and Reichow et al. (2008)*

Quality Indicators	Operational Definition for Meeting Criterion
<b>Significant Goals</b>	
<i>Socially Important Dependent Variable</i>	A behavior that expands the child's current repertoire to new settings, new contingencies, and new stimulus controls.
<i>Typical Implementer</i>	Implementer who interacts with the child regularly outside the context of research.
<i>Typical Resources</i>	Materials used to successfully implement the intervention are materials already in the setting, the participant already had access to, and/or can be found in contexts outside of research (e.g., grocery store).
<i>Typical Settings</i>	Intervention occurs in settings that the child participant typically attends in the absence of research.
<b>Acceptable Procedures</b>	
<i>Adequate Caregiver Implementation Data</i>	Implementation data indicates typical implementers can independently and accurately complete at least 80% of the intervention procedures, on average.
<i>Treatment Fidelity Over Time</i>	Study indicates typical implementer can implement the intervention over time without support or coaching from research team.
<i>Reported Caregiver Satisfaction Data</i>	Typical implementer reports that the intervention is feasible, effective, and indicate they will continue to follow the intervention procedures.



Quality Indicators	Operational Definition for Meeting Criterion
Important Outcomes	
<i>Comparison to Typically Developing Peers</i>	Researchers compare the target child's performance with the performance of a typically developing peer.
<i>Clinically Significant Changes in the Dependent Variable</i>	Following intervention, behavioral changes meet or exceed a predetermined mastery criterion, study described clinically significant (i.e., important) changes in behavior, and/or typical implementer reports that the changes in behavior were important.
<i>Generalization and Maintenance Data</i>	Researchers reports collecting data on the generalization and maintenance of child behavior.
<i>Note.</i> Researcher-adapted operational definitions of social validity quality indicators based on Gerow et al. (2018), Horner et al. (2005) and Reichow et al. (2008).	

Table A.2

*Participant and Methodological Characteristics*

Citation	Child Participant	Caregiver Participant	Setting	Caregiver Involvement			
				Caregiver Involvement in Selecting Visual Support	Percentage of Intervention Sessions Implemented	Percentage of Sessions Caregiver Implementation Fidelity Data Collected	Average Caregiver Implementation Fidelity
Buschbacher et al. (2004)	7-year-old male	Parent	Home	Not reported	Not reported	Not reported	Not reported
Clarke et al. (1999)	10-year-old male	Parent	Home	Not reported	76%-100%	76%-100%	Not reported
Dettmer et al. (2000)	7-year-old male	Parent	Multiple	Not reported	76%-100%	Not reported	Not reported
	5-year-old male	Parent	Home	Not reported	76%-100%	Not reported	Not reported
Fichtner et al. (2015)	17-year-old male	Parent	Multiple	Yes	51%-75%	Not reported	Not reported
	16-year-old male	Grandparent	Multiple	Yes	51%-75%	Not reported	Not reported

Citation	Child Participant	Caregiver Participant	Setting	Caregiver Involvement			
				Caregiver Involvement in Selecting Visual Support	Percentage of Intervention Sessions Implemented	Percentage of Sessions Caregiver Implementation Fidelity Data Collected	Average Caregiver Implementation Fidelity
	12-year-old male	Parent	Home	Yes	26%-50%	Not reported	Not reported
Gerencser et al. (2017)	4-year-old male	Parent	Home	Not reported	76%-100%	51%-75%	76%-100%
	3-year-old male	Parent	Home	Not reported	76%-100%	51%-75%	76%-100%
	3-year-old male	Parent	Home	Not reported	76%-100%	51%-75%	76%-100%
Goldman et al. (2018)	10-year-old male	Parent	Home	Yes	76%-100%	76%-100%	51%-75%
	6-year-old female	Parent	Home	Yes	76%-100%	76%-100%	76%-100%
Greene et al. (1999)	7-year-old male	Parent	Home	Yes	Not reported	76%-100%	Not reported

Citation	Child Participant	Caregiver Participant	Setting	Caregiver Involvement			
				Caregiver Involvement in Selecting Visual Support	Percentage of Intervention Sessions Implemented	Percentage of Sessions Caregiver Implementation Fidelity Data Collected	Average Caregiver Implementation Fidelity
Harding et al. (2009)	7-year-old female	Parent	Home	Yes	Not reported	76%-100%	Not reported
	7-year-old male	Parent	Home	Yes	Not reported	76%-100%	Not reported
	2-year-old male	Parent	Home	Not reported	76%-100%	Not reported	Not reported
	8-year-old male	Parent	Home	Not reported	76%-100%	Not reported	Not reported
	6-year-old male	Parent	Home	Not reported	76%-100%	Not reported	Not reported
Lorimer et al. (2002)	7-year-old male	Parent	Home	Not reported	76%-100%	Not reported	Not reported
	5-year-old male	Parent	Home	Not reported	26%-50%	76%-100%	Not reported

Citation	Child Participant	Caregiver Participant	Setting	Caregiver Involvement			
				Caregiver Involvement in Selecting Visual Support	Percentage of Intervention Sessions Implemented	Percentage of Sessions Caregiver Implementation Fidelity Data Collected	Average Caregiver Implementation Fidelity
Matson et al. (2014)	2-year-old male	Parent	Home	Not reported	76%-100%	Not reported	Not reported
	4-year-old male	Aunt	Home	Not reported	76%-100%	Not reported	Not reported
Meadan et al. (2014)	3-year-old female	Parent	Home	Yes	76%-100%	76%-100%	76%-100%
	4-year-old female	Parent	Home	Yes	76%-100%	76%-100%	76%-100%
	4-year-old female	Parent	Home	Yes	76%-100%	76%-100%	76%-100%
	3-year-old male	Parent	Home	Yes	76%-100%	76%-100%	76%-100%
	5-year-old male	Parent	Home	Yes	76%-100%	76%-100%	76%-100%

Citation	Child Participant	Caregiver Participant	Setting	Caregiver Involvement			
				Caregiver Involvement in Selecting Visual Support	Percentage of Intervention Sessions Implemented	Percentage of Sessions Caregiver Implementation Fidelity Data Collected	Average Caregiver Implementation Fidelity
Reagon et al. (2009)	6-year-old male	Parent	Home	Not reported	76%-100%	1%-25%	76%-100%
	3-year-old male	Parent	Home	Not reported	76%-100%	51%-75%	76%-100%
	2-year-old male	Parent	Home	Not reported	76%-100%	76%-100%	76%-100%
Slattery et al. (2016)	11-year-old male	Parent	Home	Not reported	76%-100%	26%-50%	76%-100%
	9-year-old male	Parent	Home	Not reported	76%-100%	26%-50%	76%-100%
	12-year-old male	Parent	Home	Not reported	76%-100%	26%-50%	76%-100%
Sreckovic et al. (2020)	18-year-old male	Parent	Home	Not reported	76%-100%	76%-100%	76%-100%

Citation	Child Participant	Caregiver Participant	Setting	Caregiver Involvement			
				Caregiver Involvement in Selecting Visual Support	Percentage of Intervention Sessions Implemented	Percentage of Sessions Caregiver Implementation Fidelity Data Collected	Average Caregiver Implementation Fidelity
Vaughn et al. (1997)	17-year-old female	Parent	Home	Not reported	76%-100%	76%-100%	76%-100%
	17-year-old male	Parent	Home	Not reported	76%-100%	76%-100%	76%-100%
	8-year-old male	Parent	Multiple	Not reported	76%-100%	76%-100%	Not reported

*Note.* Participant and methodological characteristics.

Table A.3

*Visual Support Characteristics*

Citation	Dependent Variable(s)	Prompting Procedure to Promote Use of Visual Support	Method for Identifying Visual Support	Type of Visual Support	Pre-training Prior to Using Visual Support	Type of Pre-Training
Buschbacher et al. (2004)	Engagement; CB	Not reported	Researcher selection	Visual schedule; timer; environmental label; choice board; social interaction support	Not reported	--
Clarke et al. (1999)	Engagement; length of routine/activity; CB	Not reported	Researcher selection	Visual schedule; reward chart	Not reported	--
Dettmer et al. (2000)	Transitions	Least-to-most	Researcher selection	Visual schedule	Not reported	--
	Transitions	Least-to-most	Researcher selection	Visual schedule; timer	Not reported	--
Fichtner et al. (2015)	Social interactions	Least-to-most	Caregiver input	Social interaction supports	Yes	Rule statement; least-to-most prompting



Citation	Dependent Variable(s)	Prompting Procedure to Promote Use of Visual Support	Method for Identifying Visual Support	Type of Visual Support	Pre-training Prior to Using Visual Support	Type of Pre-Training
	Social interactions	Least-to-most	Caregiver input	Social interaction supports	Yes	Rule statement; least-to-most prompting
	Social interactions	Least-to-most	Caregiver input	Social interaction support	Yes	Rule statement; least-to-most prompting
Gerencser et al. (2017)	Tasks/steps correct	Most-to-least	Researcher selection	Visual schedule	Not reported	--
	Tasks/steps correct	Most-to-least	Researcher selection	Visual schedule	Not reported	--
	Tasks/steps correct	Most-to-least	Researcher selection	Visual schedule	Not reported	--
Goldman et al. (2018)	Tasks/steps correct; transitions	Least-to-most	Caregiver input	Visual schedule; token board	Not reported	--
	Tasks/steps correct; transitions	Least-to-most	Caregiver input	Visual schedule	Not reported	--

Citation	Dependent Variable(s)	Prompting Procedure to Promote Use of Visual Support	Method for Identifying Visual Support	Type of Visual Support	Pre-training Prior to Using Visual Support	Type of Pre-Training
Greene et al. (1999)	Engagement; CB	Not reported	Caregiver input	Timer; reward chart	Not reported	--
	Engagement; CB	Not reported	Caregiver input	Timer; reward chart	Not reported	--
	Engagement; CB	Not reported	Caregiver input	Timer; reward chart	Not reported	--
Harding et al. (2009)	Tasks/steps correct; CB; communication	Not reported	Researcher selection	Picture card; environmental label	Not reported	--
Krantz et al. (1993)	Engagement; CB	Graduated guidance	Researcher selection	Visual schedules	Yes	Graduated guidance
	Engagement; CB	Graduated guidance	Researcher selection	Visual schedule	Yes	Graduated guidance
	Engagement; CB	Graduated guidance	Researcher selection	Visual schedule	Yes	Graduated guidance
Lorimer et al. (2002)	CB	Not reported	Researcher selection	Social interaction support	Not reported	--

Citation	Dependent Variable(s)	Prompting Procedure to Promote Use of Visual Support	Method for Identifying Visual Support	Type of Visual Support	Pre-training Prior to Using Visual Support	Type of Pre-Training
Matson et al. (2014)	Communication	Least-to-most	Prior experience	Social interaction support	Yes	Prior experience
	Communication	Least-to-most	Prior experience	Social interaction support	Yes	Prior experience
Meadan et al. (2014)	Communication	Not reported	Caregiver input	Visual schedule; visual rule reminder	Not reported	--
	Communication	Not reported	Caregiver input	Visual schedule; visual rule reminder	Not reported	--
	Communication	Not reported	Caregiver input	Visual schedule; visual rule reminder	Not reported	--
	Communication	Not reported	Caregiver input	Visual schedule; visual rule reminder	Not reported	--

Citation	Dependent Variable(s)	Prompting Procedure to Promote Use of Visual Support	Method for Identifying Visual Support	Type of Visual Support	Pre-training Prior to Using Visual Support	Type of Pre-Training
	Communication	Not reported	Caregiver input	Visual schedule; visual rule reminder	Not reported	--
Reagon et al. (2009)	Communication	Least-to-most	Researcher selection	Social interaction support	Not reported	--
	Communication	Least-to-most	Researcher selection	Social interaction support	Not reported	--
	Communication	Least-to-most	Researcher selection	Social interaction support	Not reported	--
Slattery et al. (2016)	Engagement; length of routine/activity	Not reported	Researcher selection	Self-management checklist	Yes	BST
	Engagement; length of routine/activity	Not reported	Researcher selection	Self-management checklist	Yes	BST

Citation	Dependent Variable(s)	Prompting Procedure to Promote Use of Visual Support	Method for Identifying Visual Support	Type of Visual Support	Pre-training Prior to Using Visual Support	Type of Pre-Training
	Engagement; length of routine/activity	Not reported	Researcher selection	Self-management checklist	Yes	BST
Sreckovic et al. (2020)	Tasks/steps correct	Verbal prompt	Researcher selection	Visual schedule	Not reported	--
	Tasks/steps correct	Verbal prompt	Researcher selection	Visual schedule	Not reported	--
	Tasks/steps correct	Verbal prompt	Researcher selection	Visual schedule	Not reported	--
Vaughn et al. (1997)	Engagement; CB	Not reported	Researcher selection	Visual schedule; object signifiers and photographs	Not reported	--

*Note.* Visual support characteristics. CB = challenging behavior, BST = behavior skills training, dashes (--) indicate not applicable because data in the preceding column was not reported

Table A.4

*Summary of Visual Support Categories for Each Dependent Variable*

Visual Support	Dependent Variables						
	Engagement	Communication	Tasks/Steps	Social Interactions	Transitions	Length of Time	Challenging Behavior
Visual Schedule	X	X	X		X	X	X
Picture Cards		X	X				X
Timers	X			X	X		X
Environmental Labels	X	X	X				X
Object Signifiers & Photographs	X						X
Choice Boards	X						X
Social Interaction Supports	X	X		X			X
Reward Charts	X			X		X	X
Visual Rule Reminder		X					
Other	X		X		X	X	

*Note.* Summary of visual support categories for each dependent variable.

Table A.5

*Summary of Social Validity Quality Indicators*

Citation	Significant Goals			Important Outcomes			Acceptable Procedures			
	Setting	Imp.	Resource	Social Sig.	Comp. to TD	Sig. Change in DV	Gen./ Maint.	TF 80% or higher	Over Time	Caregiver Report
Buschbacher et al. (2004)	Y	Y	N	Y	N	Y	Y	--	--	--
Clarke et al. (1999)	Y	Y	Y	Y	N	Y	N	--	--	Y
Dettmer et al. (2000)	Y	Y	Y	Y	N	Y	N	--	--	--
	Y	Y	Y	Y	N	Y	N	--	--	--
Fichtner et al. (2015)	Y	Y	Y	Y	N	Y	Y	--	--	Y
	Y	Y	Y	Y	N	Y	Y	--	--	Y
	Y	Y	Y	Y	N	Y	Y	--	--	Y
Gerencser et al. (2017)	Y	Y	N	Y	N	Y	Y	Y	Y	Y
	Y	Y	N	Y	N	Y	Y	Y	Y	Y
	Y	Y	N	Y	N	Y	Y	Y	Y	Y

Citation	Significant Goals			Important Outcomes			Acceptable Procedures			
	Setting	Imp.	Resource	Social Sig.	Comp. to TD	Sig. Change in DV	Gen./ Maint.	TF 80% or higher	Over Time	Caregiver Report
Goldman et al. (2018)	Y	Y	Y	Y	N	N	Y	N	N	--
	Y	Y	Y	Y	N	Y	Y	Y	Y	--
Greene et al. (1999)	Y	Y	N	Y	N	Y	N	--	--	Y
	Y	Y	N	Y	N	Y	N	--	--	Y
	Y	Y	N	Y	N	Y	N	--	--	Y
Harding et al. (2009)	Y	Y	N	Y	N	Y	N	--	--	Y
Krantz et al. (1993)	Y	Y	Y	Y	N	Y	Y	--	--	Y
	Y	Y	Y	Y	N	Y	Y	--	--	Y
	Y	Y	Y	Y	N	Y	Y	--	--	Y
Lorimer et al. (2002)	Y	Y	N	Y	N	Y	N	--	--	--
Matson et al. (2014)	Y	Y	Y	Y	N	Y	Y	--	--	--
	Y	Y	Y	Y	N	Y	Y	--	--	--
	Y	Y	N	Y	N	Y	Y	--	--	--



Citation	Significant Goals			Important Outcomes			Acceptable Procedures			
	Setting	Imp.	Resource	Social Sig.	Comp. to TD	Sig. Change in DV	Gen./ Maint.	TF 80% or higher	Over Time	Caregiver Report
Meadan et al. (2014)	Y	Y	N	Y	N	Y	Y	Y	Y	Y
	Y	Y	N	Y	N	Y	Y	Y	Y	Y
	Y	Y	N	Y	N	Y	Y	Y	Y	Y
	Y	Y	N	Y	N	Y	Y	Y	Y	Y
Reagon et al. (2009)	Y	Y	N	Y	N	Y	Y	Y	Y	--
	Y	Y	N	Y	N	Y	Y	Y	Y	--
	Y	Y	N	Y	N	Y	Y	Y	Y	--
Slattery et al. (2016)	Y	Y	N	Y	N	Y	Y	Y	Y	Y
	Y	Y	N	Y	N	Y	Y	Y	Y	Y
	Y	Y	N	Y	N	Y	Y	Y	Y	Y
Sreckovic et al. (2020)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
	Y	Y	Y	Y	N	Y	Y	Y	Y	Y

Citation	Significant Goals				Important Outcomes			Acceptable Procedures		
	Setting	Imp.	Resource	Social Sig.	Comp. to TD	Sig. Change in DV	Gen./ Maint.	TF 80% or higher	Over Time	Caregiver Report
Vaughn et al. (1997)	Y	Y	N	Y	N	Y	Y	--	--	--

*Note.* Summary of social validity quality indicators. Imp. = typical implementers, Comp. to TD = compared to typically developing peers, Social Sig. = socially significant dependent variable, Sig. Change in DV = socially significant change to the dependent variable, Gen./Maint. = generalization and/or maintenance data reported, TF = treatment fidelity, Y = yes, N = no, dashes (--) indicate not reported

Table A.6

*Leisure Activity Characteristics*

Participant	Leisure Skill	Definition	Number of Steps
Jordan	Sudoku	Completing a 4x4 Sudoku puzzle	6
	Gardening	Planting vegetable seeds in an egg crate	9
	Baking	Baking a corn bread mug cake in the microwave	9
Zane	Origami	Folding paper into the shape of a jumping frog	19
	Playdough	Making homemade playdough	12
	Puzzle	Putting together a 50-piece jigsaw puzzle	12

*Note.* Summary of leisure activities.

Table A.7

*Sample Task Analyses for Leisure Activities*

---

Steps for Sudoku Puzzle

---

1. Bring the activity box to the table
  2. Pick a row or column to solve by finding one that has 2 or more numbers filled in.
  3. Figure out which numbers are missing in the empty spaces.
  4. Look down the column or across the row to see what numbers have already been used. If one of your missing numbers has already been used in that row or column, you must put the other missing number in the empty space.
  5. Repeat Steps 2 through 4 until there are no more empty spaces and the Sudoku puzzle is complete with no repeating numbers in any row or column
  6. Put the Sudoku puzzles and pencil back in the activity box
- 

Steps for Origami Jumping Frog

---

1. Bring Origami box to the table
2. Take all material out of the box
3. Lay one half sheet of paper flat on the table
4. Fold paper in half lengthwise (hot dog style)
5. Unfold paper

6. Fold one top corner of the paper across the first fold and match the sides, press down on fold to create a crease
  7. Unfold paper
  8. Fold the other top corner of the paper across the first fold and match the sides, press down on fold to create a crease
  9. Unfold paper
  10. Fold the top of the paper down approximately an inch so that top crease is folded where the two corner folds met (at the x the corner folds made)
  11. Unfold paper
  12. Pinch the two sides of the top of the paper together to make two small triangles
  13. Press the piece of paper sticking up down from the top of the paper (the point; the paper should fold down onto itself and over the two small triangles)
  14. Fold both flaps of the triangle up so that both sides of the triangle meet in the middle of the paper
  15. Fold one side of the paper lengthwise (hot dog style) to the center line
  16. Fold the other one side of the paper lengthwise (hot dog style) to the center line
  17. Fold the bottom of the paper up until it meets the start of the two small triangles
  18. Fold the top half of the flap that you just folded up down about an inch
  19. Put all material back into the box
-

Table A.8

*Summary of Data Collection and Data Analysis Methods for Each Research Question*

Research Question	Data Collection Methods	Data Analysis Methods
1. What are caregivers' experiences with visual schedules in the home setting for promoting the independent completion of leisure activities?	<ul style="list-style-type: none"> <li>• Semi-structured interview</li> <li>• Notes (observations)</li> </ul>	<ul style="list-style-type: none"> <li>• Preparing and organizing the data</li> <li>• Reducing the data into themes</li> <li>• Displaying the data</li> </ul>
2. How do caregivers describe the use of visual supports in the home?	<ul style="list-style-type: none"> <li>• Semi-structured interview</li> <li>• Notes (observations)</li> </ul>	<ul style="list-style-type: none"> <li>• Preparing and organizing the data</li> <li>• Reducing the data into themes</li> <li>• Displaying the data</li> </ul>
3. What do caregivers identify as barriers for implementing visual supports in the home?	<ul style="list-style-type: none"> <li>• Semi-structured interview</li> <li>• Notes (observations)</li> </ul>	<ul style="list-style-type: none"> <li>• Preparing and organizing the data</li> <li>• Reducing the data into themes</li> <li>• Displaying the data</li> </ul>

*Note.* Summary of data collection and data analysis methods for each research question.

Table A.9

*Relating the Interview Questions to the Research Questions*

Interview Question	Research Question
<i>Main Questions</i>	
Tell me about your child and leisure skills?	2. How do caregivers describe the use of visual supports in the home?
What are your current concerns about leisure skills?	2. How do caregivers describe the use of visual supports in the home?
What do you do that helps with leisure skills?	2. How do caregivers describe the use of visual supports in the home?
What were your experiences implementing this intervention?	1. What are caregivers' experiences with visual schedules in the home setting for promoting the independent completion of leisure activities?  3. What do caregivers identify as barriers for implementing visual supports in the home?
How did you feel about implementing this intervention?	1. What are caregivers' experiences with visual schedules in the home setting for promoting the independent completion of leisure activities?  3. What do caregivers identify as barriers for implementing visual supports in the home?

Interview Question	Research Question
<i>Follow-up Questions</i>	
What did you think about using the visual schedule to promote independent completion of leisure activities for your child?	<p>1. What are caregivers' experiences with visual schedules in the home setting for promoting the independent completion of leisure activities?</p> <p>3. What do caregivers identify as barriers for implementing visual supports in the home?</p>
How did you feel about the use of the visual schedule to promote independent completion of leisure activities for your child?	1. What are caregivers' experiences with visual schedules in the home setting for promoting the independent completion of leisure activities?
Describe what it was like teaching your child to use the visual schedule?	<p>1. What are caregivers' experiences related to the use of visual supports in the home for promoting the independent completion of leisure activities?</p> <p>2. How do caregivers describe the use of visual supports in the home?</p>
What else was happening in your family while you started using the visual schedule that might have influenced your experience?	1. What are caregivers' experiences with visual schedules in the home setting for promoting the independent completion of leisure activities?



Interview Question	Research Question
Is there anything else that you think is important to know?	2. How do caregivers describe the use of visual supports in the home?
	3. What do caregivers identify as barriers for implementing visual supports in the home?
<i>Note.</i> Relating the interview questions to the research questions.	

Table A.10

*Summary of Codes Used for Data Analysis*

Initial Codes	Emergent Codes	Finalized Codes
Significant Goals		Significant Goals
Acceptable Procedures		Acceptable Procedures
Important Outcomes	Intervention Outcome Barriers	Intervention Outcome Barriers
	Intervention Outcome Facilitators	Intervention Outcome Facilitators

*Note.* Summary of codes used for data analysis.

Table A.11

*Cases as Aligned with the Theoretical Framework*

Caregiver	Significant Goals	Acceptable Procedures	Important Outcomes	
			Intervention Outcome Barriers	Intervention Outcome Facilitators
Mia	X	X	X	X
Earl	X	X		X

*Note.* Summary of how the cases aligned with the theoretical framework.

## APPENDIX B

### Figures

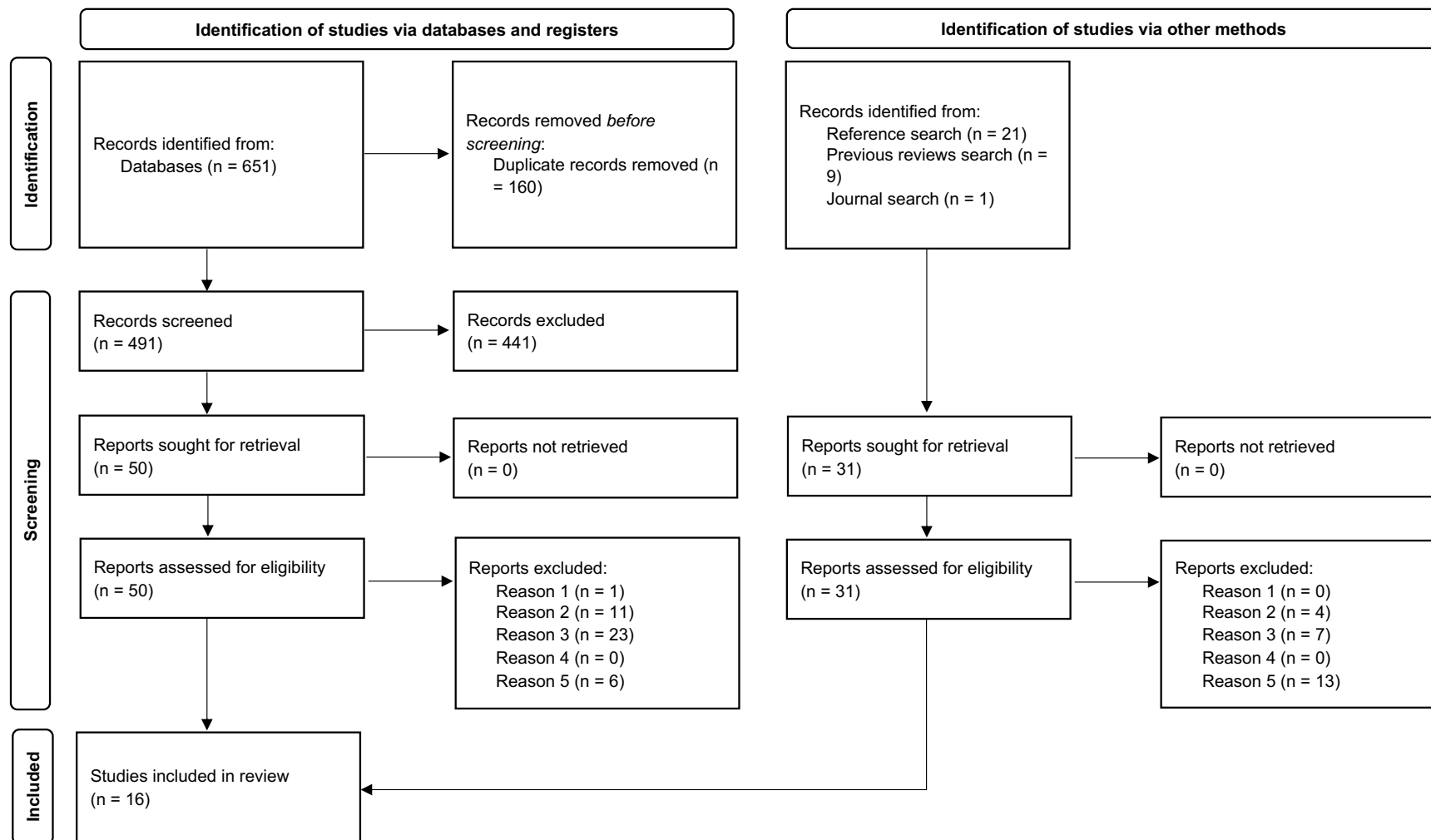
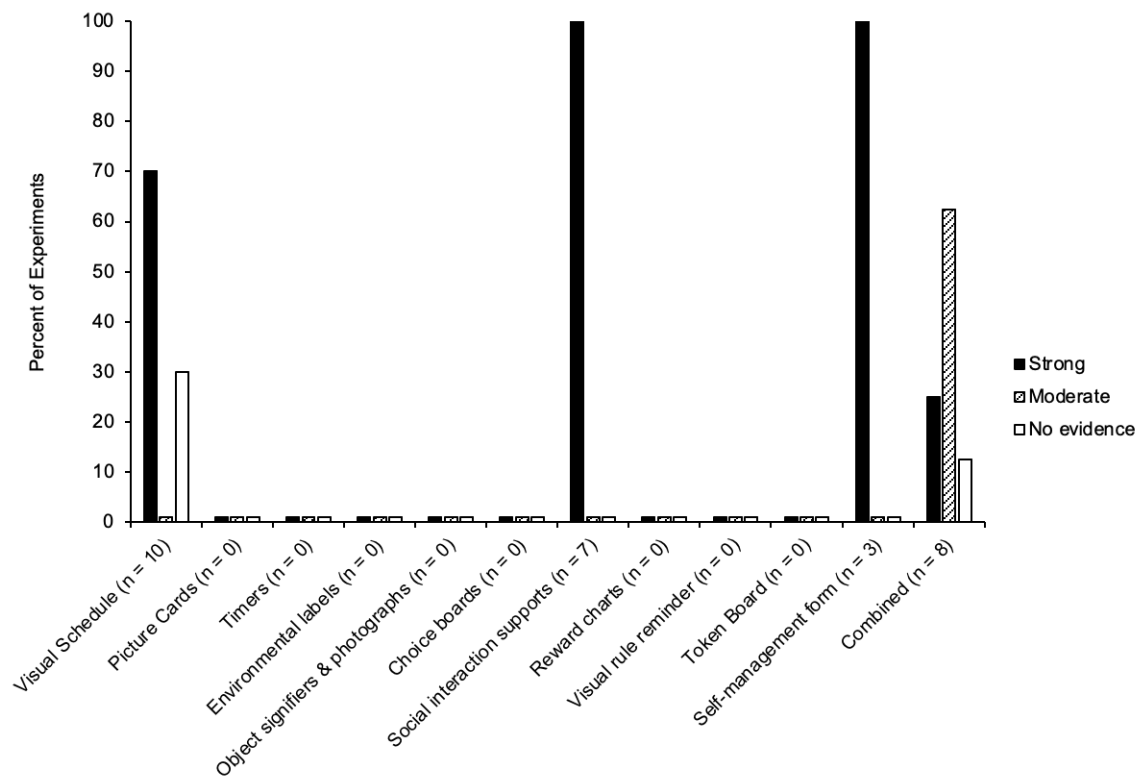


Figure B.1. PRISMA flow-chart diagram.



*Figure B.2.* Summary of visual support categories according to WWC evidence standards.

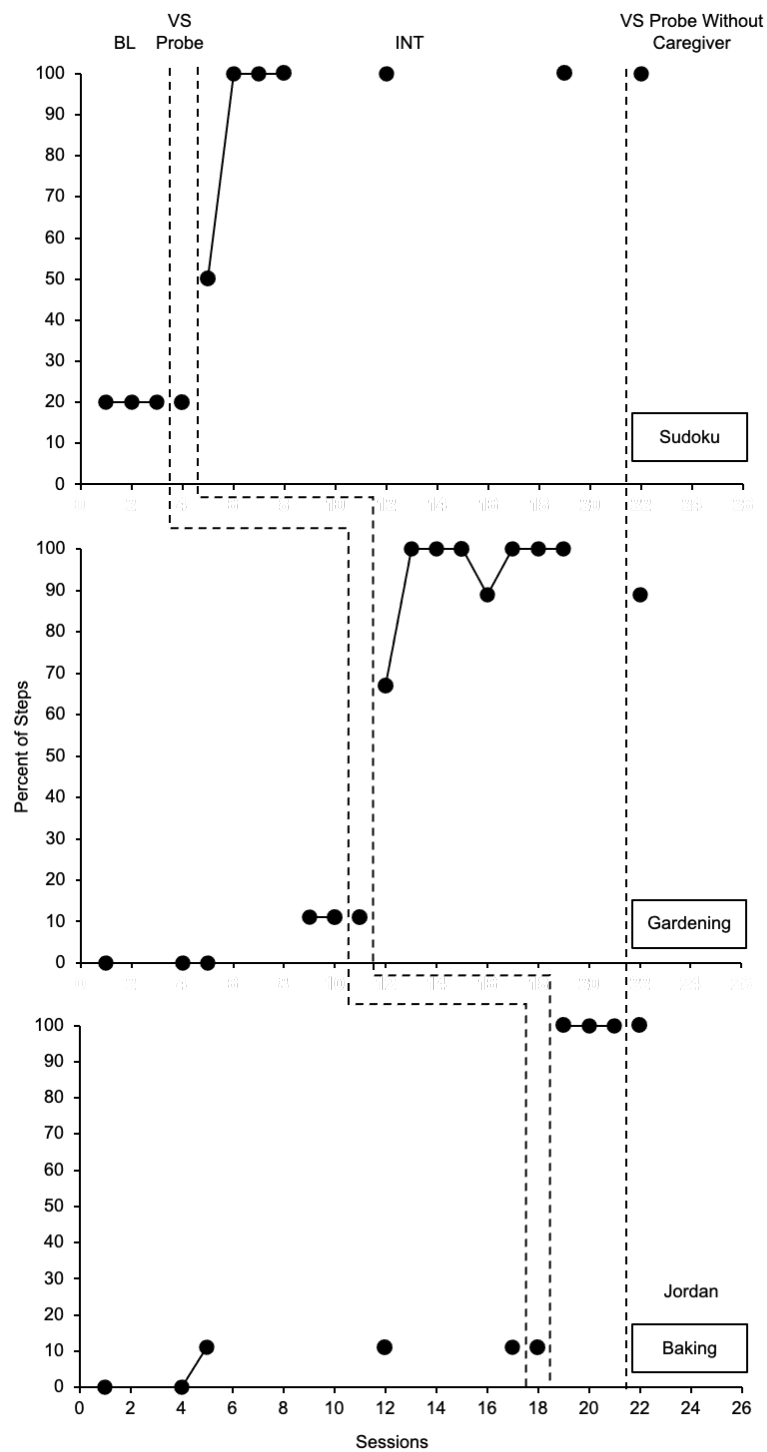


Figure B.3. Percent of steps completed correctly across leisure activities for Jordan. BL = baseline, VS = visual schedule, INT = intervention

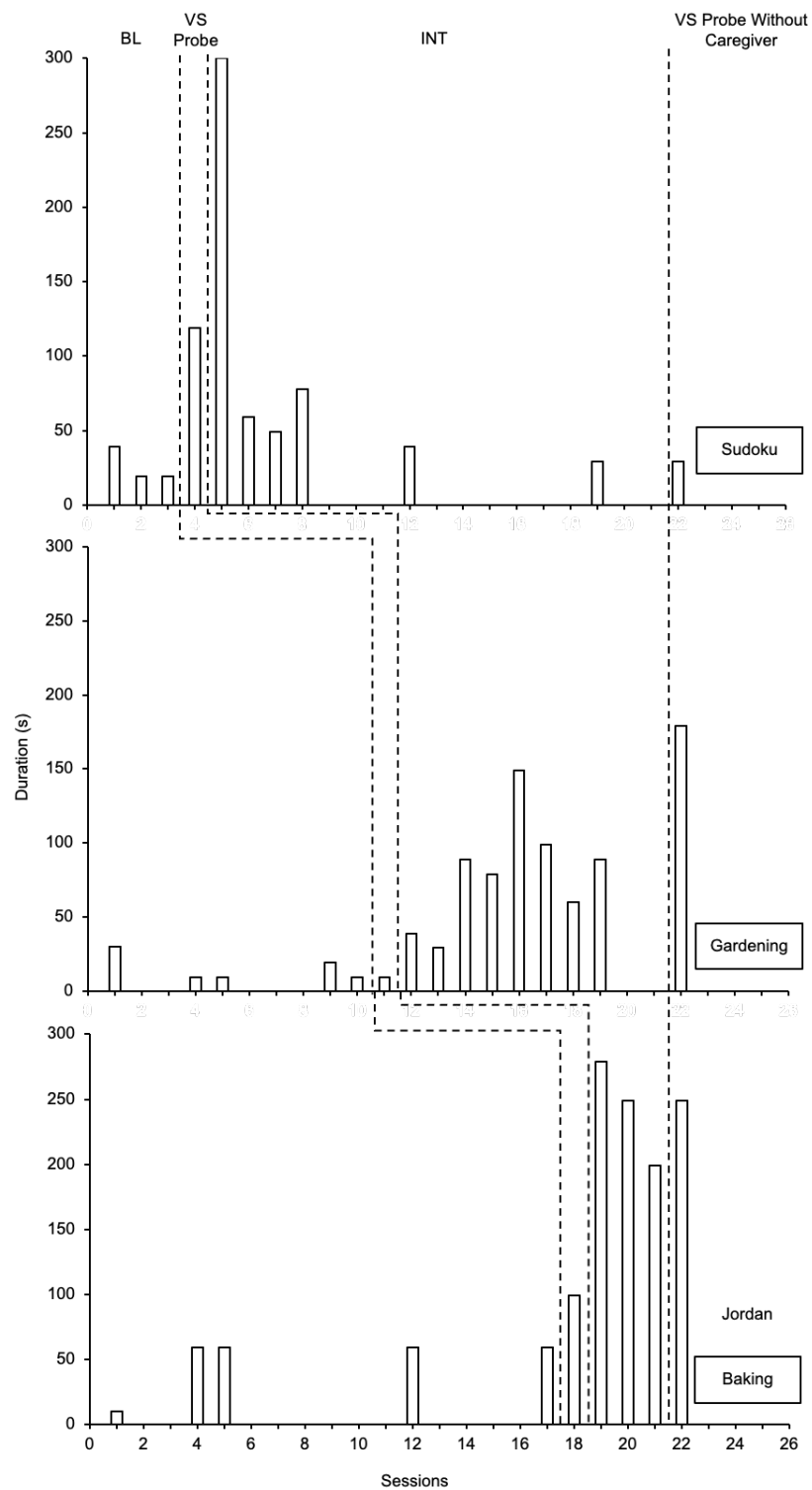


Figure B.4. Session duration across leisure activities for Jordan. BL = baseline, VS = visual schedule, INT = intervention



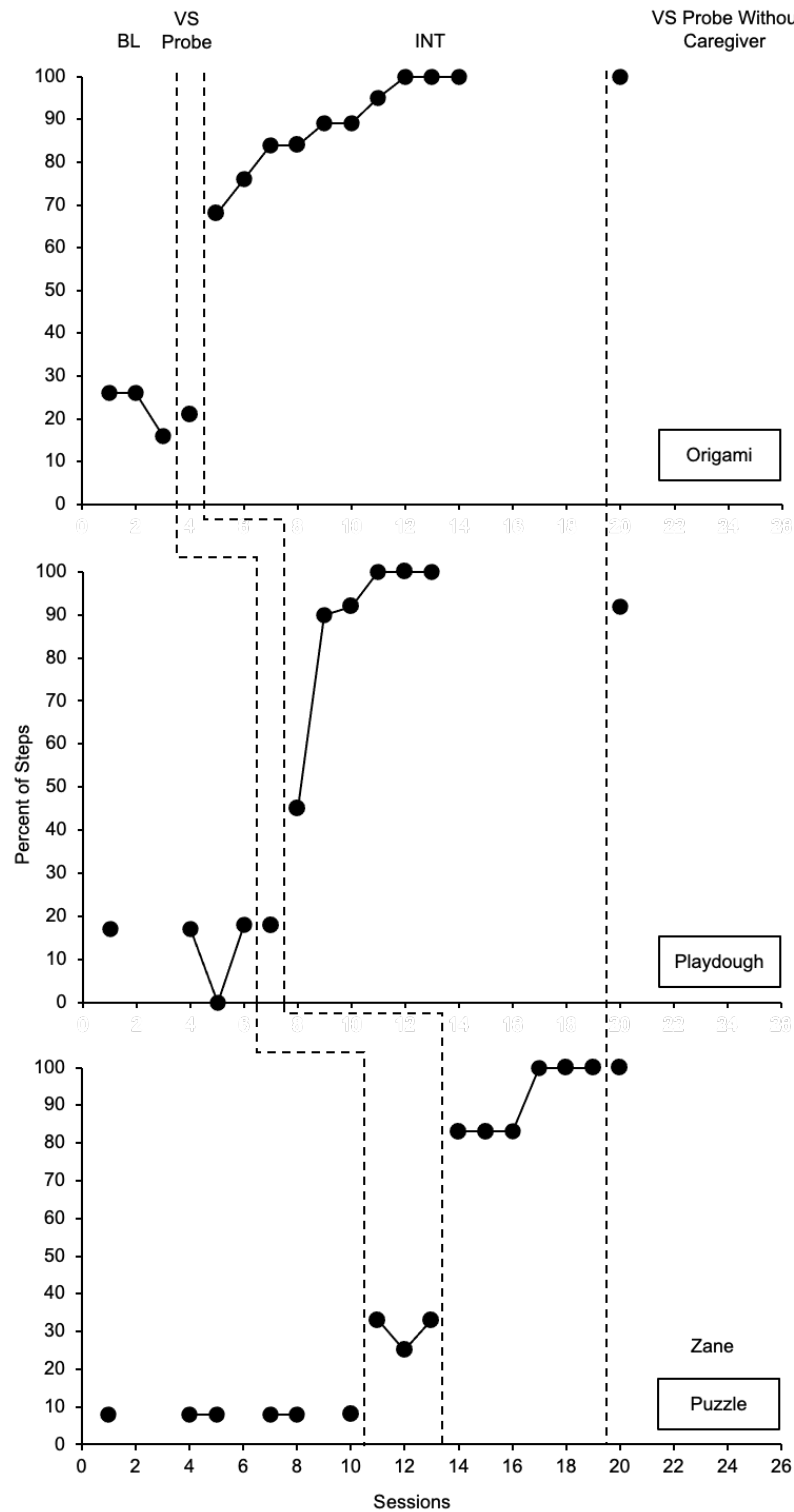


Figure B.5. Percent of steps completed correctly across leisure activities for Zane. BL = baseline, VS = visual schedule, INT = intervention

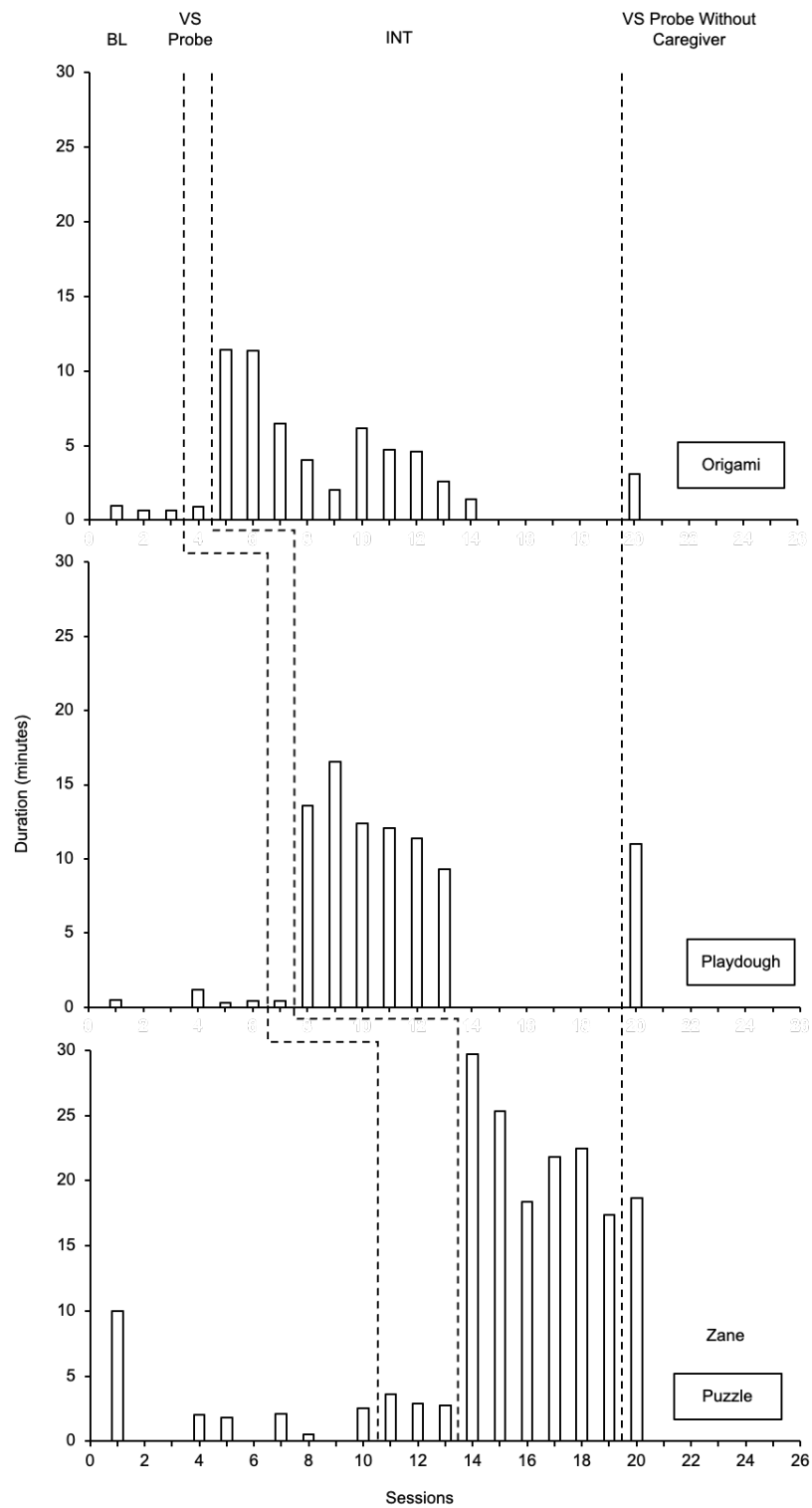
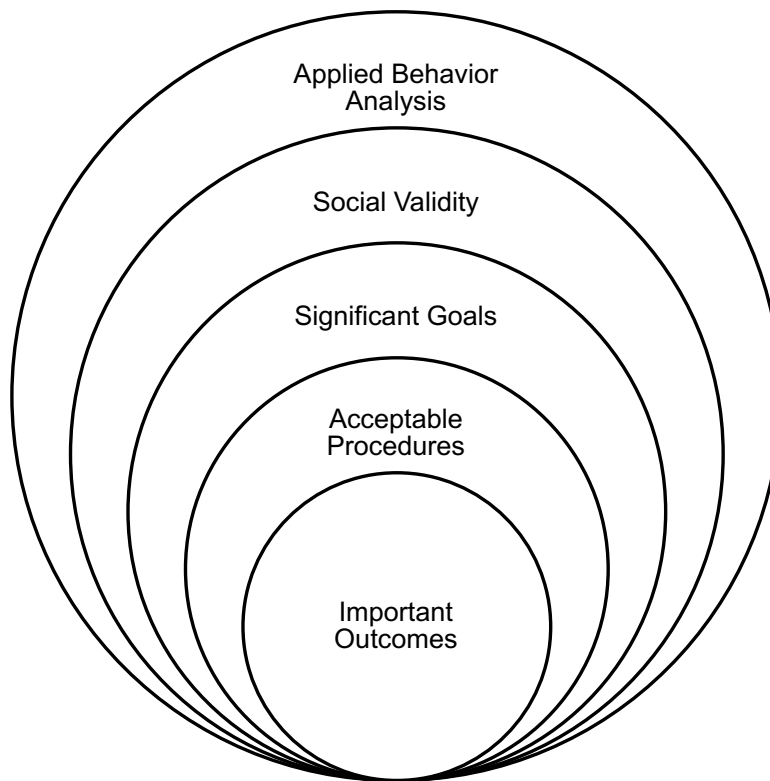
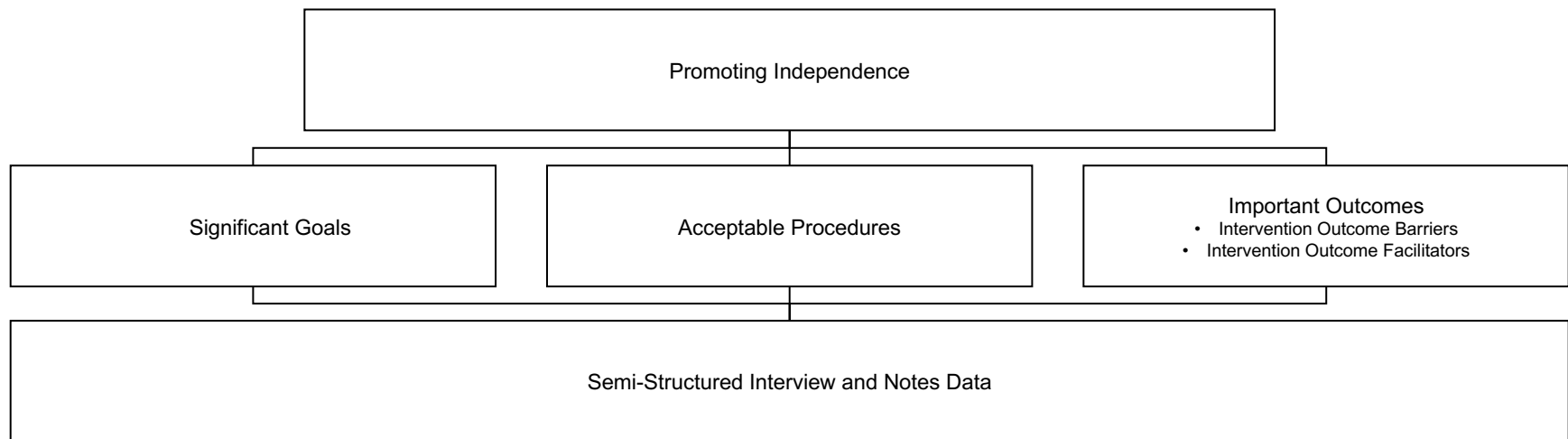


Figure B.6. Session duration across leisure activities for Zane. BL = baseline, VS = visual schedule, INT = intervention



*Figure B.7.* Theoretical and interpretive framework based on the work of Wolf (1978), Horner et al. (2005), and Reichow et al. (2008).



*Figure B.8.* Hierarchical tree diagram: Layers of analysis.



*Figure B.9.* Word cloud capturing emergent theme from the cross-case analysis.

## BIBLIOGRAPHY

- Akers, J. S., Higbee, T. S., Pollard, J. S., Pellegrino, A. J., & Gerencser, K. R. (2016). An evaluation of photographic activity schedules to increase independent playground skills in young children with autism. *Journal of Applied Behavior Analysis*, 49(4), 954-959. <https://doi.org/10.1002/jaba.327>
- Amsbary, J., & AFIRM Team. (2017). *Parent implemented intervention*. Chapel Hill, NC: National Professional Development Center on Autism Spectrum Disorders, FPG Child Development Center, University of North Carolina. Retrieved from <http://afirm.fpg.unc.edu/parent-implemented-intervention>
- Anderson, R., Taylor, S., Taylor, T., & Virues-Ortega, J. (2021). Thematic and textual analysis methods for developing social validity questionnaires in applied behavior analysis. *Behavioral Interventions*. Advanced online publication. <https://doi.org/10.1002/bin.1832>
- Arthur-Kelly, M., Sigafoos, J., Green, V., Mathisen, B., & Arthur-Kelly, R. (2009). Issues in the use of visual supports to promote communication in individuals with autism spectrum disorder. *Disability and Rehabilitation*, 31(18), 1474-1486. <https://doi.org/10.1080/09638280802590629>
- Baer, D. M., Wolf, M. M., & Risley, T. R. (1987). Some still-current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, 20(4), 313-327. <https://doi.org/10.1901/jaba.1987.20-313>
- Banda, D. R., & Grimmer, E. (2008). Enhancing social and transition behaviors of persons with autism through activity schedules: A review. *Education and Training in Developmental Disabilities*, 43(3), 324-333. <http://www.jstor.org/stable/23879794>
- Barton, E. E., & Fettig, A. (2013). Parent-implemented interventions for young children with disabilities: A review of fidelity features. *Journal of Early Intervention*, 35(2), 194-219. <https://doi.org/10.1177/1053815113504625>
- Behavior Analyst Certification Board. (2022, January 1). Ethics code for behavior analysts. <https://www.bacb.com/wp-content/uploads/2022/01/Ethics-Code-for-Behavior-Analysts-220316-2.pdf>

- Bellg, A. J., Borrelli, B., Resnick, B., Hecht, J., Minicucci, D. S., Ory, M., Ogedegbe, G., Orwig, D., Ernst, D., & Czajkowski, S. (2004). Enhancing treatment fidelity in health behavior change studies: Best practices and recommendations from the NIH Behavior Change Consortium. *Health Psychology, 23*(5), 443-451.  
<https://doi.org/10.1037/0278-6133.23.5.443>
- Bogdan, R. C., & Biklen, S. K. (1992). *Qualitative research for education: An introduction to theories and methods*. Allyn & Bacon.
- Bryan, L. C., & Gast, D. L. (2000). Teaching on-task and on-schedule behaviors to high-functioning children with autism via picture activity schedules. *Journal of Autism and Developmental Disorders, 30*(6), 553-567.  
<https://doi.org/10.1023/A:1005687310346>
- Buschbacher, P., Fox, L., & Clarke, S. (2004). Recapturing desired family routines: A parent-professional behavioral collaboration. *Research and Practice for Persons with Severe Disabilities, 29*(1), 25-39. <https://doi.org/10.2511/2Frpsd.29.1.25>
- Cannella-Malone, H. I., Miller, O., Schaefer, J. M., Jimenez, E. D., Page, E. J., & Sabielny, L. M. (2016). Using video prompting to teach leisure skills to students with significant disabilities. *Exceptional Children, 82*(4), 463-478.  
<https://doi.org/10.1177/0014402915598778>
- Carroll, R. A., Joachim, B. T., St. Peter, C. C., & Robinson, N. (2015). A comparison of error-correction procedures on skill acquisition during discrete-trial instruction. *Journal of Applied Behavior Analysis, 48*(2), 257-273.  
<https://doi.org/10.1002/jaba.205>
- Carter, S. L., & Wheeler, J. J. (2019). *The social validity manual: Subjective evaluation of Interventions*. Academic Press.
- Centers for Disease Control and Prevention. (2021a). *Trends in the prevalence of developmental disabilities in U. S. children, 1997–2008*. U.S. Department of Health and Human Services.  
<https://www.cdc.gov/ncbddd/developmentaldisabilities/features/birthdefects-dd-keyfindings.html>
- Centers for Disease Control and Prevention. (2021b). *Increase in developmental disabilities among Children in the United States*. U.S. Department of Health and Human Services.  
<https://www.cdc.gov/ncbddd/developmentaldisabilities/features/increase-in-developmental-disabilities.html>

- Chan, J. M., Lambdin, L., Van Laarhoven, T., & Johnson, J. W. (2013). Teaching leisure skills to an adult with developmental disabilities using a video prompting intervention package. *Education and Training in Autism and Developmental Disabilities, 48*(3), 412-420. <https://www.jstor.org/stable/23880997>
- Chiri, G., & Warfield, M. E. (2012). Unmet need and problems accessing core health care services for children with autism spectrum disorder. *Maternal and Child Health Journal, 16*(5), 1081-1091. <https://doi.org/10.1007/s10995-011-0833-6>
- Clarke, S., Dunlap, G., & Vaughn, B. (1999). Family-centered, assessment-based intervention to improve behavior during an early morning routine. *Journal of Positive Behavior Interventions, 1*(4), 235-241. <https://doi.org/10.1177%2F109830079900100406>
- Colaizzi, P. (1978). Psychological research as a phenomenologist views it. In: Valle, R. S. & King, M. (1978). *Existential Phenomenological Alternatives for Psychology*. Open University Press: New York.
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2020). *Applied behavior analysis*. Pearson.
- Corman, H., & Kaestner, R. (1992). The effects of child health on marital status and family structure. *Demography, 29*(3), 389-408. <https://doi.org/10.2307/2061825>
- Crawford, K.M. (2016). Developing the whole teacher: A phenomenological case study of student teachers' emotions in one teacher education program (Doctoral dissertation, Georgia Southern University). [http://digitalcommons.georgiasouthern.edu/curr\\_etd/](http://digitalcommons.georgiasouthern.edu/curr_etd/)
- Creswell, J. W. & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among the five approaches* (4th ed.). Sage.
- Denzin, N. K., & Lincoln, Y. S. (Ed.). (2005). *The SAGE handbook of qualitative research* (3rd ed.). Sage.
- Dettmer, S., Simpson, R. L., Myles, B. S., & Ganz, J. B. (2000). The use of visual supports to facilitate transitions of students with autism. *Focus on Autism and Other Developmental Disabilities, 15*(3), 163-169. <https://doi.org/10.1177/108835760001500307>
- Devers, K. J., & Frankel, R. M. (2000). Study design in qualitative research—2: Sampling and data collection strategies. *Education for health, 13*(2), 263-271. <https://doi.org/10.1080/13576280050074543>



- Donato, C., Shane, H. C., & Hemsley, B. (2014). Exploring the feasibility of the Visual Language in Autism program for children in an early intervention group setting: Views of parents, educators, and health professionals. *Developmental neurorhabilitation*, 17(2), 115-124. <https://doi.org/10.3109/17518423.2014.880526>
- Feldman, M. A., Atkinson, L., Foti-Gervais, L., & Condillac, R. (2004). Formal versus informal interventions for challenging behaviour in persons with intellectual disabilities. *Journal of Intellectual Disability Research*, 48(1), 60-68. <https://doi.org/10.1111/j.1365-2788.2004.00578.x>
- Fichtner, C. S., & Tiger, J. H. (2015). Teaching discriminated social approaches to individuals with Angelman syndrome. *Journal of Applied Behavior Analysis*, 48(4), 734-748. <https://doi.org/10.1002/jaba.237>
- Fleury, V. P., Hedges, S., Hume, K., Browder, D. M., Thompson, J. L., Fallin, K., Zein, F. E., Reutebuch, C. K., & Vaughn, S. (2014). Addressing the academic needs of adolescents with autism spectrum disorder in secondary education. *Remedial and Special Education*, 35(2), 68-79. <https://doi.org/10.1177/0741932513518823>
- Fox, N. (2009). *Using interviews in a research project*. The National Institute for Health Research, Research Design Service for the East Midlands. Yorkshire & the Humber.
- Gabor, A. M., Fritz, J. N., Roath, C. T., Rothe, B. R., & Gourley, D. A. (2016). Caregiver preference for reinforcement-based interventions for problem behavior maintained by positive reinforcement. *Journal of Applied Behavior Analysis*, 49(2), 215-227. <https://doi.org/10.1002/jaba.286>
- Ganz, J. B., & Flores, M. M. (2010). Supporting the play of preschoolers with autism spectrum disorders: Implementation of visual scripts. *Young Exceptional Children*, 13(2), 58-70. <https://doi.org/10.1177/1096250609351795>
- García-Villamizar, D. A., & Dattilo, J. (2010). Effects of a leisure programme on quality of life and stress of individuals with ASD. *Journal of Intellectual Disability Research*, 54(7), 611-619. <https://doi.org/10.1111/j.1365-2788.2010.01289.x>
- Gast, D. L. (2010). *Single subject research methodology in behavioral sciences*. Routledge.
- Gerencser, K. R., Higbee, T. S., Akers, J. S., & Contreras, B. P. (2017). Evaluation of interactive computerized training to teach parents to implement photographic activity schedules with children with autism spectrum disorder. *Journal of Applied Behavior Analysis*, 50(3), 567-581. <https://doi.org/10.1002/jaba.386>

- Gerow, S., Hagan-Burke, S., Rispoli, M., Gregori, E., Mason, R., & Ninci, J. (2018). A systematic review of parent-implemented functional communication training for children with ASD. *Behavior Modification*, 42(3), 335-363. <https://doi.org/10.1177/0145445517740872>
- Gerow, S., Rivera, G., Radhakrishnan, S., & Davis, T. N. (2020). Parent-implemented brief functional analysis in the home. *Behavioral Interventions*, 35(4), 691-703. <https://doi.org/10.1002/bin.1734>
- Goldman, S. E., Glover, C. A., Lloyd, B. P., Barton, E. E., & Mello, M. P. (2018). Effects of parent implemented visual schedule routines for African American children with ASD in low-income home settings. *Exceptionality*, 26(3), 162-175. <https://doi.org/10.1080/09362835.2017.1294984>
- Google, LLC. (2022, April 4). *Google Brand Resource Center*. <https://about.google/brand-resource-center/trademark-list/>
- Greene, L., Kamps, D., Wyble, J., & Ellis, C. (1999). Home-based consultation for parents of young children with behavioral problems. *Child & Family Behavior Therapy*, 21(2), 19-45. [https://doi.org/10.1300/J019v21n02\\_02](https://doi.org/10.1300/J019v21n02_02)
- Harding, J. W., Wacker, D. P., Berg, W. K., Lee, J. F., & Dolezal, D. (2009). Conducting functional communication training in home settings: A case study and recommendations for practitioners. *Behavior Analysis in Practice*, 2, 21–33. <https://doi.org/10.1007/BF03391734>
- Hodgetts, S., Zwaigenbaum, L., & Nicholas, D. (2015). Profile and predictors of service needs for families of children with autism spectrum disorders. *Autism*, 19(6), 673-683. <https://doi.org/10.1177/1362361314543531>
- Hong, E. R., Ganz, J. B., Mason, R., Morin, K., Davis, J. L., Ninci, J., Neely, L. C., Boles, M. B., & Gilliland, W. D. (2016). The effects of video modeling in teaching functional living skills to persons with ASD: A meta-analysis of single-case studies. *Research in Developmental Disabilities*, 57, 158-169. <https://doi.org/10.1016/j.ridd.2016.07.001>
- Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*, 71(2), 165-179. <https://doi.org/10.1177/001440290507100203>
- Hume, K., Loftin, R., & Lantz, J. (2009). Increasing independence in autism spectrum disorders: A review of three focused interventions. *Journal of Autism and Developmental Disorders*, 39(9), 1329-1338. <https://doi.org/10.1007/s10803-009-0751-2>

- Kaiser, A. P., Hancock, T. B., & Nietfeld, J. P. (2000). The effects of parent-implemented enhanced milieu teaching on the social communication of children who have autism. *Early Education and Development, 11*(4), 423-446.  
[https://doi.org/10.1207/s15566935eed1104\\_4](https://doi.org/10.1207/s15566935eed1104_4)
- Kazdin, A. E. (1980). Acceptability of time out from reinforcement procedures for disruptive child behavior. *Behavior Therapy, 11*(3), 329-344.  
[https://doi.org/10.1016/S0005-7894\(80\)80050-5](https://doi.org/10.1016/S0005-7894(80)80050-5)
- Kennedy, C. H. (2005). *Single-case designs for educational research* (1st ed.). Pearson: Allyn & Bacon.
- Kern, L., Choutka, C. M., & Sokol, N. G. (2002). Assessment-based antecedent interventions used in natural settings to reduce challenging behavior: An analysis of the literature. *Education and Treatment of Children, 113*-130.  
<https://www.jstor.org/stable/42900519>
- Kleiber, D., Larson, R., & Csikszentmihalyi, M. (1986). The experience of leisure in adolescence. *Journal of leisure research, 18*(3), 169-176.  
<https://doi.org/10.1080/00222216.1986.11969655>
- Knight, V., Sartini, E., & Spriggs, A. D. (2015). Evaluating visual activity schedules as evidence-based practice for individuals with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 45*(1), 157-178.  
<https://doi.org/10.1007/s10803-014-2201-z>
- Koegel, R. L., Bimbela, A., & Schreibman, L. (1996). Collateral effects of parent training on family interactions. *Journal of Autism and Developmental Disorders, 26*(3), 347-359. <https://doi.org/10.1007/BF02172479>
- Koegel, L., Matos-Freden, R., Lang, R., & Koegel, R. (2012). Interventions for children with autism spectrum disorders in inclusive school settings. *Cognitive and Behavioral Practice, 19*(3), 401-412. <https://doi.org/10.1016/j.cbpra.2010.11.003>
- Koyama, T., & Wang, H. T. (2011). Use of activity schedule to promote independent performance of individuals with autism and other intellectual disabilities: A review. *Research in Developmental Disabilities, 32*(6), 2235-2242.  
<https://doi.org/10.1016/j.ridd.2011.05.003>
- Krantz, P. J., & MacDuff, M. T. (1993). Programming participation in family activities for children with autism: Parent's use of. *Journal of Applied Behavior Analysis, 26*(1), 137. <https://doi.org/10.1901/jaba.1993.26-137>

- Kratochwill, T. R., Hitchcock, J. H., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M., & Shadish, W. R. (2013). Single-case intervention research design standards. *Remedial and Special Education, 34*(1), 26-38.  
<https://doi.org/10.1177/0741932512452794>
- Kurnaz, E., & Yanardag, M. (2018). The effectiveness of video self-modeling in teaching active video game skills to children with autism spectrum disorder. *Journal of Developmental and Physical Disabilities, 30*(4), 455-469.  
<https://doi.org/10.1007/s10882-018-9596-y>
- Leaf, J. B., Cihon, J. H., Leaf, R., McEachin, J., & Taubman, M. (2017). A progressive approach to discrete trial teaching: Some current guidelines. *International Electronic Journal of Elementary Education, 9*(2), 361–372. Retrieved from <https://www.iejee.com/index.php/IEJEE/article/view/163>
- LeBlanc, L. A., Raetz, P. B., Sellers, T. P., & Carr, J. E. (2016). A proposed model for selecting measurement procedures for the assessment and treatment of problem behavior. *Behavior Analysis in Practice, 9*(1), 77-83.  
<https://doi.org/10.1007/s40617-015-0063-2>
- Leko, M. M. (2014). The value of qualitative methods in social validity research. *Remedial and Special Education, 35*(5), 275-286.  
<https://doi.org/10.1177/0741932514524002>
- Lequia, J., Machalicek, W., & Rispoli, M. J. (2012). Effects of activity schedules on challenging behavior exhibited in children with autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders, 6*(1), 480-492.  
<https://doi.org/10.1016/j.rasd.2011.07.008>
- Libby, M. E., Weiss, J. S., Bancroft, S., & Ahearn, W. H. (2008). A comparison of most-to-least and least-to-most prompting on the acquisition of solitary play skills. *Behavior Analysis in Practice, 1*(1), 37-43.  
<https://doi.org/10.1007/BF03391719>
- Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology, 22*, 140–155.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.
- Lindly, O. J., Chavez, A. E., & Zuckerman, K. E. (2016). Unmet health services need among US children with developmental disabilities: Associations with family impact and child functioning. *Journal of Developmental and Behavioral Pediatrics: JDBP, 37*(9), 712-723.  
<https://doi.org/10.1097/DBP.0000000000000363>

- Lloyd, J. W., & Heubusch, J. D. (1996). Issues of social validation in research on serving individuals with emotional or behavioral disorders. *Behavioral Disorders*, 22(1), 8-14. <https://doi.org/10.1177/019874299602200105>
- Lopez, K., Reed, J., & Magaña, S. (2019). Associations among family burden, optimism, services received and unmet need within families of children with ASD. *Children and Youth Services Review*, 98, 105-112. <https://doi.org/10.1016/j.childyouth.2018.12.027>
- Lorimer, P. A., Simpson, R. L., Smith Myles, B., & Ganz, J. B. (2002). The use of social stories as a preventative behavioral intervention in a home setting with a child with autism. *Journal of Positive Behavior Interventions*, 4(1), 53-60. <https://doi.org/10.1177/109830070200400109>
- Lory, C., Rispoli, M., Gregori, E., Kim, S. Y., & David, M. (2020). Reducing escape-maintained challenging behavior in children with autism spectrum disorder through visual activity schedule and instructional choice. *Education and Treatment of Children*, 43(2), 201-217. <https://doi.org/10.1007/s43494-020-00019-x>
- Loughrey, T. O., Contreras, B. P., Majdalany, L. M., Rudy, N., Sinn, S., Teague, P., Marshall, G., McGreevy, P., & Harvey, A. C. (2014). Caregivers as interventionists and trainers: Teaching mands to children with developmental disabilities. *The Analysis of Verbal Behavior*, 30(2), 128-140. <https://doi.org/10.1007/s40616-014-0005-z>
- Lyst, A. M., Gabriel, S., O'Shaughnessy, T. E., Meyers, J., & Meyers, B. (2005). Social validity: Perceptions of check and connect with early literacy support. *Journal of School Psychology*, 43(3), 197-218. <https://doi.org/10.1016/j.jsp.2005.04.004>
- MacDuff, G. S., Krantz, P. J., & McClannahan, L. E. (2001). *Prompts and prompt-fading strategies for people with autism*. In C. Maurice, G. Green, & R. M. Foxx (Eds.), *Making a difference: Behavioral intervention for autism* (p. 37-50). PRO-ED.
- Mancil, C. R., Conroy, M. A., Nakao, T., & Alter, P. J. (2006). Functional communication training in the natural environment: A pilot investigation with a young child with autism spectrum disorder. *Education & Treatment of Children*, 29(4), 615-633. <https://www.jstor.org/stable/42900556>
- Matson, J. L., & Francis, K. L. (1994). Generalizing spontaneous language in developmentally delayed children via a visual cue procedure using caregivers as therapists. *Behavior Modification*, 18(2), 186-197. <https://doi.org/10.1177/01454455940182003>

- Meadan, H., Angell, M. E., Stoner, J. B., & Daczewitz, M. E. (2014). Parent-implemented social-pragmatic communication intervention: A pilot study. *Focus on Autism and Other Developmental Disabilities*, 29(2), 95-110. <https://doi.org/10.1177/1088357613517504>
- Meadan, H., Ostrosky, M. M., Triplett, B., Michna, A., & Fettig, A. (2011). Using visual supports with young children with autism spectrum disorder. *Teaching Exceptional Children*, 43(6), 28-35. <https://doi.org/10.1177/004005991104300603>
- Meadan, H., Ostrosky, M. M., Zaghlawan, H. Y., & Yu, S. (2009). Promoting the social and communicative behavior of young children with autism spectrum disorders: A review of parent-implemented intervention studies. *Topics in Early Childhood Special Education*, 29(2), 90-104. <https://doi.org/10.1177/0271121409337950>
- Mechling, L. C., Gast, D. L., & Seid, N. H. (2010). Evaluation of a personal digital assistant as a self-prompting device for increasing multi-step task completion by students with moderate intellectual disabilities. *Education and Training in Autism and Developmental Disabilities*, 45(3), 422-439. <https://www.jstor.org/stable/23880115>
- Mechling, L. C., & Gustafson, M. (2009). Comparison of the effects of static picture and video prompting on completion of cooking related tasks by students with moderate intellectual disabilities. *Exceptionality*, 17(2), 103-116. <https://doi.org/10.1080/09362830902805889>
- Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation*. John Wiley & Sons.
- Moes, D. R., & Frea, W. D. (2000). Using family context to inform intervention planning for the treatment of a child with autism. *Journal of Positive Behavior Interventions*, 2(1), 40-46. <https://doi.org/10.1177/109830070000200106>
- Moes, D. R., & Frea, W. D. (2002). Contextualized behavioral support in early intervention for children with autism and their families. *Journal of Autism and Developmental Disorders*, 32(6), 519-533. <https://doi.org/10.1023/A:1021298729297>
- Moncher, F. J., & Prinz, R. J. (1991). Treatment fidelity in outcome studies. *Clinical Psychology Review*, 11(3), 247-266. [https://doi.org/10.1016/0272-7358\(91\)90103-2](https://doi.org/10.1016/0272-7358(91)90103-2)
- Morrow, R., Rodriguez, A., & King, N. (2015). Colaizzi's descriptive phenomenological method. *The psychologist*, 28(8), 643-644.
- Moustakas, C. (1994). *Phenomenological research methods*. Sage.

- Musetti, A., Manari, T., Dioni, B., Raffin, C., Bravo, G., Mariani, R., Esposito, G., Dimitriou, D., Plazzi, G., Franceschini, C., & Corsano, P. (2021). Parental quality of life and involvement in intervention for children or adolescents with autism spectrum disorders: A systematic Rreview. *Journal of personalized medicine*, 11(9), 894. <https://doi.org/10.3390/jpm11090894>
- Neidert, P. L., Dozier, C. L., Iwata, B. A., & Hafen, M. (2010). Behavior analysis in intellectual and developmental disabilities. *Psychological Services*, 7(2), 103-113. <https://doi.org/10.1037/a0018791>
- Patton, M. Q. (1990). *Qualitative evaluation and research methods*. Sage.
- Pelios, L. V., MacDuff, G. S., & Axelrod, S. (2003). The effects of a treatment package in establishing independent academic work skills in children with autism. *Education and Treatment of Children*, 26(1), 1-21. <https://www.jstor.org/stable/42900533>
- Pierce, K. L., & Schreibman, L. (1994). Teaching daily living skills to children with autism in unsupervised settings through pictorial self-management. *Journal of Applied Behavior Analysis*, 27(3), 471-481. <https://doi.org/10.1901/jaba.1994.27-471>
- Quill, K. A. (1997). Instructional considerations for young children with autism: The rationale for visually cued instruction. *Journal of Autism and Developmental Disorders*, 27(6), 697-714. <https://doi.org/10.1023/A:1025806900162>
- Rao, S. M., & Gage, B. (2006). Learning through seeing and doing: Visual supports for children with autism. *Teaching Exceptional Children*, 38(6), 26-33.
- Reagon, K. A., & Higbee, T. S. (2009). Parent-implemented script fading to promote play-based verbal initiations in children with autism. *Journal of Applied Behavior Analysis*, 42(3), 659-664. <https://doi.org/10.1901/jaba.2009.42-659>
- Reichman, N. E., Corman, H., & Noonan, K. (2004). Effects of child health on parents' relationship status. *Demography*, 41(3), 569-584. <https://doi.org/10.1353/dem.2004.0026>
- Reichman, N. E., Corman, H., & Noonan, K. (2008). Impact of child disability on the family. *Maternal and Child Health Journal*, 12(6), 679-683. [https:// DOI 10.1007/s10995-007-0307-z .org](https://doi.org/10.1007/s10995-007-0307-z)
- Reichow, B., Volkmar, F. R., & Cicchetti, D. V. (2008). Development of the evaluative method for evaluating and determining evidence-based practices in autism. *Journal of Autism and Developmental Disorders*, 38(7), 1311-1319. <https://doi.org/10.1007/s10803-007-0517-7>

- Reimers, T. M., & Wacker, D. P. (1988). Parents' ratings of the acceptability of behavioral treatment recommendations made in an outpatient clinic: A preliminary analysis of the influence of treatment effectiveness. *Behavioral Disorders, 14*(1), 7-15. <https://doi.org/10.1177/019874298801400104>
- Reimers, T. M., Wacker, D. P., & Cooper, L. J. (1991). Evaluation of the acceptability of treatments for children's behavioral difficulties: Ratings by parents receiving services in an outpatient clinic. *Child & Family Behavior Therapy, 13*(2), 53-71. [https://doi.org/10.1300/J019v13n02\\_04](https://doi.org/10.1300/J019v13n02_04)
- Reimers, T. M., Wacker, D. P., Cooper, L. J., & DeRaad, A. O. (1992). Clinical evaluation of the variables associated with treatment acceptability and their relation to compliance. *Behavioral Disorders, 18*(1), 67-76. <https://doi.org/10.1177/019874299201800108>
- Reinert, K. S., Higbee, T. S., & Nix, L. D. (2020). Creating digital activity schedules to promote independence and engagement. *Behavior Analysis in Practice, 13*(3), 577-595. <https://doi.org/10.1007/s40617-020-00437-8>
- Resnick, B., Inguito, P., Orwig, D., Yahiro, J. Y., Hawkes, W., Werner, M., Zimmerman, S., & Magaziner, J. (2005). Treatment fidelity in behavior change research: a case example. *Nursing Research, 54*(2), 139-143.
- Roane, H. S., Vollmer, T. R., Ringdahl, J. E., & Marcus, B. A. (1998). Evaluation of a brief stimulus preference assessment. *Journal of Applied Behavioral Analysis, 31*(4), 605-620. <https://doi.org/10.1901/jaba.1998.31-605>
- Roberts, R. E. (2020). Qualitative interview questions: Guidance for novice researchers. *Qualitative Report, 25*(9), 3185-3203.
- Roberts, M. Y., & Kaiser, A. P. (2015). Early intervention for toddlers with language delays: A randomized controlled trial. *Pediatrics, 135*(4), 686-693. <https://doi.org/10.1542/peds.2014-2134>
- Rosenthal, M., Wallace, G. L., Lawson, R., Wills, M. C., Dixon, E., Yerys, B. E., & Kenworthy, L. (2013). Impairments in real-world executive function increase from childhood to adolescence in autism spectrum disorders. *Neuropsychology, 27*(1), 13. <https://doi.org/10.1037/a0031299>
- Rutherford, M., Baxter, J., Grayson, Z., Johnston, L., & O'Hare, A. (2020). Visual supports at home and in the community for individuals with autism spectrum disorders: A scoping review. *Autism, 24*(2), 447-469. <https://doi.org/10.1177/2F1362361319871756>



- Sam, A., & AFIRM Team. (2015). *Visual supports*. Chapel Hill, NC: National Professional Development Center on Autism Spectrum Disorder, FPG Child Development Center, University of North Carolina. Retrieved from <http://afirm.fpg.unc.edu/visual-supports>  
<https://files.eric.ed.gov/fulltext/ED595398.pdf>
- Schleien, S. J. (1995). *Lifelong leisure skills and lifestyles for persons with developmental disabilities*. Paul H Brookes Publishing Company.
- Schlosser, R. W., Wendt, O., & Sigafoos, J. (2007). Not all systematic reviews are created equal: Considerations for appraisal. *Evidence-Based Communication Assessments and Interventions*, 3, 138-150.  
<https://doi.org/10.1080/17489530701560831>
- Schwartz, I. S., Staub, D., Gallucci, C., & Peck, C. A. (1995). Blending qualitative and behavior analytic research methods to evaluate outcomes in inclusive schools. *Journal of Behavioral Education*, 5(1), 93-106.  
<https://doi.org/10.1007/BF02110216>
- Sharpe, D., & Rossiter, L. (2002). Siblings of children with a chronic illness: A meta-analysis. *Journal of pediatric psychology*, 27(8), 699-710.  
<https://doi.org/10.1093/jpepsy/27.8.699>
- Slattery, L., Crosland, K., & Iovannone, R. (2016). An evaluation of a self-management intervention to increase on-task behavior with individuals diagnosed with attention-deficit/hyperactivity disorder. *Journal of Positive Behavior Interventions*, 18(3), 168-179. <https://doi.org/10.1177/1098300715588282>
- Sloman, K. N., Vollmer, T. R., Cotnoir, N. M., Borrero, C. S., Borrero, J. C., Samaha, A. L., & Peter, C. C. S. (2005). Descriptive analyses of caregiver reprimands. *Journal of Applied Behavior Analysis*, 38(3), 373-383.  
<https://doi.org/10.1901/jaba.2005.118-04>
- Snodgrass, M. R., Chung, M. Y., Meadan, H., & Halle, J. W. (2018). Social validity in single-case research: A systematic literature review of prevalence and application. *Research in Developmental Disabilities*, 74, 160-173.  
<https://doi.org/10.1016/j.ridd.2018.01.007>
- Solish, A., Perry, A., & Minnes, P. (2010). Participation of children with and without disabilities in social, recreational and leisure activities. *Journal of Applied Research in Intellectual Disabilities*, 23(3), 226-236.  
<https://doi.org/10.1111/j.14683148.2009.00525.x>

- Sone, B. J., Lee, J., & Roberts, M. Y. (2021). Comparing Instructional Approaches in Caregiver-Implemented Intervention: An Interdisciplinary Systematic Review and Meta-Analysis. *Journal of Early Intervention*, Advanced online publication. <https://doi.org/10.1177/1053815121989807>
- Spriggs, A. D., Mims, P. J., van Dijk, W., & Knight, V. F. (2017). Examination of the evidence base for using visual activity schedules with students with intellectual disability. *The Journal of Special Education*, 51(1), 14-26. <https://doi.org/10.1177%2F0022466916658483>
- Sreckovic, M. A., Hume, K. A., & Regan, T. E. (2020). Use of work systems to increase the independence of adolescents with autism spectrum disorder. *Career Development and Transition for Exceptional Individuals*, 43(4), 240-256. <https://doi.org/10.1177/2165143420948766>
- Stoner, J. B., Angell, M. E., House, J. J., & Bock, S. J. (2007). Transitions: Perspectives from parents of young children with autism spectrum disorder (ASD). *Journal of Developmental and Physical Disabilities*, 19(1), 23-39. <https://doi.org/10.1007/s10882-007-9034-z>
- Stuckey, H. L. (2015). The second step in data analysis: Coding qualitative research data. *Journal of Social Health and Diabetes*, 3(1), 7-10. <https://doi.org/10.4103/2321-0656.140875>
- Sturmey, P., & Fitzer, A. (Eds.). (2007). *Autism spectrum disorders: Applied behavior analysis, evidence, and practice*. Pro Ed.
- Swaminathan, S., Alexander, G., Boulet, S. (2006). Delivering a very low birth weight infant and the subsequent risk of divorce or separation. *Maternal and Child Health Journal*, 10(6), 473-479. <https://doi.org/10.1007/s10995-006-0146-3>
- Symon, J. B. (2005). Expanding interventions for children with autism: Parents as trainers. *Journal of Positive Behavior Interventions*, 7(3), 159-173. <https://doi.org/10.1177/10983007050070030501>
- Tomeny, K. R., McWilliam, R. A., & Tomeny, T. S. (2020). Caregiver-implemented intervention for young children with autism spectrum disorder: A systematic review of coaching components. *Review Journal of Autism and Developmental Disorders*, 7(2), 168-181. <https://doi.org/10.1007/s40489-019-00186-7>
- Vaughn, B. J., Clarke, S., & Dunlap, G. (1997). Assessment-based intervention for severe behavior problems in a natural family context. *Journal of Applied Behavior Analysis*, 30(4), 713-716. <https://doi.org/10.1901/jaba.1997.30-713>

- Vohra, R., Madhavan, S., Sambamoorthi, U., & St Peter, C. (2014). Access to services, quality of care, and family impact for children with autism, other developmental disabilities, and other mental health conditions. *Autism, 18*(7), 815-826. <https://doi.org/10.1177/1362361313512902>
- What Works Clearinghouse. (2017). *What works clearinghouse: Standards handbook, version 4.0*. U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. Retrieved from [https://ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc\\_standards\\_handbook\\_v4.pdf](https://ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc_standards_handbook_v4.pdf).
- What Works Clearinghouse. (2020). *What works clearinghouse: Standards handbook, version 4.1*. U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. Retrieved from <https://ies.ed.gov/ncee/wwc/Docs/referenceresources/WWC-Standards-Handbook-v4-1-508.pdf>
- Williams, R., & Dattilo, J. (1997). Effects of leisure education on self-determination, social interaction, and positive affect of young adults with mental retardation. *Therapeutic Recreation Journal, 31*(4), 244-258.
- Wong, C., Odom, S. L., Hume, K. A., Cox, A. W., Fettig, A., Kucharczyk, S., Brock, M. E., Plavnick, J. B., Fleury, V. P., & Schultz, T. R. (2015). Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review. *Journal of Autism and Developmental Disorders, 45*(7), 1951-1966. <https://doi.org/10.1007/s10803-014-2351-z>
- Wolcott, H.F. (1994). *Transforming qualitative data: Description, analysis, and interpretation*. Thousand Oaks, CA: Sage.
- Wolf, M. M. (1978). Social validity: the case for subjective measurement or how applied behavior analysis is finding its heart 1. *Journal of Applied Behavior Analysis, 11*(2), 203-214. <https://doi.org/10.1901/jaba.1978.11-203>
- Yin, R. K. (2014). *Case study research: Design and method* (5th ed.). Sage.
- Zablotsky, B., Black, L. I., Maenner, M. J., Schieve, L. A., Danielson, M. L., Bitsko, R. H., Blumberg, S. J., Kogan, M. D., & Boyle, C. A. (2019). Prevalence and trends of developmental disabilities among children in the US: 2009–2017. *Pediatrics, 144*(4). <https://doi.org/10.1542/peds.2019-0811>
- Zhang, Y. X., & Cummings, J. R. (2020). Supply of certified applied behavior analysts in the United States: Implications for service delivery for children with autism. *Psychiatric Services, 71*(4), 385-388. <https://doi.org/10.1176/appi.ps.201900058>

Zoom Video Communications, Inc. (2022, April 4). *ZOOM Client for Meetings* (Version 5.10.1 [5839]).  
[https://cdn.brandfolder.io/AMC8F81D/at/w4nkf9fnvvr3tbv559bjf9xs/Zoom\\_Trademark-Use-Guidelines.pdf](https://cdn.brandfolder.io/AMC8F81D/at/w4nkf9fnvvr3tbv559bjf9xs/Zoom_Trademark-Use-Guidelines.pdf)