



2020

## A COMPARISON OF MULTIPLE BASELINE FAMILY OF DESIGNS, AN ANALYSIS OF A MULTIPLE PROBE STUDY, AND COACHING FOR PRACTITIONERS

Katherine Jordan

University of Kentucky, [katherinejord@gmail.com](mailto:katherinejord@gmail.com)

Digital Object Identifier: <https://doi.org/10.13023/etd.2020.348>

[Right click to open a feedback form in a new tab to let us know how this document benefits you.](#)

### Recommended Citation

Jordan, Katherine, "A COMPARISON OF MULTIPLE BASELINE FAMILY OF DESIGNS, AN ANALYSIS OF A MULTIPLE PROBE STUDY, AND COACHING FOR PRACTITIONERS" (2020). *Theses and Dissertations--Early Childhood, Special Education, and Rehabilitation Counseling*. 94.  
[https://uknowledge.uky.edu/edsrc\\_etds/94](https://uknowledge.uky.edu/edsrc_etds/94)

This Master's Thesis is brought to you for free and open access by the Early Childhood, Special Education, and Rehabilitation Counseling at UKnowledge. It has been accepted for inclusion in Theses and Dissertations--Early Childhood, Special Education, and Rehabilitation Counseling by an authorized administrator of UKnowledge. For more information, please contact [UKnowledge@lsv.uky.edu](mailto:UKnowledge@lsv.uky.edu).

## **STUDENT AGREEMENT:**

I represent that my thesis or dissertation and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained needed written permission statement(s) from the owner(s) of each third-party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine) which will be submitted to UKnowledge as Additional File.

I hereby grant to The University of Kentucky and its agents the irrevocable, non-exclusive, and royalty-free license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless an embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

## **REVIEW, APPROVAL AND ACCEPTANCE**

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's thesis including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Katherine Jordan, Student

Dr. Justin Lane, Major Professor

Dr. Melinda Ault, Director of Graduate Studies

A COMPARISON OF MULTIPLE BASELINE FAMILY OF DESIGNS, AN  
ANALYSIS OF A MULTIPLE PROBE STUDY, AND COACHING FOR  
PRACTITIONERS

---

THESIS

---

A thesis submitted in partial fulfillment of the  
requirements for the degree of Master of Science in the  
College of Education at the  
University of Kentucky

By

Katherine L. Jordan

Lexington, Kentucky

Director: Dr. Justin Lane Professor of Special Education

Lexington, Kentucky

2020

Copyright © Katherine L. Jordan 2020

## ABSTRACT OF THESIS

### A COMPARISON OF MULTIPLE BASELINE FAMILY OF DESIGNS, AN ANALYSIS OF A MULTIPLE PROBE STUDY, AND COACHING FOR PRACTITIONERS

#### Overview of Alternative Thesis Project

During the Spring 2020 semester, students within the applied behavior analysis program were conducting applied thesis projects within typical contexts as part of their fulfillment of the requirements of a master's degree program. Due to the coronavirus disease 2019 (COVID-19), public schools and related facilities closed with no plans to reopen within the time frame to allow for graduation for students in the last semester of their graduate program. Students were allowed to complete an alternative thesis assignment in the form of responding to writing prompts followed by an oral defense of the written products, along with questions related to their field of study. The following written prompts were assigned as an alternative to an applied thesis project:

#### *Alternate Thesis Project*

#### *Spring 2020*

*The deadline for submitting responses is April 6. Responses should be emailed to all members of your committee. You will complete an oral defense on the date that you have already scheduled, and you will answer questions about your written questions, as well as answer questions from any content that you have learned during your Master's program.*

1. Compare and contrast the multiple baseline design with a multiple probe design. I expect the product of your work to provide sufficient information that would demonstrate your understanding of each design.
2. I have attached a single-case article in your area of interest. You will use the handout you were given and practiced in EDS 633 to analyze the article (attached) – write a summary of the findings that evaluates the rigor, quality, and potential bias in the article
3. You will write an article, *designed for a practitioner*, about the independent variable (*varied levels of coaching*) you chose for your original thesis including a rationale for why this IV is important, how to implement the IV, an application vignette or scenario, and supporting references. I have attached examples of such papers (not in your topic area and longer than you are expected to write – BUT should serve as a guide in this process).

*Each response must be 4 double-spaced pages and adhere to APA 6<sup>th</sup> edition guidelines and include references (this section does not count toward page requirements). When reviewing and editing your work, make sure your responses are analytical, technical, and your own original ideas/work (plagiarism is not worth failing; <https://apastyle.apa.org/style-grammar-guidelines/citations/plagiarism>).*

---

Katherine L. Jordan

---

05/07/2020

---

Date

A COMPARISON OF MULTIPLE BASELINE FAMILY OF DESIGNS, AN  
ANALYSIS OF A MULTIPLE PROBE STUDY, AND COACHING FOR  
PRACTITIONERS

By

Katherine L. Jordan

Justin Lane

---

Director of Thesis

Melinda Ault

---

Director of Graduate Studies

05/07/2020

---

Date

## TABLE OF CONTENTS

CHAPTER 1. A COMPARATIVE ANALYSIS OF MULTIPLE BASELINE AND MULTIPLE PROBE DESIGNS	1
1.1 Introduction	1
1.2 Procedures	1
1.3 Demonstrating Effect	2
1.4 Advantages and Disadvantages	2
1.4.1 Multiple Probe Design	3
1.5 Selecting a Design	4
1.5.1 Types of Multiple Baseline and Multiple Probe	4
1.5.1.1 Multiple Probe Variations	5
1.6 Conclusion	6
CHAPTER 2. AN EVALUATION OF THE RIGOR, QUALITY, AND POTENTIAL FOR BIAS IN FOX AND COLLEAGES' 2011 EDUCATOR COACHING STUDY	7
2.1 Introduction	7
2.2 Evaluation of Rigor	7
2.3 Evaluation of Quality and Bias	9
2.4 Conclusion	11
CHAPTER 3. COACHING IN THE CLASSROOM	12
3.1 The Importance of Training	12
3.2 What Is Coaching	13
3.3 Considerations When Using Coaching	14
3.3.1 Didactic Instruction	14
3.3.2 Planning	15
3.3.3 Modeling	15
3.3.4 Practice	15
3.3.4.1 Rehearsal or Role Play	15
3.3.5 Feedback	16
3.3.5.1 Follow Up	16

REFERENCES	17
VITA	22

# 1. CHAPTER 1.A COMPARATIVE ANALYSIS OF MULTIPLE BASELINE AND MULTIPLE PROBE DESIGNS

## 1.1 Introduction

The multiple baseline family of designs includes multiple baseline and multiple probe designs. This paper describes procedures for using these designs, advantages and disadvantages of the designs, and how multiple probe addresses some of the disadvantages associated with multiple baseline. It then outlines considerations for selecting a multiple baseline or a multiple probe design and design variations.

## 1.2 Procedures

The multiple baseline and multiple probe designs are commonly used single case designs used to evaluate the effectiveness of an intervention. The designs are extensions of AB designs (Ferron & Scott, 2005), where a baseline (A) condition is compared to an intervention (B) condition. The resulting A-B graphs are stacked to form tiers and presented as a single figure (Gast, Lloyd & Ledford, 2018). Only one variable is changed when intervention the condition begins, that variable may be a single strategy (e.g., positive reinforcement) or a multicomponent treatment package (Manolov, Gast, Perdices, & Evans, 2014).

The behavior of interest (i.e., dependent variable [DV]) is measured repeatedly over time across conditions. Before the independent variable (IV) is introduced, data must be stable across tiers (Gast et al., 2018). When the IV is introduced in the first tier, data are concurrently and continuously monitored in untreated tiers. Thus, the IV is time lagged across tiers. The number of data points in each condition will vary (Ferron & Scott,

2005), but there should be at least three and preferably five data points per condition according to What Works Clearinghouse (WWC) (2013) standards.

### 1.3 Demonstrating Effect

The time lagged introduction of the IV increases the chance that behavior changes occur due to the IV and decreases the chance that changes are the result of something other than the IV (i.e., confounding variables). Baseline conditions for all tiers must begin at the same time for this argument to be convincing. Multiple baseline designs may consist of as few as two tiers of A-B designs (Cooper Heron, & Heward, 2014), however a minimum of three tiers is necessary to demonstrate a functional relation. This allows for three changes to occur across three points in time for three target behaviors (WWC, 2013). A basic demonstration of effect occurs each time behavior changes for tiers “as they are exposed to the intervention” and not for those “not yet exposed to the intervention” (Murphy & Bryan, 1980). Designs are replicated to increase external validity (Manolov et al., 2014).

### 1.4 Advantages and Disadvantages

Time-lagged designs have several advantages. They can be used to assess both reversible and non-reversible behaviors (Murphy & Bryan, 1980) and require only one or a few participants per design. Additionally, they do not require treatment to be withdrawn. The differing length of baselines alert the researcher to maturation and history effects because even if they occur for each participant, it is unlikely they would coincide with the introduction of the intervention in each case (Ferron & Scott, 2005). Finally,

these designs can be used to assess interventions across behaviors, contexts, and/or participants (Cooper et al., 2014).

Disadvantages of these designs are related to the length of conditions. History, maturation, and attrition are threats, particularly when there are multiple participants because participants in later tiers may remain in the baseline condition for extended periods of time (Cooper et al., 2014; Kazdin & Kopel, 1975). Data instability can also be a challenge since all tiers must be stable before the intervention is introduced to any tier (Gast et al., 2018).

#### 1.4.1 Multiple Probe Design

Multiple probe is a variation of multiple baseline design. It was proposed by Horner and Baer in 1978 for cases when baselines might be extended, when behavior is unlikely to change in the absence of intervention, and/or in cases where there is a risk of the participant learning ritualistic behaviors (i.e., when teaching chained behaviors). It differs from multiple baseline in the frequency of planned data collection during the pre-intervention condition. The determination of which design to use must be made before the study is started. Data collection is continuous during the pre-intervention condition for multiple baseline design (Gast et al., 2018), whereas multiple probe design utilizes infrequent scheduled probes during the pre-intervention condition (Murphy & Bryan, 1980). There are guidelines to determine when and how often these probes must occur (see WWC, 2013). Missing scheduled data collection in a multiple baseline design does not make it a multiple probe design, nor does increased pre-intervention condition data collection (e.g., due to data instability) in a multiple probe design make it a multiple baseline design (Gast et al., 2008).

## 1.5 Selecting a Design

When choosing whether to use a multiple baseline or multiple probe design, the research question and DV should be considered in conjunction with the characteristics of each design. Multiple probe designs have fewer data points in the pre-intervention condition which can be a disadvantage if the target behavior is variable (Horner & Baer, 1978). Pre-intervention condition data collection results in more data and is often used for free operant behaviors. However, frequent exposure to assessment in the pre-intervention condition could result in testing threats. If this is a concern, a multiple probe design may be preferable (Gast et al., 2018).

### 1.5.1 Types of Multiple Baseline and Multiple Probe

There are three types of multiple baseline and multiple probe designs. The researcher can examine the effect of the IV across behaviors or sets of behaviors for a single participant, across contexts (e.g., setting, people) for a single participant, or across participants.

Both multiple probe and multiple baseline designs are commonly employed across behaviors. The behaviors must be similar, but functionally independent (Kazdin & Kopel, 1975). For example, three cooking tasks could be chosen but they would all have to have differing series of steps, otherwise learning one of the cooking tasks could result in the participant learning part of a task in another tier before the IV is introduced to a subsequent tier. Evaluation of the IV across behaviors allows for both intra- and inter-participant replication within a single study if there are multiple participants; three

behavior are assessed for each participant, thus each participant's data is a complete single case design (Gast et al., 2018).

Multiple baseline design is more commonly used across contexts than multiple probe. This is because it can be difficult to identify functionally independent contexts and continuous data collection will alert the researcher to covariation as soon as it occurs. Accurate measurement and procedural fidelity across contexts can be difficult, especially if different implementors are employed. Advantages of this version of the designs are promoting of generalization and the opportunity for intra- and inter-participant replication within a single study. As with studies that examine the effect of the IV across behaviors, each participant's data across contexts is a complete single case design (Gast et al., 2018). Generalization is promoted because the target behavior is performed in a variety of settings.

Multiple baseline design across participants is most common. Individuals with similar characteristics in similar environments are selected for this type of design (Murphy & Bryan, 1980). History, maturation, and attrition are particular concerns for this variation, especially for participants in later tiers due to the extended length of time they are exposed to the pre-intervention condition before intervention begins (Gast et al., 2018).

#### 1.5.1.1 Multiple Probe Variations

There are two variations associated solely with multiple probe designs. The *days* variation is most common. It requires data to be collected for three consecutive sessions “immediately prior to the introduction of the independent variable” (Gast et al., 2018, p. 248; Murphy & Bryan, 1980) in that tier and a probe in the other tiers. The *conditions*

variation uses a probe condition for at least three sessions across tiers before the IV is introduced to any tier (Gast et al.).

## 1.6 Conclusion

In conclusion, multiple baseline and multiple probe designs have more commonalities than differences. Procedurally, they differ only in the frequency of pre-intervention data collection (Murphy & Bryan, 1980). Both are time lagged to enhance internal validity of each design, are appropriate for both reversible and non-reversible behaviors, and have the potential for intra- and inter-participant replication within a single design (Gast et al., 2018). Both are susceptible to attrition and maturation. Testing threats are a concern with multiple baseline design. As when selecting a design family, the research question and DV will drive the decision of whether to utilize a multiple baseline or a multiple probe design (Murphy & Bryan; Horner & Baer, 1978).

## CHAPTER 2. AN EVALUATION OF THE RIGOR, QUALITY, AND POTENTIAL FOR BIAS IN FOX AND COLLEAGUES' 2011 EDUCATOR COACHING STUDY

### 2.1 Introduction

This paper evaluates Fox, Hemmeter, Snyder, Binder, and Clarke's 2011 research article Coaching Early Childhood Special Educators to Implement a Comprehensive Model for Promoting Young Children's Social Competence for rigor, quality, and potential for bias. In the study, Fox and colleagues employed a multiple probe single case design to evaluate the effect of coaching on the behaviors of three teachers. The study contained one single case design.

## 2.2 Evaluation of Rigor

Rigor was evaluated using a combination of What Works Clearinghouse (WWC) (2013) single case design criteria as detailed by Kratochwill et al. (2013), as well as suggestions put forth by Council for Exception Children (CEC) (2014) and researchers such as Ledford & Wolery (2013) regarding procedural fidelity (PF) data collection. Several components should be considered when evaluating rigor. First, there must a systematic manipulation of the independent variable (IV). As Kratochwill and colleagues (2013) explained, this minimizes threats to internal validity by reducing the likelihood that changes in behavior occur as a result of some event other than the IV. The study conducted by Fox et al. (2011) explicitly describes the procedures used in both the baseline and intervention conditions, revealing clear differences between conditions.

To meet design standards, there must be at least five data points collected during each baseline and intervention condition. There must also be adequate opportunities for demonstrating effect. The minimum number of opportunities required for a rigorous multiple probe design is three across three different points in time (Ledford, Lane, & Tate, 2018a; WWC, 2013). The study meets both these standards by including three participants with five or more data points per condition (Fox et al., 2011).

The next area for evaluation is data reliability. Interobserver agreement (IOA) and PF data must both be collected for at least 20% of sessions in each condition for each tier (e.g., participant). Both agreement and fidelity should be 80% or greater in each case (CEC, 2014; Ledford & Wolery, 2013). Fox et al. (2011) collected IOA data for more than 20% of all sessions for all conditions for each tier and agreement was greater than 80%. However, they did not collect PF data for the teacher coaching sessions. For this

reason, the study does not meet recommended standards (Ledford & Wolery, 2013). If a study does not meet design standards for any reason, typically evaluation would not continue. In this case, all aspects of the study will be evaluated.

Multiple probe designs have several unique rigor considerations. First, the data in pre-intervention for each tier must include a data point in the first three sessions; to meet design standards without reservations, each tier should have a data point in each of the first three sessions (Horner, et al., 2005). Fox and colleagues (2011) collected data for four consecutive sessions for each at the beginning of the pre-intervention condition. Data were not collected for the second tier during the third session, but as data was collected during the fourth session, resulting in at least three initial data points in all tiers without a break in the data path, it can be argued that the study meets standards (Fox et al., 2011, Figure 2).

Additionally, there should be three consecutive data points immediately prior to the introduction of the IV and one probe at least every eight session across tiers (Gast, Lloyd, & Ledford, 2018). The study met both criteria. It is notable that because sessions did not occur every day, it may not appear probes were conducted frequently enough. However, closer inspection reveals probe sessions did not occur daily and probe data was, in fact, collected at least once every eight sessions (Fox et al., 2011, Figure 2). Finally, standards require either one data point in all previous tiers immediately before the IV is introduced to any tier or a data point in all later tiers when the intervention criterion for any tier has been reached (WWC, 2013). Both these criteria were met. The first two tiers reached criterion at approximately the same time and data was collected in the third tier immediately afterwards (Fox et al., Figure 2).

Although the standards for rigor were not met due to a lack of PF data, visual analysis using guidelines outlined by groups such as CEC (2014) and WWC (2013) were used to determine if a functional relation was present in this study. These include an evaluation of data level, trend, and variability; points of overlap, immediacy of effect, and consistency of data across similar conditions. There was an immediate therapeutic change in the level of the data in tiers one and three, and a delayed therapeutic change in tier two when and only when the IV was introduced. The first tier had no points of overlap while the second and third tiers had minimal overlap. There were three demonstrations of effect and no demonstration of non-effect which rates a strong demonstration of effect according to WWC (2013) standards.

### 2.3 Evaluation of Quality and Bias

Several categories warrant consideration for evaluating the quality and the potential for bias of a study. The first category is randomization. If randomization is appropriate, it should be used to reduce risk of bias. In Fox et al. (2011) study it would have been appropriate to randomize which teachers were selected out of those who met inclusion criteria, however the participant description reveals only three teachers were interested in participating in the study. Since at least three participants were necessary to demonstrate a functional relation, it was appropriate to recruit all three. Additionally, it would have been appropriate to randomize teacher assignments to tiers (Kratochwill & Levine, 2010; Ledford et al., 2018a), but this is not reported (Fox et al., 2011), creating the potential for a high risk of bias. The second category is blinding (Ledford et al., 2018a). Data were collected by observer blind to conditions (Fox et al., 2011), resulting in a low risk of bias for this category (Ledford, Lane, & Gast, 2018b).

The third category for evaluation includes factors that impact quality: ecological validity, social validity, generalization, and maintenance. The study was ecologically valid because the participants were typical implementors (i.e., teachers) in the natural setting (i.e., their classrooms), working with their students (CEC, 2014; Fox et al., 2011; Ledford et al., 2018a). Social validity measures should include goals, outcomes, and procedures (Barton, Meadan-Kaplansky, & Ledford, 2018; CEC, 2014; Kennedy, 2000). The goals for the study were set by the participants, indicating the goals were socially valid. After the study, the participants completed a questionnaire and an interview. They indicated the model employed in the study was helpful, they “would continue to implement practices,” and all “strongly agreed coaching was beneficial to their implementation” (Fox et al., p.188). These responses provide evidence of socially valid outcomes and procedures.

Generalization and maintenance should also be considered when assessing quality (Kennedy, 2000; Ledford et al., 2018a). Generalization was not mentioned in the study. It could have been assessed by observing teachers during different activities or in different settings (e.g., playground). Maintenance was assessed for the first two participants while the third tier was exposed to the IV. The third participant did not reach criterion before the end of the school year and the study (Fox et al., 2011).

The final category for consideration includes aspects of both bias and quality and addresses the appropriateness of the participants for the study. The participants were appropriate given the research question which related to teacher training, the inclusion criteria (e.g., early childhood educators), and the descriptive information. The teachers

expressed an interest receiving training in the areas covered by the training (CEC, 2014; Fox et al., 2011).

#### 2.4 Conclusion

In conclusion, the study by Fox and colleagues (2011) examined coaching of early childhood educators and did not meet design standards due to a lack of PF data. Apart from this, the study was rigorous; for example, there were adequate data points and opportunities for demonstrations of effect. A functional relation between the IV and behavior change was demonstrated. The quality and risk of bias were negatively impacted by the lack of randomization and generalization, however the risks associated with blinding and participants were low.

## CHAPTER 3.COACHING IN THE CLASSROOM

*Ms. Martin is a lead teacher in an early childhood (EC) education classroom. She has several students in her class with language delays and a few students who are learning play skills. It is important to her that the classroom staff use responsive interaction strategies such as following the child's lead and narrating play when they play with the children to help create a classroom environment that provides opportunities for growth. Ms. Martin has always been proud that her classroom is considered a model of responsive interaction use at the EC center where she works. Recently, one of Ms. Martin's long-time classroom assistants retired and the new assistant is not familiar with these strategies. Ms. Martin is confident she can teach these strategies, but she is unsure how to best go about it with the limited time she has during the school day.*

### 3.1 The Importance of Training

The effective training of EC educators affects children's success beyond the classroom. The National Institute of Health and Human Development (NICHD) conducted a study that followed 1,083 children for 4.5 years. They found that factors in EC education settings, including teachers' implementation of strategies to provide quality childcare (e.g., providing a stimulating environment and nurturing relationships), have a long-term impact on child outcomes even when differences in home life are taken into account (NICHD Early Child Care Research Network, 2002). Paired with the fact that there is no minimum education requirement for EC educators in the United States (Hemmeter, Michaelene, & Ostrosky, 2008) the importance of quality training becomes clear.

### 3.2 What Is Coaching

Coaching is a collection of adult driven teaching strategies that can be used to deepen individuals' understanding of practices, improve on existing skills, or to develop new abilities (Dunst & Trivette, 2012; Rush & Sheldon, 2008). There are multiple coaching methods and they share three key components. The first key component is modeling (Snyder, Hemmeter, & Fox, 2015; Ward-Horner & Sturmey, 2012). Modeling is providing the trainee(s) the opportunity to see the skill being performed correctly. This can entail modeling with peers, modeling with the relevant individuals, and video modeling as used by Shepley, Lane, Grisham-Brown, Spriggs, and Winstead (2018). The second key component is practice. The learner should have opportunities to engage in the new skill in the natural environment (Artman-Meeker & Hemmeter, 2012; Trivette, Dunst, Hamby, & O'Herin, 2009).

The third key component is feedback based on the trainee(s) performance of the skill (Snyder et al., 2015; Ward-Horner & Sturmey, 2012). Feedback can take several forms. It can be provided verbally or in writing. Feedback is most effective when it is provided immediately. It should be used to let the trainee(s) know what they did well and where they need improvement (Artman-Meeker, Fettig, Barton, Penney, & Zeng, 2015). In a 2015 literature review, ArtmanMeeker and colleagues found coaching commonly includes additional elements such as didactic instruction (Ward-Horner & Sturmey, 2012), planning (ArtmanMeeker & Hemmeter, 2012; Shepley et al., 2018), and rehearsal (Ward-Horner & Sturmey, 2012).

*After doing some research, Ms. Martin decides she wants to use coaching to teach her new assistant to use responsive interaction strategies. She has read about many the*

*components of coaching and the possible ways she could use them, but the amount of information she has found is overwhelming. She is not sure how to proceed.*

### 3.3 Considerations When Using Coaching

The components of coaching are flexible and should be individualized to meet the needs of the trainee(s). Coaching is most effective when multiple components are used and when it occurs in the natural setting (Dunst & Trivette, 2012). Before beginning, you will need to decide which components of coaching best fit your situation. Modeling, practice, and feedback should always be included, as they have been identified as essential components (Dunst & Trivette; Snyder et al., 2015; Ward-Horner & Sturmey, 2012). The ordering of common components is: didactic instruction, planning, modeling, practice, and feedback.

#### 3.3.1 Didactic Instruction

Didactic instruction can take a number of forms. It can include a PowerPoint presentation, an instructional manual, and/or a handout (Artman-Meeker et al., 2015). It may include demonstrating the skill you are teaching (Dunst & Trivette, 2012). It can take up to an hour (Shepley et al., 2018; Barton, Chen, Pribble, Pomes, & Kim, 2013) and occur multiple times (Artman-Meeker & Hemmeter, 2012) or it can take as few as 2-3 minutes (Lane et al., 2016). At a minimum, didactic training should include: (a) a rationale (reason) for the skill being taught, (b) a brief explanation of the skill, and (c) a chance for the trainee(s) to ask questions (Artman-Meeker & Hemmeter; Lane et al.; Shepley et al.).

### 3.3.2 Planning

Planning refers to planning when or how the learner will utilize the skill in the natural environment (Artman-Meeker et al., 2015). This may be self-evident, as in the case of using responsive interaction strategies during play, or it may require the trainee(s) to identify opportunities to practice the skill (Lane et al., 2016; Shepley et al. 2018).

### 3.3.3 Modeling

Modeling is a key component of coaching. It may be limited by time constraints or the classroom schedule (e.g., when can coaching occur, when is the skill needed). Ideally, the skill will be modeled in the natural environment. It may be more practical to use prerecorded video model than providing a live model because the trainer can ensure the quality of the model. Additionally, a video model can be referenced when providing feedback (Lane et al., 2016; Shepley et al. 2018).

### 3.3.4 Practice

Practice not only allows the trainee(s) to actively participate in the learning process (Fabiano et al., 2013), it also sets the occasion for feedback to occur. Learners should have multiple opportunities to practice the skill in the natural environment (Dunst & Trivette, 2012). The practice-feedback loop should continue across coaching sessions until the trainee(s) has met pre-determined criteria (Lane et al., 2016).

#### 3.3.4.1 Rehearsal or Role Play

Some skills may only be relevant during certain times of the day, such as strategies to transition groups of children in and out of the classroom. If there are limited

natural opportunities to practice the skill, or if the skill is complex, the trainer may want to provide the trainee(s) opportunities to rehearse or role play (Barton et al., 2013).

### 3.3.5 Feedback

Feedback is another key component of coaching (Barton et al., 2013). There are several ways feedback can be delivered. Feedback should be provided after observing the trainee(s) engage in the skill and should include: (a) behavior specific praise describing what the trainee(s) did well, (b) areas for improvement, (c) and a chance for the trainee(s) to ask questions (Ledford, Lane, & Barton, 2019). It can occur in person or via email within 8 hours of the trainer observing the trainee(s) performing the skill (Artman-Meeker & Hemmeter, 2012). In addition to occurring after the skill is performed, feedback can occur before in the form of a reminder of skills to focus on based on previous sessions (Barton et al., 2013). Additionally, the learner should have the opportunity to reflect on and evaluate their performance during this time. (Dunst & Trivette, 2012). Feedback can also occur *in vivo* (during) an observation in the form of verbal prompts

(Barton et al., 2013), behavior specific praise, and/or directing the trainee(s) to opportunities to use the skill (Lane et al., 2016).

#### 3.3.5.1 Follow Up

Research indicates that when feedback is no longer provided, skills may return to baseline levels (Artman-Meeker & Hemmeter, 2012; Neuman & Cunningham, 2009; Rudd, Lambert, Satterwhite, & Smith, 2009). If possible, a plan should be in place to provide feedback at intervals once the trainee(s) consistently performs the skill.

*Ms. Martin found a one-page handout online describing responsive interaction strategies. She has decided to provide this to her new assistant during rest time, take a few minutes to explain why this is an important skill for classroom staff to use, and to answer questions. She does not want to use a video model due to the center's strict regulations regarding the use of technology. There are a couple children who do not sleep during rest time, so she plans to model the behavior with them. Ms. Martin will have her assistant practice the skills during rest time so she can observe her and provide feedback when they do not have to divert their attention to many children.*

## REFERENCES

- Artman-Meeker, K., Fettig, A., Barton E. E., Penney, A., & Zeng, S. (2015). Applying an evidence-based framework to the early childhood coaching literature. *Topics in Early Childhood Special Education, 35*(3), 183-196.
- Artman-Meeker, K. M., & Hemmeter, M. L. (2012). Effects of training and feedback on teachers' use of classroom preventive practices. *Topics in Early Childhood Special Education, 33*(2), 112–123.
- Barton, E. E., Chen, C., Pribble, L., Pomes, M., & Kim, Y. (2013). Coaching preservice teachers to teach play skills to children with disabilities. *Teacher Education and Special Education, 36*(4), 330–349.
- Barton, E. E., Meadan-Kaplansky, H., Ledford, J. R. (2018). Independent variable, fidelity, and social validity. In J. R. Ledford & D. L. Gast (Eds.), *Single Case Research Methodology* (pp. 133-156). New York, NY: Routledge.
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2014). *Multiple baseline and changing criterion designs*. In *Applied Behavior Analysis* (pp. 220-244). Essex, England: Pearson Education Limited.
- Council for Exceptional Children. (2015). Standards for evidence-based practices in special education. Author: Arlington, VA. Retrieved April 2, 2020, from <https://journals-sagepub-com.ezproxy.uky.edu/doi/pdf/10.1177/0014402914531388>

- Dunst, C. J., & Trivette, C. M. (2012). Moderators of the effectiveness of adult learning method practices. *Journal of Social Sciences*, 8(2), 143.
- Fabiano G. A., Vujnovic, R. K., Waschbusch, D. A., Yu, J., Mashtare, T., Pariseau, M. E., Pelham, W. E., Parham, B. R., & Smalls, K. J. (2013). A comparison of workshop training versus intensive, experiential training for improving behavior support skills in early educators. *Early Childhood Research Quarterly*, 28, 450-460.
- Ferron, J., & Scott, H. (2005). Multiple baseline designs. In B. S. Everitt & D. C. Howell (Eds.), *Encyclopedia of Statistics in Behavioral Science* (pp. 1306-1309). Ohio, United States: John Wiley & Sons, Inc.
- Fox, L., Hemmeter, M., Snyder, P., Binder, D. P., & Clarke, S. (2011). Coaching early childhood special educators to implement a comprehensive model for promoting young children's social competence. *Topics in Early Childhood Special Education*, 31(3), 178-192.
- Gast, D. L., Lloyd, B. P., & Ledford, J. (2018). Multiple baseline and multiple probe designs. In J. R. Ledford & D. L. Gast (Eds.), *Single Case Research Methodology* (pp. 239-281). New York, NY: Routledge.
- Hemmeter, M. L., Michaelene, R. M. S., Ostrosky, M. (2008). Preparing early childhood educators to address young children's social-emotional development and challenging behavior: A survey of higher education programs in nine states. *Journal of Early Intervention*, 30(4), 321-340.
- Horner, R. D., & Baer, D. M. (1978). Multiple-probe technique: A variation of the multiple baseline. *Journal of Applied Behavior Analysis* 11, 189-196.

- 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*, 165-179.
- Kazdin, A. E., & Kopel, S. A. (1975). On resolving ambiguities in the multiplebaseline design: Problems and recommendations. *Behavior Therapy, 6*, 601-608.
- Kennedy, C. H. (2002). The maintenance of behavior change as an indicator of social validity. *Behavior Modification, 26*(5), 594-604.
- 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.
- Kratochwill, T. R., & Levine, J. R. (2010). Enhancing the scientific credibility of single-case intervention research: Randomization to the rescue. *Psychological Methods, 15*, 124-144.
- Lane, J. D., Ledford, J. R., Shepley, C., Mataras, T. K., Ayres, K. M., & Davis, A. B. (2016). A brief coaching intervention for teaching naturalistic strategies to parents. *Journal of Early Intervention, 38*(3), 135-150.
- Ledford, J. R., Lane, J. D., & Barton, E. E. (2019). Working with professionals in early childhood (pp. 232-246). In J. Ledford, J. D. Lane, & E. E. Barton (Eds.) *Methods for Teaching in Early Education*. New York, NY: Routledge.
- Ledford, J. R., Lane, J. D., & Gast, D. L. (2018b). Dependent variables, measurement, and reliability. In J. R. Ledford & D. L. Gast (Eds.), *Single Case Research Methodology* (pp. 97-132). New York, NY: Routledge.

- Ledford, J. R., Lane, J. D., & Tate, R. (2018a). Evaluating quality and rigor in single case research. In J. R. Ledford & D. L. Gast (Eds.), *Single Case Research Methodology* (pp. 365-392). New York, NY: Routledge.
- Ledford, J. R., & Wolery, M. (2013). Procedural fidelity: An analysis of measurement and reporting practices. *Journal of Early Interventions, 35*, 173-193.
- Manolov, R., Gast, D. L., Perdices, M., & Evans, J. J. (2014). Single-case experimental designs: Reflections on conduct and analysis. *Neurological Rehabilitation 24*(3), 634-660.
- Murphy, R. J., & Bryan, A. J. (1980). Multiple-baseline and multiple-probe designs: Practical alternatives for special education assessment and evaluation. *The Journal of Special Education, 14*(3), 325-335.
- NICHD Early Child Care Research Network. (2002). Child-care structure, process, outcome: Direct and indirect effects of child-care quality on young children's development. *Psychological Science, 13*, 199-206.
- Neuman, S., & Cunningham, L. (2009). The impact of professional development and coaching on early language and literacy instructional practices. *American Educational Research Journal, 46*, 532-566.
- Rudd, L. C., Lambert, M. C., Satterwhite, M., & Smith, C. H. (2009). Professional development + coaching = enhanced teaching: Increasing usage of math mediated language in preschool classrooms. *Early Childhood Education Journal, 37*, 63-69.
- Rush, D. D., & Shelden, M. L. (2008). Common misperceptions about coaching in early intervention. *CASEinPoint, 4*(1), 1-4.

- Shepley, C., Lane, J. D., Grisham-Brown, J., Spriggs, A. D., Winstead, O. (2018). Effects of a training package to increase teachers' fidelity of naturalistic instructional procedures in inclusive preschool classrooms. *Teacher Education and Special Education, 41*(4), 321–339.
- Snyder, P. A., Hemmeter, M. L., & Fox, L. (2015). Supporting implementation of evidence-based practices through practice-based coaching. *Topics in Early Childhood Special Education, 35*(3), 133–143.
- Ward-Horner, J., & Sturmey, P. (2012). Component analysis of behavior skills training in functional analysis. *Behavioral Interventions, 27*, 75–92.
- What Works Clearinghouse. (2013). *Procedures and standards Handbook* (Version 3.0). Retrieved from [https://ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc\\_procedures\\_v3\\_0\\_standards\\_handbook.pdf](https://ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc_procedures_v3_0_standards_handbook.pdf)

VITA

University of Georgia, Bachelor's of Arts, Japanese Language and Literature