2023

ASYNCHRONOUS E-TRAINING AND COACHING TO INDONESIAN PARENTS: NATURALISTIC STRATEGIES TO SUPPORT LANGUAGE DEVELOPMENT OF CHILDREN WITH SOCIAL-COMMUNICATION DELAYS

Ndaru Prapti
University of Kentucky, Bundashassy07@gmail.com
Author ORCID Identifier:
https://orcid.org/0000-0002-7675-3338
Digital Object Identifier: https://doi.org/10.13023/etd.2023.100

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.

Ndaru Prapti, Student

Dr. Jennifer Grisham, Major Professor

Dr. Melinda Ault, Director of Graduate Studies

ASYNCHRONOUS E-TRAINING AND COACHING TO INDONESIAN PARENTS: NATURALISTIC STRATEGIES TO SUPPORT LANGUAGE DEVELOPMENT OF CHILDREN WITH SOCIAL-COMMUNICATION DELAYS

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Education
at the University of Kentucky

By
Ndaru Prapti
Lexington, Kentucky
Director: Dr. Jennifer Grisham, Professor of Interdisciplinary Early Childhood Education
Lexington, Kentucky
2023

https://orcid.org/0000-0002-7675-3338

ABSTRACT OF DISSERTATION

ASYNCHRONOUS E-TRAINING AND COACHING TO INDONESIAN PARENTS: NATURALISTIC STRATEGIES TO SUPPORT LANGUAGE DEVELOPMENT OF CHILDREN WITH SOCIAL-COMMUNICATION DELAYS

This study is about virtual training and coaching to Indonesian parents of preschool-age children with social-communication delays to implement naturalistic intervention. These intercontinental coaching sessions were delivered asynchronously because of the time difference between the coach and the participants and internet bandwidth barrier in some rural areas in Indonesia. Multiple-baseline design across behaviors was utilized to determine the effect of asynchronous training and coaching program to teach three Indonesian parents three naturalistic strategies (i.e., modeling, mand-model, and time delay) during natural routines. Parent-child dyads video-recorded their interaction before and after intervention.

The intervention was started by learning the strategies, video-recorded the implementation, received performance-based feedback and reimplemented the strategy until reaching the criterion level in three consecutive sessions. The coach delivers feedback through chat, word documents, videos that was recorded on Zoom, enable the coach to embed parent's performance to highlight their strengths and areas for growth. Parents can ask questions anytime using WhatsApp and messenger chat. The results indicate that the parents could learn the strategies and implement them with high fidelity. The effect of parents' strategy implementation was observed in children's increase of verbal responses and initiations. Social validity interviews and surveys indicate that parents found the intervention package to be socially valid.

KEYWORDS: Parent Training and Coaching, Naturalistic Strategies, Social-Communication Delays, Asynchronous Telepractice

Ndaru Prapti

04/28/2023

Date

ASYNCHRONOUS E-TRAINING AND COACHING TO INDONESIAN PARENTS: NATURALISTIC STRATEGIES TO SUPPORT LANGUAGE DEVELOPMENT OF CHILDREN WITH SOCIAL-COMMUNICATION DELAYS

By
Ndaru Prapti

Jennifer Grisham, Ed.D.
Director of Dissertation

Melinda Ault, Ph.D.
Director of Graduate Studies

04/28/2023
Date

DEDICATION

To my late father who inspired me with his hard work and honesty. I thank you so much, I love you so much. May Allah reunite us in the Firdaus Jannah…

ACKNOWLEDMENTS

I would like to express the deepest appreciation to my academic advisor and committee chair, Professor Jenifer Grisham for her significant support and insights that helped me finish my work. Without her guidance and persistent help, this dissertation would not have been possible. She has been showing her patience and mentorship throughout my doctoral program that has led me to the point that I always wanted to be.

Also, I am grateful to my committee member, Dr. Justine Lane who has the attitude and the substance of a genius: he continually and convincingly conveyed a spirit of adventure in regard to research and scholarship. His guidance had assisted me to better shape my work. In addition, I would like to thank Dr. Sarah Hawkins-Lear and Dr. Zitsi Mirakhur, for the inspiration they gave me so I can keep moving forward.

I want to express my gratitude for having supportive friends and colleagues that with their presence can ease my homesickness. I would also like to give special thanks to my husband and two beautiful daughters, Shasi and Keiko, for their continuous support, encouragement, and understanding, especially when I drowned in my chamber working on my class projects and then this dissertation.

Finally, I would like to praise God, Allah the Almighty who has answered my mom's prayers for my wellbeing and success. I believe that I would not be able to make it this far without His blessings.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

Chapter I: Introduction

Biological and environmental factors contribute to a child's social-communication development. For example, a study found that expressive vocabularies of 24-month-old children had a strong negative relation with very low birth weight (Morgan et al., 2015) that put those low-birth-weight babies in the potential risk of cognitive deficit, motor delays, cerebral palsy, and other behavior and psychological problem (Fan et al., 2013). Morgan et al. (2015) also reported that parenting quality, as one of environmental aspects, was strongly associated with 24month-old children having larger oral vocabularies.

Parenting quality, a child's milieu of warmth, responsiveness and stimulation (Knauer et al., 2019), that is focused on supporting child's social-communication development relies on (a) improving the quality of reciprocal social interaction, which include responsive parental behaviors (Siller & Sigman, 2008), sensitivity, and emotion regulation strategies, (b) enhancing language and communication skills, that include foundation skills of imitation, affective sharing, and social motivation, (c) implementing naturalistic approach of applied behavior analysis principles (Conway et al., 2018). Similarly, Siller and Sigman (2008) suggested parents to use at least two interactive strategies to establish and maintain coordinated attention and activity with their children during early stages of development. First, parents and other caregivers should frequently engage their young children in familiar interactive routines, such as shared book reading and play time. These routines are suited to focus on children's attention on a specific aspect of their environment and to provide maximum opportunities for parents to highlight shared interesting experiences (Bruner, 1981; Kaiser & Trent, 2007). However, in this digital era, it is more challenging for many families, especially for mothers with low educational levels, who were unemployed, and

who had more than one child may not be able to spend quality time with their children because they have to both manage chores and take care of their children. Thus, they probably choose to make their children watch the screen to keep them busy (Çaylan et al., 2021). Research proved that high television usage (i.e., more than 17 hr per week) in toddlers is negatively associated with their oral vocabularies (Morgan et al., 2015).

Second, parents and other caregivers should exhibit responsive parental behaviors which means parental communication should be contingent on children's focus of attention, ongoing activity, and communicative signals (Siller & Sigman, 2008) . Exposure to these responsive parental behaviors leads to a faster rate of language acquisition in young children. Parents who are more likely to provide language input that is contingent on children's attention and activity have children who subsequently develop language at a faster rate than children of parents who are less likely to provide contingent language initially (Tamis-LeMonda et al., 2001).

Ideally, every parent or other caregivers should have quality parenting skills mentioned above, that are manifested in daily reciprocal social interaction with their children. However, these features of high-quality parenting are not naturally established, they are learned through natural interaction with their children. As it is a learning process, each parent might need support more than the others, especially for those who have children with or at-risk for disabilities. Children with or at risk of autism spectrum disorder (ASD), for example, show a characteristic deficit in joint attention for both response and initiation (Siller & Sigman, 2008), which affect parent-child engagement. Parents who often experience frustration in engaging with their children, are likely to have low self-esteem which is negatively associated with toddlers' expressive vocabularies (Morgan et

al., 2015). Parent-mediated intervention is an evidence-based approach to assist families who need extra support to be able to contribute more effectively to their child's social-communication development (Rogers et al., 2022). The selection of evidence-based naturalistic strategies should also be considered to ensure that the intervention procedures and the strategies learned are feasible.

Parent-Mediated Intervention

Parents and other caregivers are individuals on the front line of children's mental and physical development and wellness. Literature has documented that teaching parents effective strategies is practical and essential to promote their children's development and learning (Barton & Fettig, 2013), especially for children with disabilities who need early intervention to mitigate delays in receiving services In addition, federal legislation (IDEA, 2004) encourages the involvement of caregivers and other family members in a child's education in their natural environment to the maximum extent possible. The Individual with Disabilities Education Acts (IDEA) (2004) defines natural environment as settings such as the family's house and other community places where the child's same-age typical peers spend time. Examples of natural setting activities at home include self-care routines, mealtime, and play-based activities. Some activities that occur in community places could be going to a bookstore story reading, grocery shopping, and having picnics at public parks. Multiple studies indicate that when learning opportunities are provided in naturally occurring activities, children display positive growth across domains (Ashbaugh & Koegel, 2013; Dunst et al., 2006).

Social-communication skills are a crucial development area that are significantly developed in the first few years of life (Hwa-Froelich, 2015; Moore et al., 2014), and are

related to physical, cognitive, and behavioral development (Toth et al., 2006). Communication delays are often considered a significant indicator of developmental delays that are likely to impact development across all other areas of development (e.g., academic, social-emotional), later in life (Kaiser & Roberts, 2011; Moore et al., 2014). Parents are the first language teachers for their children through daily interaction (Heidlage et al., 2020; Peredo et al., 2018). They spend more time with these young children more than any other individuals in children's life (Lane et al., 2016) by engaging them in day-to-day routines such as playing, dressing, mealtime, and bedtime (Daczewitz et al., 2020; Tomeny et al., 2020). Tomeny et al. (2020) added that parents and other caregivers facilitate children's learning through this daily interaction. In other words, external factors, such as exposure to language input for young children is critical. As a result, empowering parents to conduct early intervention provides more meaningful and functional opportunities to practice skills with children (Rapport et al., 2004) and maintain learning for individuals with ASD who typically exhibit difficulties generalizing the skills learned (Grisham-Brown et al., 2000; Lane et al., 2016; Schreibman et al., 2015).

One of the ways to teach parents is through training and coaching. Training is defined as "a learning experience, or series of experiences, specific to an area of inquiry and related set of skills or dispositions" that is delivered by professional(s) who has knowledge and skill with both the subject matter and adult learning principles (NAEYC & NACCRRA, 2011, p.7). In other words, training involves delivering direct teaching to transfer knowledge, providing information, and enhancing understanding by giving examples. Coaching, on the other hand, is "a relationship-based process led by an expert" to develop specific skills and practices through "various combination of questioning,

listening, observation, reflection, feedback, prompting, modeling, and practice" typically embedded into onsite contact (NAEYC & NACCRRA, 2011, p.11). Training and coaching can stand on their own to support professionals or laypeople, but it is more beneficial to combine both practices in a professional development or client support plan (Rush & Shelden, 2011).

When working with parents through training and coaching, professionals should consider adult learning principles for a positive result, which will most likely change the children's targeted behavior to the desired outcome. Adult learning refers to a collection of theories, methods, and approaches for illustrating the features and conditions under which the process of learning is optimized (Yvonne, 2006). In the early 70s, Malcolm Knowles adopted the term "andragogy" to describe the assumptions and foundations of adult learning. These include (a) the learner's need to know, (b) prior experiences of the learner, (c) readiness-to-learn, (d) orientation to learning and problem solving, and (e) motivation to learn (Knowles et al., 2015).

Parents are the experts of their children; they know their child's strengths, area for growths, and needs, and it becomes their foundation when learning a new skill or information to support their child's development. Therefore, professionals who work with parents need to acknowledge parents' experiences and understanding about their children to validate them as capable and competent learners (Collins, 2004) and to become better advocates for their child's needs (Prata et al., 2018). Furthermore, they also need to be involved in learning and be goal-oriented; therefore, professionals and parents should determine the family's objectives and the method to accomplish them. In other words, mutual planning is consistent with the principle of learners' need to know; they need to

know what they will learn, how the learning will be conducted, and why it is essential to learn it (Knowles et al., 2015). Thus, professionals should communicate well-organized programs with clearly defined elements (Collins, 2004) so that parents understand what they are working on.

Having a child who has or is at risk of specific disabilities is stressful to parents. Raising a child with social-communication delays, especially delays in expressive language, influences the child's ability to convey their wants and interest with social partners (Lane et al., 2016). This situation can motivate parents to learn how to make positive changes for their children. Adults generally become prepared to learn when their life situation has created a need to know; accordingly, the more interventionists can recognize, understand, and anticipate the situation of parents' life and their readiness for learning, the more effective they can be (Knowles et al., 2015). Parents' readiness to learn new strategies and implement them to support their children's development is congruent with the adult learning principles mentioned earlier.

Knowles et al. (2015) highlighted that adults generally prefer a problem-solving orientation to learning rather than subject-centered learning, where the learning involves performing tasks or solving their problems, which also means that adults learn best when new knowledge is presented in a real-life context. This approach to learning is rooted in adult learning practice. Parent coaching adopts adult learning principles because it provides parents and other caregivers opportunities to try out new strategies to obtain the goal they need to achieve. They review, reflect, and discuss their performance with the clinician or other professionals and are encouraged finding areas they need to develop and areas of strengths. Teaching evidence-based practices to parents through the coaching method

includes elements that Knowles et al. (2015) considered the crucial characteristics of adult learning.

Furthermore, parents need to learn something that is relevant and practical. In conducting parent training and coaching, adult learning principles might relate to social validity. Social validity is the appropriateness and acceptability of treatment goals, procedures, and outcomes of evidence-based interventions. Evidence-based practices are not consistently implemented in natural settings by natural change agents. One of the possible reasons for this phenomenon because of their lack of, or limited social validity (Chung et al., 2020). They found that some practices (a) require too much time and effort, (b) are not considered cost-effective, or (c) do not produce meaningful change in the quality of life of themselves and/or their beloved ones (Chung et al., 2020). In other words, skills need to be easy to learn and implement in an everyday context (Roberts, et al., 2021). Furthermore, the combination of simple intervention procedures and motivation to support their child's development affect parents learning success. Therefore, it is essential to consider parents' acceptance when constructing a parent-implemented intervention program.

Professionals who work directly with young children with disabilities should have learned how to conduct interventions for their students and practice them during their formal education. However, when they collaborate with parents by teaching them to be active implementers of interventions for their children, they need to consider adult learning principles, as discussed earlier. Coaching as one of adult learning methods should include these principles as Vismara and Rogers (2018) defined, "coaching is an interactive process

and builds on the learner's ideas, experiences, skills, and knowledge to integrate new information and skills with current ones" (p. 194).

Coaching parents and other caregivers to implement best practices aligns with Part C of IDEA because professionals are encouraged to actively involve parents in early intervention for their children. Teaching parents to be an ideal implementer of early intervention in a child's natural settings best fits this notion. For example, studies have shown that early intervention in a home setting, conducted by familiar agents, is more likely to be maintained and generalized (Roper & Dunst, 2003). In addition, Lane et al. (2016) suggested early intervention through parent training and coaching program to prevent delay for young children who are at risk for ASD to receive supports they need. Historically, parents' involvement in their children's early intervention was limited to the process of decision-making. However, as time passed, it was expanded to parents' active engagement on the intervention with their children as its implementer, which has broadened the concept of family-centered (Friedman et al., 2012) practice which refers to a particular set of beliefs, principles, values, and practices for supporting and strengthening family capacity to enhance and promote child development and learning (Dunst, 2002)

A mixed-method evaluation conducted by Pickard et el. (2016) confirmed that parents could be taught to be primary interventionists for their children. In this study, they reviewed 15 manuscripts that included 28 parents of children with ASD. The parent-child dyads enrolled in ImPACT online, an interactive web-based program that teaches parents to support their children's social communication skills within the context of play and daily routines. Two groups of parent-child dyads were evaluated: the self-directed intervention group and the group with assistance from therapists via web-based remote coaching.

Although they aimed to assess parents' acceptance in ImPACT online program, which overall were positive, they also proved that parents could learn to be language interventionists for their children.

To support the notion of parent-implemented intervention, Dunst et al. (2006) found that when parents acted as passive observers on their children's intervention, it had negative impacts on their well-being and had no effects on parents' judgment about their parenting competence. In a meta-analysis study, DeVeney et al. (2017) reviewed eight studies that compared the effectiveness of parent-implemented interventions versus clinician-directed interventions for late talkers (N = 175 participants). A late talker is defined as a toddler between 18 and 30 months who displays typical development across many domains (e.g., play, motor, thinking, and social skills) but has difficulty with expressive language without a causal factor such as autism spectrum disorder (ASD) or intellectual deficits (Paul, 1996, as cited in DeVeney et al., 2017).

This systematic literature review reported that both interventions effectively improved the late talkers' communication skills. However, the parent-implemented intervention was more effective in two studies that explicitly compared these two types of intervention. Furthermore, they suggested that an increased dosage of the intervention from parents affected the intervention's therapeutic effect on the children's target behaviors (DeVeney et al., 2017). Findings from this has further supported parent-implemented intervention through parents' training and coaching.

Teaching parents to implement evidence-based practices attempts to minimize the gap between research and practice (Chung et al., 2020; Cook & Odom, 2013). Parent-implemented interventions are considered an evidence-based practice for teaching young

children with or at risk of autism spectrum disorder (Wong et al., 2015) resulting in positive outcomes when teaching joint attention (Kasari et al., 2006; Kasari et al., 2015) and social communication (Brian et al., 2017; Lane et al, 2016; Turner-Brown et al., 2019). Teaching parents social-communication skills to be implemented with children with deaf/hard-of-hearing is also considered a promising parent-implemented intervention (Daczewitz et al., 2020), and an effective intervention with children with developmental delays and challenging behaviors (An et al., 2019; Wacker et al., 2017).

In conclusion, this bidirectional coaching relationship, where parents and coach work together as partners, is based on the recognition that (a) parents have a unique knowledge of what the child can and/or cannot do, their typical performance, and challenges; an instructional coach, on the other hand, has expertise in child development and access to evidence-based practices, (b) parents understand the child's daily routines, environments, and culture, whereas the coach's job is to facilitate parent's capacity to gather the information they have, identify strategies, build new skills, problem-solve, and promote self-discovery (Siller et al., 2018) and (c) parents share ideas about family priorities and goals that increase participation of all family members, while the instructional coach supports the family to achieve their priorities and goals by guiding them to define goals and select appropriate intervention strategies (Moore et al., 2014).

Naturalistic Language Intervention

Research has shown that parents who participated in coaching or training programs reported increased well-being (Dunst et al., 2006), self-efficacy, confidence, and empowerment (Akamoglu & Meadan, 2018; McDuffie et al., 2013). There is growing evidence that naturalistic approaches, often adopted into training and coaching packages,

increase young children's social communication skills. Naturalistic language interventions have been broadly employed to teach parents and professionals to implement the strategies (e.g., environmental arrangement and responding, imitation, narrating, modeling, mand-model, matched turns, expansion, milieu teaching prompts) (Akamoglu & Meadan, 2019; Lane et al., 2016; McDuffie et al., 2013; Peredo et al., 2018; Roberts et al., 2014; Wright & Kaiser, 2017). These communication-focused instructions occur during typical activities and accommodate age-appropriate materials that corresponding communication targets (Lane et al., 2022). Therefore, parent training and coaching interventions that teach language skills utilizing naturalistic communication strategies, implement the intervention in informal settings, address topics of interest to the child, include linguistic input appropriate for the child's level of language development, and provide natural reinforcement for the child's communication.

Naturalistic language intervention is defined as a collection of practices including environmental arrangement, interaction techniques, and strategies from the applied behavior analysis principles (e.g., prompting, reinforcement, shaping) that based on a social interactionist approach to language learning (Franzone, 2009; Lane et al., 2016). The practices are designed to encourage specific target behaviors based on learners' interests by building more complex skills that are naturally reinforcing and appropriate to the interaction. In addition, naturalistic intervention is effective with individuals with ASD at preschool, elementary, and middle/high school levels and is suitable for learners of any cognitive levels, with or at-risk for disabilities (Franzone, 2009; Lane et al., 2022)

Furthermore, naturalistic intervention is implemented in daily routines and typical activities throughout the day to develop skills in the areas of communication (both

prelinguistic and linguistic) and social development (Franzone, 2009), therefore the acquired skills may be more easily to generalized (Lane et al., 2015; Lane et al., 2022; Schreibman et al., 2015; Yoder et al., 2014). Naturalistic interventions answer the limitation of more traditional, structured ABA approaches, such as Discrete Trial Training (DTT) that has also been proven to be effective to teach children social-communication skills in structured classrooms or clinical settings (Prizant et al., 2000; Smith et al., 2000), but fails to promote generalization of newly acquired skills across multiple environments and situations and spontaneous social communication acts. The reasons for this failure may include lack of spontaneity, unrelated reinforcement (e.g., getting a candy for imitating the word "car"), and overdependence on prompts (Lane et al., 2016; Schreibman et al., 2015; Yoder et al., 2014)

To summarize, naturalistic interventions, that often called with different terms (e.g., play-based intervention, embedded instruction), have been effective, especially in supporting social communication skills among children with social-communication delays (Schreibman et al., 2015; Snyder et al., 2015). These intervention approaches have several key features that are distinct them from traditional ABA approaches (e.g., DTT), in that they (a) occur in typical settings such as home, playground, and classroom, (b) employ various stimuli, based on the child's current interests and/or activities (e.g., a presence of empty cup to encourage a child to say "more" or " milk"), (c) reinforce diverse types of plausible responses (e.g., pointing to a gallon of milk, or saying "more" or "milk" would result the same reinforcer which is getting some milk), (d) incorporate naturally occurring reinforcers that are functionally related to the stimulus (e.g., if the child says "more" and points to his empty milk cup, he gets some more milk), therewith restricting the need to

fade artificial reinforcement (Cowan & Allen, 2007), and (e) implement various natural change agents, such as teachers and other practitioners (e.g., Cowan & Allen, 2007; D'Agostino et al., 2020; Grisham-Brown et al., 2000), parents and other caregivers (Akamoglu & Meadan, 2019; Lane et al., 2016; Meadan et al., 2016), and typically developing peers (Brown & Odom, 1995; Stanton-Chapman & Snell, 2011).

As mentioned earlier, naturalistic strategies have been implemented in training and coaching programs from researchers and other professionals to parents, other caregivers, and typical peers of children with disabilities. Although this evidence-based practice is established mainly in the United States (What Works Clearinghouse, n.d), implementation has been expanded across nations, especially in low-resource settings such as Greece, Turkey, Saudi Arabia, Costa Rica, Mexico, Ukraine, and Russia (Tsami et al., 2019), China (Zhou et al., 2018), Georgia-Sakartvelo (Barkaia et al., 2017), and Jordan (Al-Khalaf et al., 2014). These researchers utilized traditional modes of delivery, virtual coaching, and hybrid (i.e., combining the two coaching modalities) to connect with families around the globe. Virtual coaching is a relatively new practice following the technology expansion and web-based telecommunication to connect with people around the globe. Virtual coaching, also known as telepractice, refers to the utilization of technology (e.g., videoconference) to deliver services (e.g., consultation, assessment, or intervention) from a distance (Chung et al., 2020) that can be conducted synchronously (in real-time audio/video interaction) or asynchronously (e.g., pre-recorded video and modules) (Vismara et al., 2013).

Some studies have introduced, described, and compared these coaching delivery methods to suggest to the readers their effectiveness, challenges, and barriers when

coaching parents (Akemoglu et al., 2020; Baharav & Reiser, 2010; Breitenstein et al., 2014; Chung et al., 2020; Cole et al., 2019; Daczewitz et al., 2020; McDuffie et al., 2013; Meadan et al., 2020; Meadan et al., 2016; Quinn et al., 2021; Snodgrass et al., 2017; Suess et al., 2014; Tsami et al., 2019; Vismara et al., 2013; Wainer & Ingersoll, 2015; Wattanawongwan et al., 2020) and in-service teachers (Artman-Meeker et al., 2015; Ruble et al., 2013) in the United States. The following section discusses telepractice and hybrid, a combination of telepractice and face-to-face as methods for parent training and coaching to implement EBPs that have been conducted to support their child's social communication skills.

Virtual Coaching or Telepractice

Telepractice has been a popular approach in this decade following the growth of technologies and web-based telecommunication to connect with people worldwide. This internet-based service delivery can come in the form of synchronous (real-time), asynchronous, self-directed, and self-phase service (Akemoglu et al., 2020). Initially, this relatively new approach was widely administered by healthcare providers but to limited extent in other fields including education up until the start of the Covid-19 pandemic (Kossyvaki et al., 2022) where in some countries, educational settings closed down for several months and mental health services were interrupted in the vast majority of the countries worldwide (Layachi & Schuelka, 2022). To that limited extent, telepractice has been implemented to directly teach children with and without disabilities, train and coach teachers, caregivers, and other professionals (Craig et al., 2021; D'Agostino et al., 2020; Daczewitz et al., 2020; Edwards et al., 2012), and to provide parent training and coaching (Çelik et al., 2022; Siller et al., 2022; Sourander et al., 2022).

Despite the health issue caused by the pandemic that has interfered with the stability of education services, especially for children with disabilities and their families, telepractice has solved other families' challenges in attending in person parent training and coaching programs to support their children. Among the most prominent barriers of families to participate in face-to-face programs was the need for parents to arrange family errands such as work, schedule conflicts, daycare for the younger sibling, grocery shopping, and transportation, especially for those who live in rural areas (Breitenstein et al., 2014). In addition, online delivery methods were proven to be beneficial for clinicians and other professionals who serve the communities. The low rate of parents' participation and completion of ongoing training and coaching impacted the program outcomes because it directly affected the intervention dose for parents to an unfavorable result. Breitenstein et al. (2014) discovered that digital delivery methods increased parents' program completion rates at 41.7% compared to 25% for face-to-face parent training delivery methods.

In short, parents and providers noted the possibility that telepractice may be cost and time-effective related to travel time and expenses for both the providers and the families (McDuffie et al., 2013). McDuffie et al. (2013) conducted a study on parent-implemented naturalistic language intervention recruited families living, on average, 82 miles away from university clinicians. The way they combined the parent coaching session into face-to-face and video-teleconferencing assisted with resource challenges, such as finances and time, associated with traveling. Likewise, participants in Wattanawongwan et al. (2020) reported similar advantages of this virtual coaching modality.

One of the keys for a successful parent-implemented communication intervention is the adequate dosage to the EBP's exposure to the child and that the intervention be conducted with fidelity. Telepractice is a growing and emerging method to deliver training and coaching program to parents that offers high potential for reaching more families, sustainability, and maximizing intervention fidelity and dose (Breitenstein et al., 2014). In telepractice, the coach trains and coaches the caregivers in their natural setting with familiar materials and more limited guidance that promotes independence (McDuffie et al., 2013). In addition, telepractice provides more opportunities for parents to eagerly implement the skill they just learned to other settings (Davis et al., 2012), especially when the coach continues scaffolding the skill during the coaching session and collaboratively plans for the next session.

Another advantage of telepractice is easy access to professionals regardless of one's geographic location and demographic features. Many studies have mentioned professional shortages in some areas within a district, a state, or a country (Neely et al., 2020; Simacek et al., 2017). In the United States alone, shortages of trained professionals in most states have affected the delivery of services to families who qualified for Part C (Bricker, 2020). As a result, many families need to arrange their visits to clinics located miles away from their homes. Traveling from one area to another to seek services may not be time and cost-effective, and efficient for those families.

There is no distant limit in telepractice if there is an internet connection. Coaching participants and the coach can be thousands of miles away. Tsami et al. (2019) investigated telepractice serving families in seven countries (i.e., Greece, Turkey, Saudi Arabia, Costa Rica, Mexico, Ukraine, and Russia) while the coach hosted in the United States. The study

suggested the training was highly effective in teaching parents in multiple countries to conduct functional analysis of behavior and implement functional communicative training with their young children. Furthermore, they reported that participant families considered the coaching modality, the treatment procedures, and likely outcomes were acceptable.

The transition from face-to-face to telepractice or virtual coaching needs adjustment from the providers and parents in the technology adoption portion. Some studies used relatively high-tech devices and software (Chung et al., 2020; Quinn et al., 2021), requiring an additional training phase for parents to navigate the technology. Others utilized devices and free applications from the internet that were familiar to the parents (Barton et al., 2019; Pierson et al., 2021; Simacek et al., 2017; Sukonthaman, 2021). The considerations of adopting certain types of technology might rely on technical issues (i.e., parents' access to equipment, unstable connectivity), and unique needs of participants (i.e., bug-in-ear (BIE) for parent of a child who is easily distracted by coach's voice from the monitor (Lerman et al., 2020).

Currently, telepractice has become a common training and coaching modality when working with families who had child with social-communication delays (Nelson et al., 2018). For example, in Wattanawongwan et al., (2020), four parent-child dyads participated in a telepractice intervention in one of the southeast regions. In that study, the researchers taught the parents five naturalistic language strategies (i.e., incentivizing communication, modeling, prompting, progressive time delay, and expanding) for 11-13 sessions. Parents and researchers worked on the intervention plan program after baseline sessions were completed. In the coaching session, parents spent an hour of individual videoconference containing verbal feedback on parents' video from the previous session

by (a) reviewing their performance that included specific performance praise and area for growth, (b) showing sample videos and graphs, and (c) answering questions from parents. Then, focusing on the parents' outcome, they reported functional relation between the telepractice parent coaching program and parents' use of the strategies shown by an immediate increase in the data between the baseline and intervention conditions.

To further support the effectiveness of a virtual parent-implemented intervention, Akemoglu et al. (2020) conducted a systematic review of 12 studies to investigate the characteristics of telepractice-based parent-implemented language and communication intervention for young children with developmental and disabilities related to interventions, participants, and outcomes. They also examined if telepractice-based intervention methodological aspects adequately met the quality standard of single-case intervention research. Of the 12 studies, they found seven types of intervention packages that were conducted virtually (i.e., Early Start Denver Model-ESDM; Parent in the Early Start Denver Model-P-ESDM; Reciprocal imitation program-RIT; Decide, Arrange, Now, Count, and Enjoy-DANCE; Improving Parents as Communication Teacher-ImPACT; Internet-Based Parent-Implemented Communication Strategies- i-PiCS; Prepare, Offer, Wait, and Respond- POWR).

They reported the parent outcomes to be positive; parents showed increases in the target intervention strategy to support their children's social communication skills. However, two studies suggested that online training alone was insufficient to increase parents' intervention fidelity. The parents in these studies started to significantly improve their performance after receiving videoconference-based coaching. The finding also suggested that telepractice intervention to be effective when teaching parents specific

strategies, such as environmental arrangement, modeling, mand model, time delay, following the child's lead, and prompting strategies and expansion. On the other hand, child participants in the studies improved their social communication skills, although not all studies reported robust effects of the parent-implemented intervention. Besides the reporting results on the parent and child outcomes, the analysis also discovered that of the ten SCR studies, one study *met the What Works Clearinghouse (WWC) standards,* six were analyzed as *meet standards with reservation*, and three studies *do not meet standards* because they employed nonexperimental design.

Hybrid Coaching Delivery Method

The term hybrid training and coaching method discussed in this paper refers to a combination of in person and telepractice modalities. McDuffie et al. (2013) taught parents to implement naturalistic language intervention with children with neurodevelopmental disorders (e.g., ASD, intellectual disability). The mothers learned four naturalistic language strategies in this coaching program. The first strategy was the parent's use of verbal descriptions corresponding to the child's focus of attention, the use of preferred activities, and noncontingent reinforcement to increase engagement in play routines. For the second target skill, the participants were introduced to indirect prompting strategies, such as environmental arrangement, time delay, choice-making, and contingent verbal responding to child communication acts, such as interpreting and expanding. The next coaching content taught the mothers to be active in their child's playing by modeling and developing new play actions for the child. The last target skill was introducing a way to prompt child communication acts and interactive book reading by utilizing questions.

In this study, they paired monthly face-to-face and weekly video-teleconferencing coaching modalities. One of the research questions they addressed explicitly compared these delivery methods' effectiveness. The clinician implemented the same coaching strategies during the face-to-face and telepractice coaching sessions; for example, during the teaching/training phase, the clinician implemented: (1) direct observation, (2) video modeling, (3) role-play, and (4) performance feedback. Following the training, parents received coaching from the clinician through (1) information sharing, (2) observation, (3) direct teaching, (4) demonstration with verbal description, (5) practice with feedback, (6) caregiver performance feedback, (7) joint problem solving/reflection (Friedman et al., 2012), and (8) discussion about home implementation. The result of the study suggested that the overall program effectively changed both mothers' and the child participants' target behaviors. There were no significant differences in the positive results between face-to-face and video-teleconferencing coaching sessions. The mothers reported high satisfaction with distance coaching sessions (M=6.63 out of 7 scales).

Another study that employed a hybrid coaching method was conducted by Quinn et. al. (2021). They taught four caregivers of children with language impairments to implement Enhanced Milieu Teaching (EMT) strategies (i.e., matched turns, target talk, expansion, time delays, and milieu teaching). These strategies were aimed to elicit children's communicative responses that reflected on three types of behaviors: number of child communication acts, weighted count of communication acts, and number of different words. Caregivers' accuracy and frequency of the strategy use were the main dependent variable of this study that were examined using a multiple baseline design across behaviors. Both caregiver's and child's behaviors were measured from 10 min- video presentation.

The program was 40% in-person and 60% delivered via telepractice, with all sessions occurring in families' homes. The therapist taught the five EMT strategies using the *Teach-Model-Coach-Review* approach during in-person workshop sessions, which lasted about 85.7 min on average. They presented a slideshow that included (a) the definition of the EMT strategy, (b) rationale of the strategy, (c) video examples, and (e) a role-play of the strategy with the caregiver. In the modeling phase, the caregiver observed the therapist model the strategy by interacting with the child while pointing out the strategy. Next, in the coaching phase, the therapist observed and guided the caregiver during a 10-min caregiver-child interaction implementing the target skill. Finally, the therapist reviewed the caregiver's performance.

The caregivers participated in twice-weekly coaching sessions conducted in person and via telepractice. These sessions included communication and information sharing (CIS), direct teaching the strategy definition and rationale, collaborative goal planning for the current session, modeling the strategy, observing the caregiver implement the strategy, and collaborative review. The hybrid delivery method in this study effectively increased the caregivers' use of the four EMT strategies (i.e., matched turns, target talk and expansion, time delays, and milieu teaching episodes). In contrast, the increases in child communication were modest and varied across children.

Parent Coaching Components

Teaching parents to implement evidence-based strategies is a cascading intervention because children's language outcomes are directly related to the frequency and fidelity of their caregiver's implementation of language support strategies (Barton & Fettig, 2013; Meadan et al., 2020; Roberts et al., 2014). Barton and Fettig (2013) added that in the

pursuance of implementation science, high fidelity implementation of effective training practice produces the high-fidelity performance of EBPs that allows positive child outcomes. Therefore, professionals and providers need to invest their time in examining coaching components and strategies that are effective and easy to implement. In addition, Friedman et al. (2012) suggested that well-defined behaviors expected for effective coaching strategies need to be established to strengthen providers' and/or clinicians' capabilities when developing their professional practice and building capacity among the families they work with.

Face-to-Face Coaching

Some studies that implemented parent coaching programs employed the *Teach-Model-Coach-Review* model approach (Peredo et al., 2018; Wright & Kaiser, 2017) shared similar coaching components as they utilized the same coaching approach. For example, in the teaching phase, Peredo et al. (2018) included an explanation of each strategy, video samples, discussion on how to implement the strategy with the target child, and a time for questions and answers from the parents that compiled in a-15-20 min interactive workshop to introduce a new target strategy. They expanded the teaching phase by (a) reminding the parent about the strategies being practiced, and the target sign words for Wright and Kaiser's study (2017), (b) reviewing the rationale of the strategy, (c) role-playing the strategy with the parent or asking open-ended questions about how they might implement the strategy, and (d) giving the parents opportunity to ask questions. In the *model* session, the coach demonstrated the strategy to the parent by directly interacting with the child and narrating its key points while parents watched. The parent then implemented the strategy with assistance from the provider in the *coach* portion. There was no additional information

in Peredo et al.'s (2018) study about to what extent the assistance from the coach (i.e., caregiver practice with feedback or guided practice with feedback), whereas Wright and Kaiser (2017) implemented guided practice with feedback when coaching parents to set up a situation to elicit communication during the implementation of time delay or milieu teaching prompts. The last portion of every session was *review*; the coach asked the parents open-ended questions to reflect on their current performance. They also delivered feedback on the parent's use of the strategy, which was started by summarizing the parent's performance.

Akamoglu and Meadan (2019) conducted a study that included training and coaching as two intervention phases involving shared storybook reading strategies and naturalistic language strategies. Each phase had its components that shared some similarities. They divided the training session into two an-hour training sessions. The first focused on shared storybook reading techniques. In this session, they included (a) explanation of handouts about *Before, During* and *After* book reading techniques, (b) presentation of video samples, (c) practice the reading strategies with the researcher, (d) suggestion and feedback, and (e) review on the training by addressing questions and concerns.

The second training session focused on parent-implemented communication strategies (PiCS). The components of this session were (a) explanation about social communication behaviors, (b) introduction about PiCS through handouts, (c) presentation of video samples of another mother implementing each PiCS strategy, (d) practice of each strategy with the researcher, (e) suggestions and feedback, and (f) review on the training by addressing questions and concerns (Akamoglu & Meadan, 2019).

After completing the two training sessions, parents moved to the coaching session. Akamoglu and Meadan (2019) implemented seven components in their coaching sessions: (a) researcher and mother reviewed the targeted PiCS strategies or book reading techniques before the reading session, (b) researcher provided feedback to the mother's previous performance, (c) the mother and the child engaged in shared storybook reading, (d) the researcher observed the parent-child interaction, (e) the mother reflected their performance (f) the mother received feedback and suggestions, and (g) the researcher addressed the mother's concerns and questions. These components were adopted from a study in 2014 conducted by the second author of the current research (Akamoglu & Meadan, 2019).

Lane et al. (2016) included rationale, modeling, coaching, and feedback when training parents of children with ASD to implement naturalistic language strategies to promote their children's expressive communication. The rationale of the strategies being taught was delivered during the training session. It gave parents overviews of the reasons why they learn a particular strategy. It was not clearly stated whether the rationales were presented in the form of handouts that parents could revisit anytime they wanted or orally expressed by the clinicians. Video modeling was the second component of the intervention. Clinicians modeled the strategies through video samples that contained the instructional coach demonstrating the strategies with the child. During the coaching session, parents were guided to implement the strategy with their children. They received behavioral-descriptive praises when demonstrating the target behaviors. In addition, they also received direction from the clinician whenever there was an opportunity to engage in the target behavior.

Adult participants obtained feedback from the clinician at the end of every session by watching a sample video from the parent's previous performance or a new video sample where the instructional coaching specified target behavior on the video that the parent could try in the next session. These components were delivered in a relatively short coaching session in a clinic setting (approximately 10 min). Adult participants in the study reported they could implement the procedures with fidelity. Lane et al. (2016) collected data on the parents' target behaviors, showing that both adult participants could implement the target behaviors at or above the criterion.

In a meta-analysis study, Tomeny et al. (2020) analyzed 26 manuscripts, and suggested coaching components into four categories: (1) collaborative planning, (2) building on caregivers' competence, (3) guided practice, and (4) collaborative reflection and decision making. They found that all reviewed studies emphasized building on caregivers' competence (n=26), but less than half studies underlined collaborative reflection and decision making (n=11), only eight of them addressed collaborative planning. Among the 26 manuscripts, there are two studies that highlighted only on building on caregivers' competence and did not mention any of the other coaching components, and only six studies addressed all four of the coaching components.

They concluded that some coaching components (i.e., building caregivers' competence, guided practice) are widely used, described, and utilized across the literature. This finding noted that the implementation of parent coaching might adopt a more direct parent-teaching approach with limited collaboration with families on achieving decision points (Tomeny et al., 2020). These findings were derived from 26 relatively small studies compared with the number of manuscripts available discussing parent-implemented

language intervention. Their claim about the lack of collaboration in parent-implemented interventions was not highly valid. There was always a collaboration between parents and their providers to some degree, especially those that adopted single-case research design that allowed individualized or small group interaction. For example, during the review phase at the end of every session, parents and the providers usually engaged in collaborative reflection, exploring parents' strengths and areas for growth from their current practice or implementation (Lane et al., 2016; McDuffie et al., 2013; Peredo et al., 2018; Wright & Kaiser, 2017).

In conclusion, there were three coaching components implemented consistently within the parent coaching interventions mentioned earlier, they were (a) direct teaching by utilizing handouts, rationales, and video samples, (b) guided practice by delivering descriptive praise and corrective feedback that usually occurred in coaching phase, and (c) collaboration by working collaboratively with parents through collaborative planning which included parents in selecting the objectives for their child, and collaborative reflection which allowed parents to self-reflect their previous performance and decided for the next session with support from the clinicians. Table 1 summarizes telepractice and traditional coaching components employed in some studies that specifically taught naturalistic language strategies to parents/caregivers.

Telepractice

There were almost no differences in coaching components between interventions delivered face-to-face or telepractice. They both usually incorporate video samples, handouts, rationales in the teaching phase to teach the intervention strategy of the selected EBP. In addition, during the coaching phase, which usually incorporates guided practice

with feedback, the provider can still observe the parent-child interaction implementing the intervention procedures and deliver direct verbal feedback on parents' performance through videoconference. The critical difference is in the delivery method of the coaching components.

Table 1

Summary of Coaching Components in some Studies

Study	Intervention Components	Coaching Strategies	Intervention strategy	Parent and Child outcomes
Face-to-face				
Akamoglu et al. (2019)	Explanation about reading technique/social communication behaviors Handouts Video samples	Direct teaching	Naturalistic communication teaching strategies	The training intervention alone was adequate to teach parents shared storybook reading strategy.
	Practice Parent implementation of the strategy	Roleplaying (parent practiced the strategy with the coach)		Parent Coaching was effective to teach parents the three target behaviors (modeling, mand-model, and time delay)
	The coach observed the parent-child interaction	Parent practice with feedback Observation		The child participants showed increases in the target behaviors
	Suggestion and feedback Review	Problem-solving/reflection		
Lane et al. (2016)	Rationale Video examples Handouts	Direct teaching	Naturalistic strategies Narration Imitation	The brief training and coaching package may be effective to teach the parents the naturalistic
	Practice	Parent practice with feedback	Environmental arrangement	

Table 1 (continued)

Study	Intervention Components	Coaching Strategies	Intervention strategy	Parent and Child outcomes
	Review	Problem-solving/reflection		language/communication strategies The child participants showed some increase in initiation and response
Peredo et al. (2018)	*Teach* Rationale Handouts Video samples Practice *Model* Demonstration *Coach* Practice with assistance *Review* Open-ended questions feedback	Direct teaching Roleplaying Demonstration Caregiver Practice with Feedback (CPF) or Guided practice with feedback (GPF) Problem-solving/Reflection	Enhanced Milieu Teaching strategies	Parents showed increases in the target behaviors. Child participants showed an increase in the target behaviors
Wright & Kaiser (2017)	*Teach* Rationale Handouts Target Sign words Practice *Model* Demonstration of the strategy with the child	Direct teaching Roleplaying Demonstration Caregiver Practice with	Enhanced Milieu Teaching Strategies and EMT words and signs	Parents showed increases in the target behaviors There was no clear cut on child participant use of language before and after implementing the strategies.

Table 1 (continued)

Study	Intervention Components	Coaching Strategies	Intervention Strategies	Parent and Child Outcomes
	Coach Practice with assistance *Review* Summarization of parents performance Open-ended questions Feedback	Feedback (CPF) and Guided practice with feedback (GPF) Problem-solving/Reflection		
Virtual Coaching/Telepractice				
Meadan et al. (2016)	Training phase: Overview of the social-communication intervention Review handouts and flowcharts Video samples Create action plan collaboratively Questions and answers Coaching phase: Pre-observation conference Observation (parent practice) Post-observation Provide feedback Video feedback	 Direct teaching Direct teaching Modeling CIS CIS CIS and Collaborative progress monitoring OB Delayed CPF PS/R	Naturalistic language strategies: EA + Modeling Mand-model Time delay	Parents learned to implement the strategies with fidelity The child participants showed increase in the two communication behaviors: initiation and response during the intervention

Table 1 (continued)

Study	Intervention Component	Coaching Strategies	Intervention Strategies	Parent and child Outcomes
Wattanawongwan et al. (2020)	Webinar video Parent's interview form Handouts Written and oral feedback	Asynchronous self-paced direct teaching Indirect information sharing Synchronous direct teaching via video-conference	Incentivizing communica-tion Modeling Prompting Progressive time delay Expanding	The parents could implement the strategies taught No child outcomes were reported

Note. CIS = conversation and information sharing; CPF = caregiver practice with feedback; DEM = demonstration; DT = direct teaching; JI = joint interaction; OB = observation; PS/R = problem-solving/reflection

For example, in her dissertation, Sukhothaman (2021) conducted online training for parents of children with cochlear implants in Thailand. She modified the Teach-Model-Coach-Review instructional approach to teach parents language expansion strategies (e.g., labeling, describing, explaining). The researcher included all components needed for the four phases of the coaching process; she provided descriptions and rationales, video presentation, video samples in the *teach* phase. In the *model* phase, instead of directly interacting with the child and demonstrating how to implement the strategies, the researcher used one of the videos from baseline. She encouraged open discussion about the video where the caregiver learned from a self-video model. In the *coach* phase, the researcher observed and provided feedback and guidance for the parent when implementing the language expansion strategies with their child. Finally, the researcher and the parent engaged in a conversation where the parent was encouraged to provide comments, concerns, and questions.

Challenges in Telepractice

Telepractice requires specific pieces of equipment that are considered to be high-tech devices. Even though almost everyone, 86.34% of the world population, has a smartphone (Bankmycell, n.d), it requires a high-speed internet connection that is not equally available everywhere. Uninterrupted internet connection during direct observations is still a problem in telepractice (Lerman et al., 2020). Researchers and service providers found that one of the barriers to telepractice was internet-connection-related issues (i.e., internet connection, lack of bandwidth, privacy concern) (Cole et al., 2019; Douglas et al., 2018; Guðmundsdóttir et al., 2019; Lerman et al., 2020; Neely et al., 2020). It often interfered with the intervention continuity, especially during a live videoconference, the most common type of software used in telepractice studies (Akemoglu et al., 2020). Lerman et al. (2016) added that high-speed internet access was still relatively expensive that not every family could afford. Besides, for low socioeconomic-status families, purchasing equipment needed to participate in telepractice might be challenging. To mitigate this barrier, many studies accommodated their participants with equipment they needed (e.g., tablets, laptops, iPad) and upgraded modem or internet services (Lerman et al., 2020).

Challenges when working with low-income families through virtual coaching can also be limited materials the family needs during the intervention. For example, if coaching sessions are conducted at a clinic, parents can select any toys their child would prefer from an abundant available toys and materials. The child might be excited just to find novel materials on the site that might not be available at their house. To overcome such a barrier, a clinician or coach could support parents to find creative ways to use items at home to

substitute for toys they cannot afford (Jeffrey et al., 2020), for example using old newspapers and rubber bands to make a ball. It did not only solve the problem relating to limited available materials, but the coach also presented psychoeducation, problem-solving and communication skills, by simply allowing parents to use any materials as long as they supported parent-child engagement and allowed children to take the lead in the interaction. In addition, Jeffrey et al. (2020) noted that it could empower parents to feel they could engage in developmentally appropriate and child-centered play despite income.

Rationale for Current Study

Asynchronous telepractice in training and coaching parents has key features of self-phase learning and delayed performance-based feedback. This delivery method was selected for the current study for several reasons. A high-speed internet access is not equally accessible across countries, including Indonesia. A recent analysis conducted by discount code portal CupoNation Indonesia found that Indonesia has lower fiber optic for internet connection speeds than other Southeast Asian Countries (Khidhir, 2019). He added that some areas had about 200 megabytes per second available to the internet users, ranking Indonesia fifth place out of six countries. However, Indonesia's average internet connection speeds were only 6.65 Mbps, putting Indonesia in the 92nd position worldwide (AsiaQuest Indonesia, 2020). Nevertheless, this speed is adequate for reliable audio-based communication via cell phones, access to web-surfing experience, and streaming high-definition videos (Sumers, 2015). Therefore, parents in Indonesia could still access web-based modules with embedded videos.

In this study, the parent coaching program attempted to mitigate barriers and challenges associated with technical and procedural issues. First, the coaching delivery

relied more on the asynchronous method; there was no videoconference, which likely requires more stable fast internet speed, to gather data on the strategy implementation. Instead, parents learned the strategy using shared video files and handouts as a self-directed intervention module. Studies showed that parents could learn independently from the module, but assistance from a coach would increase the effectiveness of the intervention package (Douglas et al., 2018; Pickard et al., 2016). Therefore, parents and the researcher communicated as a coach and a coachee throughout the session via WhatsApp chat and audio call, Facebook messenger and email. In addition, parents also received delayed feedback on their performance via video files or in a written form that contained (a) descriptive praise, (b) areas for growth, (c) self-reflection guided by questions, and d) suggestions for the next session. Furthermore, parents and the coach review the previous session through WhatsApp chat if necessary. Parents were encouraged to ask questions during this time. Finally, parents and the coach planned for the next strategy implementation. This delivery method was selected to extend the reach for participants residing in any area across Indonesia, where high-speed internet access may not be available.

Second, a successful result of this intervention program would add to limited literature about parent training and coaching across continents that would open opportunities for any parents around the globe to receive training and coaching from professionals across the world despite the significant time difference between the continents (i.e., there is approximately a 12-h difference between Indonesia and the US). The asynchronous delivery method for parent coaching helps both providers and parents work on the intervention in their pace. Third, collaborative work between the providers,

parents, and an interpreter decrease language and cultural barriers. Parents who do not speak the same language as the provider can still benefit from the coaching through telepractice when an interpreter facilitates communication between the two (Tsami et al., 2019). However, it is not the case in the current study because the researcher speaks the same language as the study participants. An interpreter was still needed to validate the translation of all materials from English to *Bahasa Indonesia,* the official language of Indonesia.

Fourth, the equipment required to participate in the study is relatively affordable. Almost everyone has a cellphone with embedded cameras. In the United States, 85% of American has a smartphone (Pew Research Center, 2021), while Indonesia was the fourth-largest smartphone market worldwide after China, India, and the United States (Nurhayati, 2021). Fifth, an asynchronous training package enables parents to access the training materials at their pace and at their most convenient times, and locations. Every family has its own unique structure and life challenges; therefore, an online training platform is the best delivery method because it can be adjusted based on the family's situation (Douglas et al., 2018).

This current study adapted and modified an internet-based parents' training and coaching program conducted by Meadan, et.al. (2016). The research questions that guided this study were as follows:

Research Question 1: Is there a functional relation between an asynchronous text-based parent training and coaching program to teach naturalistic teaching strategies and parents' fidelity of implementation and rate of the newly acquired strategies?

Research Question 2: If parents display improvements in fidelity of implementation and rate, will children improve their social communication skills?

Research Question 3: How was parents' acceptance toward the training and coaching procedures, the skills taught, and the cultural aspects of the strategies? Is there any correlation between parents' acceptance of the program and their performance?

Chapter II: Method

Participants and Setting

Participants

Prior to the study, the primary researcher, referred to as a coach for the rest of the paper, obtained research board approval from the institution. Then, three participants were recruited by sharing study advertisements that were written in Bahasa, through administrators who managed WhatsApp chat groups of parents of preschool-age children and Facebook groups of parents who have a child with autism. Interested families contacted the coach and were screened for eligibility. The participants for this study consisted of parent-child dyads who were Indonesian citizens and resided in Indonesia. All participants are referred to by pseudonyms to protect their anonymity. The inclusion criteria for adults included: (a) being at least 19 years old, (b) having a preschool-age child with social-communication delays, (c) owning and being able to operate a laptop, a tablet, and/or a cell phone (e.g., use office software, especially Microsoft Word document, open a browser to access Google Drive or YouTube) and, (d) ability to video-record on a cell phone, and (e) ability to upload and download files on the internet. The inclusion criteria for children were as follows: (a) being between 2 to 5 years old, (b) having social communication delays that were at least self-reported by the parent, and the (c) ability to understand and follow simple instructions (e.g., raise hand when parent says, 'high five", clap hands when parent model and ask to clap hands).

Eligible families were given a consent form that explained the details of the study and the contact person they could reach if they had any questions. They read, signed, and sent it back to the coach. They received $17.50 in the middle of the study and another

$17.50 at the end of the study to reimburse purchases to increase their cellphones' bandwidth data and engaging toys for their child used in the study.

Initially, five families contacted the coach and showed interest in participating in this study. All the prospective participants were mothers who lived in different areas across Indonesia (i.e., East Java, west Sumatra, Jakarta, West Kalimantan). One of them could not participate in the study because her child was more than five years old. Another candidate could not proceed after reviewing the timeline of the study which overlapped with her work schedule. Therefore, the study was conducted with three mother-child dyads. All the participants completed all phases of the study.

Rika and Fariz were the first dyad who received the intervention. Rika was a 31-year-old fulltime mother with three children. She had a diploma in chemical analysis. She and her husband lived in the capital city of West Sumatera and earned $8,000 per year which was considered on the high-end of a middle-income family. Fariz was 31-month-old male when enrolled in the study. He was the youngest child of three. While his two siblings were typically developing, Fariz was diagnosed with a low mental age by the local pediatrician. He was 24 months old, but his mental age was nine months old, and he was referred to early intervention. He received speech and occupational therapies twice a week. Rika mentioned the anxiety that she and her husband felt whenever taking him to a therapy session. Fariz exhibited uncooperative behavior by crying and screaming. His parents usually terminated the 45-min-sessions before they ended. They eventually ceased the program completely after trying for two months.

Fariz was a cheerful lovely toddler who loved to play pretend with kitchen-set toys. He also loved to make noises when pushing his toy truck. Most of the time Fariz

enjoyed playing by himself. His parents were concerned about his social-communication skills because both the parents and the child were often frustrated to understand each other when trying to engage in an interaction. Fariz's receptive and expressive language were limited. He said less than 20 words and seldom made eye contact when interacting with anyone. He could not combine two words to form a phrase and most of the time communicated using gestures or unintelligible one-word utterance. He also often ignored his name when being called. In one of the baseline videos, his father, who was capturing the interaction between the mother and the child, described Fariz as being like a computer with only four RAM speed (random-access memory).

The second dyad was Tari and Dilan. Tari was a 33-year-old mother of two children. She had a bachelor's degree in English education and worked at a preschool program. She and her husband lived in a small town in West Sumatera and together earned $3,120 per year. Dilan was a 25-month- old male when enrolled in the study. Dilan was a curios boy who loved to pay attention to what happens in his surroundings. He loved to play with toy trucks, car and train. His mother reported that Dilan's communication skills were behind his peers who attended the same daycare where she was also working as a teacher for 32 hours per week. During the initial interview through WhatsApp audio call, she mentioned that she sometimes monitored Dilan's interaction with adults and peers in the classroom and found that Dilan was always the "silent" one. Dilan communicated using few words, sign, vocalization and facial expression, but seldom initiated communication with adults. Whenever he needed something, he pointed to the desired object and then whined when his mother did not attend to him right away. She admitted that she gave more screen time to Dilan compared with his older brother

when he was at Dilan's age. She thought that it might be the main reason for his speech delay, which was diagnosed by a nurse practitioner.

As a preschool teacher, Tari had received some training held by the local government on how to actively engage in adult-young children interaction. She mentioned that the training never included follow-up meetings. She thought that being a talkative adult would stimulate children's language development, including her own son. Therefore, she talked intensively with Dilan whenever she had chance, especially after finishing chores or other family errands. She expected to learn more effective ways of engaging in a meaningful interaction with her son by participating in this study.

Table 2

Adult Demographic Information

Name (sex)	Age (year)	Occupation	Level of Education	Number of Children in the Household	Family Income per Year (US$)
Rika (F)	31	Housewife	Diploma	3	8,000
Tari (F)	33	Preschool Teacher	Bachelor	2	3,120
Dilla (F)	30	University Professor	Master	2	3.000

Dilla and Yuna were the last dyad in the program. Dilla was a 30-year-old married mother of one daughter and was pregnant with a second child. She was a full-time mother in the beginning of her studies and was hired as a professor at one of the public universities in East Java in the middle of the study. She had a master's degree in chemical analysis. She and her husband lived in a big city in East Java and earned $2,400 per year.

Yuna was a 43-month-old female who was diagnosed with autism by the local pediatrician. She was enrolled in therapy that utilized principles of applied behavior analysis (ABA) to teach her to independently follow one-step instruction (e.g., sit, clap, touch) and mastered 50% of the goals set by parents and therapists in the first quarter of the program. Her parents were concerned about Yuna's language development because at this age she could not communicate verbally. At the beginning of the study, Yuna communicated primarily through gestures, such as holding adult's hand and leading him or her toward what she wanted. She often had a tantrum when her parents failed to understand what she wanted and felt. They planned to enroll Yuna into a speech therapy program after completing the ABA sessions. They took advantage of therapy services one at a time because of time and financial constraints. Therefore, they were delighted to participate in this study so that they expected to learn communication strategies to support Yuna's language development.

Table 3

Child Participant Demographic Information

Name (Sex)	Age (month)	Diagnosis	Services Received	Number of Expressive Words	Desired Outcome upon Program Completion
Fariz (M)	31	Low-mental age Speech and language delay	Speech and occupational therapies	< 20	Novel word approximation & word, phrase
Dilan (M)	25	Speech Delay	-	< 20	Novel word approximation & word, phrase
Yuka (F)	43	Autism Spectrum Disorder	ABA therapy	-	Novel syllable, word approximation & word, phrase

Besides the coach, an Indonesian woman participated in this study as an independent observer to assist the coach in collecting procedural and interobserver agreement data. She had a bachelor's degree in statistics and was employed by Indonesian government. She had experience in coding survey data, especially in the field of economics (e.g., cost of living per capita). She had a 7-year-old child with a speech delay. She was interested in assisting this project because she could learn the strategies that might be beneficial for her as a parent while carefully coding the videos and checking the procedural fidelity (e.g., watching the modules, reviewing the performance-based feedback for parents).

Settings and Materials

All sessions were conducted at the participants' homes (e.g., living room, bedroom, dining room) or other locations of their choice (e.g., relative's house, public park, daycare, convenience store). The coach was never physically present to train and coach the parents. All sessions were conducted over the internet asynchronously using shared Google Drive, WhatsApp text messaging, Facebook messenger, and emails.

Both the coach and parents used widely available devices connected to the internet (laptops and/or cell phones). All parents utilized their smartphones to participate in the study. The coach reminded the parents to provide some space in their smartphone's memory to ensure that they could save the recorded videos before sending them to the researcher. They were also encouraged to create an online free storage account, protected with a password to store the videos.

The coach used laptops and an iPad to create training modules and uploaded them to a Google Drive, WhatsApp, and YouTube, depending on the parent's preference.

Parents and the coach communicated primarily using cell phones via WhatsApp chat and Facebook messenger. One parent used only WhasApp, and two others utilized both WhatsApp and Facebook messenger. Parents used their cell phones to video-record the interaction with their child and sent them to the coach through the same delivery method. The coach and the independent observer utilized Datavyu software to code all the videos from parents. The software captured the onset and offset of the behaviors of interest with a frame precision up to a thousandth of second.

Research Design

A multiple-baseline design across behaviors (naturalistic strategies) replicated across each family was used to evaluate the effectiveness of the intervention on the parent's application of the teaching strategies and, in turn, the child's expressive communication. This design allowed each family to serve as its own control with three opportunities to demonstrate the effectiveness of the intervention at different points in time. The replication across the families is one of ways to address threat to external validity (Gast & Ledford, 2010)

The design was used to answer Research Questions 1 and 2 by examining the effect of asynchronous training and coaching program on changes in (a) parent strategy use that coexisted with the introduction of training and coaching, and (b) their children's communication skills coexisting with changes in their parents' strategy use. The independent variable (i.e., training and coaching on modeling strategy) was introduced when the baseline data were stable, and the second naturalistic teaching strategy was introduced once participants reached criterion levels of 80% for implementation fidelity, and one per min for rate of strategy implementation. Staggering the introduction of the

target strategies across the tiers was to address threats to internal validity due to history, maturation, and testing (Gast et al., 2018).

Baseline data were collected concurrently and continuously for each tier or target behavior. The immediate effect of the intervention on the parents' behavior under stable baseline conditions addressed the threats to internal validity (e.g., maturation and history) (Gast et al., 2018). Gast et al. (2018) described that the effect of the independent variable to the first tier should be immediate and ideally abrupt, change in a therapeutic direction in the tier, while data in in other tiers remain stable and unchanged. They added that an immediate change in level and/or a change in a therapeutic trend direction, should be observed on introduction of the independent variable for each tier, and not before.

As parent-child interaction is naturally occurring events, temporal precedence could become ambiguous (Petursdottir & Carr, 2018). Ambiguous temporal precedence is defined as the inability of the researcher (based on the data) to specify which variable is the cause and which variable is the effect. To address this type of threat to internal validity (i.e., ambiguous temporal precedence), the repeated baseline measures and the evaluation of baseline trend can detect the possibility of reverse temporal precedence. Therefore, a minimum of five data points were collected to obtain more reliable data trend or change in level before introducing an intervention. Another threat to internal validity that can be reduced by the presence of a stable baseline data is testing effects, which is defined as the influence of exposure to a test or observation upon performance on subsequent test or during subsequence observations (Shadish et al., 2002).

Independent Variable

The independent variable in this study was a two-phased intervention: asynchronous training and text-based coaching on three naturalistic teaching strategies (i.e., modeling, mand model, and time delay).

Dependent Variables

The primary dependent variables were the quality and the rate of implementation of three naturalistic teaching strategies called modeling, mand-model, and time delay by adult participants (Meadan et al., 2016). The secondary dependent variables were child's rate of response per min, contingent to parent's strategy implementations (i.e., modeling and mand-model), and number of initiating behaviors.

Mand-model. Correct use of mand-model also required joint attention on an object or activity. Parents produced a mand, choice, or question, allowing 2-3 s for a response. Parents provided feedback contingent on the child's communication. The implementation of the procedure sequence was coded as one strategy implementation, starting from the outset of the prompts (i.e., delivering a mand, a choice, and/or a question) to the end of parent's verbal feedback (i.e., repetition of the prompt, a model and/or praise), depending on child's response (see Table 4). In other words, the nature of parent-child interaction looked different from one use to the next, depending on whether the child responded to the first, second, or third part of the procedures.

Modeling. Correct use of modeling required establishment of joint attention on an object or activity. This meant that the child and parent were either making eye contact or focusing on a common object. With joint attention parents then produced a one or two-word model for their child to imitate. Next, the parent waited 2-3 s for the child to respond and then responded contingently to her/his communication. If the child responded appropriately,

the parent provided the desired object or activity and gave verbal praise within 2-3 s of child's communication. If the child did not respond, the parent repeated the model to provide another opportunity for them to respond (Meadan et al., 2016).

Time Delay. Joint attention was imperative for the use of time delay. The parent established joint attention and looked expectantly at the child, waiting 5 s for him/her to initiate. Time delay also required that the child understood the routines that was occurring. For example, during playtime the child was provided with small car toys in a container, but at this time, the container was tightly closed requiring the child to ask for help from the parent to open the container. The parent waited for 5-10 s after joint attention was established and responded contingently to the child's communication with either a model, mand-model, or positive feedback if the child initiate correctly. The implementation of any strategy that followed the time delay (i.e., modeling or mand-model) was coded separately as either modeling or mand-model.

The secondary dependent variable was the children's social-communication initiations and responses. Besides the type of the communication behaviors (i.e., response and initiation), the topography of child's verbal expressive language was coded as syllable, approximation, word, and phrase. These dependent variables were reflected in the first two research questions addressed in this study.

Data Collection and Measurement

Adult Behavior

All adult behaviors were measured using time-stamped event recording (Ayres & Ledford, 2014) and rate recording. In time-stamped event recording, data collectors noted the time in the video at which each occurrence of a target behavior occurred and rate

recording where the target behavior occurrences were calculated within the duration of the video recording sent by parents (between 3 to 5 min-long). The coding process was administered on Datavyu software that enables the accuracy of the time stamp up to one thousandth of second. The time-stamped event recording was utilized to record the onset and the offset of the target behavior occurrence, determine the type of the strategy used (e.g., modeling mand-model, time delay), and to analyze the quality of the strategy implementation that was scored from 1 to 4. For example, when parents modeled a language without developing joint attention, the implementation of this modeling strategy was scored as 1, but when they built joint attention and then modeled the language and waited for 2-3 s for the child to imitate the language and respond to the child's communication attempt by delivering praise, repeating the language model, or giving a mand, the parents received full credit for the strategy implementation. See Table 4. for the summary of coding system and detailed coding system that was adopted from Meadan et al. (2016) can be found in Appendix B.

Table 4

Criteria for Coding Quality of Teaching Strategy Use

Quality	Criteria		
	Modeling	Mand-model	Time delay
1	Produces a verbal, sign, or gestural model related to child's interest No joint attention	Produces a verbal prompt in form of question, choice, or mand No joint attention	Looks expectantly at child for 5-15 s No joint attention
2	Joint attention + above	Joint attention + above	Joint attention + looks expectantly for fewer than 5 s

Table 4 (continued)

3	Above + waits 2-3 s for response	Above + waits 2-3 s for response	Joint attention + Looks expectantly at child for 5-10 s for initiation
4	Above + verbal feedback (praise or repeated model)	Above + verbal feedback (praise or repeated prompt or use of model)	Above + verbal feedback (praise or use of model/mand-model)

The rate for the implementation quality of each session was measured by dividing the total score by the possible maximum score and multiplying it with 100, so that it could be presented in a percentage. For instance, if the parent received a total score of 11 from the three attempts of strategy implementation, her quality rate was 11 divided by 12 (maximum score for the three attempts is 3 x 4 = 12) and then multiplied by 100 that would give her 91.7%. The criterion level of mastery for implementation quality was 80%. The data for the quality of strategy implementation were presented in line graphs.

The second data collection aspect was the target behaviors' occurrence rate per minute. All occurrences of a strategy was counted and divided by the duration of the video (i.e., 3 to 5 min). The criterion level for parents' behaviors was once per minute. For example, when parent implemented the strategy three times in the 4 min duration of their interaction with the child, the rate of the behavior was 3 divided by 4, or .75 per minute. The criterion mastery is once per min.

Child Behavior

Child participant's target behaviors were collected in two aspects. First, the type of expressive communication behavior that was coded as an initiation (I) or a response (R).

An initiation was recorded when child started communication exchange that occurred at least 3 s after the last communication exchange, or when the child communicated needs. On the other hand, a response was coded when child replied to a mand, made a choice and/or answered parent's question and/or copied parent's model. Second, the topography of child's expressive communication acts was measured (e.g., sign, vocalization, facial expression). For sign language and vocalization, data collectors also coded the topography of the vocalization as "*W"* for "word", "*APX"* for "approximation", and "*Syl"* for "syllable". A syllable was recorded aside from an approximation because the nature of the *Bahasa Indonesia*, the language widely spoken in Indonesia, consists of at least two syllables. A child could say a syllable "num (noom)" for "minum (mee-noom)" which means drink or say an approximation "inyum (eenyoom)". However, none of the family included sign language as the target desirable communicative behaviors of their child. The definition of each target behavior can be found in Appendix B.

Inter-observer Agreement (IOA) Data Collection

An independent observer was assigned to observe and code the data for each participating family and record implementation fidelity of each strategy on each phase of the intervention. Before assessing IOA, the independent observer was introduced to the definition of the target behaviors for both adult and child participants, and trained on the coding procedures, coded video samples from the pilot project, compared the result with the result from the primary coder, and discussed disagreement. This process was repeated until the primary and the secondary observer reached at least 80% agreement for each coding category. The categories included (a) time of the event (e.g., parent strategy use or child communication, a window of 2 s was permitted, (b) type of strategy (i.e., modeling,

mand-model, or time delay), (c) quality of strategy (range 1-4), and (d) child behaviors (i.e., responding or initiating and its topography).

The IOA was calculated as agreement divided by agreement and disagreement multiplied by 100. As the primary observer, the coach coded all sessions and the secondary observer independently coded at least 30% (range= 30%-100%) of the sessions randomly selected in each study phase. Table 5 shows the IOA data, averages, and ranges by family for each phase. Incorporating an independent observer to collect data on the target behaviors minimizes threat to internal validity called instrumentation, changes in the measurement system during the intervention that may responsible for an observed effect (Shadish et al., 2002)

Table 5

Interobserver Agreement (IOA) by Family and Phase

Family	Phase (n, % of session coded)	Average IOA of Coded Categories (range)					Overall (%)
		Time (%)	Strategy (%)	Fidelity (%)	Child's behavior		
					Type	Topography	
Rika and Fariz	Baseline (2, 40)	100 (100-100)	95 (90-100)	100 (100-100)	100 (100-100)	100 (100-100)	99
	Coaching: Modeling (3, 50)	100 (100-100)	97.7 (93-100)	93.3 (88-100)	100 (100-100)	95.8 (92-100)	97
	Coaching: Mand Model (3, 50)	100 (100-100)	100 (100)	85.9 (64-100)	99 (97-100)	91 (88-93)	95
	Coaching: Time Delay (3, 50)	97.6 (93-100)	94 (93-95)	97 (93-100)	99 (97-100)	94 (92-97)	96
	Maintenance (1, 33)	100 -	100 -	80 -	90 -	80 -	90
Tari and DIlan	Baseline (2, 40)	92.5 (85-100)	90 (80-100)	81.4 (77.8-85)	86.5 (74-100)	89 (83.3-94.7)	88
	Coaching: Modeling (3, 50)	98 (94-100)	98 (94-100)	88.8 (76.5-100)	91.8 (79-100)	89.4 (85.7-89.4)	93
	Coaching: Mand Model	95	100	100	95.5	81.9	

Table 5 (continued)

		(90-100)	(100-100)	(100-100)	(91-100)	(73.1-90.9)	94
	(3, 50)						
	Coaching:	94	97	94.4	100	93	
	Time Delay	(83-100)	(91.7-	(83.3-100)	(100-100)	(86.4-100)	95.8
	(3, 50)	100	100)	100	96	96	98
	Maintenance	-	100	-	-	-	
	(1, 33)		-				
Della and	Baseline	87.5	100	100	100	100	97.5
Yura	(2, 40)	(75-100)	(100-100)	(100-100)	(100-100)	(100-100)	
	Coaching:						
	Modeling	100	94.6	76.9	98.7	92.5	
	(3, 50)	(100-100)	(90-100)	(70-100)	(96-100)	(81-100)	92.5
	Coaching:						
	Mand Model	100	97.6	98.4	94	82	94.4
	(3, 50)	(100-100)	(92.9-	(95.2-100)	(90-96)	(75.6-88)	
	Coaching:		100)				
	Time Delay	93.1		93.4	95.9	89	
	(3, 50)	(84.6-	97.4	(88-100)	(91.7-	(79.2-100)	93.8
	Maintenance	100)	(92.3-	94.4	100)	90.3	94
	(1, 33)	94.4	100)	-	96.8	-	
		-	94.4		-		
			-				

Data Analysis

Data were analyzed based on guidelines for visual analysis of graphed line data including level, trend, variability, immediate effect, and overlap (Gast, 2010). Level refers to the magnitude of data as indicated by the ordinate scale value that discusses mainly about level stability and level change. Trend (slope or angle) refers to steepness of data path across time to determine whether the direction of the trend is improving or deteriorating. Overlap data refers to percentage of data points in one condition that fall within the range of data plotted in an adjacent condition (Gast, 2010).

Data were graphed and analyzed for each mother-child dyad. Additionally, percentage of data points exceeding the median of baseline level (PEM) was utilized to visualize any overlapped data from the baseline level. Instead of using Percentage of Non-overlapping Data (PND), PEM was adopted because of the presence of the 0 or 100

(ceiling and floor effect) value in the baseline level data makes it meaningless or zero that the risk of making Type II error (i.e., a false negative) was too high (Ma, 2006).

When calculating PEM value in an AB design, some steps are followed (a) determine the median value of the baseline level, (b) draw a horizontal line from the median to the right, (c) determine the intervention data points above this horizontal line, (d) divide the number of data points in the previous step by the total number of data points at the intervention level, and multiply by 100 (Ma, 2006; Şen & Sen, 2019). Ma (2006) recommended criteria for the PEM index as a "very effective" when the values between 91% and 100%; "moderate" intervention effect when it between 70% and 90%; "questionable" or "ineffective" when the PEM is below 70%.

Procedures

Before the baseline condition, the coach collected consent forms and demographic data through a form completion. An interview with parents then followed to expand some supportive information and to build the connection and trust between the coach and parents. In this 30 to 45 min audio call via WhatsApp, the coach and parents discussed parents' concerns and expectations of their child regarding their social communication skills and familiarity with the technology that would be utilized throughout the training and coaching sessions.

Baseline

Parents video recorded playtime or any shared activity with the target child, as they usually do, for at least 3-6 min. Parents were required to record at least three different videos for the baseline data and send them to the coach or until the data were stable. All the three dyads sent five videos for baseline. No feedback on their

performance was delivered to parents except about the angles of the video and other technical issues.

Parent Training and Coaching

Parent Training. The first phase of the intervention was a parent-training session delivered through video modules available online (Google Drive or Dropbox). There were four video modules included for the training phase. The first two modules were shared to parents once the baseline data were stable. The first module contained an introduction to the training and coaching program (e.g., format of the training, explanation about naturalistic strategies and environmental arrangement). The introduction video module covered 13 key elements of information about the program that can be found in Appendix C. After watching this video, parents proceeded to learn the strategy starting with modeling, then mand model and finally time delay. Each module contained (a) video slides about the naturalistic strategy, (b) video samples of the strategy implementation embedded in the video presentation, (c) a flowchart of the strategy, and (d) a template of the action plan of the strategy.

Parents independently accessed and completed the training module at their own pace which required approximately 1-2 h to complete. The duration of video presentation ranged from 14 to 27-min, explaining the strategy and its video samples that were presented once in a time. Parents were encouraged to print or screenshot a printable flowchart of the strategy for easy access if they wanted to revisit the chart at any time. A template of an action plan was provided for parents to guide them in creating a list of the target language for the child. The template also included guidance and examples of how to complete the action plan (See Appendix D). The action plan template and example

guided parents to (a) recall their child's favorite activities and items, (b) write interaction scenarios, utilizing the desirable activities and/or materials from point a, that focused on the strategy learned, (c) refer to the steps of strategy implementation by preparing two-ways communication details with their child, such as delivering descriptive praise for a correct response, and/or repeating a model and/or a mand for incorrect behavior, and (d) provide a timeline for the implementation. Parents had opportunities to ask questions via WhatsApp or Facebook messenger chat. In average, parents sent the first draft of the action plan within 48 to 72 h after they were granted access to the training module. They admitted that the workload was on the process of composing the action plan. They watched the video modules twice in average, based on the self-report included on the survey, before being able to create an action plan for a certain strategy.

Procedural Fidelity of Training. The fidelity of implementation for the training procedures was collected by assessing the training modules, especially the video presentation. First, the coach completed a fidelity checklist containing 13 key elements of the first module and 10 key elements for the other three modules. Then the independent observer completed the same fidelity of implementation checklist. There were three training modules for the naturalistic strategies taught in this study for all the three parent-child dyads; therefore, all modules were assessed to obtain procedural fidelity of the implementation. To summarize, the coach performed eight behaviors for training phase; they were (1) greeted the audience (i.e., the parents), (2) explained the format of the training and coaching, (3) explained the timeline of the training and coaching program, (4) explained the materials related to the naturalistic strategies, (5) provided video samples of naturalistic strategies , (6) encouraged parents to print or screenshot strategy's

flowchart, (7) explained the process of creating an action plan, (8) encouraged participants to contact the coach and/or ask questions. The checklist for fidelity can be found in Appendix C.

Parent Coaching. Parent coaching sessions started when the parents submitted their action plan. The coach reviewed the action plan and made suggestions and comments before sending it back to the parent using a shared word document in Google Drive or WhatsApp chat. The coach also provided opportunities for parents to discuss it through WhatsApp chat or Facebook messenger. Once the final action plan was ready, parents created their first video capturing the implementation of the strategy. The coach reminded parents to record the videos from the third-person angle, meaning, parent and child had to be captured on the videos.

The coach observed and reviewed the parent-child interaction from the 3-to-5 min clips. The coach utilized the first video of each strategy implementation to create video feedback about the parent's performance, highlighting what they had done well and what they could have done differently next time. The coach embedded video from parents, added comment (i.e., descriptive praise, reflective questions, suggestions) on the clips of target behaviors, and/or pointed out missing opportunities to implement the strategy. The duration of video feedback was 10 min on average. After watching the first video of each strategy, if parents did not have any questions, they continued to the second video. From the second to the sixth videos, parents received written feedback from the coach through email, shared word documents. The coach provided opportunities for parents to ask questions through the same message delivery methods. One parent chose to receive feedback embedded in a video over a written form when learning the first and the second

strategy but later switched to receive feedback on a Microsoft word document format because of its easy access (i.e., not required extra space to save the file on the smartphone compared with a video file).

For the written feedback on parents' performance, the coach adopted a fidelity checklist from a study that incorporated text messages to deliver delayed feedback. The study suggested the use of six steps in providing text messaging feedback (Barton et al., 2019). In this study, the researchers found that text messaging to deliver performance-based feedback to preservice teachers working in inclusive early childhood classrooms was effective. The steps were (a) a positive opening statement, (b) a frequency count of the target behavior(s), (c) one verbatim example of parent use of the target behavior, (d) feedback related to the target behavior, (e) a positive closing statement, and (f) a response request (see Appendix C).

Examples of how text messaging performance-based feedback was used were by providing the following sentences. Feedback began with a positive opening statement (e.g., "I like to see how much fun (child's name) played with his airplane today!"), includes a frequency count of targeted behavior(s), (e.g., "I noted you provided model language for (child's name) five times during the play!"), a verbatim example of how parent used the targeted behavior(s) (e.g., "For example, you said "want truck" to expand his request for you to assist him in getting the truck toy from the shelf", feedback related to the target behavior(s) (e.g., "You can expand his language by adding 1-2 words to his utterances such as 'go truck,' 'red truck,' or 'all done truck'."), a positive closing statement (e.g., "Keep up the good work in responding to (child's name)'s language through your use of expansions."), and a response request (e.g., "Is 10 p.m. tomorrow still a good time for you

to send me the next video?"). The text was sent after checking the data collection sheets regarding parent practices. In addition, a reminder text could be sent prior to the due date to send the next video based on the action plan, for example, at night before the next schedule to implement the strategy (e.g., "I look forward to the next video tomorrow night at 10 a.m. or later").

Each family created at least six videos for each strategy; therefore, there were six data points of parents performing each strategy in the intervention phase. Parents received written feedback on the second to the fourth or sixth videos they submitted on each strategy depending on the stability of their performance. When the parents moved to the next strategy, the data on that current strategy served as maintenance data for the previous strategy learned. The coach was expected to provide the feedback within 18 hours after parents submitted their action plan and any other materials from parents.

Procedural Fidelity of Coaching. The independent observer collected the fidelity from 100% of the action plan process and on each first video of strategy implementation, and 60% of written feedback in intervention phase. The written feedback on the action plan contained four primary behaviors, which were (a) highlighted and provided descriptive praise for correct plan, (b) asked questions about unclear explanations, if any, (c) added comment and/or suggestions on each section of action plan, and (d) reminded parent to create and submit the first video of the strategy if they did not have further questions (see Appendix C).

The independent observer captured seven behaviors for procedural fidelity in delivering performance-based feedback for the first implementation of strategy learned through video. The target behaviors of the coach were (a) delivered greeting, (b) embedded

video from parents, (c) delivered verbal praise, (d) asked reflective questions, (e) provided corrective feedback, (f) encouraged parents to ask questions and/or discuss the next session via phone or chat, (g) reminded parents to create and submit the next video of the strategy implementation.

The last part of the coaching phase was performance-based feedback of parents' strategy implementation in a written form. The coach's behaviors required for this phase were (a) provided a positive opening statement (e.g., greeting, thanking the parents for sending the video, and mentioned one unique thing about the video), (b) mentioned a frequency count of target behaviors, (c) provided one verbatim example of parent use of the target behavior, (d) delivered feedback related to the target behavior, (e) added a positive closing statement, and (f) stated a response request. The checklist can be found in Appendix C.

Maintenance. There were two maintenance phases. The first phase was when the intervention ended for modeling and mand-model. During this time, intervention continued for the subsequent strategy. The second phase was when intervention for time delay ended. At this time a full maintenance phase had been started which was identical with baseline. Each dyad sent three different videos for this phase, a month after the study ended.

Social Validity. The third research question of this study was answered by asking parents to complete a survey each time they finished creating a video for the strategy implementation. A Likert-type scale was provided to measure parents' acceptance of the training and coaching program regarding the goals, procedures, and outcomes. Parents also answered open-ended questions upon completing the program.

There were a total four surveys completed by the parents, (a) a survey after the first strategy implementation, (b) a survey after the second implementation when performance-based feedback via a video was obtained by parents, (c) a survey for the third to fifth strategy implementation, after a written performance-based feedbacks was added, and (d) a final survey when the training and coaching program was completed.

The data from these surveys were compared with parents' performance quality to measure any correlation coefficient between the parent's acceptance of the program and their quality in the intervention implementation. As mentioned earlier, each time parents submitted a performance video, they completed a survey that reflected their acceptance toward the coaching package. The score rate for their acceptance was compared with the score of their performance from the video. Microsoft Excel was used to compute the correlation of the two variables. There is no correlation found between parents' satisfaction on the training and coaching program with their strategy implementation fidelity. The survey questionnaires can be found in Appendix C.

Chapter III: Results

Parent and Child Behaviors

To answer the first two research questions (i.e., is there a functional relation between the intervention and the parents' behavior? and is there a functional relation between parents' implementation of the newly acquired strategies and their children's social communication skills?), the researcher used a multiple-baseline, single-case research design, and visually analyzed graph data for each dependent variable. The data are presented in Figures 1, 2, and 3. Each figure presents the data for one family. The top three tiers of the figure present the parents' performance in the multiple-baseline design across the three naturalistic strategies (i.e., modeling, mand-model, and time delay), and the bottom tier presents child's communication behaviors.

The line graphs in the first three tiers represent the percentage of parents' implementation fidelity for each session. The sessions marked with an "Xs" represent sessions during which parents never used the strategy. The shaded squares represent parents' performance after asynchronous training and coaching, without performance-based feedback, and the shaded bullets represent parents' performance after a full training and coaching package. The shaded diamonds represent generalization probes during which parent-child interaction data on the related strategy were coded with no feedback provided. Although unsolicited feedback was not given after parents met criterion, if parents asked a question about previously mastered strategy, the coach responded. Thus, maintenance data on modeling and mand-model that were collected while receiving coaching on time delay are labelled as "maintenance with other coaching" and separated (by a dotted vertical line) from maintenance data collected when all coaching had ended. The open diamond symbols represent the full maintenance sessions that were conducted at least one month after the

program was completed by each family. The shaded bar graphs represent the rate of strategy implementation per minute. The dotted horizontal lines note the median value of data points on baseline level that determine the index of intervention effectiveness.

The line graphs in the bottom tier represent the percentage of opportunities (i.e., the mother's strategy used) to which the child responded, and the shaded bars reflect the number of times the child initiated communication. Sessions marked with "x" are sessions during which the child never initiated or responded.

When analyzing the data in the top three tiers to answer the first research question, both percentage of fidelity rate (i.e., line graphs) and the rate of strategy use (i.e., bar graphs) were considered. A parent could have used the strategy at a high rate but with low quality or vice versa. For example, if the parents implemented the strategy only once but with high quality of 4, the quality rate for that session was 100%. When taking rate into consideration, this percentage was considered an anomaly and not representative of the parent's overall mastery of the strategy.

Rika and Fariz Results

Rika's data are presented in Figure 1, on the first three tiers. A total of 26 sessions were conducted across all conditions.

Parent Behavior

Modeling. In baseline Rika implemented the modeling strategy at a high rate; more than once per min in three out of five trials (i.e., bar graphs), but with low quality, with 63% as the highest (i.e., line graphs). There was slight variability in the rate of the use of the strategy implementation (ranged from .31 to 1.88 times per min) whereas there was a gradual accelerating trend in a therapeutic direction on the quality of the strategy

performance (i.e., range from 46% to 63%) during baseline condition. There was an immediate increase in the use of the target behavior when training and coaching were introduced (i.e., from 63% to 90%), regardless of the absence of performance-based feedback (i.e., shaded square symbol). Her performance dropped below the criterion level of 80% (i.e., 75%) on the third session, but increased above the criterion level for three consecutive sessions (89%-100%) during intervention. She continued implementing the strategy with high fidelity when she used it in maintenance with other coaching, and full maintenance. Visual inspection of the implementation fidelity shows stability in performance (ranged from 83%-100%). On the other hand, there was variability in the rate of strategy use. During training and coaching, Rika implemented the strategy at a high rate (ranged from .86 to 2.25 times per min), whereas when the intervention was focused on mand-model and then time delay, the rate of modeling-strategy implementation decreased to 0 to 1.25 times per min.

The dotted horizontal line marked the median value of the baseline level (i.e., at 50%). This line was drawn to calculate the percentage of data points exceeding the median of baseline level (PEM). Visual analysis of the data shows that no single data point overlapped or was below the median level. This implies that the PEM value is 100% based on the PEM index, indicating that the intervention was "very effective" (Ma, 2006) for teaching the parent the modeling strategy

Mand-model. Baseline data for mand-model consisted of 11 data points. During baseline, Rika implemented the mand-model strategy with relatively low fidelity (ranging from 50% to 75%). The baseline data were stable when training was introduced. However,

here was no immediate effect recorded upon the introduction of the training and coaching (i.e., shaded square symbol). Rika reached criterion of mastery once performance-based

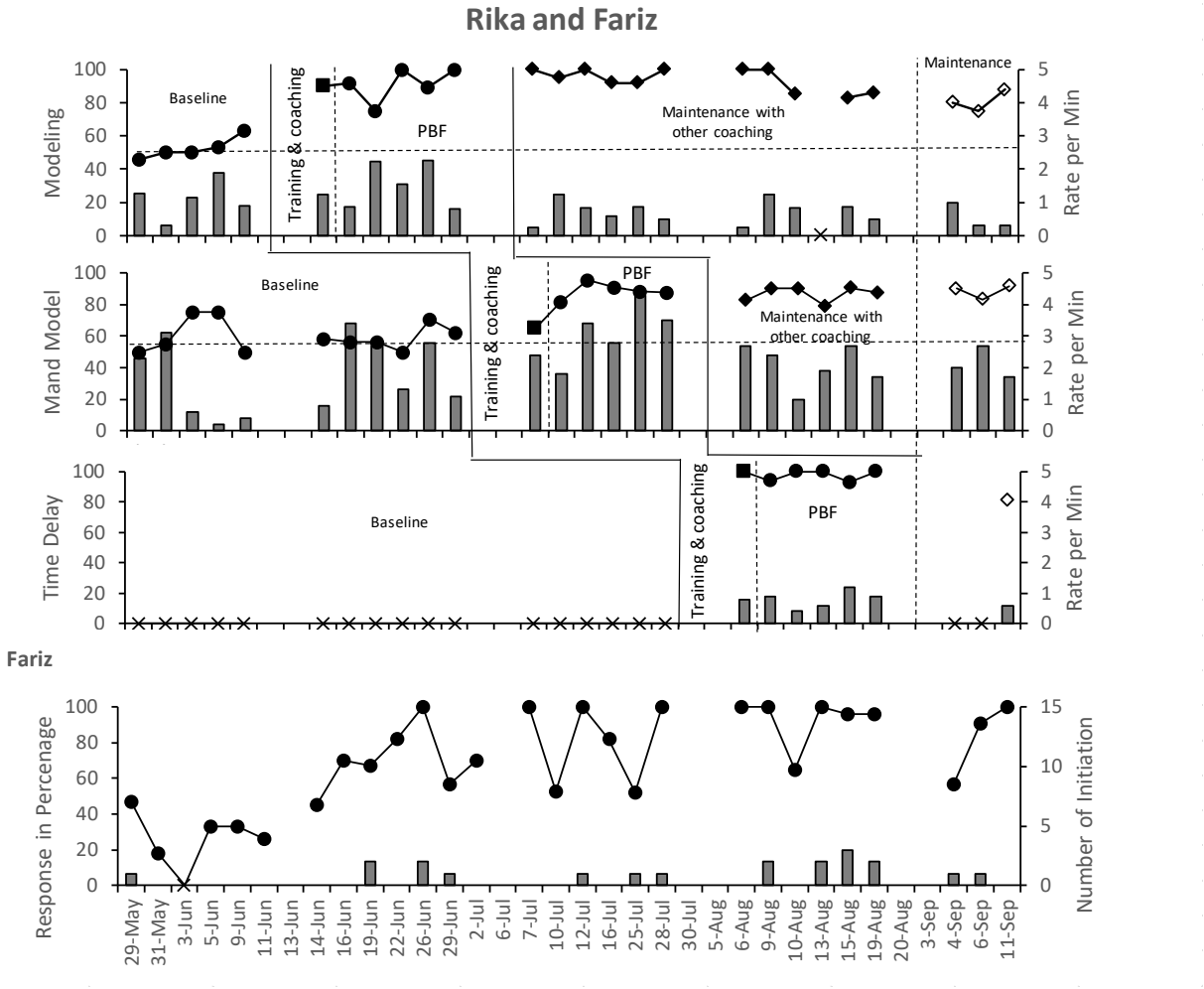

Figure 1 Rika and Fariz's performance

Note. Mother's and child's performance. In tier 1-3, line graphs represent the mother's rate of performance fidelity in percentage. Square symbols represent training and coaching with an absence of performance-based feedbacks. The vertical dotted line separates the intervention condition with and without performance-based feedback (PBF). Shaded circle symbols represent training and coaching with PBF. Shaded diamonds represent maintenance while other coaching was presented, open diamonds represent full maintenance sessions and "x" symbols represent sessions with no strategy was implemented. Shaded bars graphs reflect the rate of strategy implementation per minute. Dotted horizontal lines show median point of baseline sessions. The line graphs on the bottom show the percentage of opportunities (i.e., mother's strategy implementation) to which the child responded, and the bar graphs represent the number of times the child initiated a communication.

feedback was added to the coaching package (i.e., 82%) that separated by vertical dotted line, and maintained the stability of high-fidelity rate across intervention, maintenance with other coaching of other procedures and full maintenance (ranged from 79.2% to 95.3%).

On the other hand, the rate of strategy implementation per min varied during the baseline (.2 to 3.4 times per min) and showed an increase and stability during the intervention (1.8 to 4.3 times per min). Although the data trend after the intervention was ended was slightly decelerating, but the average performance for the rate of the strategy implementation was still on the criterion level of once per min during the maintenance with other coaching and the full maintenance sessions.

As was the case with training and coaching on the modeling strategy, the median value of baseline data for the mand-model was also determined (i.e., 56.3%). Visual analysis of the data shows that no single data point in the intervention phase overlapped or was below the horizontal dotted line. This indicates that the PEM value for the mand-model intervention is 100% which implies the current intervention package was "very effective" in teaching parents the strategy.

Time Delay. Rika's baseline data for the last phase of the intervention package were stable at the zero level. Indicating that she did not attempt to implement the strategy before training and coaching were introduced. Visual analysis shows an immediate effect of training and coaching intervention on Rika's last target behavior (i.e., 100%) with the rate of strategy implementation was .8 time per min. She maintained her performance fidelity at range of 93% to 100% in the intervention phase which resulted in 100% PEM value. On the other hand, the rate of the strategy implementation was between .4 to 1.2

times per min. She implemented the strategy in two of the three maintenance trials with fidelity rate of 100 % and 81% and the frequency rate was .9 and .6 times per min.

Child Behavior

Two types of child communicative behaviors were coded, response and initiation. In addition, topography of those behaviors was also recorded (e.g., gesture, signs, syllable, word approximation, word, and phrase) depending on child's target verbal communication response. In the action plan, Fariz had list of words targeted during the interaction with his mother for the training and coaching program. The parent accepted four types of topography of those words (i.e., syllable, approximation, word, and phrase) as the correct response or initiation.

Response. The line graphs on the bottom tier of Figure 1 represent Fariz's response percentages contingent on parent's strategy implementation. Fariz's average responding percentage during baseline was 26.2 % (0 to 47%), 70.17% during modeling (45% to 100%), 81.17% during mand-model (52% to 100%), 92.83% during time delay (65% to 100%), and 82.67% during maintenance (57% to 100%). There was an increase in Fariz's responding behavior from the baseline to the intervention and maintenance phases.

The rates of the responding behavior based on the topography of the target language per phase are presented on Table 6. Acceptable verbal responses for Fariz were set from the beginning of the study. Fariz's mother and the coach discussed reasonable goals for Fariz during the program and four types of verbal language topography were included in the objectives for Fariz (i.e., syllable, approximation, word and phrase). There was progress in the number of syllables that switched to approximation and then turned to words from baseline to the intervention phases. During baseline, Fariz could not combine two words

or more to form a phrase, and soon after his mother started to implement the strategies, he started to make two-word utterances.

Initiation. Fariz initiated communication at a relatively low frequency (i.e., bar graphs). His initiating behavior with relation to time delay could not be calculated for most baseline sessions because Rika did not implement this strategy. When the intervention for time delay was introduced, which targeted for initiating language behavior, there was an increase in the occurrence of Fariz's initiation. He initiated on

Table 6

The Rate of Fariz's Communication Topography per Phase

Phase	Topography of the Target Behavior							
	Response				Initiation			
	Syllable	Approx	Word	Phrase	syllable	Approx	Word	Phrase
Baseline	1.4	1.2	0.4	-	0.2	-	-	-
Modeling	1.3	1.5	4.5	0.8	-	-	0.3	-
Mand-model	1.5	3.2	11	0.5	-	-	0.5	-
Time Delay	0.8	6.5	8.5	2.2	-	0.3	1	0.2
Maintenance	1.7	4	8.6	2.3	-	-	0.7	-

average 1.5 times per session (0 to 3 times), whereas his spontaneous initiations were less frequent during baseline, modeling, and mand-model. During maintenance sessions, Rika continued to implement the time delay strategy in two of the three maintenance sessions, and Fariz exhibited initiating behavior in those sessions. Fariz exhibited spontaneous initiations in one of the sessions that was not related to Rika's time delay strategy implementation. He initiated an interaction with relation to the implementation of time delay strategy once, and in another opportunity, he did not exhibit the desirable behavior of using verbal communication, instead, he used gesture which was not included in his target communicative behaviors.

In conclusion, during 26 sessions, that consisted of five baseline sessions, six modeling sessions, six mand-model sessions, six time-delay sessions and three maintenance sessions, Fariz made spontaneous initiations in three of the modeling sessions and three of the mand-model sessions. His initiation in the time delay and maintenance sessions were related to the parent's strategy implementation. He also exhibited progress on the topography of his utterances, the transition from syllable to approximation and then to word and phrases (See Table 5).

Tari and Dilan Results

Parent Behavior

Tari's data are presented in Figure 2, on the first three tiers. There was a total of 26 sessions that covered baseline, modeling, mand-model, time delay and maintenance.

Modeling. During baseline Tari implemented the strategy at a moderate rate, which ranged from .38 to 1.93 times per min (i.e., bar graphs), but with low quality, with 64% as the highest and 38% was the lowest (i.e., line graphs). The data were stable when the intervention was introduced. There was an immediate increase in the use of the target behavior when training and coaching were implemented (i.e., from 60% to 88%), regardless of the absence of performance-based feedback (i.e., shaded square symbol). She maintained her performance for the remaining five consecutive sessions above the criterion level of 80% (87.5%-95.5%) during intervention. She continued implementing the strategy with variability (75%-100%) during maintenance with other coaching of other procedures, and full maintenance phases.

On the other hand, there was variability in the rate of the strategy use. During baseline Tari implemented the strategy on an average of 1.05 (.3 to 1.93) times per min.

During training and coaching, she implemented the strategy at a high rate, except for the first session, that ranged from .44 to 2.6 on an average of 1.7 times per min, whereas when the intervention was focused on mand-model and then time delay, the rate of modeling-strategy implementation decreased to an average of .45 times per min. She did not implement the strategy in four (out of 12) sessions of maintenance with other coaching. She continued implementing the strategy at a low rate during the full maintenance sessions. A median value of baseline data is presented in a horizontal dotted line to calculate the PEM. Visual analysis of the data shows that no single data point overlapped or was below the median level. This implies that the value of the PEM is 100% based on the PEM index, indicating that the intervention was "very effective" for teaching the parent the modeling strategy (Ma, 2006).

Mand-model. Baseline data for mand-model consisted of 11 data points. During baseline, Tari implemented the strategy with fidelity ranging from 44% to 75% which was below the criterion level. The visual analysis shows that there was gradual decelerating trend in a contra therapeutic direction when training and coaching was introduced. There was no immediate effect recorded upon the introduction of the training and coaching program (i.e., shaded square symbol). Tari reached the criterion of mastery once performance-based feedback was added to the coaching package (100%), that separated by a vertical dotted line, and maintained the high-fidelity rate for the rest of the intervention sessions (89%-100). When she learned the next strategy, her fidelity performance decreased to an average of 83% (71%-92%) and increased during full maintenance sessions (80%-100%).

Meanwhile, the rate of strategy implementation per min was stable in the first five baseline videos on the average of 2.3 (1.5 to 3.4) times per min and decreased during the last six baseline session on the average of 0.98 (0- 3) times per min when she was learning the modeling strategy. The rate was stable again during the intervention on the average of 1.98 (1.4-2.6) times per min. She continued to implement the strategy at a high rate across maintenance with other coaching of other procedure and full maintenance that ranged from 0.8 to 3 times per min. Similar with the training and coaching on modeling strategy, median value of baseline data for the mand-model was also determined (i.e., 58%). Visual analysis of the data shows that no single data point in the intervention phase overlapped or was below the horizontal dotted line. This indicates that the PEM value for the mand-model intervention is 100% which implies that the current intervention package to be "very effective".

Time Delay. Tari's baseline data for the last phase of the intervention package were stable at zero level, indicating that she did not attempt to implement the strategy before the training and coaching were introduced. Visual analysis shows an immediate effect of training and coaching intervention on Tari's last target behavior (i.e., 75%). Although the implementation fidelity and the frequency rate (i.e., 0.3 times per min) were still under the criterion level, but the visual analysis shows that Tari made progress right after she received training and coaching. She reached the criterion level after performance-based feedback was added to the intervention package and maintained her performance fidelity at 100% for the rest of the intervention phase. Her performance remained stable during full maintenance (92%-100%). Because Tari never implemented the strategy during the baseline, the PEM value was 100% that indicates a very effective

intervention for teaching the parent the time delay strategy. criterion level of 1 per min that was 0.8 (0.2 to 2.3) times per min during the intervention. She performed the strategy during the full maintenance with more stable frequency rate at 0.7 to 0.8 times per min.

Child Behavior

In addition to response and initiation, Dilan's communication topography was also determined at the beginning of the program. Dilan was expected to use more verbal words that were listed on the action plan for this training and coaching program. The parent accepted three types of topography of utterances (i.e., approximation, word, and phrase) as the correct response or initiation.

Response. The line graphs on the bottom tier of Figure 2 represent Dilan's response percentage contingent to parent's strategy implementation. Dilan's average responding percentage during baseline was 71.2 % (33 to 100%), 20. 73% during modeling (10% to 36.36%), 53% during mand-model (25% to 90%), 52% during time delay (25% to 92.3%), and 70.43% during maintenance (60% to 78.57%). There was a decrease in Dilan's responding behavior from the baseline to the intervention and maintenance phases. A possible reason for this decline was because during baseline sessions Dilan was encouraged to respond and/or initiate communication using some words from his repertoire, whereas during intervention Tari encouraged him to practice new target vocabularies.

The rate of responding behavior based on the topography of the target language per phase is presented on Table 7. Acceptable verbal responses for Dilan were set from the beginning of the study. Dilan's mother and the coach discussed reasonable goals for him

during the program and three types of verbal language topography were included in the objectives for Dilan (i,e., approximation, word and phrase).

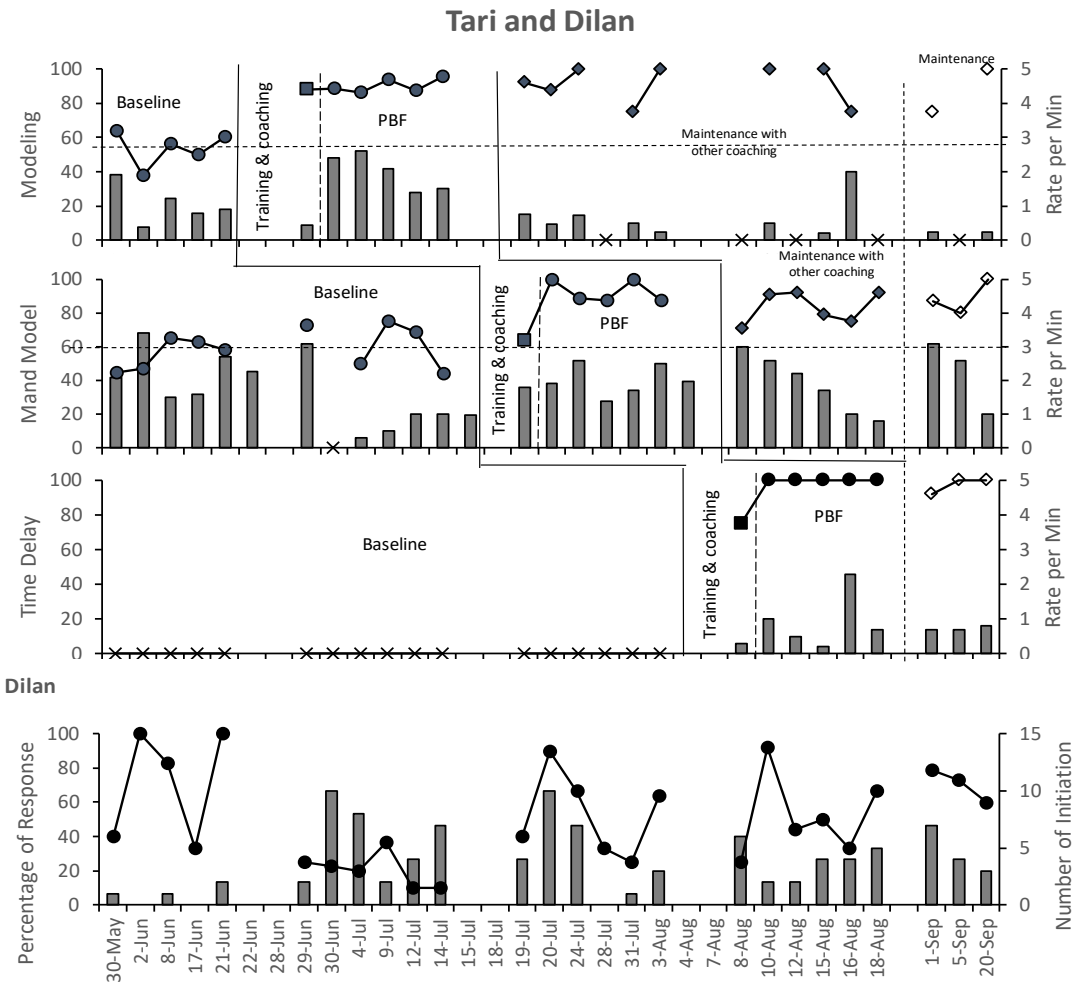

Figure 2 Tari and Dilan's performance

Note. Mother's and child's performance. In tier 1-3, line graphs represent the mother's rate of performance fidelity in percentage. Square symbols represent training and coaching with an absence of performance-based feedbacks. The vertical dotted line separates the intervention condition with and without performance-based feedback (PBF). Shaded circle symbols represent training and coaching with PBF. Shaded diamonds represent maintenance while other coaching was presented, open diamonds represent full maintenance sessions and "x" symbols represent sessions with no strategy was implemented. Shaded bars graphs reflect the rate of strategy implementation per minute. Dotted horizontal lines show median point of baseline sessions. The line graphs on the bottom show the percentage of opportunities (i.e., mother's strategy implementation) to which the child responded, and the bar graphs represent the number of times the child initiated a communication.

During baseline Dilan engaged in interactions with his mother that required him to use the words that have been in his repertoire by labelling, imitating his mother's utterances or responding to a mand. Therefore, during baseline Dilan produced approximations and words at a high-rate contingent to his mother's use of strategies regardless of its low implementation fidelity.

Table 7

The Rate of Dilan's Communication Topography per Phase

Phase	Topography of the Target Behaviors					
	Response			initiation		
	Approx	Word	Phrase	Approx	Word	Phrase
Baseline	4.8	2.4	-	0.8	0.4	-
Modeling	1.2	1.3	-	2.5	2.3	-
Mand-model	2.3	3.3	-	1.3	2.7	0.2
Time Delay	1.5	3	-	1	2.5	0.2
Maintenance	1.7	5	1	1.3	2.7	0.3

Moving to the intervention phases, Dilan was expected to use target words listed on the program plan set by his parents. He responded using word approximation counts on the average of 1.2 during modeling, 2.3 during mand-model, 1.5 during time delay, and 1.7 during maintenance. Progress is not detected from the numbers in the table alone because Dilan uttered more word approximations during baseline (4.8).

For word counts, Dilan delivered words to respond to his mother on the average of 1.3 during modeling, 3.3, during mand-model, 3 during time delay, and 5 during maintenance. There was an improvement in the number of words used in the interaction between Dilan and his mother during the mand-model, time delay and maintenance conditions, when compared with the baseline. Dilan used a phrase to respond to his mother during one of the maintenance sessions.

Initiation. On the contrary, distinctive growths can be captured on Dilan's initiation (i.e., bar graphs). His initiating behavior with relation to time delay could not be calculated for most baseline sessions because Tari did not implement this strategy. However, his spontaneous initiations varied across baseline, modeling, and mand-model. During baseline, Dilan initiated on the average of 0.8 times per session (range= 0-2). During the modeling, his initiation increased to the average of 5.5 times per session (range= 2-10), and during mand-model it decreased to the average of 4.2 times per session (range= 0-10). When the intervention for time delay was introduced, there was a decrease in the occurrence of Dilan's initiation, but the data were more stable across the sessions. The average was 3.8 times per session (2-6 times). Tari kept implementing time delay strategy during maintenance sessions that affected Dilan's initiating behavior on the average of 4 times per session.

Table 7 shows improvement in all target communication topography. The occurrence of word approximations increased from baseline on an average of 0.8 times per session to 2.5 times during modeling, 1.3 times during mand-model, 1 time during time delay and 1.3 times during maintenance. In addition to that, an increase in word counts was recorded across phases. Dilan initiated communication using word on the average of 0.4 times during the baseline and improved to the average of 2.3 times during the modeling, 2.7 during the mand-model, 2.5 during the time delay, and 2.7 times during the maintenance. Dilan never used two-word utterances to initiate an interaction with his mother during the baseline and the modeling, but he started to use it during the mand-model, time delay and maintenance phases although in a low rate (0.2-0.3 times per session).

Dila and Yuna Results

Parent Behavior

Dila's data are presented in Figure 3, on the first three tiers. There was a total of 28 sessions that covered baseline, modeling, mand-model, time delay and maintenance.

Modeling. Dila implemented modeling strategy twice during seven baseline sessions at a moderate rate of 0.5 and 1.57 times per min (i.e., bar graphs). She also had a low implementation fidelity of 50% for those trials (i.e., line graphs). Therefore, the data were stable when the intervention was introduced. There was an immediate increase in the implementation fidelity of the target behavior when training and coaching were implemented (i.e., from 50% to 73%), although it did not reach the criterion level of mastery of 80% (i.e., shaded square symbol).

She increased her performance fidelity once the performance-based feedback was added to the intervention package (89.6%) that was separated by a vertical dotted line. There were changes in level and trend in therapeutic direction for the remaining four consecutive sessions above the criterion level of 80% (range= 91.7%-97.5%) during intervention (i.e., shaded circle symbols). This high rate of implementation fidelity was accompanied by a high rate of strategy implementation on an average of 1.8 times per min (range=1.15-2.12 times per min).

Dilla's data on implementation fidelity varied after the intervention ended were relatively stable (range=75%-100%). There was a decrease in her performance fidelity below the criterion level before they were more stable data for the rest of the phases (i.e., maintenance with other coaching and full maintenance). On the contrary, the average

strategy implementation rate was below the criterion level at 0.7 times per min (range= 0.2-1.9).

The dotted horizontal line marked the median value of the baseline level (i.e., at 50%). This line was drawn to calculate the percentage of data points exceeding the median of baseline level (PEM). Visual analysis of the data show that no single data point overlapped or was below the median level. This implies that the PEM value is 100%. Based on the PEM index suggested by Ma (2006), this value indicates that the intervention was "very effective" for teaching the parent the modeling strategy.

Mand-model. Baseline data for mand-model consisted of 12 data points. During baseline, Dila implemented the mand-model strategy with fidelity on the average of 47.3% ranged from 25% to 67% which was below the criterion level. The visual analysis shows stable level and trend before the intervention was implemented. There was an immediate effect recorded upon the introduction of training and coaching program to 71.2% (i.e., shaded square symbol) though it was still below the criterion level. Dila reached the criterion of mastery once performance-based feedback was added to the coaching package (85.7%) but then showed a decrease to 78.8%. She increased and maintained the high-fidelity rate for the three consecutive sessions at the range of 83.3% to 94.6% during the intervention that is shown by accelerating trend of the line graph in a therapeutic direction (i.e., shaded circle symbols). She maintained her performance at a high-fidelity rate during maintenance with coaching of other procedures and the full maintenance sessions on an average of 92% that ranged from 83.3% to 100%.

Furthermore, there was variability in the rate of strategy implementation. The rate of strategy implementation was stable during baseline at 0.64 (range=0.3-1.2) times per

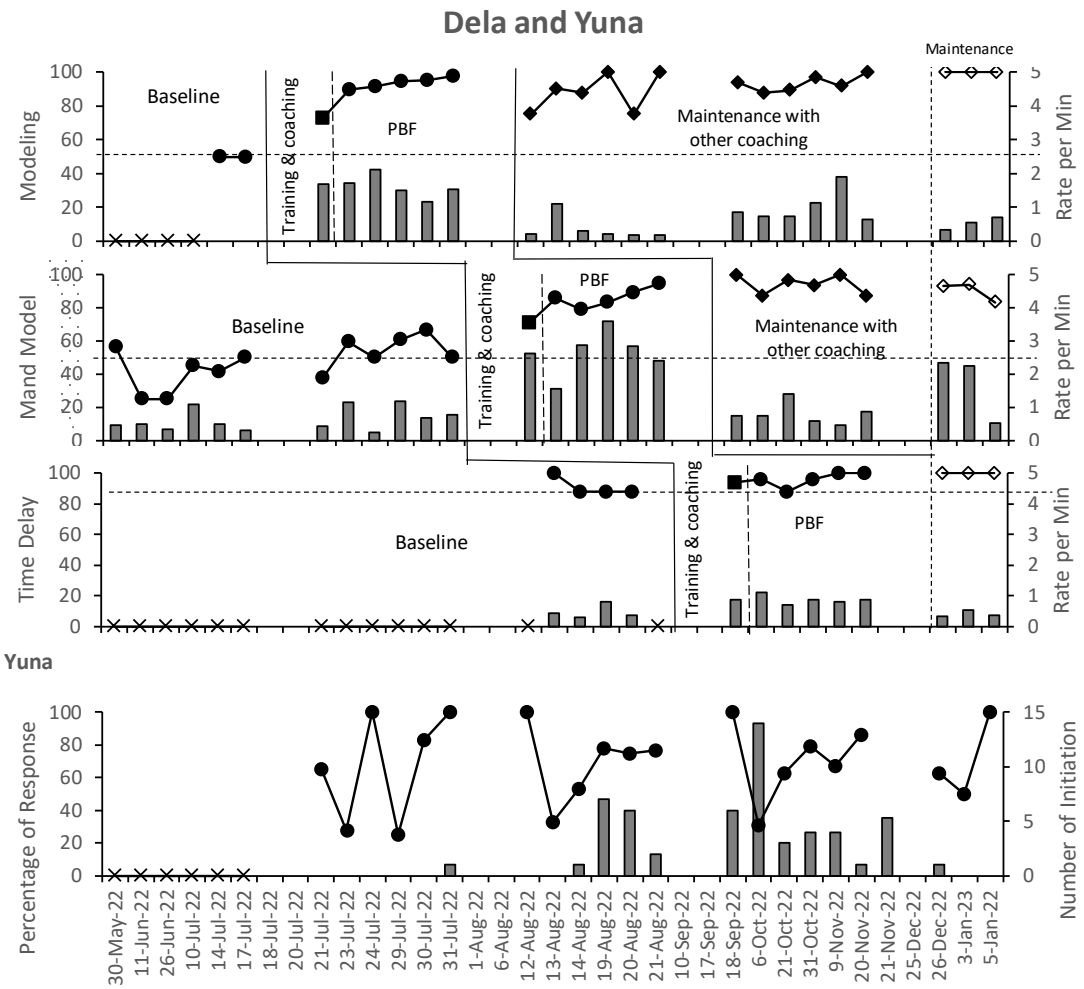

Figure 3 Dila and Yuna's performance

Note. Mother's and child's performance. In tier 1-3, line graphs represent the mother's rate of performance fidelity in percentage. Square symbols represent training and coaching with an absence of performance-based feedbacks. The vertical dotted line separates the intervention condition with and without performance-based feedback (PBF). Shaded circle symbols represent training and coaching with PBF. Shaded diamonds represent maintenance while other coaching was presented, open diamonds represent full maintenance sessions and "x" symbols represent sessions with no strategy was implemented. Shaded bars graphs reflect the rate of strategy implementation per minute. Dotted horizontal lines show median point of baseline sessions. The line graphs on the bottom show the percentage of opportunities (i.e., mother's strategy implementation) to which the child responded, and the bar graphs represent the number of times the child initiated a communication.

in. She implemented the strategy at a high rate during the intervention on the average of 2.65 (1.56-3.6) times per min. However, her performance rate decreased to an average of 0.8 times per min during maintenance with coaching of other procedure and showed an increase during full maintenance on an average of 1.7 times per min.

Similar to the training and coaching on modeling strategy, median value of baseline data for the mand-model was also determined (i.e., 50%). Visual analysis of the data shows that no single data point in the intervention phase overlapped or was below the horizontal dotted line. It indicates that the PEM value for the mand-model intervention is 100% that implies the current intervention package to be "very effective" to teach parent the strategy.

Time Delay. Differently than the other adult participants, Dila exhibited the last target behavior during baseline. There were 18 baseline data points for the last phase of the intervention package and Dila implemented the target strategy on the 14th to the 17th sessions (four consecutive sessions). She performed the strategy at a high-fidelity rate (range=87.5%-100%) before she stopped implementing it. That was when the intervention package was introduced. She reached the criterion during the baseline; therefore, the therapeutic trend during the intervention cannot be concluded as the result of the intervention. However, the strategy implementation rate during the baseline was low (range=0.3-0.8 times per min) whereas there was an increase in the strategy implementation rate during the intervention ranged from 0.7-1 times per min. During maintenance, Dila continued to perform the strategy at a high fidelity (100%) but the implementation rate decreased to the range of 0.33-0.53 times per min.

To discover the effectiveness of the intervention, the median line for the baseline was determined (i.e., 87.5%). Visual analysis shows that there was one out of six data points that overlapped with the baseline median, as a result, the PEM value was 83%. According to the PEM index suggested by Ma (2006), the outcome implies that the current intervention package has "moderate" intervention effect to teach the parent the time delay strategy.

Child Behavior

Yuna's target language topography was planned in the beginning of the study. Desirable verbal response and/or initiation were syllable (part of a word), approximation, word, and phrase. She was expected to learn words that she most likely would need in daily interaction. Dila added list of words for Yuna in the action plan for the training and coaching program.

Table 8

The Rate of Yuna's Communication Topography per Phase

Phase	Topography of the Target Behavior							
	Response				Initiation			
	Syllable	Approx	Word	Phrase	syllable	Approx	Word	Phrase
Baseline	-	-	-	-	-	-	-	-
Modeling	0.3	4.3	9.7	0.3	-	-	0.3	-
Mand-model	2.5	6.7	11	-	-	1.7	1.2	-
Time Delay	0.3	3.3	10.7	0.3	-	2	3	0.2
Maintenance	0.3	4.7	11.7	-	-	-	0.3	-

Response. The line graphs on the bottom tier of Figure 3 represent Yuna's responding behavior percentage contingent to parent's strategy implementation. Yuna did not exhibit the target behavior during the baseline condition. She started to respond to her mother's communication attempts during intervention. An immediate increase was

recorded in Yuna's target behavior of responding to her mother's implementation of the strategies. There was variability in the data across the three intervention and the maintenance conditions. During the modeling Yuna's average responding behavior was 66% that ranged from 25%-100%. During mand-model, the average responding was 69% that ranged from 33%-100%, during time delay was 71% that ranged from 31%-100%, and during the maintenance was 71% that ranged from 50%-100%.

Based on the target language topography (i.e., syllable, approximation, word, and phrase), Yuna's use of syllable during the mand-model was relatively frequent, on an average of 2.5 per session, whereas during the other phases the rate was less frequent, on an average of .3 per session (see Table 8). Yuna responded using word approximations at a high rate during all intervention and maintenance phases. The occurrence of word approximations during modeling was 4.3 per session, 6.7 during the mand-model, 3.3 during the time delay, and 4.7 during the maintenance. Yuna made progress on the use of words in response to Dila's communicative strategy implementation that started from the modeling condition through maintenance. She produced one-word utterances during the modeling condition on the average of 9.7 per session, on average of 11 during the mand-model, 10.7 during the time delay, and 11.7 during the maintenance conditions. However, Yuna's use of phrases was still low on the average of .3 per session during the modeling and the time delay. She did not produce any two-word-utterances during the mand-model and the maintenance.

Initiation. Similarly, Yuna did not exhibit any initiations or make any attempt to communicate during baseline and the first five sessions of the modeling condition (i.e., bar graphs). She initiated spontaneous communication for the first time when Dila was

learning the modeling strategy. Her initiation varied during the mand-model condition on average of 2.7 (range= 0-7) per session. The occurrence of initiating behavior corresponded with the implementation of the time delay strategy and was observed during the second through the fifth session of the mand-model intervention which served as the baseline condition for the time delay strategy intervention. When Dila implemented the time delay during the intervention, Yuna's target behavior increased to an average of 5.33 per session with the highest frequency 14 occurrences and the lowest one occurrence. However, during maintenance the behavior drastically decreased to an average of .3 times per session which indicates that Yuna exhibited the desired behavior only once during the three maintenance sessions.

Table 8 shows Yuna's initiating behaviors across target language topography. When she displayed spontaneous initiation during mand-model, she started it by producing word approximation on an average of 1.7 per sessions. Word approximations increased from baseline at the average of 0.8 times per session to 2.5 times during modeling, 1.3 times during mand-model, 1 time during time delay and 1.3 times during maintenance. Furthermore, an increase in word counts was recorded across phases. Yuna initiated communication using words on the average of 0.3 during modeling, 1.2 during mand-model, 3 during time delay, and .3 during maintenance. On the other hand, the frequency of using phrase was low during all phases. She only exhibited two-word utterances on an average of .2 times per session during the time delay condition.

In conclusion, the results show that asynchronous e-training and coaching program was effective in teaching the parents in the current study to implement the

naturalistic language teaching strategies namely modeling, mand-model, and time delay (See Table 9).

Table 9

The Average of Percentage of Data Points Exceeding the Median of Baseline Level (PEM)

	Rika	Tari	Dila	Average Value	Interpretation
Modeling	100	100	100	100	Very Effective
Mand-Model	100	100	100	100	Very Effective
Time Delay	100	100	83	94.33	Very Effective

Correlation of Parents Strategy Implementation and Children's Target Behavior

Investigating a correlation coefficient between two variables cannot determine functional relation between them. However, information about association between variables can serve as a preliminary finding that leads to a potential existence of a functional relation. Therefore, as the first step to quantitatively answer the second research question (i.e., If parents display improvements in fidelity of implementation and rate, will children improve their social communication skills? (See Table 10).

As expected, parents' implementation of communication strategies and children's communication behaviors were statistically significant. All variables associated with parent's implementation (e.g., variable rate of implementation fidelity for modeling = ROIFM), with few exceptions, were significantly correlated to children's communication initiation. The computation shows five significant correlations at α=0.1, those are (1) rate of implementation fidelity for modeling (ROIFM) and child's response, (2) rate of implementation fidelity for mand-model (ROIFMM) and child's initiation, (3) ROIFMM and child's response, (4) rate of strategy implementation for mand-model (ROSIMM) and

child's response, and (5) rate of strategy implementation for time delay (ROSITD) and child's initiation.

The strongest correlation between parent's behavior and child initiating behavior can be found in ROIFMM and ROSITD. Coefficient correlation (r) for ROIFMM is 0.294, or coefficient variation (r^2) of 0.0864. This number implies that 8.64% of variability of ROIFMM can be explained by variability in the initiation variable. Similarly, the value of coefficient variation (r^2) is 8.63% which means that 8.63% of variability of ROSITD can be explained by variability in variable initiation. On the other hand, the strongest correlation between parent behavior and child responding behavior was found in ROSIMM at coefficient correlation (r) of 0.5376 and the coefficient variation (r^2) of 0.289 that implies 28.9% of variability of ROSIMM can be explained by variability in variable response.

Table 10

Correlation between Parents' Implementation Strategy and Children Communication

Parent Implementation Strategy	Children Communication	
	Initiation	Respond
ROIFM	0.2477 ***	0.4473 ****
ROIFMM	0.294 ****	0.4257 ****
ROIFTD	-0.2623 *	-0.2094
ROSIM	0.1548 *	0.0504
ROSIMM	0.195 **	0.5376 ****
ROSITD	0.2937 ****	0.2536 ***

Note: **** singificant at α=0.01; *** significance at α=0.05; ** significant at α=0.1; * marginally significance at α=0.2

On the contrary, there was one variable of parent's behavior that was negatively correlated with variable initiation and response (i.e., ROIFTD). ROIFTD is negatively correlated with variable initiation at α=0.2 (marginally significance) with coefficient correlation (r) of -0.2623 for initiating behavior, and statistically insignificant for

responding behavior, with coefficient correlation (r) of -0.2094. In general, a study needs at least 30 observations to meet the central limit theorem assumption (Boddie, n.d.), whereas data available for ROIFTD was less than 30 (i.e., 29) therefore the result can be misleading.

Procedural Fidelity and Inter-observer Agreement

The results of both procedural fidelity and inter-observer agreements were high. See Table 4 for IOA per family per phase and Table 11 for procedural fidelity. Three aspects were coded for parents' behavior (i.e., time, strategy, fidelity). The type of strategy used by the parents had the highest score of IOA across the phases and families, whereas the fidelity had the lowest score of IOA across the phases and families (see Table 4).

Table 11

Procedural Fidelity

Training & Coaching Component	N (%)	Average Score (%)	Overall (%)
Video Module 1: Introduction	1 (100)	100	100
Video Module 2: Modeling	1 (100)	100	100
Video Module 3: Mand-model	1 (100)	100	100
Video Module 4: Time Delay	1 (100)	100	100
Written Feedback: Action Plan	9 (100)	100	100
Video Feedback: Strategy Implementation	9 (100)	100	100
Written Feedback: Strategy Implementation	27 (60)	100	100

The procedural fidelity was rated by the independent observer at 100% for the module content (see Appendix C for a complete description). The independent observer also examined all written feedback on parents' action plans, and all video-based feedback

on parents' strategy implementation for each strategy learned. After receiving video-based feedback, parents had written feedback for the rest of the intervention phase for each strategy. Three documents containing written feedback were selected randomly from each intervention phase of each family that there were 27 written feedback documents in total (i.e., 60%). All procedural fidelity was scored 100%.

Social Validity

To answer the third research question, (i.e., how was parents' acceptance toward the training and coaching procedures, the skills taught, and the cultural aspects of the strategies? Is there any correlation between parents' acceptance of the program and their performance?) parents completed social validity survey about the training and coaching package (see Appendix D). The coach also conducted a qualitative interview as a follow up of the survey over phone calls for about half an hour. During those interviews, parents mentioned their inclination toward strategies with which they were most comfortable.

All three mothers indicated high satisfaction with the goals, procedures, and outcomes of the asynchronous e-training and coaching program. They also believe that the strategies taught were culturally suitable for Indonesian families. Employing 5-likert scale questionnaires, each survey item was rated 1 to 5 which was classified in three categories to measure parents' acceptance toward the program: a) training and coaching procedures, b) parent' confidence, and c) strategies' appropriateness See Figure 4 for a listing of the items and responses' mean.

	Post-intervention Survey On a scale of 1 to 5 (1=low, 5=high) Please rate the following	Mean
	Training and coaching procedures	
1.	The module was clear and easy to understand and implement.	4.32
2.	The action plan was planned in a good phase	4.33

3.	I found the video feedback was very helpful to guide my next performance	4.33
4.	I am satisfied with the wait time to receive respond and feedback from the coach when I have questions or need suggestions	4.38
5.	The performance-based feedback helps me better implement the strategy in the future.	4.38
6.	I think it is more beneficial if the programs were taught synchronously, so I can get immediate response and feedback from the coach.	3.00
7.	I like the flexibility of asynchronous online training and coaching because I can better manage it with other activities and routines.	4.33
	Parents' confidence	
8.	Learning the strategy has made me more confident when interacting with my child	4.38
9.	I am confident that the strategy implementation will support my child's language learning	4.43
10.	I will continue using the strategies taught in this training and coaching program with my child	4.33
	Strategy Appropriateness	
11.	I will encourage my spouse to also learn and implement the strategies	4.33
12.	The strategy was flexible to be implemented in my family's daily routines	4.41
13.	I think more families need to receive this program	4.33
14.	The strategy is appropriate to be implemented for Indonesian families.	4.43

Figure 4 Social Validity Survey Results

One survey question asked the parents if they would like synchronous coaching instead of having it asynchronously, therefore they would receive immediate feedback and response from the coach. All parents rated that question neutrally or being not inclined to either coaching modality. However, when they rated another statement about the flexibility of the program related to their daily activities and routines, all parents were very satisfied with the current asynchronous training and coaching program (4.33 out of 5). One participant who was pregnant with her second child explicitly stated her satisfaction toward the program delivery method. She was content with the schedule flexibility.

The results for the appropriateness of the strategies show that parents rated the particular survey questions on an average of 4.38 out of 5. It indicates that the naturalistic strategies taught in the current program were relevant to the parent-child daily interactions that were easy to learn and implemented (see Figure 4). In addition to the survey result, although all participants were mothers, one of them clearly mentioned that the father also learned the strategy and became a secondary implementer when she was away from home. One family lived separately, and the child stayed with the father most of the time. Not only the father, but the grandmother was also captured implementing the modeling and mand-model strategies in one of the videos from this family.

Table 12

Descriptive Statistic of Variable Parents' Acceptance and Performance

Variable	Obs	Mean	Std. Dev.	Min	Max
PARENTS' ACCEPTANCE					
Clarity	44	4.31818	0.47116	4	5
Guidance	44	4.20455	0.6675	1	5
Flexibilty	44	4.38636	0.49254	4	5
Selfconfider	44	4.36364	0.48661	4	5
Support	44	4.40909	0.49735	4	5
Promptness	44	4.34091	0.4795	4	5
Applicable	44	4.43182	0.50106	4	5
PARENTS' PERFORMACE					
ROIF-M	69	84.4044	16.9232	38	100
ROIF-MM	78	73.4308	19.2668	25	100
ROIF-TD	29	95.531	6.69366	75	100
ROSI-M	79	0.88696	0.74982	0	3.14
ROSI-MM	79	1.72443	1.04137	0	4.3
ROSI-TD	79	0.26278	0.42012	0	2.3

Note:
ROIF = Rate of implementation fidelity (0-100%)
ROSI = Rate of strategy implementation per minutes
M = Modelling
MM = Mand modelling
TD = Time delay

The aim of this study was to determine the correlation between parent acceptance toward training and coaching and their performances. As mentioned above, the survey questionnaire captured three categories which classified into seven variables: (1) clarity, (2) guidance, (3) flexibility, (4) self-confident, (5) support, (6) promptness, and (7) applicability. Those variables were compared with parents' rate of implementation fidelity (ROIF) and rate of strategy implementation (ROSI) in the target strategies (i.e., modeling, mand-model, time delay).

Table 13.

Correlation between Parent's Acceptance and Performance

Parent's Acceptance	Parent's Performances					
	ROIFM (1)	ROIFMM (2)	ROIFTD (3)	ROSIM (4)	ROSIMM (5)	ROSITD (6)
Clarity	0.1836 *	-0.1901 *	-0.0590	0.2570 **	-0.3403 **	-0.1125
Guidance	0.0563	-0.0340	0.0945	0.0369	-0.1058	0.0283
Flexibilty	0.2240 *	-0.2281 *	0.2320 *	0.2417 **	-0.3693 **	0.2311
Selfconfidence	0.0517	-0.1779	0.2320	0.0537	-0.1151	0.1397 *
Support	0.0805	-0.0642	0.2681 **	0.0592	-0.1769	0.2290 *
Promptness	0.0134	-0.2732 **	0.0142	0.0796	-0.1408 *	0.0051
Applicable	0.0854	-0.1266	0.1307	0.1416	-0.2703 **	0.1025

Note: **** singificant at α=0.01; *** significance at α=0.05; ** significant at α=0.1; * marginally significance at α=0.2

Every time the participants submitted a video during intervention, especially the first four videos of each strategy, they completed a survey to collect data on the parents' acceptance using Likert Scale between 1 to 5. They were expected to watch the module video and read the performance-based feedback from earlier strategy implementation before redoing it. Therefore, they also required to answer an open-ended question of how many times they watched the module video before implementing the strategy. There was a total 44 observations on the parents' acceptance. The results show very high ratings on the parents' acceptance. They rated almost all variables between 4 and 5. The average acceptance are all above 4.2 out of 5 scale. This indicates that there was not much

variability in the values of the survey results. The data were gathered to find out if there was a correlation between parents' acceptance toward the program procedures and their performance that is depicted in the following table.

The correlation between parents' acceptance and their performances showed mixed results. Among the parents' acceptance variables only clarity and flexibility were statistically significantly correlated to almost all different measures of their performances. Variable guidance does not affect any variables of parents' performances. The self-confidence variable only affects one out of six variable parents' performance, i.e., ROSITD. Variable support affects two out of six variables parents' performances, i.e., ROFITD and ROSITD. Variable promptness affects two out of six parents' performance, i.e., ROIFMM and ROSIMM. Finally, variable applicable only affects one out of six variables of parents' performances, i.e., ROSIMM. This lack of significant correlation results can be due to the lack of variability in the survey results of parents' acceptance. Almost all of parents' opinion of the video varies between 4 and 5 out of 5 Likert Scale.

Unexpectedly, some results show negative significant correlation between variables (i.e., clarity and ROIFMM, clarity and ROSIMM, flexibility and ROIFMM, promptness and ROIFMM, promptness and ROSIMM, applicability and ROSIMM). Interpretations from these results can be perversely counterintuitive.

Chapter IV: Discussion

Internet-based training and coaching can be effective for parents who are from diverse backgrounds. This study adopted coding manual from Meadan et al. (2016) to evaluate target behaviors of adult and child participants. The same study was also replicated by Akamoglu and Meadan (2019) and Daczewitz et al. (2020), but those studies were implemented in English-speaking countries. The similar findings of the current training and coaching package provided support for the effectiveness of delivering systematic internet-based training and coaching to Indonesian parents who do not speak English and are from different socio-cultural backgrounds.

Therefore, the present study extends previous research in two ways. First, it provides support for the effectiveness of delivering parent training and coaching from a distance instead of in person. Second, it offers additional support for effective parent-implemented intervention which particularly targeted naturalistic language strategies. The parents' implementation of the strategies also corresponded with therapeutic changes in their children's communication skills. In addition to that, the current study eliminated real-time communication over video-based conference software such as Zoom, Skype, and Google Meet. The absence of some important training and coaching components (i.e., direct observation, direct guidance and feedback, a real-time discussion) did not negatively affect the intervention results.

This section covers discussion about a) major findings, b) study limitations, c) future direction and implications of the current study, and d) conclusion.

Major Findings

Asynchronous E-Training and Coaching Program

The current study examined the effectiveness of asynchronous e-training and coaching on the parents' use of language strategies. This delivery method not only mitigated some barriers of traditional telepractice such as unreliable internet connection in some areas, and complications with scheduling synchronous video conference, but also it can be a promising training and coaching method to serve families from low-income community or even countries. The materials and technology used in the current training and coaching program were relatively cheap and user friendly. In addition, the intervention program was conducted in children's natural environments (e.g., home, park, school) which is identified as a recommended practice (Division for Early Childhood Recommended Practice [DEC RPs], 2014). From the videos sent by the participants, all of them were observed implementing the strategies in public places (e.g., a park, a daycare, public playground) that might be challenging if the interaction should be captured by the coach over live video conferencing.

Beside the program procedures and delivery methods, another concern that arises when supporting parent-implemented interventions is ensuring that the teaching and coaching focuses on evidence-based instructional strategies that can be embedded in daily activities and routines (Meadan et al., 2016). Therefore, naturalistic language strategies were selected when creating the current training and coaching package. Naturalistic teaching strategies are composed to closely portray natural communication exchanges by superimposing behavioral fundamentals onto typical interactions between adults and children (Hart, 1985). Therefore, parents may have already formed consistent patterns of interaction with their younger ones. However, coaching is oftentimes still required to assist the parents in removing engrained procedures and replacing them with the specific steps

depicted in evidence-based practices (Meadan et al., 2016). The findings of this study are consistent with those of previous research that support parent training and coaching as effective methods to enhance children's communication (Akamoglu & Meadan, 2019; Daczewitz et al., 2020; Guðmundsdóttir et al., 2019) despite some changes in the training and coaching delivery method.

The Effectiveness of Training and Coaching Program

The first objective of the study was to measure fidelity and the rate of strategy implementation of the intervention, which in the end would determine the effectiveness of the training and coaching package. Performance on the strategies learned was investigated using multiple baseline design across three mother-child dyads that is reflected in the first research question: Is there a functional relation between an asynchronous text-based parent training and coaching program to teach naturalistic teaching strategies and parents' fidelity of implementation and rate of the newly acquired strategies? Although there was variability in the data within and across dyads, the result presented in Figures 1-3 reveal, with few exceptions, increases in both the rate and quality of strategy use during coaching. Performance scores for all three mothers were stable between the coaching and maintenance phases; however, the performance rate for the modeling was constantly low during the maintenance phase for all participants. It may be natural to have stable performance during intervention because parents focused on the strategy learned. On the other hand, during maintenance, when a typical interaction was likely to occur, parents should be able to select among the strategies and use each one they comfortable with or when appropriate (Daczewitz et al., 2020).

The goal of the intervention was to increase the fidelity with which the parent used the strategy and to maintain that quality across numerous applications of the strategy. However, parents' preferences of strategy use also needs to be considered. All parents in the current study reported their inclination to mand-model strategy. Meaning, when they were not applying another strategy (i.e., modeling or time delay), they focused on implementing one type of mand model strategy (i.e., asking question, manding, providing choices) to teach their child the target language. This finding corroborates those of Meadan et al (2014 & 2016), Daczewitz et al. (2020) that mand-model was the most frequently used teaching strategy during the baseline and maintenance phases, with lower quality mand-model occurring in baseline for all parents.

All parents exhibited the modeling and the mand-model strategies during baseline with relatively low fidelity. The main obstacles for the low-quality level were building joint attention and providing wait time, especially for Dila-Yuna dyad and Rika-Fariz dyad. They often failed to build joint attention and provide wait time for their child to respond, and when the child responded to the models, mands or questions correctly, they did not provide descriptive praise and/or expand the child utterances, nor did they model a correct response for an incorrect one. These findings are similar with previous studies discussing about joint-attention skills in children with autism (Charman, 2003; Toth et al., 2006). This pivotal skill, together with imitation and toy play, have been associated with the development of language and communication skills both in typically developing children and children with autism (Toth et al., 2006). Therefore, parents need to ensure the presence of environmental arrangement and early joint attention behaviors (e.g., response to name),

because it significantly increases the likelihood of children developing phrase speech overtime (Siller & Sigman, 2008).

The strategies of modeling, mand-model, and time delay require the parents to establish joint attention and wait for a response, repeating the attempt if the child does not response (Daczewitz et al., 2020). Among the three parents, Dila's implementation fidelity data during the baseline was the lowest. It may relate to the fact that Dila often struggled to engage in any kind of interaction with Yuna who was diagnosed with low-functioning ASD. She often asked a question to her child without establishing joint attention. She attempted to implement the mand-model in two different baseline sessions but failed to ensure that Yuna attended to her communication attempt before asking her a question. As a result, her average score for the strategy implementation was only 25% for consistently earning fidelity 1 (see Appendix B) in these two sessions. When she learned the modeling strategy, she maintained joint attention but, on some occasions, failed to provide enough wait time for Yuna to respond. After watching a video that contained feedback on her performance, she maintained the minimum 3 s-wait time for most of the strategy implementation during the intervention. Providing wait time for a child to respond is one of common elements of teaching sequences (CETS) suggested by Ruble et.al. (2020). They added that allowing children with ASD, like Yuna, to process an initial and/or a follow-up command, prompt, and/or cue for at least 3 s (Ruble et al., 2020) is particularly necessary considering receptive language problem commonly encountered by children in the spectrum (Ellis Weismer et al., 2010). These results suggested that providing training with subsequent coaching is effective in increasing parents' fidelity of naturalistic strategies and

rate of strategy implementation which support the previous studies in the same field (Akamoglu & Meadan, 2019; Daczewitz et al., 2020; Meadan et al., 2016).

Ratih, on the other hand, experienced the same issue several times during the baseline phase. Ratih was a talkative person when it came to interacting with Dilan. She often dominated the interaction by using auditory bombardment, a language teaching strategy that includes repeating words related to the child's interest without eliciting language in return or allowing wait time (Hodson & Paden, 1983), that was considered as low-quality models and mand-models (Daczewitz et al., 2020). She displayed mixed performance relating to the implementation of joint attention and wait time. Similarly, Rika was observed having difficulty building joint attention when interacted with Fariz during baseline and when she could engage in two-way communication with her son, she dominated the interaction, and did not provide wait time for Fariz to respond.

Modeling was the least favorite strategy whereas the mand-model was more popular for all participants in this study based on their performance. This finding corroborates those of Daczewitz et. al. (2020). It was interesting to observe that although Dila and Rika were aware of echolalia behavior exhibited by their child, they still often delivered a mand (e.g., "say milk") instead of modeling the language by simply saying "milk". Dila admitted that she was more certain to receive a response from Yuna if she included a prompt, but then immediately regretted it when Yuna repeated the prompt instead of the target word. On the other hand, Ratih stated that she liked the variation of the strategy that enabled her to select a particular type of the mand-model (i.e., providing choices, delivering a mand, asking a question), she added that these variations made the interaction more appealing.

The time delay strategy was consistently absent during the baseline phase except for Dila. She did not seem to realize the strategy, nor had a preliminary knowledge about it. She exhibited the behavior as a series of the mand-model implementation. She paused delivering the mand and held the desired item while waiting for Yuna to initiate the target word. All parents could master the strategy from the training module alone. The simplicity of the strategy might be the reason for this mastery. In addition, parents' strategy implementation was required for the children to use utterances that were in their repertoire to obtain a desired item or activity. This natural reinforcement often prevented the parents to wait for an initiation from their child more than 5 s, as a minimum wait time for time delay strategy recommended by researchers from previous studies (Akamoglu & Meadan, 2018, 2019; Meadan et al., 2014; Meadan et al., 2016) However, the strategy implementation rate was invariably low (average $\leq$1) for all participants across all intervention phases.

Finally, visual analysis shows that there was a functional relation between training and coaching parents to implement naturalistic language strategies and increases in fidelity of implementation of the strategies. All adult participants experienced immediate increase in all strategy implementation fidelity upon the introduction of systematic asynchronous training and coaching package. However, one parent did not reach the criterion level during the modeling before receiving performance-based feedback. Correspondingly, all parents did not reach criterion level for the mand-model intervention before they reviewed their performance through performance-based feedback. A possible reason for this result might be the complexity of the strategy that cannot be learned independently from the module alone. The modeling strategy was more straightforward compared with the mand-model

strategy although it was the first strategy introduced. In the mand-model strategy the parents selected one of the three modes, those are providing choices, asking a question, and delivering a mand. These options could have been the reason for any confusion when first learning the strategy in a way that which type of mand-model should be implemented in certain situations.

In conclusion, despite the variability in data collection for intervention phases across strategy and family, the intervention package was shown to be very effective to teach the parents the target strategies in the current study. Table 8 depicts the average PEM values for each strategy intervention package.

The Effects of Parents' Strategy Implementation on Child's Social-Communication Skills

Improvements in children's social communication after the parents receiving the intervention were also examined to answer the second research question: Is there a functional relation between parents' implementation of the newly acquired strategies and their children's social communication skills? Results also indicated a positive change in children's social communication after providing their parents with training and coaching sessions.

The improvements were captured by calculating the percentage of children's response upon parents' strategy implementation and the number of initiations during parent-child interactions. In addition, the children's progress on language topography (i.e., verbalization: syllables, approximation, words, and phrases) were also coded. All the child participants showed increases in the target verbal language that is presented separately in Table 6, 7, and 8.

However, the data presented were not sensitive enough to differentiate the target language from those which were already in the children's repertoires. For example, Dilan's graphs show high percentages of responses during baseline. A misleading interpretation is possibly concluded from the graphs that he performed better during the baseline compared to the intervention and maintenance phases only because his mother asked him to say and/or imitate model of words that he had already mastered. Parents' choices to not include other non-verbal topographies (e.g., gesture, facial expression) resulted in underrating the children's ability to respond to parents' communication attempts. For example, Yuna and Fariz were observed delivering response and initiation by signing, changing facial expressions, and gesturing, especially during baseline sessions. Gestures and facial expressions are also important for social communication.

Social Validity and Correlation between Parents' Acceptance and Their Performance

Parents completed the 5-likert-type survey to answer the last research question: How was parents' acceptance toward the training and coaching procedures, the skills taught, and the cultural aspects of the strategies? Is there any correlation between parents' acceptance of the program and their performance? In other words, the third research question of the study focused on its social validity.

By word definition, acceptance means the quality or state of being accepted or acceptable (Merriam-Webster, 2023). Parents' acceptance toward the training and coaching was measured using 5-likert scale questionnaires (see Figure 4) and post-program interviews. The parents' acceptance of the training and coaching package was high at the range of 4.2 out of 5 scale. Analysis of social validity from the surveys and the interviews revealed that all participants indicated satisfaction with the asynchronous e-training and

coaching program, displaying that they believed the program a) improved their self-confidence and teaching skills, b) improved their children communication skills (i.e., communication exchange, language topography), and c) affected family members' use of target strategies.

However, the results show that there is no correlation, with few exceptions, between these two variables (see Table 8). There are potential reasons that might be responsible for this outcome. First, there might be opinion bias from the respondents to the extreme, either too high or low. For example, all parents were being "nice" and rated the surveys with a 4 or 5. All participants were asked to add their name whenever completing a survey which could be the cause of this bias. People tend to provide favorable opinions when their identity is being exposed. Moreover, the person who delivered the program was the same person who conducted pre-training and post-training interview which made it very possible that their personal feeling affected their judgement toward the program.

Second, there was often a time lapse between the training and coaching and the time when the parents rated the program package. Although all participants were aware that they were expected to complete a survey right after they submitted a video of strategy implementation, but in the reality, the coach had to resend the survey link to them which sometimes took more than 12 h because of the time difference. The delay on the survey completion might result in parents' confusion about the previous training and coaching experience they had. For example, there was a question asking the participants how many times they had watched the video module before practicing the strategy. Parents could have forgotten about the number of times they watched the video module.

Third, there might be overlap bias in that the parents might consider all the strategies in the program were equally complex and delivered similarly. For example, when they were learning the second strategy (i.e., mand-model), and they had a good impression of the modeling training and coaching phases (i.e., video module, video samples, wait time for feedback, performance-based feedback) they assumed that the procedures for the second strategy would be the same regardless the wait time for receiving feedback, for example, might slightly longer than they had when learning the modeling strategy. Therefore, they rated all the intervention phases in the same way that resulted in a very low variability on the data.

Limitation

The current study, like any other study, has limitations. First, while the content of the training modules explicitly taught the parents to increase the fidelity of target strategy implementation, the training failed to emphasize the importance of adequate dosage of exposure to the target strategies. Therefore, the implementation rates for modeling and time delay were often below the criterion level of once per min, whereas any increase in parents' implementation fidelity might be the result of the intervention. Secondly, the coding system is not sensitive to capture the adult participants' use of mand-model types, whether it was providing choices, asking a question, or delivering a mand. In addition to that, the coding system did not include the type of question parents asked (e.g., open-ended questions or a yes/no question). This information can be useful to better assess the effectiveness of the strategy implementation on the child's communication behavior. As an illustration, Ratih often asked yes/no questions to Dilan which required him to elicit a one-syllable word of "yes" or in Bahasa it is "ya". The coding system rates the child's verbalization as a response

using a one-word utterance for this trial. Therefore, this results in overestimating the child's language skills, especially because the Bahasa language consists of at least two syllables, for example "mobil /mow-beel/" for "car", "tidur /tee-door/" for "sleep", and "tambah /tum-buh/" for "more".

Related to a limitation mentioned above, another insensitivity of the coding system is related to syllable segmentation for child's response and initiation, especially for a more complex language like Bahasa Indonesia. All child participants in this study were observed to communicate using single-word utterances and few word combinations or a phrase. None of the children could form a complete sentence yet. However, this finding could lead to an incorrect conclusion if language complexity was not considered. Many words in Bahasa were formed in a more complex syllables than English. For example, if a child from an English-speaking country could say "I want more" (3 syllables= I-want-more), whereas to convey the same need, a child from Indonesia would need to say "Saya mau tambah" that consist of 6 syllables (i.e., sa-ya ma-u tam-bah).

The next limitation was the absence of a formal assessment on the child participant's language development prior to the study and/or after completing the study for decision making, planning, and progress monitoring. An authentic language assessment for early childhood was still not available in Indonesia. Following curriculum from the government, teachers were expected to compose evaluation instruments for their students to monitor their progress. They usually worked in workshops held by the local education department. Initially, the coach planned to adopt a valid and reliable screening tool available in the U.S. such as The Battelle Developmental inventory 3rd Edition (BDI-3). The Ages and Stages Questionnaires (ASQ-3) (Troude et al., 2011), or an authentic

language assessment such as social-communication areas of Assessment, Evaluation, and Programming System, 3rd Edition (AEPS®) (Gao, 2008) but due to lack of funding and time constrain of the current study, a reliable screening and/or assessment which is sensitive to the nature of Bahasa characteristics, could not be obtained.

The last limitation relates to the procedures used for distributing and receiving the surveys from the parents. The surveys should have been distributed and received by another party than the coach. Parents should have been informed from the beginning that their identity and responses would be kept confidential. This might have minimized opinion bias from the respondents because they would not feel any burden with the coach by providing favorable response toward the training and coaching program.

Implication for Practice

Asynchronous e-training and coaching program in this study was effective to teach the parents the naturalistic language strategies. This training and coaching delivery method should be considered when providing services for families with some challenges related to access to technology, internet connection, and time availability. In addition, early intervention providers should focus on teaching parents the naturalistic language strategies to encourage language development in their children with substantial delays because parents usually have established consistent foundation from the everyday interactions with their child.

In addition to that, the asynchronous e-training and coaching also can facilitate a new trainer and/or coach to practice the skills required in such program, such as preparing training materials, and providing guidance and performance-based feedbacks. Different with traditional telepractice that providing direct observations and direct performance-

based feedback through tele-conference, asynchronous e-coaching could reduce the risk of missing opportunities to provide feedback because of interactions' fast pace. Delayed feedback enabled new coaches to rewatch and review; the coach can rewatch the interactions to carefully capture target behaviors and review the feedback before sending them to participants.

Conclusion

The findings of the current study contribute to the evidence base supporting parent-training and coaching interventions that improve children's communication skills. The combination of parent-implemented intervention and naturalistic communication strategies in this study demonstrates strong effectiveness on both parents' performance and child communication. In addition, the simplification of traditional telepractice by using widely available devices such as smartphones that require moderate internet speed to access user-friendly software and application, was a very effective modality of a service delivery. This finding has opened wider opportunities for low to moderate-income families to receive EI regardless of their location of residency.

Appendices

Appendix A. Operational Definitions

Codes and Rules

The codes and rules in this manual are meant to help analyze both the social context for communication and the communication itself between parent and child. You will use the codes,
definitions, and rules to code videos of parent-child interaction. This section describes the codes to use, how to use them, and when to use them. Some of the groups have several rules for deciding how to code complex interactions. Remember, it is important to keep the context of the interaction in mind while coding.

1. Parent use of Naturalistic Teaching Strategy

a. Code to indicate the type of teaching strategy Modeling, Mand-Model, or Time Delay (See
pages 5-6 for definitions of these strategies).
b. Code, on a new line, one strategy each time the parent uses a naturalistic teaching strategy.
c. If the parent is responding to a child initiation with a naturalistic teaching strategy, code the initiation on one line, and begin a new line to record the strategy use and the remainder of the interaction. If the child initiates within 3 second, and mom respond to the child initiation, do not
code either child initiation (less than 3 sec rule) or code mom's respond as a
strategy
d. The parent use Time Delay and child respond to the strategy. If mom verbally feedback
with an extension of the child response, code it as another strategy use (e.g., Time Delay bubble – child "bubble" – mom "More bubble please [verbal feedback for TD] code the second one as Modeling)
e. If the parent uses a naturalistic teaching strategy, and within one second repeats it or uses
another, code these as one naturalistic teaching strategy use:
i. If one of these teaching strategies was a mand-model, code as a mand-model.
ii. Time delay does not fit into this rule. Because the procedure of establishing joint attention
and looking expectantly for 5-15 seconds without giving explicit
instruction, time delay cannot be used within 1 second of a mand/model.
f. If the parent uses a naturalistic teaching strategy and uses another naturalistic teaching strategy between 1-2 seconds after the end of the first strategy, code the first use as one strategy with a fidelity of 1 or 2, and begin a new line to record the second strategy use and
the remainder of the interaction.
g. If the parent repeats a naturalistic teaching strategy because someone (the child or a third
party) was talking, do not code the first use and code the repeated use.

h. If mom is just describing the situation what she or the child is doing, do not code as strategy use (e.g., Child is putting ball into the container and mom says “ball in”)
i. If mom is commenting the situation, do not code as strategy use (e.g., give playdough and
say “it is orange and yellow,” reading words inside a book for child)
j. If mom asks to do something (i.e., direction), do not code as a mand-model or model (e.g.,
“hit the ball,” “open this bottle” “turn the page”)
k. If mom used Mand-Model with the Yes/No question format, consider mom’s follow-up
feedback of the strategy use (i.e., feedback or another strategy use). If mom did not give proper feedback (e.g., yes, no, or use another strategy related to the yes/no question), give Fidelity 3.
l. If the child responds to mom’s strategy with a different topic using form of communication.
(e.g., verbal respond, signing), and mom respond to the topic, consider the mom response as an appropriate verbal feedback.
m. The child is pointing object/person and mom is modeling social interaction (e.g., Hi poppy!) with the object/person, code it as “modeling.” To get Fidelity 4, mom needs to give a feedback related to the object/person (e.g., great job saying hi to poppy) or use modeling (e.g., hi poppy) or Mand-Model (e.g., say “hi poppy”) again. If the child points to another object/person and mom modeled another social interaction about that (e.g., Hi Sam), code child response as “yes” and “gesture” for previous strategy use but mom gets Fidelity 3.
n. If the parent and/or child are out of camera frame when a strategy is used, do not code.

2. Fidelity of Naturalistic Teaching Strategy Use

a. Code fidelity of naturalistic teaching strategy use as 1, 2, 3, or 4.
b. Code fidelity each time the parent uses a naturalistic teaching strategy.

3. Child’s Communication Behavior

a. Code child’s communication behavior as initiation, response, or none, each time the parent
uses a naturalistic strategy. b. Code child’s communication behavior:
i. Code the child’s communication behavior as a response when:
1. the parent has used a mand-model and the child communicates in return.
2. the parent has used modeling and the child communicates in return.
3. Remember to allow the child time to respond to a strategy use.
ii. Code the child’s communication behavior as none when:
1. the parent has used a mand-model and the child does not communicate in return and does not change his behavior in response to the parent communication act.
2. the parent has used modeling and the child does not communicate in return and does not change his behavior in response to the parent communication act.
iii. Code the child’s communication behavior as initiation when:
1. The parent has used a time delay and the child communicates in return.
2. Three seconds have passed from the last communication act between the

parent and the child and the child communicates with the parent.

Operational Definitions

1. **Parent use of Naturalistic Teaching Strategy–** Parents use one of three types of naturalistic teaching strategies (i.e., modeling, mand-model, and time delay). See *Training and Coaching Manual* for more specific information about each strategy.

a. **Modeling**: Modeling is a teaching strategy in which the parent uses demonstrations to teach the child new words, phrases, signs, or gestures. The first step in modeling is to establish joint attention by focusing attention on the child or the child's specific interest. Next, the parent presents a model that is related to the child's interest. If the child responds correctly to the model by imitating, the parent gives the child immediate positive feedback.

i. Examples:

1. The parent says, "Big ball!" (Parent expects the child to imitate.)
2. The parent says, "More, please." (Parent expects the child to imitate.)
3. The parent says, "Yes." (Parent expects the child to imitate.)
4. The parent says, "No." (Parent expects the child to imitate.)
5. The parent says, "All done." (Parent expects the child to imitate.)

ii. Nonexamples:

1. The parent asks, "What do you have?" (Code as a mand-model).
2. The parent asks, "Are you all done?" (Code as a mand-model).
3. The parent says, "Say 'more please.'" (Code as a mand-model).

b. **Mand-mode**l: The mand-model strategy is very similar to the modeling strategy. Mandmodel differs from modeling by including a verbal prompt in the form of a question (e.g., "What do you want?"), a choice (e.g., "Do you want an apple or a banana?"), or a mand (e.g., "Tell me what you want" or "Say 'more please'"). The first step in the mand-model strategy is to establish joint attention by focusing attention on the child or the child's specific interest. Next, the parents say a mand that is related to the child's interest. If the child responds correctly, the parent gives the child immediate positive feedback.

i. Examples:

1. The parent asks, "Are you hungry?"
2. The parent asks, "Do you want an apple or a banana?"
3. The parent asks, "Do you want to play ball?"
4. The parent says, "Say 'more please.'"
5. The child points to an object (child initiates) and the parent asks, "What do you want?"
6. The parent says, "1, 2, ___." (The parent wants the child to say 3)
7. When reading a book, the parent points to pictures and asks, "What's this?" or "How about this?"

ii. Nonexamples:

1. The parent says, "Ball." (Parent expects the child to imitate. Code as modeling).

2. The parent says, “Yes.” (Parent expects child to imitate. Code as modeling).
3. The parent says, “No.” (Parent expects child to imitate. Code as modeling).
4. The parent says, “More.” (Parent expects child to imitate. Code as modeling).

5. The parent says, “All done.” (Parent expects child to imitate. Code as modeling).

c. **Time Delay**: Time delay is a strategy that encourages children to initiate communication within a routine or regular activity where the child understands the expectations based on past patterns. This strategy is especially helpful in encouraging children to ask for help, to ask for food or toys, or to ask for permission. The first step in time delay is to establish joint attention. Once the parent has established joint attention, he or she looks expectantly at the child, and waits 5 to 15 seconds to see if the child will request help or the object she/he wants. If the child requests correctly, the parent gives the child immediate positive feedback.

i. Examples:

1. The child walks to the table when it is time to eat. She always needs help getting into the chair. The parent looks at the child expectantly for 5 to 15 seconds until the child says, “Up, please!”
2. The parent and child are taking turns blowing bubbles. The parent holds the bubble wand and looks at the child expectantly until the child says, “My turn!”

ii. Nonexamples:

1. The child walks to the table when it is time to eat. He always needs help getting into the chair. The parent looks expectantly at the child and says, “Tell me what you need?” (Code as mand-model).
2. The parent and the child are painting and focusing on separate papers. The child initiates by saying “pink.” (Code as initiation, with no teaching strategy use).

Parent use of Naturalistic Teaching Strategy– Parents use one of three types of naturalistic teaching strategies (i.e., modeling, mand-model, and time delay). See *Training and Coaching Manual* for more specific information about each strategy.

a. **Modeling**: Modeling is a teaching strategy in which the parent uses demonstrations to teach the child new words, phrases, signs, or gestures. The first step in modeling is to establish joint attention by focusing attention on the child or the child’s specific interest. Next, the parent presents a model that is related to the child’s interest. If the child responds correctly to the model by imitating, the parent gives the child immediate positive feedback.

i. Examples:

1. The parent says, “Big ball!” (Parent expects the child to imitate.)
2. The parent says, “More, please.” (Parent expects the child to imitate.)
3. The parent says, “Yes.” (Parent expects the child to imitate.)
4. The parent says, “No.” (Parent expects the child to imitate.)
5. The parent says, “All done.” (Parent expects the child to imitate.)

ii. Nonexamples:

1. The parent asks, “What do you have?” (Code as a mand-model).
2. The parent asks, “Are you all done?” (Code as a mand-model).
3. The parent says, “Say ‘more please.’” (Code as a mand-model).

b. **Mand-mode**l: The mand-model strategy is very similar to the modeling strategy. Mand-model
differs from modeling by including a verbal prompt in the form of a question (e.g., “What do you want?”), a choice (e.g., “Do you want an apple or a banana?”), or a mand (e.g., “Tell me what you want” or “Say ‘more please’”). The first step in the mand-model strategy is to establish joint attention by focusing attention on the child or the child’s specific interest. Next, the parents say a mand that is related to the child’s interest. If the child responds correctly, the parent gives the child immediate positive feedback.

i. Examples:

1. The parent asks, “Are you hungry?”
2. The parent asks, “Do you want an apple or a banana?”
3. The parent asks, “Do you want to play ball?”
4. The parent says, “Say ‘more please.’”
5. The child points to an object (child initiates) and the parent asks, “What do you want?”
6. The parent says, “1, 2, ___.” (The parent wants the child to say 3)
7. When reading a book, the parent points to pictures and asks, “What’s this?” or “How about this?”

ii. Nonexamples:

1. The parent says, “Ball.” (Parent expects the child to imitate. Code as
1. modeling).
2. The parent says, “Yes.” (Parent expects child to imitate. Code as
3. modeling).
4. The parent says, “No.” (Parent expects child to imitate. Code as modeling).
5. The parent says, “More.” (Parent expects child to imitate. Code as
6. modeling).
7. 5. The parent says, “All done.” (Parent expects child to imitate. Code as
8. modeling).

c. **Time Delay**: Time delay is a strategy that encourages children to initiate communication
within a routine or regular activity where the child understands the expectations based on past patterns. This strategy is especially helpful in encouraging children to ask for help, to ask for food or toys, or to ask for permission. The first step in time delay is to establish joint attention. Once the parent has established joint attention, he or she looks expectantly at the child, and waits 5 to 15 seconds to see if the child will request help or the object she/he wants. If the child requests correctly, the parent gives the child immediate positive

feedback.

i. Examples:

1. The child walks to the table when it is time to eat. She always needs help getting into the chair. The parent looks at the child expectantly for 5 to 15 seconds until the child says, "Up, please!"
2. The parent and child are taking turns blowing bubbles. The parent holds the bubble wand and looks at the child expectantly until the child says, "My turn!"

ii. Nonexamples:

1. The child walks to the table when it is time to eat. He always needs help getting into the chair. The parent looks expectantly at the child and says, "Tell me what you need?" (Code as mand-model).
2. The parent and the child are painting and focusing on separate papers. The child initiates by saying "pink." (Code as initiation, with no teaching strategy use).

Child's Communication Behavior– The child's communication behavior can include responding to the parent's communication act, initiating a new communication exchange, or not
responding to the parent's communication act (i.e., none).

a. **Initiation:** When a child initiates a communication act, he/she uses a communicative behavior to begin a communication exchange with the parent. Many communication behaviors may look like initiation, but to be coded as initiation, the child's communication
act must either be within the use of a time delay strategy by the parent or begin 3 seconds or more after the end of the last communicative act by anyone else in the room, including the child.

i. Examples:

1. After 5 seconds of no communication exchanges between the parent and the child, the child points to a snack and says "Mom."
2. After playing for 6 seconds, a child holds up a picture card of a doll and says, "Baby."
3. Within the use of a time delay strategy by the parent, the child says, "More please."
4. When finished cleaning the play area, the child says, "All done."
5. While the parent is singing "The Wheels of the Bus" and does not expect a response from the child, the child looks at the parent and says "Milk."

ii. Nonexamples:

1. The parent says, "Say more," and the child responds after 1-2 seconds with
1. "Please". (Code the child's "Please" as a response,).
2. The parent says, "Say more," and the child looks at the parent for 6 seconds
3. and then says, "More." (Code as response).

b. **Response:** When a child responds, he/she uses a communication behavior to communicate
due to the parent's use of a teaching strategy.

Examples:

1. The parent asks, “Do you want to play ball?” and the child says, “Yes” or
1. nods or puts his hands up to catch the ball.
2. The parent asks if the child wants more to eat and, within less than 3
3. seconds, the child requests to have her shirt sleeve pulled up.
4. The parent has established joint attention and says, “Put the puzzle piece
5. in,” and the child gets up and walks away to choose another activity.

ii. Nonexamples:

1. The parent uses a strategy and the child begins crying. (Code the child’s
1. communication behavior as none).
2. The parent says “I am going to put this puzzle piece here” and the child
3. says, “No.” (This is not a response because the parent’s communication was
4. not a teaching strategy).

c. **None:** When a child’s communication behavior is none, the child is not responding to the
parent’s use of a teaching strategy, although joint attention was established.

i. Examples:

1. The parent has established joint attention and asks, “Do you want to play ball?” and the child only continues to look at the parent.
   The parent has established joint attention and says, “Say more,” and the child looks around the room.
   ii. Nonexamples:
1. The parent has established joint attention and asks, “Do you want more bubbles?” and the child makes an audible utterance with no intelligible words, but the utterance has meaningful intonation. (Code as response).
2. The parent has established joint attention and says, “Say more,” and the child says, “No.” (Code as response).
3. The parent has established joint attention and says, “Put the puzzle piece in,” and the child gets up and walks away. (Code as response)

4. **Topography of Child’s Response/Initiation** – Describes how the child responded or
initiated. If the child just ignores the parent and continues to play, do not code. If child responded
or initiated with two modes in the same communication act, code the dominant one.

a. **Complex Speech/sign (sentences)** – Child responses or initiates within a complete sentence

1. The parent asks, “Do you want to play ball?” and the child says, “Yes” or nods or puts his hands up to catch the ball.
2. The parent asks if the child wants more to eat and, within less than 3 seconds, the child requests to have her shirt sleeve pulled up.
3. The parent has established joint attention and says, “Put the puzzle piece in,” and the child gets up and walks away to choose another activity.

ii. Nonexamples:

1. The parent uses a strategy and the child begins crying. (Code the child’s communication behavior as none).
2. The parent says “I am going to put this puzzle piece here” and the child says, “No.” (This is not a response because the parent’s communication was

not a teaching strategy).

c. **None:** When a child's communication behavior is none, the child is not responding to the parent's use of a teaching strategy, although joint attention was established.

i. Examples:

1. The parent has established joint attention and asks, "Do you want to play
1. ball?" and the child only continues to look at the parent.
2. The parent has established joint attention and says, "Say more," and the
3. child looks around the room.

ii. Nonexamples:

1. The parent has established joint attention and asks, "Do you want more
1. bubbles?" and the child makes an audible utterance with no intelligible
2. words, but the utterance has meaningful intonation. (Code as response).
3. The parent has established joint attention and says, "Say more," and the
4. child says, "No." (Code as response).
2. The parent has established joint attention and says, "Put the puzzle piece
5. in," and the child gets up and walks away. (Code as response)

4. **Topography of Child's Response/Initiation** – Describes how the child responded or initiated. If the child just ignores the parent and continues to play, do not code. If child responded or initiated with two modes in the same communication act, code the dominant one.

a. **Complex Speech/sign (sentences)** – Child responses or initiates within a complete sentence

i. Example:

1. "I want bubbles"
2. Sign "I want more"

ii. Nonexamples:

1. "more bubbles"
2. "bubbles"
3. Sign "more bubbles"

b. **Multiple-word phrase/sign** – Child responses or initiates by combining more than one word

i. Examples:

1. "more bubbles"
2. "Bubble please"
3. Sign "more bubbles"

ii. Nonexamples:

1. "bubbles"
2. Child says, "I want to play bubbles"
3. Sign "more"

c. **One word utterances/sign** – Child responses or initiates with one complete word

i. Examples:

1. "Bubbles"

2. “Ball”
3. Sign “more”

ii. Nonexamples:

1. “Ba” for bubbles
2. “More bubbles”
3. Clapping for a sign “more”

d. **Other Vocalization/ Approximate sign**– Child responses or initiates with at least 1 consonant sound that matches consonant sounds in the word OR makes a sound that approximates the target word but does not have any consonant sounds or a consonant sound that matches.

i. **Examples:**

1. Child says, “Mah!” for “more”
2. Child says, “Gu, gu, gu” for “go
3. Child says, “Ahhh” for “more” (no consonant sounds)
4. Child says, “Dah!” for “go” (incorrect consonant sound)
5. Child clapping hands for sign “more”

ii. **Nonexamples:**

1. Child yells or screams
2. Child engages in self-stimulating vocal behaviors

e. **Gesture** – Child uses a gesture to communicate meaning but does not approximate a sign.

i. **Examples**:

1. Child reaches for preferred toy
2. Child reaches for parent’s hands to make the parent sign
3. Child points to preferred toy

ii. **Nonexamples:**

1. Child approximates a sign
2. Child runs away
3. Child pushes toy/parent away

f. **Reject** – The child engages in a behavior that indicates rejection of the toy, the activity, or
responding to the parent’s strategy use.

i. **Examples**:

1. Child runs away from parent/activity/toy.
2. Child pushes parent’s hands away
3. Child picks up a different toy than the current object of reference
4. Child points to or reaches for a different toy than the current object of reference

ii. **Nonexamples:**

1. Child picks up the toy of reference.

Appendix B. Coding System
Fidelity of Naturalistic Teaching Strategy Use

The fidelity of the parent's use of a naturalistic teaching strategy depends on several criteria. Joint attention is the process of sharing one's experience of observing an object or event via nonverbal means, such as following another's eye gaze or pointing. If the child responds to the parent or the referent object, you can assume joint attention exists, even if the child was not looking at the parent or referent object.

a. When parent uses modeling:

Fidelity 1 – The parent presents a verbal, a sign, or a gestural model that is related to the child's interest (no joint attention).
Fidelity 2 – The parent establishes joint attention by focusing attention on the child's specific interest AND presents a verbal, a sign, or a gestural model that is related to the child's interest.
Fidelity 3 – The parent establishes joint attention by focusing attention on the child's specific interest AND presents a verbal, a sign, or a gestural model that is related to the child's interest AND waits 2-3 seconds for the child to respond.
Fidelity 4 – The parent establishes joint attention by focusing attention on the child's specific interest AND presents a verbal, a sign, or a gestural model that is related to the child's interest AND waits 2-3 seconds for the child to respond AND responds to the child's behavior by providing verbal feedback, repeating the model, or using the mand-model strategy.

b. When parent uses a mand-model

Fidelity 1 – The parent presents a verbal prompt in the form of a question, a choice, or a mand. (no joint attention).
Fidelity 2 – The parent establishes joint attention by focusing attention on the child's specific interest AND presents a verbal prompt in the form of a question, a choice, or a mand.
Fidelity 3 – The parent establishes joint attention by focusing attention on the child's specific interest AND presents a verbal prompt in the form of a question, a choice, or a mand AND waits 2-3 seconds for the child to respond.
Fidelity 4 – The parent establishes joint attention by focusing attention on the child's specific interest AND presents a verbal prompt in the form of a question, a choice, or a mand AND waits 2-3 seconds for the child to respond AND responds to the child's behavior by providing verbal feedback, repeating the mand-model or using the modeling strategy.

c. When parent uses time delay

Fidelity 1 – Parent looks expectantly at the child, but no joint attention.
Fidelity 2 – The parent establishes joint attention by focusing attention on the child's specific interest and looks expectantly at the child for less than 5 seconds.
Fidelity 3 – The parent establishes joint attention by focusing attention on the child's specific interest AND looks expectantly at the child for 5-15 seconds
Fidelity 4 – The parent establishes joint attention by focusing attention on the child's specific interest AND looks expectantly at the child for 5-15 seconds AND responds to the child's behavior by providing verbal feedback, or using the mand-model or modeling strategy.

Child's Communication Behavior– The child's communication behavior can include responding to the parent's communication act, initiating a new communication exchange, or not responding to the parent's communication act (i.e., none).

a. Initiation: When a child initiates a communication act, he/she uses a communicative behavior to begin a communication exchange with the parent. Many communication behaviors may look like initiation, but to be coded as initiation, the child's communication act must either be within the use of a time delay strategy by the parent or begin 3 seconds or more after the end of the last communicative act by anyone else in the room, including the child.

Examples:

1.	After 5 seconds of no communication exchanges between the parent and the child, the child points to a snack and says "Mom."
2.	After playing for 6 seconds, a child holds up a picture card of a doll and says, "Baby."
3.	Within the use of a time delay strategy by the parent, the child says, "More please."
4	When finished cleaning the play area, the child says, "All done."
5.	While the parent is singing "The Wheels of the Bus" and does not expect a response from the child, the child looks at the parent and says "Milk."

Nonexamples:

1.	The parent says, "Say more," and the child responds after 1-2 seconds with "Please". (Code the child's "Please" as a response).
2.	The parent says, "Say more," and the child looks at the parent for 6 seconds and then says, "More." (Code as response).

b. **Response:** When a child responds, he/she uses a communication behavior to communicate
due to the parent's use of a teaching strategy.

Examples:

1.	The parent asks, "Do you want to play ball?" and the child says, "Yes" or nods or puts his hands up to catch the ball.
2.	The parent asks if the child wants more to eat and, within less than 3 seconds, the child requests to have her shirt sleeve pulled up.
3.	The parent has established joint attention and says, "Put the puzzle piece in," and the child gets up and walks away to choose another activity.

Nonexamples:

1.	The parent uses a strategy, and the child begins crying. (Code the child's communication behavior as none).
2.	The parent says, "I am going to put this puzzle piece here" and the child says, "No." (This is not a response because the parent's communication was not a teaching strategy).

c. **None:** When a child's communication behavior is none, the child is not responding to the
parent's use of a teaching strategy, although joint attention was established.

Examples:

1.	The parent has established joint attention and asks, "Do you want to play ball?" and the child only continues to look at the parent.
2.	The parent has established joint attention and says, "Say more," and the child looks around the room.

Nonexamples:

1.	The parent has established joint attention and asks, "Do you want more bubbles?" and the child makes an audible utterance with no intelligible words, but the utterance has meaningful intonation. (Code as response).
2.	The parent has established joint attention and says, "Say more," and the child says, "No." (Code as response).
3.	The parent has established joint attention and says, "Put the puzzle piece in," and the child gets up and walks away. (Code as response)

4. **Topography of Child's Response/Initiation** – Describes how the child responded or
initiated. If the child just ignores the parent and continues to play, do not code. If child responded
or initiated with two modes in the same communication act, code the dominant one.

a. **Complex Speech/sign (sentences)** – Child responses or initiates within a complete sentence

Example:

1. "I want bubbles" "

2. Sign “I want more”

ii. Nonexamples:

1. “more bubbles”
2. “bubbles”
3. Sign “more bubbles”

b. **Multiple-word phrase/sign** – Child responses or initiates by combining more than one word

i. Examples:

1. “more bubbles”
2. “Bubble please”
3. Sign “more bubbles”

ii. Nonexamples:

1. “bubbles”
2. Child says, “I want to play bubbles”
3. Sign “more”

c. **One word utterances/sign** – Child responses or initiates with one complete word

i. Examples:

1. “Bubbles”
2. “Ball”
3. Sign “more”

ii. Nonexamples:

1. “Ba” for bubbles
2. “More bubbles”
3. Clapping for a sign “more”

d. **Other Vocalization/ Approximate sign**– Child responses or initiates with at least 1 consonant sound that matches consonant sounds in the word OR makes a sound that approximates the target word but does not have any consonant sounds or a consonant sound that matches.

i. **Examples:**

1. Child says, “gi!” for “lagi” (more)
2. Child says, “mam mam” fro “makan” (eat)

2. Child says, “Gu, gu, gu” for “go
3. Child says, “Ahhh” for “more” or “tambah”(no consonant sounds)
4. Child says, “Dah!” for “go” (incorrect consonant sound)
5. Child clapping hands for sign “more”

ii. **Nonexamples:**

1. Child yells or screams
2. Child engages in self-stimulating vocal behaviors

e. **Gesture** – Child uses a gesture to communicate meaning but does not approximate a sign.

i. **Examples**:

1. Child reaches for preferred toy
2. Child reaches for parent’s hands to make the parent sign
3. Child points to preferred toy

ii. **Nonexamples:**

1. Child approximates a sign

2. Child runs away
3. Child pushes toy/parent away

f. **Reject** – The child engages in a behavior that indicates rejection of the toy, the activity, or
responding to the parent's strategy use.

i. **Examples**:

1. Child runs away from parent/activity/toy.
2. Child pushes parent's hands away
3. Child picks up a different toy than the current object of reference
4. Child points to or reaches for a different toy than the current object of reference

ii. **Nonexamples:**

i. 1. Child picks up the toy of reference

Appendix C: Fidelity Checklist for Procedural Fiedelity

Module 1 (Video Training)
Introduction

Family: _____ Session Date: _____ Person Completed: _____

Warmly greet the parent to build a good relationship and make them ready to learn	Yes	No
Explain to the parent the format of the training	Yes	No
Explain to the parent about verbal and non-verbal language used in communication	Yes	No
Ask the parent how the child communicate currently	Yes	No
Explain to the parent about naturalistic strategies	Yes	No
Explain to parents how to be responsive of the child communication attempt	Yes	No
Explain to the parent the purpose of being responsive of the child communication attempt	Yes	No
Explain to the parent the purpose of learning naturalistic strategies	Yes	No
Explain to the parent the three components of naturalistic strategies	Yes	No
Explain to the parent about environmental arrangement strategies	Yes	No
Mention the three naturalistic strategies targeted in the training and coaching	Yes	No
Tell the parent the timeline to complete the training and coaching	Yes	No
Provide contact information for the parent if they need assistance and/or have questions	Yes	No
Totals Yes: _____ No : _____ Yes/(Yes+No) X 100 = _____%		

Fidelity Checklist for Naturalistic Strategies Training
Module 2 (Video Training)
Modeling Strategy

Family: _____ Session Date: _____ Person Completed: _____

Warmly greet the parent to build a good relationship and make them ready to learn	Yes	No
Explain to the parent about modeling in naturalistic strategy	Yes	No
Explain to the parents about the steps of modeling strategy implementation	Yes	No

Provide video samples of modeling strategy	Yes	No
Highlight the modeling procedures from the video sample	Yes	No
Provide flowchart of the modeling procedure	Yes	No
Tell the parents that they can print the flowchart and put it somewhere they can access easily during their routines	Yes	No
Encourage the parents to practice the strategy and how they can do it	Yes	No
Explain to the parents about creating an action plan to practice the strategy that are going to be video recorded	Yes	No
Provide contact information for the parent if they need assistance and/or have questions	Yes	No
Totals Yes: _____ No : _____ Yes/(Yes+No) X 100 = _____%		

Fidelity Checklist for Naturalistic Strategies Training
Module 3 (Video Training)
Mand-Model Strategy

Family: _____ Session Date: _____ Person Completed: _____

Warmly greet the parent to build a good relationship and make them ready to learn	Yes	No
Explain to the parent about mand-model in naturalistic strategy	Yes	No
Explain to the parents about the steps of mand-model strategy implementation	Yes	No
Provide video samples of mand-model strategy	Yes	No
Highlight the mand-model procedures from the video sample	Yes	No
Provide flowchart of the mand-model procedure	Yes	No
Tell the parents that they can print the flowchart and put it somewhere they can access easily during their routines	Yes	No
Encourage the parents to practice the strategy and explain how they can do it	Yes	No
Explain to the parents about creating an action plan to practice the strategy that are going to be video recorded	Yes	No
Provide contact information for the parent if they need assistance and/or have questions	Yes	No
Totals Yes: _____ No : _____ Yes/(Yes+No) X 100 = _____%		

Fidelity Checklist for Naturalistic Strategies Training
Module 4 (Video Training)
Time Delay Strategy

Family: _____ Session Date: _____ Person Completed: _____

Warmly greet the parent to build a good relationship and make them ready to learn	Yes	No
Explain to the parent about time delay in naturalistic strategy	Yes	No
Explain to the parents about the steps of time delay strategy implementation	Yes	No
Provide video samples of modeling strategy	Yes	No
Highlight the time delay procedures from the video sample	Yes	No
Provide flowchart of the time delay procedure	Yes	No
Tell the parents that they can print the flowchart and put it somewhere they can access easily during their routines	Yes	No
Encourage the parents to practice the strategy and how they can do it	Yes	No
Explain to the parents about creating an action plan to practice the strategy that are going to be video recorded	Yes	No
Provide contact information for the parent if they need assistance and/or have questions	Yes	No

Totals Yes: _____

No : _____

Yes/(Yes+No) X 100 = _____%

Fidelity Checklist for Naturalistic Strategies Coaching
First Coaching of Each Strategy

Family: _____ Session Date: _____ Person Completed: _____

Name of the Strategy:_____

Written Feedback on the Action Plan			
Highlight what the parents have planned correctly by providing descriptive praise on the comment section	Yes		No
Ask question about unclear explanation of the action plan	Yes	No	NA
Give comment or suggestion on each section of the action plan	Yes		No

Provide opportunity for parent to make appointment to discuss the action plan over the phones or chat after they receive the feedback	Yes	No
Remind parent to create and submit their first video of the strategy implementation	Yes	No
Totals Yes: _____ No : _____ Yes/(Yes+No) X 100 = _____%		

Fidelity Checklist for Naturalistic Strategies Coaching
First Video Feedback

Family: _____ Session Date: _____ Person Completed: _____

Name of the Strategy:_____

Greeted the parents to maintain warm positive connection	Yes	No
Included video clip of parent's implementation in the video feedback	Yes	No
Delivered verbal praise	Yes	No
Asked parent what they could do differently	Yes	No
Provided corrective feedback	Yes	No
Provide opportunity for parent to ask questions or/and discuss the next trial of strategy implementation over the phones or chat	Yes	No
Remind parent to create and submit the next video of the strategy implementation	Yes	No
Totals Yes: _____ No : _____ Yes/(Yes+No) X 100 = _____%		

Fidelity Checklist for Naturalistic Strategies Coaching
Written Feedback on Parent's Video

Family: _____ Session Date: _____ Person Completed: _____

Name of the Strategy:_____

A positive opening statement	Yes	No

A frequency count of target behavior(s),	Yes	No
A verbatim example of parent use of the target behavior	Yes	No
Feedback related to the target behavior	Yes	No
A positive closing statement	Yes	No
A response request	Yes	No

Totals Yes: _____

No : _____

Yes/(Yes+No) X 100 = _____%

Parent's Survey #1

Parent's Name: _____

Name of the focus strategy: _____

Date of completing the survey: _____

Please select an option below that best represents how you feel about the recent online training and coaching program.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
The module was clear and easy to understand and implement					
The action plan was planned in a good phase					
The strategy was flexible to be implemented in my family's daily routines					
Learning the strategy has made me more confident when interacting with my child					
I am confident that the strategy implementation will support my child's language learning					
I am satisfied with the wait time to receive respond and feedback from the coach when I have questions or need suggestions					
The strategy is appropriate to be implemented for Indonesian families					

Parent's Survey #2

Parent's Name: _____

Name of the focus strategy: _____

Date of completing the survey: _____

Did you watch the video presentation from the module before implement the strategy with your child again?

If yes, how many times? _____

Please select an option below that best represents how you feel about the recent online training and coaching program.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
The module was clear and easy to understand and implement					
The action plan was planned in a good phase					
I found the video feedback was very helpful to guide my next performance					
The strategy was flexible to be implemented in my family's daily routines					
Learning the strategy has made me more confident when interacting with my child					
I am confident that the strategy implementation will support my child's language learning					
I am satisfied with the wait time to receive respond and feedback from the coach when I have questions or need suggestions					
The strategy appropriate to be implemented for Indonesian families					

Parent's Survey #3-6

Parent's Name: _____

Name of the focus strategy: _____

Date of completing the survey: _____

Did you watch the video presentation from the module before implement the strategy with your child again?

If yes, how many times? _____

Please select an option below that best represents how you feel about the recent online training and coaching program.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
The module was clear and easy to understand and implement					
The action plan was planned in a good phase					
I found the written feedback was very helpful to guide my next performance					
I prefer video feedback to written feedback					
The strategy was flexible to be implemented in my family's daily routines					
Learning the strategy has made me more confident when interacting with my child					
I am confident that the strategy implementation will support my child's language learning					
I am satisfied with the wait time to receive respond and feedback from the coach when I have questions or need suggestions					
The strategy appropriate to be implemented for Indonesian families					

Post-Training-and-Coaching Survey

Parent's Name: _____

Date of completing the survey: _____

Please indicate your agreement of the following statements

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I will continue using the strategies taught in this training and coaching program with my child					
I will encourage my spouse to also learn and implement the strategies					
I think more families need to receive this program					
I think it is more beneficial if the programs were taught synchronously, so I can get immediate respond and feedback from the coach					

Appendix D: Action Plan
Target Language and Topography

Child's Name :

Parent's Name :

Target Language

Sign and verbal language for action words/expression

- Help/need help
- Want
- eat
- drink
- more
- walk
- potty
- play
- please
- thank you

sign and/or verbal language for noun:

- milk
- water
- car
- doll
- ball
- plate
- fork
- spoon
- banana
- cookie
- cat
- dog
- fish
- etc

Note: you can make changes to the target language when needed

Lesson Plan : Mand-model

Day Date Time	**Activity & Target language**	**Materials**	**Description**	**Response Scenarios**
Wed,	Snack time	Plate and cup	Mommy will prepare two kinds of Dilan's favorite	If after 3 s Dilan does not respond verbally, mommy will repeat the prompt or

June 27, 22 11 a.m	Target language: • milk • water • banana • cookie • more • thank you • want		snacks: cookies and banana. Mommy will build joint attention and deliver choices for Dilan by holding the items and saying: "Dilan, do you want cookie or banana?". Mommy will wait for Dilan's response (3 s).	give model following Dilan's interest, and wait for another 3 s. For example: Dilan just look at the banana, mommy will model the word "banana" or deliver a mand "say, banana" and wait for 3 s If Dilan still does not respond verbally, mommy will model the word and give the banana to Dilan. If Dilan responds correctly by saying "banana", mommy will deliver descriptive praise and expand the language by saying "Good job saying banana! yummy banana!" and give the item to Dilan

Note: Please plan at least 5 activities

Reference

accept. 2021. In Merriam-Webster.com. Retrieved March 14, 2021, from https://www.merriam-webster.com/dictionary/accept

Boddie, Kathryn. (n.d.). *Hoe to determine if central limit theorem applies to a sampling distribution.* Study.com. https://study.com/skill/learn/determining-if-the-central-limit-theorem-applies-to-a-sampling-distribution-explanation.html#:~:text=If%20the%20sample%20size%20is%20at%20least%2030%20or%20the,limit%20theorem%20does%20not%20apply.Akamoglu, Y., & Meadan, H. (2018). Parent-Implemented Language and Communication Interventions for Children with Developmental Delays and Disabilities: a Scoping Review. *Review journal of autism and developmental disorders*, *5*(3), 294-309. https://doi.org/10.1007/s40489-018-0140-x

Akamoglu, Y., & Meadan, H. (2019). Parent-Implemented Communication Strategies During Storybook Reading. *Journal of early intervention*, *41*(4), 300-320. https://doi.org/10.1177/1053815119855007

Akemoglu, Y., Muharib, R., & Meadan, H. (2020). A Systematic and Quality Review of Parent-Implemented Language and Communication Interventions Conducted via Telepractice. *Journal of behavioral education*, *29*(2), 282-316. https://doi.org/10.1007/s10864-019-09356-3

Al-Khalaf, A., Dempsey, I., & Dally, K. (2014). The Effect of an Education Program for Mothers of Children with Autism Spectrum Disorder in Jordan. *International journal for the advancement of counselling*, *36*(2), 175-187. https://doi.org/10.1007/s10447-013-9199-3

An, Z. G., Horn, E., & Cheatham, G. A. (2019). Coaching to Build Parent Competency in Addressing Early Challenging Behaviors. *Young exceptional children*, *22*(4), 198-213. https://doi.org/10.1177/1096250618759941

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. https://doi.org/10.1177/0271121415595550

Ashbaugh, K., & Koegel, R. L. (2013). Naturalistic Interventions. In F. R. Volkmar (Ed.), *Encyclopedia of Autism Spectrum Disorders* (pp. 1978-1986). Springer New York. https://doi.org/10.1007/978-1-4419-1698-3_124

Baharav, E., & Reiser, C. (2010). Using telepractice in parent training in early autism. *Telemedicine journal and e-health*, *16*(6), 727-731. https://doi.org/10.1089/tmj.2010.0029

Barkaia, A., Stokes, T. F., & Mikiashvili, T. (2017). Intercontinental telehealth coaching of therapists to improve verbalizations by children with autism. *Journal of applied behavior analysis*, *50*(3), 582-589. https://doi.org/10.1002/jaba.391

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

Barton, E. E., Rigor, M. N., Pokorski, E. A., Velez, M., & Domingo, M. (2019). Using Text Messaging to Deliver Performance Feedback to Preservice Early Childhood Teachers. *Topics in early childhood special education*, *39*(2), 88-102. https://doi.org/10.1177/0271121418800016

Breitenstein, S. M., Gross, D., & Christophersen, R. (2014). Digital Delivery Methods of Parenting Training Interventions: A Systematic Review. *Worldviews on evidence-based nursing*, *11*(3), 168-176. https://doi.org/10.1111/wvn.12040

Brian, J., Smith, I., Zwaigenbaum, L., & Bryson, S. (2017). Cross-site randomized control trial of the Social ABCs caregiver-mediated intervention for toddlers with autism spectrum disorder. *Autism research : official journal of the International Society for Autism Research*, *10*. https://doi.org/10.1002/aur.1818

Brown, W. H., & Odom, S. L. (1995). Naturalistic Peer Interventions for Promoting Preschool Children's Social Interactions. *Preventing school failure*, *39*(4), 38-43. https://doi.org/10.1080/1045988X.1995.9944641

Bruner, J. (1981). The social context of language acquisition. *Language & Communication*, *1*(2), 155-178. https://doi.org/https://doi.org/10.1016/0271-5309(81)90010-0

Çaylan, N., Yalçın, S. S., Erat Nergiz, M., Yıldız, D., Oflu, A., Tezol, Ö., Çiçek, Ş., & Foto-Özdemir, D. (2021). Associations between parenting styles and excessive screen usage in preschool children. *Turk Arch Pediatr*, *56*(3), 261-266. https://doi.org/10.14744/TurkPediatriArs.2020.43765

Çelik, S., Tomris, G., & Tuna, D. M. (2022). The COVID-19 pandemic: The evaluation of the emergency remote parent training program based on at-home support for children with down syndrome. *Children and youth services review*, *133*, 106325-106325. https://doi.org/10.1016/j.childyouth.2021.106325

Charman, T. (2003). Why is joint attention a pivotal skill in autism? *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, *358*(1430), 315-324. https://doi.org/10.1098/rstb.2002.1199

Chung, M. Y., Meadan, H., Snodgrass, M. R., Hacker, R. E., Sands, M. M., Adams, N. B., & Johnston, S. S. (2020). Assessing the Social Validity of a Telepractice Training and Coaching Intervention. *Journal of behavioral education*, *29*(2), 382-408. https://doi.org/10.1007/s10864-020-09372-8

Cole, B., Pickard, K., & Stredler-Brown, A. (2019). Report on the use of telehealth in early intervention in colorado: Strengths and challenges with telehealth as a service delivery method. *International journal of telerehabilitation*, *11*(1), 33-40. https://doi.org/10.5195/ijt.2019.6273

Collins, J. (2004). Education techniques for lifelong learning: Principles of adult learning. *Radiographics*, *24*(5), 1483-1489. https://doi.org/10.1148/rg.245045020

Conway, L. J., Levickis, P. A., Smith, J., Mensah, F., Wake, M., & Reilly, S. (2018). Maternal communicative behaviours and interaction quality as predictors of language development: findings from a community-based study of slow-to-talk toddlers. *International journal of language & communication disorders*, *53*(2), 339-354. https://doi.org/10.1111/1460-6984.12352

Cook, B. G., & Odom, S. L. (2013). Evidence-Based Practices and Implementation Science in Special Education. *Exceptional children*, *79*(2), 135-144. https://doi.org/10.1177/001440291307900201

Cowan, R. J., & Allen, K. D. (2007). Using naturalistic procedures to enhance learning in individuals with autism: A focus on generalized teaching within the school

setting. *Psychology in the schools*, *44*(7), 701-715. https://doi.org/10.1002/pits.20259

Craig, E., Dounavi, K., & Ferguson, J. (2021). Telehealth to train interventionists teaching functional living skills to children with autism spectrum disorder. *Journal of applied behavior analysis*, *54*(2), 511-529. https://doi.org/10.1002/jaba.834

D'Agostino, S., Douglas, S. N., & Horton, E. (2020). Inclusive Preschool Practitioners' Implementation of Naturalistic Developmental Behavioral Intervention Using Telehealth Training. *Journal of autism and developmental disorders*, *50*(3), 864-880. https://doi.org/10.1007/s10803-019-04319-z

Daczewitz, M., Meadan-Kaplansky, H., & Borders, C. (2020). PiCs: Telepractice coaching for a parent of a child who is hard-of-hearing. *Deafness & education international*, *22*(2), 113-138. https://doi.org/10.1080/14643154.2019.1587235

Davis, A., Hopkins, T., & Abrahams, Y. (2012). Maximizing the Impact of Telepractice Through a Multifaceted Service Delivery Model at The Shepherd Centre, Australia. *The Volta review*, *112*(3), 383-391.

DeVeney, S. L., Hagaman, J. L., & Bjornsen, A. L. (2017). Parent-Implemented Versus Clinician-Directed Interventions for Late-Talking Toddlers: A Systematic Review of the Literature. *Communication disorders quarterly*, *39*(1), 293-302. https://doi.org/10.1177/1525740117705116

Douglas, S. N., Kammes, R., & Nordquist, E. (2018). Online Communication Training for Parents of Children With Autism Spectrum Disorder. *Communication disorders quarterly*, *39*(3), 415-425. https://doi.org/10.1177/1525740117727491

Dunst, C. J. (2002). Family-centered practices: Birth through high school. *The Journal of special education*, *36*(3), 141-149.

Dunst, C. J., Bruder, M. B., Trivette, C. M., & Hamby, D. W. (2006). Everyday Activity Settings, Natural Learning Environments, and Early Intervention Practices. *Journal of policy and practice in intellectual disabilities*, *3*(1), 3-10. https://doi.org/10.1111/j.1741-1130.2006.00047.x

Edwards, M., Stredler-Brown, A., & Houston, K. T. (2012). Expanding Use of Telepractice in Speech-Language Pathology and Audiology. *The Volta review*, *112*(3), 227-242. https://doi.org/10.17955/tvr.112.3.m.704

Ellis Weismer, S., Lord, C., & Esler, A. (2010). Early Language Patterns of Toddlers on the Autism Spectrum Compared to Toddlers with Developmental Delay. *Journal of autism and developmental disorders*, *40*(10), 1259-1273. https://doi.org/10.1007/s10803-010-0983-1

Fan, R. G., Portuguez, M. W., & Nunes, M. L. (2013). Cognition, behavior and social competence of preterm low birth weight children at school age. *Clinics*, *68*, 915-921.

Franzone, E. (2009). Naturalistic intervention for children and youth with autism spectrum disorders. In: Madison, WI: National Professional Development Center on Autism Spectrum ….

Friedman, M., Woods, J., & Salisbury, C. (2012). Caregiver coaching strategies for early intervention providers: Moving toward operational definitions. *Infants and young children*, *25*(1), 62-82. https://doi.org/10.1097/IYC.0b013e31823d8f12

Gao, X. (2008). *Young children's accountability data on language, literacy and pre-math areas: Validating authentic assessment* ProQuest Dissertations Publishing].

Gast, D. L. (2010). General Factors in Measurement and Evaluation. In (pp. 91-109). Routledge. https://doi.org/10.4324/9780203877937-5

Grisham-Brown, J., Schuster, J. W., Hemmeter, M. L., & Collins, B. C. (2000). Using an Embedding Strategy to Teach Preschoolers with Significant Disabilities. *Journal of behavioral education*, *10*(2/3), 139-162. https://doi.org/10.1023/a:1016688130297

Guðmundsdóttir, K., Ala'i-Rosales, S., & Sigurðardóttir, Z. G. (2019). Extending Caregiver Training Via Telecommunication for Rural Icelandic Children With Autism. *Rural special education quarterly*, *38*(1), 26-42. https://doi.org/10.1177/8756870518783522

Heidlage, J. K., Cunningham, J. E., Kaiser, A. P., Trivette, C. M., Barton, E. E., Frey, J. R., & Roberts, M. Y. (2020). The effects of parent-implemented language interventions on child linguistic outcomes: A meta-analysis. *Early childhood research quarterly*, *50*, 6-23. https://doi.org/10.1016/j.ecresq.2018.12.006

Hwa-Froelich, D. A. (2015). *Social communication development and disorders*. Psychology Press.

Jeffrey, J., Marlotte, L., & Hajal, N. J. (2020). Providing Telebehavioral Health to Youth and Families During COVID-19: Lessons From the Field. *Psychological trauma*, *12*(S1), S272-S273. https://doi.org/10.1037/tra0000817

Kaiser, A. P., & Roberts, M. Y. (2011). Advances in Early Communication and Language Intervention. *Journal of early intervention*, *33*(4), 298-309. https://doi.org/10.1177/1053815111429968

Kaiser, A. P., & Trent, J. A. (2007). Communication intervention for young children with disabilities. *Handbook of developmental disabilities*, 224-245.

Kasari, C., Freeman, S., & Paparella, T. (2006). Joint attention and symbolic play in young children with autism: a randomized controlled intervention study. *Journal of child psychology and psychiatry*, *47*(6), 611-620. https://doi.org/10.1111/j.1469-7610.2005.01567.x

Kasari, C., Gulsrud, A., Paparella, T., Hellemann, G., & Berry, K. (2015). Randomized Comparative Efficacy Study of Parent-Mediated Interventions for Toddlers With Autism. *Journal of consulting and clinical psychology*, *83*(3), 554-563. https://doi.org/10.1037/a0039080

Knauer, H. A., Ozer, E. J., Dow, W. H., & Fernald, L. C. H. (2019). Parenting quality at two developmental periods in early childhood and their association with child development. *Early childhood research quarterly*, *47*, 396-404. https://doi.org/https://doi.org/10.1016/j.ecresq.2018.08.009

Knowles, M. S., Holton, E. F., & Swanson, R. A. (2015). *The adult learner the definitive classic in adult education and human resource development* (Eight edition. ed.). Routledge.

Kossyvaki, L., Meadan, H., Cristescu, L., Alharbi, H., Sands, M., & Tuite, D. (2022). Telepractice parent-implemented training and coaching in a rural area in the UK:

Impact on mothers and their children with autism. *Research in autism spectrum disorders*, *98*, 102044. https://doi.org/10.1016/j.rasd.2022.102044

Lane, J. D., Gast, D. L., Shepley, C., & Ledford, J. R. (2015). Including Social Opportunities During Small Group Instruction of Preschool Children With Social-Communication Delays. *Journal of early intervention*, *37*(1), 3-22. https://doi.org/10.1177/1053815115588828

Lane, J. D., Graley, D., Shepley, C., & Lynch, K. M. (2022). Systematic Review of Naturalistic Language Interventions in Schools: Child- and Adult-Level Outcomes for Verbal Communication. *Remedial and Special Education*, *0*(0), 07419325221125887. https://doi.org/10.1177/07419325221125887

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. https://doi.org/10.1177/1053815116663178

Lane, J. D., Lieberman-Betz, R., & Gast, D. L. (2016). An Analysis of Naturalistic Interventions for Increasing Spontaneous Expressive Language in Children With Autism Spectrum Disorder. *The Journal of special education*, *50*(1), 49-61. https://doi.org/10.1177/0022466915614837

Layachi, A., & Schuelka, M. J. (2022). The Impact of the COVID-19 Related School Closure on the Mental Health and Well-Being of Children with SEN and Their Parents in Algeria. *International Journal of Disability, Development and Education*, 1-18. https://doi.org/10.1080/1034912X.2022.2092080

Lerman, D. C., O'Brien, M. J., Neely, L., Call, N. A., Tsami, L., Schieltz, K. M., Berg, W. K., Graber, J., Huang, P., Kopelman, T., & Cooper-Brown, L. J. (2020). Remote Coaching of Caregivers via Telehealth: Challenges and Potential Solutions. *Journal of behavioral education*, *29*(2), 195-221. https://doi.org/10.1007/s10864-020-09378-2

Ma, H.-H. (2006). An Alternative Method for Quantitative Synthesis of Single-Subject Researches: Percentage of Data Points Exceeding the Median. *Behavior modification*, *30*(5), 598-617. https://doi.org/10.1177/0145445504272974

McDuffie, A., Machalicek, W., Oakes, A., Haebig, E., Weismer, S. E., & Abbeduto, L. (2013). Distance Video-Teleconferencing in Early Intervention: Pilot Study of a Naturalistic Parent-Implemented Language Intervention. *Topics in early childhood special education*, *33*(3), 172-185. https://doi.org/10.1177/0271121413476348

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., Chung, M. Y., Sands, M. M., & Snodgrass, M. R. (2020). The Cascading Coaching Model for Supporting Service Providers, Caregivers, and Children. *The Journal of special education*, *54*(2), 113-125. https://doi.org/10.1177/0022466919884070

Meadan, H., Snodgrass, M. R., Meyer, L. E., Fisher, K. W., Chung, M. Y., & Halle, J. W. (2016). Internet-Based Parent-Implemented Intervention for Young Children With

Autism: A Pilot Study. *Journal of early intervention*, *38*(1), 3-23. https://doi.org/10.1177/1053815116630327

Moore, H. W., Barton, E. E., & Chironis, M. (2014). A Program for Improving Toddler Communication Through Parent Coaching. *Topics in early childhood special education*, *33*(4), 212-224. https://doi.org/10.1177/0271121413497520

Morgan, P. L., Farkas, G., Hillemeier, M. M., Hammer, C. S., & Maczuga, S. (2015). 24-Month-Old Children With Larger Oral Vocabularies Display Greater Academic and Behavioral Functioning at Kindergarten Entry. *Child development*, *86*(5), 1351-1370. https://doi.org/10.1111/cdev.12398

Neely, L., Hong, E. R., Kawamini, S., Umana, I., & Kurz, I. (2020). Intercontinental Telehealth to Train Japanese Interventionists in Incidental Teaching for Children with Autism. *Journal of behavioral education*, *29*(2), 433-448. https://doi.org/10.1007/s10864-020-09377-3

Nelson, S., McDuffie, A., Banasik, A., Tempero Feigles, R., Thurman, A. J., & Abbeduto, L. (2018). Inferential language use by school-aged boys with fragile X syndrome: Effects of a parent-implemented spoken language intervention. *Journal of communication disorders*, *72*, 64-76. https://doi.org/10.1016/j.jcomdis.2018.02.007

Peredo, T. N., Zelaya, M. I., & Kaiser, A. P. (2018). Teaching low-income spanish-speaking caregivers to implement EMT en Español with their young children with language impairment: A pilot study. *American journal of speech-language pathology*, *27*(1), 136-153. https://doi.org/10.1044/2017_AJSLP-16-0228

Petursdottir, A. I., & Carr, J. E. (2018). Applying the Taxonomy of Validity Threats from Mainstream Research Design to Single-Case Experiments in Applied Behavior Analysis. *Behav Anal Pract*, *11*(3), 228-240. https://doi.org/10.1007/s40617-018-00294-6

Pickard, K. E., Wainer, A. L., Bailey, K. M., & Ingersoll, B. R. (2016). A mixed-method evaluation of the feasibility and acceptability of a telehealth-based parent-mediated intervention for children with autism spectrum disorder. *Autism : the international journal of research and practice*, *20*(7), 845-855. https://doi.org/10.1177/1362361315614496

Pierson, L. M., Thompson, J. L., Ganz, J. B., Wattanawongwan, S., Haas, A. N., & Yllades, V. (2021). Coaching Parents of Children With Developmental Disabilities to Implement a Modified Dialogic Reading Intervention Using Low Technology via Telepractice. *American journal of speech-language pathology*, *30*(1), 119-136. https://doi.org/10.1044/2020_AJSLP-20-00037

Prata, J., Lawson, W., & Coelho, R. (2018). Parent training for parents of children on the autism spectrum: A review. *Int J Clin Neurosci Ment Health*, *5*, 3.

Prizant, B. M., Wetherby, A. M., & Rydell, P. J. (2000). Communication intervention issues for children with autism spectrum disorders. In *Autism spectrum disorders: A transactional developmental perspective.* (pp. 193-224). Paul H. Brookes Publishing Co.

Quinn, E. D., Kaiser, A. P., & Ledford, J. (2021). Hybrid telepractice delivery of enhanced milieu teaching: Effects on caregiver implementation and child

communication. *Journal of speech, language, and hearing research*, *64*(8), 3074-3099. https://doi.org/10.1044/2021_JSLHR-20-00430

Rapport, M. J. K., McWilliam, R. A., & Smith, B. J. (2004). Practices Across Disciplines in Early Intervention: The Research Base. *Infants and young children*, *17*(1), 32-44. https://doi.org/10.1097/00001163-200401000-00006

Roberts, M. Y., Kaiser, A. P., Wolfe, C. E., Bryant, J. D., & Spidalieri, A. M. (2014). Effects of the teach-model-coach-review instructional approach on caregiver use of language support strategies and children's expressive language skills. *Journal of speech, language, and hearing research*, *57*(5), 1851-1869. https://doi.org/10.1044/2014_JSLHR-L-13-0113

Rogers, S. J., Stahmer, A., Talbott, M., Young, G., Fuller, E., Pellecchia, M., Barber, A., & Griffith, E. (2022). Feasibility of delivering parent-implemented NDBI interventions in low-resource regions: a pilot randomized controlled study. *Journal of neurodevelopmental disorders*, *14*(1), 3-3. https://doi.org/10.1186/s11689-021-09410-0

Roper, N., & Dunst, C. J. (2003). Communication intervention in natural learning environments: Guidelines for practice. *Infants and young children*, *16*(3), 215-226. https://doi.org/10.1097/00001163-200307000-00004

Ruble, L. A., Love, A. M. A., Wong, V. W., Grisham-Brown, J. L., & McGrew, J. H. (2020). Implementation fidelity and common elements of high quality teaching sequences for students with autism spectrum disorder in COMPASS. *Research in autism spectrum disorders*, *71*, 101493. https://doi.org/10.1016/j.rasd.2019.101493

Ruble, L. A., McGrew, J. H., Toland, M. D., Dalrymple, N. J., & Jung, L. A. (2013). A Randomized Controlled Trial of COMPASS Web-Based and Face-to-Face Teacher Coaching in Autism. *Journal of consulting and clinical psychology*, *81*(3), 566-572. https://doi.org/10.1037/a0032003

Schreibman, L., Dawson, G., Stahmer, A. C., Landa, R., Rogers, S. J., McGee, G. G., Kasari, C., Ingersoll, B., Kaiser, A. P., Bruinsma, Y., McNerney, E., Wetherby, A., & Halladay, A. (2015). Naturalistic Developmental Behavioral Interventions: Empirically Validated Treatments for Autism Spectrum Disorder. *Journal of autism and developmental disorders*, *45*(8), 2411-2428. https://doi.org/10.1007/s10803-015-2407-8

Şen, N., & Sen, S. (2019). Calculation of Effect Size in Single-Subject Experimental Studies: Examination of Non-Regression-Based Methods. *Journal of Measurement and Evaluation in Education and Psychology*, *10*, 30-48. https://doi.org/10.21031/epod.419625

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Houghton Mifflin.

Siller, M., Hotez, E., Swanson, M., Delavenne, A., Hutman, T., & Sigman, M. (2018). Parent coaching increases the parents' capacity for reflection and self-evaluation: results from a clinical trial in autism. *Attachment & human development*, *20*(3), 287-308. https://doi.org/10.1080/14616734.2018.1446737

Siller, M., Pickard, K., Fuhrmeister, S., Kushner, E., Rudrabhatla, A., & Morgan, L. (2022). Teacher-Implemented Parent Coaching in Inclusive Preschool Settings for

Children With Autism. *Journal of early intervention*, *44*(2), 211-231. https://doi.org/10.1177/10538151221083552

Siller, M., & Sigman, M. (2008). Modeling Longitudinal Change in the Language Abilities of Children With Autism: Parent Behaviors and Child Characteristics as Predictors of Change. *Developmental psychology*, *44*(6), 1691-1704. https://doi.org/10.1037/a0013771

Simacek, J., Dimian, A. F., & McComas, J. J. (2017). Communication Intervention for Young Children with Severe Neurodevelopmental Disabilities Via Telehealth. *Journal of autism and developmental disorders*, *47*(3), 744-767. https://doi.org/10.1007/s10803-016-3006-z

Smith, T., Groen, A. D., Wynn, J. W., & Smith, T. (2000). Randomized trial of intensive early intervention for children with pervasive developmental disorder. *American journal of mental retardation*, *105*(4), 269-285. https://doi.org/10.1352/0895-8017(2000)105<0269:RTOIEI>2.0.CO;2

Snodgrass, M. R., Chung, M. Y., Biller, M. F., Appel, K. E., Meadan, H., & Halle, J. W. (2017). Telepractice in Speech–Language Therapy: The Use of Online Technologies for Parent Training and Coaching. *Communication disorders quarterly*, *38*(4), 242-254. https://doi.org/10.1177/1525740116680424

Snyder, P. A., Rakap, S., Hemmeter, M. L., McLaughlin, T. W., Sandall, S., & McLean, M. E. (2015). Naturalistic Instructional Approaches in Early Learning: A Systematic Review. *Journal of early intervention*, *37*(1), 69-97. https://doi.org/10.1177/1053815115595461

Sourander, S., Sourander, A., Hinkka-Yli-Salomäki, S., Ristkari, T., & Kurki, M. (2022). An Internet-Based Parent Training With Telephone Coaching on Managing Disruptive Behavior in Children at Special Family Counseling Centers During the COVID-19 Pandemic: Feasibility Study. *JMIR pediatrics and parenting*, *5*(4), e40614-e40614. https://doi.org/10.2196/40614

Stanton-Chapman, T. L., & Snell, M. E. (2011). Promoting turn-taking skills in preschool children with disabilities: The effects of a peer-based social communication intervention. *Early childhood research quarterly*, *26*(3), 303-319. https://doi.org/10.1016/j.ecresq.2010.11.002

Suess, A. N., Romani, P. W., Wacker, D. P., Dyson, S. M., Kuhle, J. L., Lee, J. F., Lindgren, S. D., Kopelman, T. G., Pelzel, K. E., & Waldron, D. B. (2014). Evaluating the Treatment Fidelity of Parents Who Conduct In-Home Functional Communication Training with Coaching via Telehealth. *Journal of behavioral education*, *23*(1), 34-59. https://doi.org/10.1007/s10864-013-9183-3

Sukonthaman, R. (2021). The Effects of Online Parent Training in the Teach-Model-Coach-Review Instructional Approach on Parents' Use of Language Expansion During Routine-Based Activities for Children with Cochlear Implants in Thailand. In: ProQuest Dissertations Publishing.

Tamis-LeMonda, C. S., Bornstein, M. H., & Baumwell, L. (2001). Maternal Responsiveness and Children's Achievement of Language Milestones. *Child development*, *72*(3), 748-767. https://doi.org/10.1111/1467-8624.00313

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

Toth, K., Munson, J., N. Meltzoff, A., & Dawson, G. (2006). Early Predictors of Communication Development in Young Children with Autism Spectrum Disorder: Joint Attention, Imitation, and Toy Play. *Journal of autism and developmental disorders*, *36*(8), 993-1005. https://doi.org/10.1007/s10803-006-0137-7

Troude, P., Squires, J., L'Hélias, L. F., Bouyer, J., & de La Rochebrochard, E. (2011). Ages and Stages Questionnaires: feasibility of postal surveys for child follow-up. *Early Hum Dev*, *87*(10), 671-676. https://doi.org/10.1016/j.earlhumdev.2011.05.007

Tsami, L., Lerman, D., & Toper-Korkmaz, O. (2019). Effectiveness and acceptability of parent training via telehealth among families around the world. *Journal of applied behavior analysis*, *52*(4), 1113-1129. https://doi.org/10.1002/jaba.645

Turner-Brown, L., Hume, K., Boyd, B. A., & Kainz, K. (2019). Preliminary Efficacy of Family Implemented TEACCH for Toddlers: Effects on Parents and Their Toddlers with Autism Spectrum Disorder. *Journal of autism and developmental disorders*, *49*(7), 2685-2698. https://doi.org/10.1007/s10803-016-2812-7

Vismara, L. A., McCormick, C., Young, G. S., Nadhan, A., & Monlux, K. (2013). Preliminary findings of a telehealth approach to parent training in Autism. *Journal of autism and developmental disorders*, *43*(12), 2953-2969. https://doi.org/10.1007/s10803-013-1841-8

Wacker, D. P., Schieltz, K. M., Berg, W. K., Harding, J. W., Dalmau, Y. C. P., & Lee, J. F. (2017). The Long-Term Effects of Functional Communication Training Conducted in Young Children's Home Settings. *Education & treatment of children*, *40*(1), 43-56. https://doi.org/10.1353/etc.2017.0003

Wainer, A. L., & Ingersoll, B. R. (2015). Increasing Access to an ASD Imitation Intervention Via a Telehealth Parent Training Program. *Journal of autism and developmental disorders*, *45*(12), 3877-3890. https://doi.org/10.1007/s10803-014-2186-7

Wattanawongwan, S., Ganz, J. B., Pierson, L., Yllades, V., Liao, C.-Y., & Ura, S. K. (2020). Communication Intervention Implementation via Telepractice Parent Coaching: Parent Implementation Outcomes. *Journal of special education technology*, 16264342095002. https://doi.org/10.1177/0162643420950026

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

Wright, C. A., & Kaiser, A. P. (2017). Teaching Parents Enhanced Milieu Teaching With Words and Signs Using the Teach-Model-Coach-Review Model. *Topics in early childhood special education*, *36*(4), 192-204. https://doi.org/10.1177/0271121415621027

Yoder, P., Sandbank, M. P., Woynaroski, T., & Bottema-Beutel, K. (2014). Targeted Interventions for Social Communication Symptoms in Preschoolers with Autism Spectrum Disorders. In (Vol. 1, pp. 788-812).

Yvonne, D. T. (2006). Adult Learning Theories: Impacting Professional Development Programs. *The Delta Kappa Gamma bulletin*, *72*(2), 8.

Zhou, B., Xu, Q., Li, H., Zhang, Y., Wang, Y., Rogers, S. J., & Xu, X. (2018). Effects of Parent-Implemented Early Start Denver Model Intervention on Chinese Toddlers with Autism Spectrum Disorder: A Non-Randomized Controlled Trial.

Vita

Ndaru Prapti was born in Padang, Indonesia. After graduating in May 2003 from Padang State University, where she received her Bachelor's degree in English education, she taught in elementary public school in Solok Town Indonesia for ten years. She became a superintendent of early childhood education programs in 2014 and started to look for scholarship opportunities. She went to the University of Kentucky with a Fulbright scholarship in 2016 to earn a master's degree in interdisciplinary early childhood education. She taught infants and toddlers for the University of Kentucky Early Childhood Laboratory from 2018 until 2023 when she was completing her doctoral program.