Investigating the Feasibility of the See and Say Sequence: Integrated Strategies for Early Word Learning

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Cross-disciplinary research demonstrates the impact caregivers have on child development. Parents shape the early interactions a child has, the environment they live in, and the experiences the child has access to. A major achievement in the parent-child relationship is the establishment of positive, reciprocal communication interactions. However, disruptions in a child's language development may have a major impact on these communication interactions. Late language emergence (LLE), or a delay in spoken words in otherwise healthy toddlers, impacts 10-15% of children (Horwitz et al., 2003; Zubrick et al., 2007), and can have both short- and long-term consequences. Parent implemented interventions, in which early intervention (EI) providers coach parents to use specific strategies within their daily routines, may serve to mitigate the social and communication impacts of LLE.

Parent-implemented interventions tend to be a complex "package" of intervention strategies and the success of these interventions is determined by an interaction of multiple variables (Brown & Woods, 2016). Specifically, the strategies selected, the instructional process by which parents learn these strategies, and the uptake and implementation of the strategies all impact the changes observed in parents' input and subsequent effect on children's language. However, very few studies on parent-implemented interventions clearly detail which variables are contributing most to parent change. This presents barriers to future research and makes it difficult to translate research to clinical practice. Thus, the current study uses a brief intervention, thoroughly detailing the components of the intervention and precisely measuring parent outcomes. This approach may help translate research-based interventions, which tend to be intensive and involved, to more streamlined interventions that are feasible for clinical practice.

The aim of the current study was to determine the feasibility of a brief parent-implemented intervention. The study was designed to provide information about the amount of

instruction needed for parents to learn and implement language strategies and determine whether these strategies alter specific properties of parent input. The literature review provides an overview and critical analysis of the parent-implemented intervention literature followed by the theoretical and empirical frameworks used to inform the design of the brief parent-implemented intervention used in the current study.

The Transactional Nature of Parent-Implemented Interventions

The interactions between parents and their children are the foundation of parent-implemented interventions, aligning with a transactional model (Sameroff, 1975). Skilled clinicians provide education to caregivers on intervention strategies and then coach parents in using these strategies during parent-child interactions and daily routines (Woods et al., 2011). The transactional theory posits that a child and their caregiver respond and adapt based on the other's behaviors, influencing the transactions in interdependent ways (Sameroff, 1975). Both the child and the parent contribute to the transaction, and these contributions influence subsequent transactions. Further, the interpretation or perception of the transaction also influences both parent and child behavior (Sameroff & Fiese, 2000). For example, if both the child and the caregiver perceive a communication interaction as positive and engaging, the likelihood of a subsequent communication interaction should be high. However, if either the child or parent have a negative attribution about communication interactions, the ability to facilitate subsequent positive and engaging interactions may become more difficult. From a transactional perspective, parent-implemented interventions should enhance parent-child interactions for both the parent and the child.

It is critical to not only include caregivers in the intervention process but consider how parent-implemented interventions can foster positive changes across the transactional landscape

of parent-child interactions. Parents carry much of the responsibility within parent-implemented interventions. Brown and Woods (2016) have explained that parent-implemented interventions function as a "triadic relationship" between the EI provider, parent, and child. A transfer of information and skills must first take place between the provider and the parent, followed by the parent implementing language strategies meant to facilitate the child's language learning. Numerous studies have demonstrated that parents can learn language strategies and that these strategies can, in turn, facilitate improved child communication outcomes (Roberts & Kaiser, 2011; Roberts et al., 2019). However, to understand the impact parent-implemented interventions have on parent-child transactions, it is necessary to document the precise ways these language strategies impact parent input.

Rowe and Snow (2020) provide a helpful organizational framework to review language strategies commonly used within parent-implemented interventions and detail how these strategies may alter parent input features. The interactive dimension of parent input highlights the importance of socially engaging, responsive, and back-and-forth communication interactions. Interaction-promoting strategies are grounded in responsivity, or a parent's prompt, contingent, and appropriate reaction to their child (Bornstein, 1989; Tamis-LeMonda & Borstein, 2002). In parent-implemented interventions, parents are taught to allow space for their child to communicate, follow their child's lead, and respond to their child's communication with semantically related utterances (e.g., Girolametto et al., 1999; Kaiser et al., 1996; Kaiser, 2015; Tannock et al., 1992; Weitzman, 2017).

The conceptual dimension of parent input characterizes whether parent input is about objects and events in the physical context referred to as the "here and now" or to more abstract topics about objects and events outside this context, often characterized as the "then and there"

(Rowe & Snow, 2020). Many parent-implemented interventions emphasize the use of conceptually simple input. By labeling objects and describing events within the child's focus of attention, parents are taught to use contextualized language about the here and now (e.g., Girolametto et al., 1999; Kaiser et al., 1996; Roberts & Kaiser, 2015; Tannock et al., 1992; Weitzman, 2017). The linguistic dimension of parent input characterizes the lexical and grammatical features of the input (Rowe & Snow, 2020). Parent-implemented interventions tend to teach parents broad input modifications, such as using short, simple sentences (e.g., Girolametto et al., 1999) as well as more specific language modeling strategies, such as imitations and expansions (e.g., Girolametto et al., 1996; Kaiser et al., 1996; Roberts & Kaiser, 2012, 2015).

Clearly, different language strategies modify parent input in different ways. The use of one language strategy may change interactive features of parent input, whereas a different strategy may alter conceptual or linguistic features. For example, teaching a parent to use imitations (i.e., immediately repeating the child's utterance; Levickis et al., 2014) would likely alter a parent's interactive features by providing the child an immediate and semantically related response. Teaching a parent to use parallel talk (i.e., describing the child's actions; (Robertson & Weismer, 1999) may have a larger impact on the parent's conceptual features by focusing their talk on events happening in the here and now. Consequently, altering parent input across all three dimensions may require multiple language strategies. Most parent-implemented interventions within the field of speech-language pathology tend to use a "package" of language strategies. In a scoping review, Finestack and colleagues (2022) summarized 59 parent-implemented intervention studies, revealing that all interventions taught parents more than one language strategy. In theory, a package of language strategies has the potential to optimize parent input

across the interactive, conceptual, and linguistic dimensions. However, for this to happen, the parent instructional procedures used in the intervention must explicitly teach parents how to utilize the entire package of language strategies. In addition, the outcome measures reported in the literature should reflect precise changes across each dimension of parent input. Unfortunately, these characteristics are rarely detailed in the parent-implemented intervention literature, limiting the ability to make conclusions about how a package of language strategies contributes to multidimensional changes in parent input.

Gaps in the Parent-Implemented Intervention Literature

Employing a Package of Language Strategies

Parent-implemented interventions teach parents numerous language strategies, but rarely include information on how parents should integrate or balance their use of these strategies. When introducing parents to language strategies, intervention procedures in the parent-implemented intervention literature tend to use an incremental approach. That is, parents learn a single strategy at a time, typically to a level of mastery, prior to the introduction of subsequent strategies (e.g., Kaiser & Roberts, 2013). For example, the parent manual for *It Takes Two to Talk,* a parent program specific to parents of children with language delays, addresses responsivity strategies in the first five chapters, but does not address language modeling until chapter six (Weitzman, 2017). Thus, parents learn how to be responsive early on, but do not learn what types of linguistic input to use in their responses until four weeks later (McCauley et al., 2017). However, parent input that contains appropriate interactive features, but not conceptual or linguistic features does not offer the child with optimal input for language learning (Rowe & Snow, 2020). Current research has emphasized the importance of understanding both *what* parents say and *how* they deliver it in parent input (Masek et al., 2021; Preza & Hadley,

2022). This same approach may be beneficial for parent instruction within parent-implemented interventions. Rather than teaching parents responsivity as an isolated strategy, parents may benefit from learning *what* linguistically rich and conceptually simple input to use during these responsive interactions. This would allow parents to simultaneously alter the interactive, conceptual, and linguistic features of their input.

Further, an integrated approach, where strategies are taught to parents together rather than incrementally over time, may aid parents' learning and implementation. From an adult learning perspective, parents may benefit from understanding the whole task prior to learning individual components, as it helps conceptualize the final product (Boshier, 2011). If parents are given a holistic understanding of the intended parent-child interaction, they may better understand and implement the individual language strategies that contribute to this final product. Single case designs, such as Kaiser et al. (1996) and Roberts et al. (2014), highlight that parents enrolled in parent-implemented interventions differ in their acquisition and maintenance of strategies. One reason for this may be that parents have different preferences and interaction styles. Parents with a directive interaction style, for example, may default to strategies that are adult-initiated, such as prompting, rather than more responsive strategies, such as responsive labeling. Without explicit instruction on how to balance the use of different language strategies, parents may rely on a strategy they feel most confident delivering and avoid strategies they find more difficult. Unfortunately, no study to date has clearly detailed how parents balance their use of a package of language strategies during interactions with their child.

In addition to integrating language strategies, it is critical that all language strategies within a package are developmentally timed to the child. Because a transactional model recognizes the influence a child has on parent behaviors (Sameroff, 1974), the child's

developmental level must be considered. However, a large subset of parent-implemented intervention research utilizes populations of children that are developmentally heterogeneous. Meta-analyses of parent-implemented interventions have compared interventions across populations of children ranging in age from 15 months to 5 years with diagnoses of language impairment, developmental delay, and various neurodevelopmental disabilities (Roberts & Kaiser, 2011; Roberts et al., 2019). These different populations of children have different linguistic skills and may benefit from different features of parent input. For example, lexical redundancy in parent input to infants is advantageous for learning words (Newman et al., 2016), but lexical diversity in parent input to toddlers around age 2 is a stronger predictor of later vocabulary outcomes (Hsu et al., 2017; Pan et al., 2005; Rowe, 2012). When intervention effects are collapsed across children with various language levels, the strategies in the package may not be specifically tailored to the child's language level. This makes it difficult to draw conclusions about which language strategies are most effective for specific developmental periods.

Developmentally timed strategies, on the other hand, may be easier for parents to learn and implement. Focused, developmentally timed strategies that are immediately relevant to the child should be easier to learn, as these fit within parents' current understanding of their child (Boshier, 2011; Jarvis, 1985; Knowles, 1980). Further, parents' ability to implement a strategy is influenced by their children's language abilities. For example, the use of expansions (i.e., a response that repeats the words of the child's proceeding utterance and adds additional morphemes or words; Levickis et al., 2014), is highly dependent on what the child offers linguistically to the interaction. If a child does not use words often, parents have very few opportunities to employ this strategy. When strategies are commensurate with the child's developmental level, parents can make better use of them in parent-child interactions.

Unfortunately, when an intervention program is targeted to children with a wide range of developmental levels, the strategies in the package may not be specifically tailored to the child's language level. This also means parents may not learn about the optimal developmental timing for individual strategies. Thus, using an "all purpose" package of strategies without specifying the developmental timing of each strategy may present barriers to parent learning and implementation.

Measuring Parent Outcomes

Measuring changes in parent input is critical in understanding the catalyst of change in parent-implemented interventions. Unfortunately, not all parent-implemented intervention investigations report parent communication outcomes. A meta-analysis revealed that less than half of the parent-implemented intervention investigations reported caregiver outcomes (Roberts et al., 2019). Parent change is the most proximal measure in parent-implemented interventions and contributes to changes in parent-child interactions. Thus, it is important to prioritize parent outcome measures in these studies.

Of the parent-implemented interventions that report parent outcomes, many only measure parents' strategy use. They do not provide precise information about how the use of a strategy changes specific properties of parent input. For example, in a randomized control trial of Enhanced Milieu Teaching (EMT; Roberts & Kaiser, 2012, 2015), parent outcomes were reported as the percentage with which parents used matched turns, responsive feedback, language targets, expansions, and prompting. However, implementing these strategies may alter parent input in substantially different ways depending on the parents' baseline input and the lexical and grammatical features parents select when employing these strategies. Without an

analysis of how each strategy in the package alters parent input, it is difficult to determine how these strategies optimize the input to facilitate growth in children's language.

In addition, parent-implemented intervention studies have not adequately addressed all three dimensions of parent input when measuring parent outcomes. The interactive dimension, with specific focus on parent responsivity, has received much of the attention in the parent-implemented intervention literature. For example, Girolametto (1988) measured turn taking, contingent responsiveness, and topic control to precisely capture change in parents' interactive features before and after participation in the Hanen Parent Program. These constructs were theoretically supported by the responsivity literature and aligned with the strategies taught to parents in the intervention, making them sensitive to change. When compared to the control group, parents who received the intervention demonstrated more balanced and responsive turns with their children and used fewer topic redirections. These measures aligned with the language strategies taught to parents in the intervention and precisely quantified change in the interactive features of the parents' input.

Unfortunately, parent-implemented interventions have not characterized linguistic features with as much precision and theoretical motivation as interactive features. For example, in a later study of the Hanen Parent Program, Girolametto et al. (1999) measured changes in parents' structural features, features related to Rowe and Snow's linguistic dimension. Theoretically, the authors posited "maternal speech input that is slightly more advanced than the child's expressive language may facilitate language development because it provides models that are one step ahead of the child's abilities, but still at a level that can be mastered" (pp. 365). In practice, however, the authors did not focus on measures of parent language that empirically tested their structural hypothesis. Instead, they employed broad measures of parent input,

including parents' total number of utterances, rate of communication, length of utterances, and type-token ratio. The language measures used did not reflect their theoretical position that slightly more advanced parent input would promote language outcomes. Although language strategies are hypothesized to alter the way parents interact and talk with their children, more precise and theoretically motivated measures are needed to test hypotheses about the properties of parent input that promote language development in intervention research.

In summary, parent-implemented interventions tend to be a complex package of intervention strategies to be used with children reflecting a range of developmental levels. Interventions have introduced these strategies in an incremental manner and have failed to show how these strategies can interact to alter parent input across the interactive, conceptual, and linguistic dimensions. Further, investigations of parent-implemented interventions have not consistently reported parent outcomes and those that do tend to only use broad measures. Specifically, precise linguistic measures are rarely used in the parent-implemented intervention literature. This limits researchers in drawing conclusions about how language strategies specifically alter parent input and the parent-child interactions in which this input is delivered. In considering next steps for parent-implemented interventions, researchers need to specify the interactive, linguistic, and conceptual value of language strategies and then measure these features in the parent input.

The current study aimed to fill the identified gaps in the parent-implemented intervention literature. To do this, I designed the See and Say Sequence, an integrated set of language strategies, empirically motivated to facilitate children's early word learning through parent-child interactions. Rather than introducing these individual strategies to parents using an incremental approach, I created an approach in which strategies were introduced as an integrated whole. That

is, parents learned all strategies at once with clear instruction on how to balance their use of the strategies during parent-child interactions. This novel approach is hypothesized to streamline the process of learning and implementing language strategies, decreasing overall intervention time when compared to well-established parent-implemented intervention approaches in the literature (Kaiser & Hampton, 2017; Weitzman et al., 2017). The following section details the empirical and theoretical support for the design and implementation of the See and Say Sequence.

The See and Say Sequence

The See and Say Sequence uses a novel approach for teaching parents to implement language strategies with their child in an integrated way. The goal of this approach is for parents to simultaneously enrich their interactive, conceptual, and linguistic features of parent input in a way that is developmentally timed to children who are learning their first 100 words. Parents are taught to notice their children's communication and respond with high quality linguistic input tailored to this developmental period. To encourage a back-and-forth interaction, parents are taught to deliver this responsive, linguistically rich, and conceptually simple input within an interactive sequence. The steps to the See and Say Sequence and the features of input they are hypothesized to alter are detailed below:

1. See: Notice the child's communication or a comment-worthy moment with the child's object of interest (Conceptual: focus on concrete object).
2. Say: Respond with the name of the object the child is communicating about or interested in (Interactive: responsive input; Conceptual: mapping of word in input to concrete object in the world; Linguistic: single word, noun-focused input).

3. See: Wait for the child to communicate back with either a verbal or non-verbal communication act. If no communication occurs within 5 sec, move to the final step (Interactive: balanced turns).
4. Say: Use a toy talk sentence (i.e., an active declarative sentence with a noun subject) about the object of interest (Interactive: responsive input; Conceptual: talk about concrete object; Linguistic: semantically related information in simple sentence structure).

Optimizing Parent Input

As highlighted in Rowe and Snow's framework (2020), optimal parent input contains features of the interactive, conceptual, and linguistic dimensions that are developmentally timed to the child. The See and Say Sequence aims to alter parents' input to support their children's communication and word learning. Implementation of the See and Say Sequence should result in parent input that is responsive, linguistically rich, and delivered in moments that support children's conceptual mapping and word learning. The sequential nature demonstrates how the features of each dimension, when developmentally timed, are not operating independently, but interact to result in optimal parent input.

The See and Say Sequence aligns with previous applications of responsive strategies such as following the child's lead and noticing the child's interests (Weitzman, 2017) but provides further support to explicitly teach parents what child acts to respond to. To encourage responsivity, parents are provided education on the importance of responding to their children's non-linguistic forms of communication, such as gestures, and more subtle forms of communication, such as vocalizations and social engagement acts. Empirically, high levels of parent responsivity have been linked to children's use of intentional communication (Yoder &

Warren, 1999), higher parent-reported child vocabulary (McGillion et al., 2013), and higher scores and longitudinal growth on cognitive and language measures (Landry et al., 2001).

Additionally, parents are taught to notice comment-worthy moments. Comment-worthy moments describe moments in which the child has heightened interest and attention to an object (Hadley, n.d.). These moments occur more often when an object suddenly appears, changes, or moves, making them easy to recognize and an optimal context for responsive parent comments. These salient moments of heightened interest are hypothesized to support initial conceptual mapping, or the process of extracting a word from the input and connecting it with a referent in the environment (Trueswell et al., 2016). Increasing parents' awareness of their children's many forms of communication and knowledge on highly informative contexts for word learning may better equip parents to be responsive.

Parents are taught specific linguistic structures to use when responding during play interactions with their child. The See and Say sequence first directs parents to respond to their children's communication acts by using single words to name salient objects in the play environment. Word learning researchers tend to agree that the earliest word learning involves these word-to-world pairings (e.g., Bruner, 1974; Gleitman et al., 2005). For example, Tomasello and Farrar (1986) found that mothers' object references that were accompanied by a gesture and followed children's attentional focus when their children were 15 months were significantly and positively correlated with children's overall vocabulary size and children's object labels at 15 and 21 months. This highlights how increasing the saliency of a referential object may contribute to children's word learning. Further, Brent and Siskind (2001) found that when mothers presented a word frequently in isolation to their 9- to 15-month-old children, the word was more likely to be in the children's productive vocabulary at 18 months. Thus, isolated words in the

parent input may also support early word learning, perhaps by eliminating the challenge of extracting a noun from the speech stream.

However, this initial fast mapping only accounts for a partial representation of the word (Carey & Bartlett, 1978). A complete understanding of a word develops over time and is referred to as extended mapping. In building a full representation of a word, a child must acquire information about the objects it refers to such as their properties, actions, or relationships with other objects in the world. The final step of the See and Say Sequence may facilitate opportunities for extended mapping by encouraging parents to use toy talk sentences (Hadley & Walsh, 2014, Hadley et al., 2017a). By teaching parents to 'talk about the toys' and 'give the object its name,' Hadley et al. (2017a) demonstrated that parents increased their use of active, declarative sentences with noun subjects, operationally defined as a sentence in which the predicate described a referential subject's state, property, action, location, or possession. Conceptually, toy talk sentences provide opportunities for children to learn about qualities of the sentence subject. For example, when a parent says, "The cow is eating" or "The cow is in the barn," they are providing relevant information about what cows do and where cows live. In contrast, the sentence, "You found the cow," is not about cows at all, but rather about the child's action, and therefore does not provide any new information about cows. Hadley et al. (2017a) also documented that parents' use of toy talk sentences are linked to growth in children's grammatical development. However, in the absence of instruction, these types of sentences are rare in naturally-occurring parent input, accounting for less than 3% of parent utterances to toddlers.

The final component of the See and Say Sequence is the sequence. The packaging allows the interaction to proceed in a back-and-forth, interactive manner. In line with a transactional

perspective (Sameroff, 1975), the See and Say Sequence aims to facilitate mutual enjoyment of the communication interaction by both the parent and the child. The "redefinition" approach to intervention detailed by Sameroff and Fiese (2000) aims to change the way in which a parent interprets their child's behavior and alters the expectations the parent has about their child. In the current investigation, the aim is to redefine what parents view as communication, expanding this definition to include their children's more subtle forms of nonlinguistic communication (e.g., pointing, eye gaze, showing objects). The goal would be to shift a parent's negative attribution about their child (e.g., my child should be using words and they are not) to a more constructive attribution (e.g., my child is successfully communicating with gestures).

In the current study, the redefinition approach to intervention is hypothesized to have cascading effects. By emphasizing communication broadly, rather than spoken words, I aim to direct parents' attention to the child's message rather than verbal performance, which should increase parents' responsivity to a wider variety of communication acts. Communication is defined as the exchange of a message between a sender and a receiver (Pence Turnbull & Justice, 2017). When parents respond to their children's communication attempts, they signal that they have received the message. By expanding the range of messages parents respond to, children will receive these signals more often, reinforcing the child's role as a "sender" in the communication process. Communication is a naturally reinforcing process (Rice & Wilcox, 1995). Thus, an increase in successful communication exchanges may lead to higher levels of engagement and mutual enjoyment within communication interactions and increase the likelihood that subsequent communication interactions will occur. A critical component of parent-implemented interventions is establishing a positive and engaging environment in which language learning can

occur. This sequence of events highlights how a transactional perspective can lay the foundation for this positive learning environment in the current investigation.

The See and Say Sequence is a novel approach to introducing parents to language strategies grounded in transactional theory and designed with each dimension of Rowe and Snow's (2020) framework in mind. Parents are taught to respond in optimal moments when children's interests are heightened. The input they respond with should be varied and linguistically rich to first refer to concrete objects in the play environment and then convey semantic information about those referents. The sequential packaging allows the interaction to proceed in a back-and-forth, interactive manner. In this way, the See and Say Sequence prioritizes mutual engagement and shared enjoyment while offering simple input modifications to enhance children's ability to engage in communicative interactions, segment nouns from the speech stream, conceptually map these nouns to their referents in the environment and build up the word's semantic representation.

Parent Learning within a Brief Intervention

In conceptualizing a parent-implemented intervention, parent learning must be considered in all areas of the design. These areas include the content of the intervention, the order the content will be introduced, and the instructional approach. For the current investigation, parent learning was considered within a brief intervention, conceptualized as a single intervention session. Brief interventions are not conducive to extensive amounts of content. Despite this, in the literature many interventions deemed "low-intensity" attempt to cover the wide range of child developmental milestones that a parent may observe (e.g., Cates et al., 2018; Mendelsohn et al., 2011; Peacock-Chambers et al., 2017). This content, comprised of a variety of topics, is not proportionate with the intensity level. Focused, developmentally timed information, on the

other hand, provides parents with a limited set of strategies that are useful and feasible to learn in a brief lesson. Thus, the current investigation focuses on parents' ability to learn a limited number of components. These components were selected with empirical support, as detailed in the previous section. In addition, the See and Say Sequence was designed so parents could feel successful in implementing it without requiring their children's production of spoken words. Parent-implemented interventions that are contingent upon children's spoken word production may leave parents feeling frustrated and disappointed if their children do not begin producing words. When faced with this, parents may lose motivation to continue implementing the language strategies in the intervention, reducing the amount of quality input the child is getting. However, by directing parents' attention to any child communication act, the parent is likely to notice progress in the child's communication they may not have otherwise looked for. Overall, the contents of the See and Say Sequence intervention was designed to include a limited set of empirically supported strategies that prioritized parents' ease of implementation and feelings of success.

Next, I turned to adult learning principles to guide how these components would be introduced to parents. Two main adult learning principles guided the design of the See and Say Sequence intervention. First, the See and Say Sequence presented language strategies as an integrated whole, rather than as incremental strategies over time to help parents conceptualize the final product (Boshier, 2011): a linguistically rich back-and-forth interaction with their child. The use of an integrated approach was hypothesized to support parents by illustrating how each step of the sequence worked together to create a cohesive communication interaction. Parents should understand the link between the "see" and "say" components and understand how they work together. Further, an integrated approach should reduce parents' need to select between

strategies, as the sequence provides a clear approach to balance responsive input strategies with language modeling strategies. Second, parents' knowledge about their child should be valued and connected to the learning environment (Boshier, 2011; Jarvis, 1985; Knowles, 1980). The See and Say Sequence is developmentally timed to children learning their first 100 words. Therefore, the content is narrowly focused on supporting children in this developmental period and should align well with parents' understanding of their children's skills.

Finally, I used empirically supported work to adapt an instructional process. Work by Trivette and colleagues (2009) has influenced the instructional processes of many parent-implemented interventions in the literature. This work revealed that adult learning approaches using a higher number of learning characteristics yielded higher effect sizes (d=1.25 for five) than those with fewer characteristics (d=0.75 for two to four; Trivette et al., 2009). One specific adult learning approach evaluated by Trivette et al. (2009) was coaching. Coaching is an empirically supported adult learning method commonly cited within parent-implemented interventions (Brown & Woods, 2016; Sone et al., 2020). However, parent coaching practices are not well-defined in the literature, which may limit the clinical utility of this approach. A recent meta-analysis revealed interventions that included parent coaching yielded larger intervention effect sizes than interventions in which providers engaged in information sharing and instructional techniques alone (g = .745; Sone et al., 2021). The authors concluded that coaching was the most effective practice to promote adult learning in early intervention sessions, but across studies there was ambiguity in the coaching practices described. Friedman and colleagues (2012) found that providers were more likely to use general coaching strategies (i.e., conversation and information sharing, observation, jointly interacting, and provider-child interactions) than specific coaching strategies (i.e., direct teaching, demonstration, caregiver

practice with feedback, guided practice with feedback, problem solving, and reflection), which is problematic as specific coaching strategies are designed to enhance adult learning.

To systemize coaching practices, Kaiser and Roberts (2013) introduced an instructional process called Teach-Model-Coach-Review (TMCR). TMCR incorporates adult learning methods summarized by Trivette et al. (2009) into an instructional process for parent-implemented interventions. Roberts and colleagues (e.g., Roberts & Kaiser, 2012, 2015; Roberts et al., 2014) have studied the impact of TMCR within investigations of EMT. Results have demonstrated TMCR can be implemented with high fidelity and that it facilitates large effect sizes in parents' use of language facilitation strategies when compared to a control group (Roberts & Kaiser, 2015). The authors state that adult learning principles are gradually incorporated at each stage of TMCR, as summarized in Table 1. Further, the rich description of this instructional process is a valuable addition to the parent-implemented intervention literature, as not all parent-implemented interventions describe the instructional process or learning characteristics they are including in the intervention (Roberts et al., 2019).

Table 1

TMCR Integration of Adult Learning Principles

Teach-Model-Coach-Review (Kaiser & Roberts, 2013)	**Adult Learning Principles** (Trivette et al., 2009)
Teach: parents attend a workshop to learn strategies of EMT, view video examples, and role-play with the researcher.	Introduce: provide the learner a preview of the material Illustrate: demonstrate the use of and applicability of the material Practice: engage the learner in use of the material
Model: the therapist models the strategies with the child while verbally explaining the strategy to the parent	Illustrate: demonstrate the use of and applicability of the material
Coach: the therapist provides a balanced amount of praise and constructive feedback while the parent is implementing the strategy with the child	Practice: engage the learner in use of the material Evaluate: engage the learner in evaluating the outcome using the material
Review: The parent and therapist discuss the session. The therapist asks questions regarding the parents' perception of the session and provides their own impressions of the session.	Reflection: engage the learner in self-assessment of their knowledge and skills Mastery: engage the learner in assessing their knowledge and skills based on an external set of criteria

In the current investigation, TMCR was employed to ensure a systematic instructional process across parents. Overall, the intervention was designed to support parent learning in a brief intervention. This aligned with the aim the study, which asked how quickly parents can learn responsive, language modeling strategies when introduced to them using the See and Say Sequence. Parent-implemented interventions in the literature typically span weeks, if not months (Finestack et al., 2022). The integrated instructional approach reflected in the See and Say Sequence is hypothesized to allow parents to learn numerous empirically supported language strategies within a single, brief session. Thus, the goal of the current investigation is to evaluate the feasibility of this novel, integrated approach.

The Current Study

The current study examined the feasibility of the See and Say Sequence in a brief intervention design. This investigation adds to the parent-implemented intervention literature in multiple ways. First, the See and Say Sequence introduces parents to strategies in a novel way that is hypothesized to simultaneously alter the interactive, conceptual, and linguistic dimensions of their input. Second, the methodology includes measures of each dimension to characterize changes in parent input. Third, the parent training procedures are conducted in a short, empirically supported instructional process rooted in adult learning theory to foster efficient parent learning. The brief nature of the intervention session allowed for a better understanding of how quickly and accurately a parent can learn language strategies packaged in a novel sequence. The purpose of this study was to understand how much change, if any, could be facilitated in parent input when introduced to the See and Say Sequence with a brief intervention session. The current study asked the following research questions:

1. Can parents of toddlers demonstrate knowledge and application of the See and Say Sequence with brief instruction?
2. How does the See and Say Sequence alter parents' input during a play interaction with their children?
3. Exploratory: What characteristics of parents and children support parents in learning and applying the See and Say Sequence given brief instruction?

Based on previous work utilizing toy talk in a low-intensity format (Hadley & Walsh, 2014), I hypothesized that parents would alter their input in response to learning the See and Say Sequence. Specifically, after a brief intervention session, I hypothesized parents would use an increased number of single word nouns and active, declarative sentences with a noun subject

(i.e., toy talk sentences) in responsive and conceptually relevant utterances during play with their child.

Method

Design

The current study employed a single group pre-post intervention design. All participants took part in the brief intervention and learned the See and Say Sequence. Data central to the primary research questions was collected before and after the brief intervention through naturalistic language sampling. Data collection took place at a playroom at the Speech and Hearing Science Department (SHS) at the University of Illinois Urbana-Champaign (UIUC).

Participants

Participants were recruited through social media advertisements, community daycares, and other community sources in the Champaign County area. Interested parents contacted the researcher and participated in a screening process, which consisted of a brief phone interview and completing the web-based version of the *MacArthur-Bates Communication Development Inventories: Words and Gestures* (CDI; Fenson et al., 2007) to determine eligibility. The Web-CDI is an online vocabulary checklist in which parents indicate whether their child "understands" or "understands and says" each word from a list 396 words, gestures, and early communication milestones. The Words and Gestures (WG) version was used because parents recruited for the proposed study will have children who are not combining words often. To date, reliability and validity data have not been reported for the Web-CDI. However, the original paper and pencil version of the MacArthur-Bates Communication Development Inventories: Words and Gestures (CDI:WG; Fenson et al., 2007) was normed on 1,178 participants. It has adequate reliability and validity and is frequently used in research on toddler language.

To be eligible for the study, children in the parent-child dyad had to meet the following inclusion criteria: (a) between the age of 15 and 24 months (b) 100 words or less based on parent report on the CDI, (c) no known hearing or vision impairments, (d) no known motor deficits, (e) no known cognitive impairment, (f) no diagnosed development disabilities (e.g., autism, Down syndrome, cerebral palsy), and (g) English as primary language spoken to the child in the home. Because children were younger than the average age many developmental disabilities are identified (Sheldrick et al., 2017), a proxy measure was used to screen for developmental disabilities. In addition to the inclusion criteria, children also had to meet one of the following criteria: (a) parent report of "often" in response to three out of four primary gesture items on the CDI (i.e., items related to *give, show, reach,* and *point* gestures); (b) five or more *referential* words on the CDI; or (d) parent-report of an external developmental assessment in which results did not identify a diagnosis or at-risk status for developmental disabilities. These inclusion criteria ensured that children in the study were homogenous in their language and developmental levels. Parents not included in the study were offered a PDF summary of the See and Say Sequence.

Two investigator over-rides were made to the proposed eligibility criteria. In both cases, the children exceeded 100 words on the CDI, with 103 and 135 words reported, respectively. This eligibility criterion was set to ensure children in the study were primarily single word users during the parent-child interactions. To ensure this was true of the two children who had not met the CDI criterion, their mean length of utterance in morphemes (MLU) was compared to other children in the study. Both children had an MLU of 1.13, which were not outliers in the dataset and indicated they were both primarily single word users. Thus, both children were included in the study.

In total, 14 parent-child dyads participated in the study. Table 2 summarizes parent demographic characteristics. At the time of screening, parents were, on average 34 years old (*SD*=4.5). Most parents were White, non-Hispanic (92.9%) and female (78.6%). All parents held a college degree, with 64.2% of those being a graduate degree, and had average annual incomes greater than $50,000. Only 28.6% of parents expressed concern about their children's speech and language development. Table 3 summarizes child demographic characteristics. At the time of screening, children ranged from 15 months to 24 months (*M*=19.57 months, *SD*=2.85 months). Most children were White, non-Hispanic (92.9%), male (64.3%), and not enrolled in early intervention (78.6%).

Table 2

Parent Demographic Characteristics

Parent (*N*=14)	
Age (*M, SD)*	34.93, 4.5
Gender (*n*)	
Female	11
Male	3
Race (*n*)	
Black	1
White	13
Ethnicity (*n*)	
Hispanic or Latino	1
Non Hispanic	13
Education (*n*)	
College degree	5
Advanced degree	7
More than advanced degree	2
Average annual income (*n*)	
$50,000-100,000	6
$100,00-150,00	6
$150,000-200,000	2
Worried about child's speech and language (*n*)	
Yes	4
No	10

Table 3

Child Characteristics

Child (*N*=14)	
Age (*M, SD)*	19.57, 2.85
Gender (*n*)	
Female	5
Male	9
Race (*n*)	
Black	1
White	13
Ethnicity (*n*)	
Hispanic or Latino	1
Non-Hispanic	13
Enrolled in early intervention (*n*)	
Yes	3
No	11

Procedures

Parent-child dyads that met the inclusion criteria were enrolled in the study. After parents were notified of their enrollment status, they received an instructional email with a brief description of the research study purpose and procedures and a link to the informed consent form. Parents who signed the informed consent received a link to three baseline measures via Research Electronic Data Capture (REDCap): A demographic survey, The "Child Communication Priority" survey, and *Knowledge of Infant Development Inventory (KIDI*; MacPhee, 1981). All online surveys and participant information were stored in REDCap, a secure, HIPAA-compliant platform. The "Child Communication Priority" survey used an open-ended question format to better understand parents' priorities for their toddlers' communication. This was a self-made measure that is being piloted in the current study to inform future work with parents of late talking toddlers. Two questions were asked related to parents' priorities for their children's communication development.

1. *Think about your child's communication. What is something they do really well?*
2. *If you could help your child gain one new communication skill in the next 3 months, what would it be?*

The KIDI is a measure of parent knowledge of developmental milestones and processes in children from birth to three years of age (MacPhee, 1981). It has been used as a measure of child development knowledge in numerous studies that have reported high levels of reliability and validity (e.g., Benasich & Brooks-Gunn, 1996; Hamilton & Orme, 1990).

Data collection took place at the SHS department at UIUC and lasted approximately one hour. Research visits were recorded with audiovisual cameras embedded in the playroom. All video and transcript data were de-identified and stored on a secure password-protected University of Illinois server. When parent-child dyads arrived, parents were asked to sign a media consent form and provided instructions on all research visit tasks. In the following order, parents participated in a pre-intervention language sample, the brief intervention to learn the See and Say Sequence, a post-intervention language sample, and an online Parent Satisfaction Survey via the researcher's iPad. Finally, parents were provided with take-home materials and recommendations. Materials include a PDF summary of the See and Say Sequence (Appendix A), a PDF strategy-use observation document (Appendix B), and a recommendation to play with their child 15-min a day while using the See and Say Sequence.

Language Samples

The parent-child dyad engaged in two separate language samples: before and after the See and Say Sequence brief intervention. In the pre-intervention language sample, parents were instructed to play as they normally do at home. In the post-intervention language sample, parents were instructed to use the See and Say Sequence during play. Each language sample lasted 10

minutes. Parent-child dyads were presented with identical toys for each language sample to control for language production opportunities, child engagement in the play interaction, and parent-child play style between the two language samples. All play opportunities were set up in the playroom prior to the parent-child dyad arriving and parents were informed of all opportunities prior to starting the language sample.

Parents were instructed to begin language samples by playing with wind-up toys. The wind-up toys were used to provide children a clear opportunity to use a proto-imperative communication gesture (e.g., Blake et al., 1994; Olson & Masur, 2011). After the wind-up toys, parents could play with any other toy in the playroom as they normally would at home. The following toy sets were used: baby and bath set, farm set, stacking houses with animals, and a playground and with children figures set. Parents were told they did not need to play with every toy in the playroom. At the halfway point of each language sample, the researcher activated a remote-control car that was hidden under a chair and made the car drive across the playroom. The remote-control car was used to provide children an opportunity to use a proto-declarative pointing gesture (Blake et al., 1994; Olson & Masur, 2011).

The See and Say Sequence Brief Intervention

The researcher taught the parents to use the See and Say Sequence. To allow parents to focus on the intervention, a research assistant was present to occupy the child. New toys were also offered to the child to reduce the likelihood the child would tire of the language sample toys. Parents were given a handout, which was comprised of the following four steps and accompanying researcher explanation:

1. "See your child communicate or show interest"—Notice the child's communication or notice a comment-worthy moment with the child's object of interest.

2. "Say the name"—Respond by saying the name of the object the child is communicating about or playing with (e.g., "Train!").
3. "See your child communicate back"—Wait for the child to communicate back with either a verbal or non-verbal communication act. If no communication occurs within 5 sec., proceed to the final step.
4. "Say something about it"—Respond with a sentence that starts with the name of the object of interest (e.g., "The train is going up!").

The "see" component (steps 1 and 3) focused on aspects of parent responsivity. Parents were taught to notice and respond to their children's communication acts or a comment-worthy moment within the children's play. A child communication act in the current study was defined as any child behavior directed toward the parent that could be interpreted to have meaning. This was intentionally broad to encourage parents to recognize children's subtle behaviors. A comment-worthy moment during play was defined as a moment of heightened interest by the child, typically in reaction to something surprising or interesting in the environment (Hadley, n.d.).

The "say" component (steps 2 and 4) focused on providing linguistically rich input. First, parents were instructed to say the object name as a single word. Then, parents were instructed to say something about the object in a sentence. Parents were instructed to start their sentence with the name of the object, incorporating principles of toy talk (Hadley et al., 2017a; Hadley & Walsh, 2014). The See and Say Sequence was presented in a specific sequence that mirrored the natural back-and-forth of communication. The researcher explained to parents that their child would begin the sequence by communicating about or playing with an object in the play

environment. Parents were encouraged to provide enough wait time for their child to take a turn during the sequence.

Participants were taught the See and Say Sequence in a brief intervention using the Teach-Model-Coach-Review (TMCR) instructional process.

1. *Teach*: The researcher introduced the See and Say Sequence and described the components through didactic instruction and examples. Examples were based on information the parent shared with the researcher regarding the child's play interests and communication styles. Within the explanation of each component, the researcher provided a brief explanation and, helped parents identify types of non-linguistic communication their child used, explained comment-worthy moments, and explained and illustrated the parent responses (e.g., "say the name" and "say something about it").
2. *Model*: The researcher modeled the See and Say Sequence with the parent through role play. The parent took on the role of the child, while the researcher took on the role of the parent. The researcher instructed parents to point to a puzzle piece and then lift it up and show it to the researcher. The researcher modeled "say the name" and "say something about it" in response to the parents' non-linguistic communication acts.
3. *Coach*: First, the parent practiced with the researcher. The researcher took on the role of the child and the parent practiced using the See and Say Sequence. The researcher provided specific feedback to the parent during this practice opportunity and allowed the parent to ask any clarification questions. The parent then joined their child in play and used the See and Say Sequence during this play interaction. To elicit the child's

interest and communication attempts, the parent presented the child with new toys not used in the language sample. The researcher provided guided feedback, as needed and specific feedback after most attempts. On the parent's third attempt, the researcher prompted the parent to provide self-feedback. The researcher responded by providing further explanations, if needed. Prior to the fourth opportunity, the researcher encouraged the parent to complete the See and Say Sequence without support.

4. *Review*: Following the coaching period, the researcher asked the parent to provide the name and describe the steps of the See and Say Sequence. If the parent was unable to do so, the researcher restated the name and description.

Transcription Procedures

The researcher transcribed all adult and child utterances within the language samples. Child utterances were transcribed using *Systematic Analysis of Language Transcript* (SALT; Miller & Iglesias, 2017) conventions. Table 4 summarizes additional gesture-specific conventions that were used to code children's gesture acts. All gesture conventions and definitions are adopted from Mattie and Hadley (2021).

Table 4

Gesture Transcription Conventions

Gesture Code	Definition	Example in Transcript
[point]	Extension of the index finder toward a proximal or distal person, object, location, or event for the purposes of sharing attention or requesting	M {oh} a baby. **C {points}.** =to baby M yep, there she is.
[reach]	Extension of open, empty hand(s) toward a proximal or distal person, object, location or event for the purposes of sharing attention or requesting.	**C {reach}.** =to bubbles M no, you can't have the bubbles.
[show]	Holding an object toward a communication partner's line of sight while making eye contact or orienting their body to the communication partner	**C {show}.** =the baby's hat M {oh} I see the hat.
[give]	Extension of the arm while holding an object toward the hand of a communication partner with the intent of them taking the object	M I like the duck! **C {give}.** =duck to M M {aw} thank you!
[rep]	A gesture that represents the referent with or without the physical object	M {ooh} what does baby need? **C {rep}.** =pretends to drink juice from cup M some juice!
[con]	Conventional gestures in which form and meaning are culturally defined	M Do you want to play with the puzzle? **C {con}.** =shakes head no M ok.

An undergraduate research assistant independently transcribed both the adult and the child utterances in a randomly selected 5-min segment of one language sample per participant (i.e., 25% of transcription for each participant). For the adult utterances, morpheme-by-morpheme agreement was used to determine reliability. The reliability transcription was compared to the original transcription for morpheme agreement. Morphemes had to match exactly and occur in the same sequence to be considered an agreement. Small variations were

allowed (i.e., *a-the, in-on, wanna-want to*). Disagreements, omissions, and additions were all counted as disagreements. Adult transcription accuracy was calculated by dividing the number of agreements by the sum of the number of agreements and the number of disagreements (i.e., # Agreements / # Agreements + # Disagreements). Adult transcription agreement was high, ranging from 89.95% to 100%, with a mean of 95.57% (*SD*=2.38).

Child transcription reliability scoring focused on the presence and position of the child's turn relative to the adult's utterance. Transcribers did not have to agree on the content of the child's utterances or the number of consecutive child utterances. Rather, each child turn (i.e., single or consecutive vocal, verbal, or gesture behavior(s) that happened without intervening adult utterances) was examined for its presence (i.e., did the transcribers agree that the child took a turn?) and position (i.e., did the transcribers agree on the position of the child turn relative to the adult utterances?). Dichotomous scoring (i.e., agree =1, disagree =0) was used for each child turn. To score a 1, the child turn transcribed by the reliability transcriber had to be present in the original transcript and positioned in the same spot relative to the adult utterances. This ensured that the transcribers agreed that the child took a turn and agreed on the position of the parent response that followed. A child turn would be scored 0 if the reliability transcriber omitted a child turn that was present in the original transcription, added a child turn that was not transcribed in the original transcription, or disagreed on the position of a child turn in relation to the adult utterances. Child transcription reliability scores ranged from 66.67% to 100%, with a mean of 90.5% (SD=8.07), indicating high levels of overall agreement. Reliability for one participant was unacceptably low, falling below 85%. Thus, this participants' pre- and post-intervention transcripts were reviewed in their entirety. Both transcribers came to a consensus about all child turns for these transcripts.

Coding Procedures

The researcher coded all participants' language samples. Only utterances that were spontaneous, complete, and fully intelligible received codes. Routine-based utterances, such as counting, singing or nursey rhymes, were placed in curly brackets and excluded from analyses of general language measures. SALT conventions were used to identify bound morphemes and contractions. Lexical variations of the same word were coded with a pipeout convention (e.g., ducky|duck), which allowed lexical variations to be counted as a single word.

Parent utterances were further coded using strategy-specific and supplemental codes. Appendix C provides a summary of all codes. The [S1] code captured parents' integration of the first two steps of the See and Say Sequence (i.e., notice the child's communication and/or comment-worthy moment and say the name of the object). This code was independent of other See and Say Sequence related codes. That is, parents did not have to use all four steps to be credited for the first two steps and receive the [S1] code. The [S1] code focused on parents' use of referentially transparent nouns (i.e., saying the name of a concrete object in the play environment) in a responsive context. Linguistically, parents had to use a single word noun (e.g., "dog") or an article + noun (e.g., "the dog"). Interactively, parents had to use an utterance that was related to the child's object of interest, did not interrupt or overlap the child's utterance, and occurred within 3 sec of the child's communication or play act. Subcodes were used to differentiate if parents responded to a child's communication or play act. If parents responded to the child's communication act, [S1:C] was placed on the noun:

P What did you find?
C [point] {ba}.
P a bunny[S1:C]?

If parents responded to a child's play act, [S1:P] was placed on the noun. Child play acts were defined as the child interacting with a toy. This included picking up a toy, inspecting a toy, or any action that moved or changed the toy. This did not include accidental interactions with a toy, such as bumping into a toy or knocking a toy off a table. If parents used an [S1] response in the absence of a child communication act, the video was used to determine whether the child was playing with the object the parent had just named. If the child was, a child utterance was added into the transcript with a [play] code:

P What did you find?
C [play].
P bunny[S1:P]!

If the child was not playing with the object the parent named, the utterance was deemed not responsive and received an exclusionary code.

The [S2] codes captured parents' use of the third and fourth step of the See and Say Sequence (i.e., wait for the child to respond either verbally or non-verbally and respond with a toy talk sentence about the object). This code was independent of other See and Say Sequence related codes. That is, parents did not have to use all four steps to be credited for the last two steps and receive the [S2] code. The [S2] code focused on parents' use of referentially transparent noun subjects in active declarative sentences (ADS) in responsive contexts. Linguistically, parents had to use an ADS with a noun subject (e.g., "The dog is going in). Interactively, parent had to use an utterance that was related to the child's object of interest, did not interrupt or overlap the child's utterance, and occurred within 3 sec of the child's utterance *or* followed $\geq$3 sec of wait time. Again, subcodes were used to differentiate if parents responded to a child's communication act or provided wait time. If parents responded to a child communication act, [S2:C] was placed on the noun subject:

P {oh} look at that!
C yummy.
P The cow[S2:C] is eat/ing.

If parents provided wait time (i.e., moments in which neither the parent nor the child were communicating for at least 3 sec) and then responded to the child, [S2:W] was placed on the noun subject.

P {oh} look at that!
; :04
P The cow[S2:W] is eat/ing.

A decision was made to not code [S2] codes in response to child play acts because the child was typically playing with toys. This would allow parents to use [S2] sentences in a back-to-back manner without providing wait time for the child. Note that both the [S1] and [S2] codes were word-level codes, placed directly on the noun or noun subject.

The [SSS] code captured parents' consecutive use of all four steps of the See and Say Sequence, or the complete sequence. For an utterance to receive an [SSS] code, one of the [S1] codes had to be followed by one of the [S2] codes. The [SSS] code was an utterance level code placed at the end of the utterance containing the [S2] code:

C [point].
P pig[S1:C].
C {oink oink}.
P yes, the pig[S2:C] says %oinkoink [SSS].

Finally, in order to document all parent attempts at using the See and Say Sequence, parent utterances that met the linguistic criteria for either [S1] or [S2], but were not responsive were given an exclusionary [S1:EX] or [S2:EX] code, respectively. This included utterances that were (a) not semantically responsive, meaning they did not relate to the child's object of interest; (b) not temporally responsive, meaning they were not within 3 sec of the child's communication act or delivered back-to-back with a consecutive adult utterance; or (c) overlapped or interrupted

the child. Exclusionary codes were word-level codes placed on the noun or noun subject. The exclusionary [S1:EX] and [S2:EX] codes allowed the researcher to determine how often parents attempted to use the specific linguistic structures of the See and Say Sequence, while still being able to exclude these non-responsive attempts from the analyses.

Two supplemental codes were used to examine parents' utterances outside of the confines of the strategy-specific codes. This allowed for a more in-depth analyses of the responsive and linguistic aspects of the parents' input. A responsive code [R] was placed on all utterances that did not fit the linguistic requirements of the [S1] and [S2] codes, but occurred within 3 sec of a child's communication act, were semantically related to the child's object of interest, and did not overlap or interrupt a child utterance. Responsive [R] codes were only placed on parent utterances that responded to a child's communication act and were utterance-level codes.

A labeling code [L] was adapted from Hadley et al. (2017a) and Mattie and Hadley (2021) for utterances that labeled a picture or concrete object in the play environment. The code [L:NP] was placed on responsive utterances containing an isolated noun phrase (NP) (e.g., "a little baby") and [L:S] was placed on responsive utterances containing a pronoun + copula + NP sentence (e.g., "That's a baby"). Because labeling [L] utterances served a similar function as [S1] utterances, the [L] codes were placed on utterances that were responsive to a child's communication act or play act. If a parents used a [L] utterance in the absence of a child communication act, the video was used to determine whether the child was playing with the object the parent had just labeled. If the child was, a child utterance was added into the transcript with a [play] code:

P What did you find?
C [play].
P that's a bunny[L:S]!

If the child was not playing with the object the parent labeled, the utterance was deemed not responsive and received no code. Labeling [L] codes were word-level codes, placed on the noun in the utterance.

Coding Reliability. A series of computerized SALT checks were used on all transcripts immediately after coding to check accuracy. To ensure coding reliability, an undergraduate RA coded three randomly selected pre-intervention transcripts and three randomly selected post-intervention transcripts (21.4% of the data). Participants' transcripts that were not randomly selected were used for coding training. The RA first read the coding procedures and took a coding quiz with immediate feedback built in. Then, the RA watched a participant video and followed along with a pre-coded transcript and discussed any questions with the researcher. Finally, the RA coded three 3 min transcripts, receiving feedback, and asking questions between each practice attempt.

After training was complete, the RA coded the six randomly selected transcripts in their entirety. The researcher scored the transcript and provided feedback to the RA following each completed transcript. Cohen's kappa was used to compute reliability between the two coders on the following codes: [S1:C], [S1:P], [S1:EX], [S2:C], [S2:W], [S2:EX], [R] and [L:NP/S]. Because coders had to not only decide which code to place, but also whether to code the utterance at all, a no code [NC] code was also included in the reliability score. Because the sequence [SSS] code was not an independent code (i.e., it was dependent on the placement of [S1] and [S2]), it was not included in the Cohen's kappa reliability score. Additional computerized SALT checks were used across all transcripts to ensure accuracy of [SSS] codes. The criterion for reliability was set at .80, which is considered as an acceptable level of agreement (Sprent & Smeeton, 2001). The average Cohen's kappa was .89 (range = .87-.93). The

most common errors included placing a responsive [R] code on an utterance that was not responsive and using the wrong subcode within the [S1] or [S2] code category. It is important to note that the disagreements between [S1] and [S2] subcodes did not affect the primary outcomes because data analysis was not conducted at the subcode level.

Measures

Parent Learning Measures

The researcher used the "Parent Learning Checklist" (Appendix D) to document parent learning of the See and Say Sequence during the brief intervention. The researcher watched the coaching and review portions of the brief intervention video and marked the presence (1) or absence (0) of parent behaviors. During the coaching portion, the researcher documented whether parents were able to carry out an [S1] response, [S2] response, and one complete See and Say Sequence [SSS] without guided feedback or corrections from the researcher. This was used to measure immediate application of the See and Say Sequence. During the review portion, the researcher documented whether the parent was able to state the name and explain each step of the See and Say Sequence. These five criteria were used as a knowledge indicator of parent learning.

Parent Input Measures

All parent input measures were obtained by exploring SALT codes within the language sample transcripts. Measures were calculated in the pre- and post-parent instruction language sample transcripts separately and compared at the analyses stage.

Strategy Use. Frequency counts of all [S1] codes (i.e., combination of [S1:C] and [S1:P]), all [S2] codes (i.e., combination of [S2:C] and [S2:W]) and [SSS] codes were used to

determine the parents' use of the "say the name" and "say something about it" responses as well as the full See and Say Sequence during the language samples.

Parent Input. Changes in parent input were explored by computing the frequency and diversity of several measures. First, parents' total responsivity was calculated by exploring transcripts for the number of [S1:C], [S2:C], and [R] codes. These codes represented utterances in which parents responded to a child communication act. Second, parents' mean turn length was examined using an automated SALT measure. Third, parents' labeling behaviors were examined. Although parents were taught to use single word responses to name objects in the environment, labeling was examined more broadly to include utterances in which the parent used a single noun, isolated NP, or labeling sentence to label an object in the play environment that a child was communicating about or manipulating. The frequency of responsive labels was calculated by exploring transcripts for the total number of [S1:C], [S1:P], [L:NP], and [L:S] codes used. The diversity of responsive labels was computed by collapsing the codes (i.e., {[S1:C], [S1:P], [L:NP], [L:S]}) and identifying the number of different nouns used across all responsive label codes. Finally, the diversity of noun subjects in toy talk sentences was computed by exploring transcripts for the number of different noun subjects collapsing [S2] codes in responsive ADS (i.e., {[S2:C], [S2:W]}.

Data Analysis

A combination of descriptive and inferential statistics was used to analyze data. The strategy-specific codes were analyzed through paired *t* tests comparing pre- and post-intervention language sample data for each category of the strategy-specific codes. Total parent responsivity and mean turn length was also analyzed through a paired *t* test. Finally, Spearman rank

correlations were run to explore which parent and child characteristics supported parents in learning and applying the See and Say Sequence.

Results

Intervention

Fourteen parents took part in the brief intervention to learn the See and Say Sequence using the TMCR instructional method. Instruction time ranged from 16 min to 26.1 min (*M*=18.98 min, *SD*=2.65). One participant was an outlier with an elapsed time of 26.1 min. This parent's child had a difficult time transitioning between toys and required extra support. No coaching took place during these transition periods. When these transition periods were excluded, the total elapsed time was reduced to 21.17 min, and this data point was no longer an outlier.

Fidelity was measured using an observation checklist of 22 items organized by TMCR components (Appendix E). Fidelity ranged from 77.27% to 100% (*M*=93.18%, *SD*=7.72). Three intervention sessions (21.4%) received fidelity scores below 85%. Two of these sessions were due to the researcher not administering the review questions in the review portion of TMCR. However, these parents received the same instruction, modeling, and coaching as other parents in the study; therefore, these parents were retained in the analyses. The missing review questions were not expected to have a significant impact on the participants' ability to learn the sequence. The third session was impacted by technical problems prior to the session (i.e., the audio of the recording system was not functioning). This delayed the start of the intervention session and diverted the researcher's focus to solving the audio issue. These problems impacted the researcher's ability to execute various components of the intervention, which may have had an

impact on the participant's ability to learn the sequence. The remaining sessions had fidelity scores exceeding 85%, yielding a good overall intervention fidelity.

Parents completed a parent satisfaction survey to provide their perceptions on the instructional session and the See and Say Sequence, as well as to rank the components of the instructional session they found most helpful. Thirteen out of the fourteen participants completed this survey. Parents were asked to rate the TMCR instructional session and the See and Say Sequence on Likert items ranging from 1 (strongly disagree) to 5 (strongly agree). Reverse wording was used on two questions to reduce acquiescence bias. Table 5 summarizes the frequency counts for each Likert item. Out of 13 parents, all parents either strongly agreed (n=11) or agreed (n=2) with the statement "I had enough time to learn the See and Say Sequence." When asked if they would have liked more time practicing with the researcher prior to practicing with their child, nine parents strongly disagreed or disagreed, while four parents were neutral towards this statement. All 13 parents either strongly agreed or agreed that the information provided by the researcher, practice opportunities with the researcher, and coaching were helpful. Similarly, all parents either strongly agreed or agreed that they understood the See and Say Sequence enough to teach it to a friend.

Parents also had a positive perception of the See and Say Sequence. All parents either strongly agreed (n=7) or agreed (n=6) that the See and Say Sequence would help their child learn new words. All parents stated they planned to use the See and Say Sequence at home and would encourage a friend with a young toddler to use it. Items related to implementation of the See and Say Sequence were more variable. When asked if they felt successful using the See and Say Sequence with their child, one parent disagreed, four parents were neutral, six parents agreed, and two parents strongly agreed. Similarly, when asked if playing with their child felt harder

when using the See and Say Sequence, two parents strongly disagreed, three parents disagreed, three parents were neutral, four parents agreed, and one parent strongly agreed. This was the only item that had responses in every category, highlighting that variability in play abilities may reveal individual differences in parents' abilities to easily implement the See and Say Sequence.

Table 5

Frequency Counts of Likert Items on Parent Satisfaction Survey

	1	2	3	4	5
Instructional					
The information provided by the researcher helped me learn	0	0	0	1	12
I had enough time to learn	0	0	0	2	11
Practicing while the researcher pretended to be my child was helpful	0	0	0	1	12
I would have liked more practice with the researcher before practicing with my child*	1	8	4	0	0
While I played with my child, the suggestions the researcher gave helped me	0	0	0	2	11
I understand the See and Say Sequence enough to teach it to a friend	0	0	0	4	9
Strategy					
I believe the See and Say Sequence will help my child learn new words	0	0	0	6	7
I felt it was harder to play with my child after learning the See and Say Sequence*	2	3	3	4	1
I felt successful using the See and Say Sequence with my child	0	1	4	6	2
I plan to use the See and Say Sequence at home	0	0	0	4	9
I would encourage a friend with a young toddler to learn the See and Say Sequence	0	0	0	6	7

Note. 1=strongly disagree; 2=disagree; 3=neither agree nor disagree; 4=agree; 5=disagree

An item denoted with * indicates reverse wording

Finally, parents were asked to rank the following instructional components from 1 (most helpful) to 4 (least helpful): See and Say Sequence handout, researcher's explanation of the See and Say Sequence, practicing the See and Say Sequence with the researcher, and researcher's suggestions while the parent played with the child. Parents were required to assign each instructional component a rank. Parents could not give two instructional components the same rank. Table 6 summarizes the frequency counts for these rankings. Parents varied in their preferences. However, more parents ranked the researcher's explanation during the teach portion and the researcher's suggestions during the coach portion of TMCR as a 1 or 2, signifying that these instructional components may have been more helpful across participants.

Table 6

Frequency Counts of Parents' Rankings of Instructional Components

	1	2	3	4
Handout	3	3	1	6
Explanation	3	4	5	1
Practice with Reseacher	1	4	4	4
Suggestions from Researcher	6	2	3	2

Note. 1=most helpful; 4=least helpful

Parent Knowledge and Application of the See and Say Sequence

The first research question asked if parents could demonstrate knowledge and application of the See and Say Sequence with brief instruction. Parents were asked to review the name and four steps of the See and Say Sequence during the review portion of TMCR. These responses were used to describe immediate knowledge of the See and Say Sequence. When asked to recall the name, 66.67% (8/12) of parents responded with the full name, and an additional three others stated, "See and Say," but missed "sequence." When asked to state the four steps, 75% (9/12) of parents were able to do so. Note that only 12 out of 14 parents were included in these measures because the review questions were not administered to two parents. Parents' interactions with their children during the coach portion of TMCR were used to describe immediate application of the See and Say Sequence. Without researcher support, 92.9% (13/14) of parents were able to use an [S1] response, all parents (14/14) were able to use an [S2] response, and 71.4% (10/14) were able to complete the full sequence [SSS].

Application of the See and Say Sequence was also measured by comparing parents' use of the individual See and Say Sequence responses and the full sequence before and after the brief intervention. Three one-way paired *t* tests were conducted on each See and Say Sequence code (i.e., [S1], [S2], [SSS]) to test the hypothesis that parents would increase their use of the See and

Say Sequence post-intervention. Table 7 summarizes the mean level changes, *t* scores, and effect sizes for the [S1] and [S2] responses and the full sequence. As expected, there was a significant increase in the mean level of both responses and the full sequence following the brief intervention with large effect sizes. Figure 1 illustrates the differences in the full sequence [SSS] and Figure 2 illustrates the differences in the two See and Say Sequence responses (i.e., [S1], [S2]).

Table 7

Pre- and Post-Intervention Use of the See and Say Sequence

Codes	Pre Intervention	Post Intervention		
	M (*SD)*	M (*SD*)	*t*(13)	Cohen's *d*
S1	2.79 (2.61)	17.71 (6.97)	9.281***	2.48
S2	1.36 (1.74)	19.36 (8.23)	7.54***	2.01
SSS	.14 (.36)	4.86 (3.3)	5.25***	1.40

*Note. *p value < .05, **p value <.01, ***p value <.001*

Changes in Parent Input

The second research question asked how the See and Say Sequence altered parents' input during a play interaction with their children. Figure 3 illustrates the mean number of total utterances pre- and post-intervention broken down by parent utterance type. Note the largest category at both time points was "other" representing utterances that were not coded. These utterances were not hypothesized to be as facilitative for the developmental level of children in the study as the See and Say Sequence responses (e.g., [S1] and [S2]). Utterances in the "other" category included questions (e.g., "What's that?"), imperatives (e.g., "Pick it up."), or sentences with pronoun subjects (e.g., "It's cute.") that were not responsive to children's communication acts. Following intervention, the mean number of utterances in the "other" category was reduced

by 53%. Overall, parents used fewer total utterances, but increased their use of utterances that were deemed responsive, linguistically rich, or a combination of both.

The "see" component of the See and Say Sequence was hypothesized to alter parents' interactive features of parent input. Parents' responsivity and mean turn length were used to examine changes in these interactive features. Parents' responsivity was computed by combining the following parent utterance types: [R], [S1:C], and [S2:C]. Recall that parent responsivity represented the total number of parent utterances that were semantically and temporally responsive to a child communication act during the 10 min sample. A one-way paired *t* test revealed a significant difference in total responsive utterances, increasing from an average of 31.21 (*SD*=14.99) utterances pre-intervention to an average of 35.57 (*SD*=12.96) utterances post-intervention ($t(13)=1.798$, $p=.044$). A Cohen's *d* of .48 indicated a moderate effect size. Parents' mean turn length was computed using an automated SALT measure of mean turn length in utterances which reflected the mean number of consecutive utterances parents used per turn prior to their child taking a turn. Parents significantly decreased their mean turn length from 3.39 utterances per turn (*SD*=1.58) pre-intervention to 2.11 utterances per turn (*SD*=0.52) post-intervention ($t(13)=3.31$, $p=.006$). A Cohen's *d* of .89 indicated a large effect size.

Next, responsive labels were computed by combining [S1:C], [S1:P], [L:NP], and [L:S] utterances. Recall that responsive labels represented utterances in which the parent used a single word, isolated NP, or labeling sentence to label an object in the play environment that a child was communicating about or manipulating. Prior to intervention, parents responsively labeled an object an average of 5.5 times (*SD*=2.95) throughout the 10 min sample. Following intervention, this increased to a mean of 24 times (*SD*=10). Not surprisingly, parents also increased the

number of different objects they labeled, increasing from 4.79 different objects labeled prior to intervention to 11.79 different objects labeled after intervention.

Finally, parents' frequency of noun subjects in toy talk sentences were computed using [S2:C] and [S2:W] utterances. Prior to intervention, parents used a mean of 1.36 noun subjects (*SD*=1.74) in the 10 min sample. This increased to 19.36 noun subjects (*SD*=8.23) following intervention. Parents used a variety of noun subjects in toy talk sentences increasing from an average of 1.21 different noun subjects prior to intervention to an average of 7.79 different noun subjects following intervention.

Global Measures of Parent Input

To relate the changes observed in this study to other investigations of parent language input, general language measures were also examined. As expected, parents showed mean level decreases on all general measures of language. Prior to intervention, parents used a mean of 161.86 total utterances (*SD*=59.82). Following intervention, the mean number of total utterances decreased to 134.14 utterances (*SD*=39.51). Similar trends were seen for parents' mean length of utterance (MLU), with a pre-intervention mean MLU of 3.99 (*SD*=0.53) and post-intervention mean MLU of 3.72 (*SD*=0.56). Likewise, parents' mean number of different words decreased from 127.14 (*SD*=35.97) to 102.79 (*SD*=24.86).

Associations with Parents' Strategy Use

The final research question was exploratory and focused on parent and child characteristics that may support parents in learning and applying the See and Say Sequence. The number of full sequences [SSS] parents used in the post-intervention sample was selected as the dependent variable. A list of empirically motivated independent variables was created. Parent variables included raw accuracy on the KIDI, total attempted items on the KIDI, parents' total

responsivity in the pre-intervention sample, and total number of responsive labels in the pre-intervention sample. Child variables included number of words produced on CDI, number of total words in the pre-intervention sample, number of different words in the pre-intervention sample, and total number of gestures used in the pre-intervention sample.

Spearman rank correlations were run between each independent variable and the dependent variable. Given the exploratory nature of these analyses, correlations with *p* values less than 0.1 were reported. The only correlation that reached this level was between parents' raw accuracy on the KIDI and parents' post-intervention strategy use ($r(12)=.52$, $p=.0579$). Figure 4 illustrates this relationship.

Taken together, these results reveal that the brief intervention was acceptable to parents, generally implemented with fidelity, and resulted in parents learning the individual See and Say Sequence responses as well as the full See and Say Sequence. When parents implemented the See and Say Sequence, meaningful changes in the interactive, conceptual, and linguistic features of parent input were observed. The following section interprets these findings and discusses their implications for future research and clinical practice.

Discussion

The purpose of the current study was to understand how quickly and accurately parents could learn the See and Say Sequence. I hypothesized that parents would increase their use of the See and Say Sequence, thus demonstrating knowledge and application of a transactional sequence. With less than 20 minutes of average instruction time, parents in this study significantly increased their use of the See and Say Sequence during a play sample with their child. Further, the use of the See and Say Sequence had measurable impacts on the interactive, conceptual, and linguistic properties of parents' input. These preliminary findings provide

evidence that the See and Say Sequence is a feasible approach for parents to learn language strategies quickly and has an immediate impact on parents' language input.

Primary Findings

As predicted, parents learned the See and Say Sequence, as evidenced by significant increases in [S1], [S2], and [SSS] codes before and after the brief intervention. This adds to the body of literature demonstrating that parents can learn language strategies (Roberts et al., 2019). Additionally, by providing a rich description of the intervention and reporting intervention fidelity, I addressed methodological gaps previously identified in the parent-implemented intervention literature. A systematic instructional method, Teach-Model-Coach-Review (TMCR), consisting of four distinct portions and high levels of intervention fidelity likely supported parents in the See and Say Sequence. Following intervention, parents rated the teach and coach portions of TMCR as the most helpful in learning the See and Say Sequence. A supplementary correlation analysis revealed that parents who successfully implemented all components of the See and Say Sequence during the coaching portion of TMCR tended to use the sequence more often in the post-intervention play sample (r=.54, p=.045). This highlights the importance of effective coaching. That is, parents' performance in the coaching portion of the intervention session was related to their performance in the post-intervention play sample. These findings add to the current literature that recognizes the importance of effective and replicable instructional methods, specifically parent coaching, to facilitate parent learning (Sone et al., 2021).

By using a brief intervention, the current study demonstrated that parents can learn empirically supported language strategies in a short amount of time. The See and Say Sequence taught parents to be responsive and to model language, both of which are mentioned frequently

in the parent-implemented intervention literature (Finestack et al., 2022). However, most parent-implemented interventions gradually teach parents these strategies across multiple sessions that span weeks or months. In contrast, the parents in the current study learned to use the See and Say Sequence, with its embedded responsive and language modeling strategies, in a single 20-min session. Three key design features were hypothesized to support parents in quickly learning and implementing the sequence—the integration of strategies, the use of a developmentally timed approach, and the redefinition approach (Sameroff & Fiese, 2000) to intervention.

Teaching parents all the strategies at once as part of the sequence, rather than incrementally, allowed the intervention to be brief and still resulted in significant changes in parents' implementation of the sequence before and after instruction. In fact, the integrated approach appeared to be a feasible method that helps parents learn to use responsive and language modeling strategies within interactions with their children quickly, perhaps because it helped illustrate the "big picture" of how responsive language modeling could be implemented with their children in a back-and-forth fashion. Not only did parents learn to be responsive, but they also learned two different linguistically rich and conceptually simple responses (i.e., say the name and say something about it). Importantly, parents did not need to select between these responses. Rather, they were able to use both responses to create a back-and-forth communication interaction with their children. In addition to contributing to the briefness of the intervention, this approach illustrates how the current intervention applied a transactional framework, focusing on the parent-child transactions that make up communication interactions.

Second, all components of the See and Say Sequence were developmentally timed to the children in the study. Using a linguistically homogeneous group of children, all of whom were considered early word learners, allowed the current study to use a developmentally targeted

approach. This design feature may have supported parents in learning all the components within the brief session because the components aligned with their understanding of their children (Boshier, 2011; Jarvis, 1985; Knowles, 1980). The same types of examples and explanations were used across parents. During the teach and model portion of the instructional period, parents in the study appeared to have an easy time conceptualizing how the See and Say Sequence might work with their children. Parents brought up relevant examples and questions and easily related the components of the sequence to their own experiences with their children. Further, results of the Parent Satisfaction Survey revealed that parents recognized the value of the See and Say Sequence in relation to early word learning. All parents agreed with the statement, "I believe the See and Say Sequence will help my child learn new words." Though there is mostly anecdotal evidence to support this claim, the developmental tailoring of the See and Say Sequence may have aided parents in rapid learning and implementation.

Finally, parents may have had more opportunities to practice the See and Say Sequence because it was not entirely dependent on children's use of spoken words. Recall that the redefinition approach to intervention (Sameroff & Fiese, 2000) was employed to alter parents' definition of communication—expanding from a definition presumably focused on spoken words to one that emphasized nonverbal forms of communication and mutual enjoyment within parent-child communication interactions. Although parents were taught to be responsive to their children's communication, they were also encouraged to provide language learning opportunities even if their children were not communicating frequently. For [S1] responses (i.e., single word nouns or article + noun NP), parents were able to name objects in response to children's play acts. For [S2] responses (i.e., responsive ADS with a noun subject) parents were encouraged to provide their child five seconds of wait time prior to saying something about the object. On

average, almost half (47%) of parents' See and Say Sequence responses (i.e., [S1] and [S2]) occurred within contexts in which their children were not communicating (i.e., [S1:P] and [S2:W]). Because of this, parents had more opportunities to successfully utilize the See and Say Sequence responses when learning the sequence and in the post-intervention samples.

The redefinition approach was also hypothesized to increase parents' positive perceptions about their communication interactions with their children. An increase in the number of communication exchanges was predicted to increase feelings of success and foster mutual enjoyment in the communication interaction. Unfortunately, Parent Satisfaction Survey data did not fully support this hypothesis. Only 57% of parents reported feeling successful using the See and Say Sequence, and only 36% felt that playing with their child was no harder when implementing the See and Say Sequence. The variability parents showed on these two survey items reveal that success may be defined and experienced differently across parent-child dyads. Additionally, parents may require more time than just a single brief intervention session to feel successful. In future studies, alternative measures, perhaps collected with parent interviews, may provide more insight into the impacts of a redefinition approach on parent-child enjoyment and feelings of success.

Efficient learning was a key finding from the current study. Using an integrated, developmentally timed approach that focused on redefining communication, parents in the current study were provided a clear roadmap for when to respond, how to respond, and what to say in these responses within the context of communication interactions. This followed recommendations from researchers who have stressed the importance of understanding both *what* parents say and *how* they deliver it in parent input (Masek et al., 2021; Preza & Hadley, 2022). Only a few other studies have used a methodology that examine how quickly adults can

learn a language strategy (e.g., Hadley & Walsh, 2014; Hatcher & Page, 2020). Some single case design studies, such as Hatcher and Page (2019), reveal that parents can increase their use of a strategy within a single session. Although Hatcher and Page (2020) used more than a single session across the entire intervention, continuous data collection revealed that parents were able to implement a new strategy within the session it was introduced. Hadley and Walsh (2014) demonstrated the feasibility of bringing about adult change in a language modeling strategy in a single session. They found that college students could learn to use toy talk (i.e., ADS with noun subjects) in a "contrived situation." That is, students watched a silent video of a parent-child interaction and spoke for the adult as if they were the parent in the interaction before and after a single, 15-min TMCR session. The current study extends these findings by using a similar brief intervention approach with a sample of parents, rather than college students. Additionally, the current study used a more ecologically valid setting by measuring changes in parent language input within a parent-child play sample, rather than with a silent video. Given the limited data on how quickly parents can learn language strategies, the current study contributes to the parent-implemented intervention literature by offering a novel approach that shows promise in facilitating immediate change in parent input.

Efficient learning of the See and Say Sequence positively impacted parents' input during a play interaction with their children. Measuring both the frequency of strategy use and specific features of parent input allowed me to document robust changes. Frequency measures of strategy use revealed that parents significantly increased their use of the See and Say Sequence from pre- to post-intervention language samples. All parents increased their use of the individual See and Say Sequence responses (i.e., [S1] and [S2]) during the post-intervention sample. In addition, all but one parent increased their use of the full sequence [SSS]. To understand the impacts on

parent input, I address each component of the See and Say Sequence separately in the following paragraphs.

The “see” component of the See and Say Sequence focused on parents’ interactive features of parent input. The goal of the "see” component was to encourage parents’ to notice their children’s interests and provide sufficient wait time to facilitate balanced back-and-forth interactions, a key feature of responsive input (Hirsh-Pasek et al., 2015; Tamis-LeMonda & Bornstein, 2002). In the current study, a series of findings provided evidence that parents altered their interactive features. First, parents significantly reduced their total number of utterances in the post-intervention 10-min language sample. Second, parents significantly decreased their mean turn length, meaning that on average, they used fewer consecutive utterances. Finally, they significantly increased the number of utterances that responded to a child’s communication act. Taken together, these findings reveal that parents learned and applied the “see” component of the See and Say Sequence, decreasing overall utterances to provide children more space to communicate and increasing the number of utterances that responded to the children’s communication attempts. Providing children with increased communication opportunities and reinforcement through temporally and semantically contingent responses may contribute to increases in children’s rate of communication. Although child outcomes were not examined in the current study, future studies should investigate whether parents’ use of the See and Say Sequence increases the rate with which their children communicate.

The “say” component of the See and Say Sequence focused on the conceptual and linguistic features of parent input. Parents in the study were taught to “say the name” of the object their child was communicating about or manipulating in a responsive manner. Specifically, parents were taught to use single words to make the child’s task of mapping a word

to its referent, or the object in the environment, simpler. Parents significantly increased their use of [S1] responses (i.e., single word nouns or article + noun) following intervention. Parents' responsive labeling behaviors were also examined more broadly, including labeling sentences (i.e., [L:S]; That's a puppy!) and isolated NPs (i.e., [L:NP]; a blue puppy!). Prior to intervention, parents used this broader category of responsive labels in about 4% of their total utterances. Following intervention, this increased to approximately 18%. Thus, children were provided with an increase in linguistically simple input that provided clear labels for referents in the play environment. This is notable, as responsive object labels, specifically those in response to children's gestures, have been linked with young children's vocabulary skills concurrently and longitudinally (Goldin-Meadow et al., 2007; Olson & Masur, 2015). Though child outcomes were not measured in the current study, future studies should examine if the use of the See and Say Sequence has a positive impact on young children's expressive vocabulary skills.

Parents were also taught to "say something about" the objects in a responsive manner (i.e., [S2]). This led parents to comment on the properties of the objects, using short sentences with the object's name in the sentence subject position (e.g., "The box is empty"). This provided opportunities for children to learn about the qualities of the object and strengthen the semantic representation of the word in memory. Prior to intervention, responsive ADS with noun subjects made up less than 1% of parents' total utterances. Following intervention, parents significantly increased their use of these utterances to nearly 15% of total utterances. Again, this increased the conceptually simple input directed to children, but this time in a well-formed sentence. This finding is in line with previous studies demonstrating that parents' use of declarative sentences and noun subjects are rare in naturally occurring parent input (Hadley et al., 2017a; Preza & Hadley, 2022), but are sensitive to intervention (Hadley et al., 2017a). Hadley and colleagues

(2017a, 2017b) have also established a link between parents' use of diverse lexical noun subjects and children's sentence diversity and morphosyntactic development. Thus, this linguistic input has the potential to facilitate subsequent grammar development.

Although parents clearly understood the components of the See and Say Sequence and implemented [S1] and [S2] responses frequently in the post-intervention sample, utilizing the full sequence (i.e., [SSS]) appeared to be more difficult. Overall, use of the full sequence was more variable across parents (range: 0-11), with one parent never successfully completing a full sequence and two parents only completing one full sequence in the 10 min post-intervention sample. Because the full sequence was dependent on the successful use of an [S1] response in conjunction with an [S2] response, it was more difficult for parents to implement. Additionally, children may have had more of an influence on parents' use of the full sequence during their interactions. For example, if the parent responsively named an object (i.e., [S1] response), but then their child immediately moved to a new toy, it was no longer appropriate for the parent to say something about the object (i.e., [S2] response), and they could not use the full sequence. Thus, parents with children who had less sustained attention on toys may have had more difficulty implementing the full sequence. Future research should examine individual differences more closely to better understand variability in implementing the full sequence successfully.

To summarize, at the same time parents were increasing their use of See and Say Sequence responses (i.e., [S1] and [S2]), they were also decreasing their total number of utterances. This demonstrated that parents did not just add to what they were already doing, but that the brief instruction had a significant effect on the interactive, conceptual, and linguistic quality of their input, changing the composition of parent utterances pre- and post-intervention (see Figure 3). Parents eliminated utterances in the "other" category by reducing their total

number of utterances. However, they also replaced "other" category utterances with [S1] and [S2] utterances, which were comprised of linguistically rich, conceptually simple input and delivered in a responsive manner. Despite these meaningful changes in parent input, parents' use of the full sequence was more variable across parents, demonstrating individual differences in employing the See and Say Sequence.

Exploratory Findings

The exploratory analysis aimed to understand whether parent or child characteristics impacted parents' abilities to learn and apply the See and Say Sequence. The only finding that approached significance was the relationship between parents' baseline accuracy on the KIDI and the number of full sequences (e.g., [SSS]) used in the post-intervention language sample. This is notable, as it aligns with previous work highlighting that parents' communicative interactions with their children may be influenced by parent knowledge of child development (Rowe, 2008). Parents with higher accuracy scores on the KIDI presumably had more baseline knowledge of child development, which may have supported their ability to learn and implement empirically-supported language strategies. Further, knowledge of child development is a characteristic that is amenable to intervention. Formal instruction on child development within a parent-implemented intervention may enhance parents' ability to adapt their input in ways that align with their child's current developmental level. Thus, future studies should continue to investigate the link between parents' knowledge of child development and the malleability of their interaction and input properties.

Limitations and Future Directions

The result of this study should be interpreted with caution considering the small sample size (N=14) that was limited in racial, socioeconomic, and educational diversity. Notably, the

parents in the current study had very high levels of formal education, with all parents holding a college degree and 64.2% of those being graduate degrees. Higher levels of education may have facilitated the efficient parent learning observed. Future studies will need to determine if this pattern of parent learning holds in samples with less formal education and greater cultural and linguistic diversity. In addition, no follow-up observations were obtained to document parent maintenance or generalization, nor the impact of the See and Say Sequence on children's word learning.

Future studies should continue prioritizing precise measures of parent outcomes and expand upon the current study by examining parents' maintenance and generalization of the See and Say Sequence. In the current study, I identified that learning the See and Say Sequence increased parents' instances of responsive labeling and responsive ADS with noun subjects in more balanced parent-child interactions. When examining only short-term outcomes, this confirmed that the intervention altered parent input in expected ways. The next step in this line of research is understanding the long-term impact on parent input with more culturally and linguistically diverse populations, examining whether parents can maintain these input features over time and generalize the use of them outside of a clinical research setting.

In addition, it is critical for future studies on the See and Say Sequence to collect longitudinal data on child language outcomes. Characterizing changes in key features of parent input across the interactive, conceptual, and linguistic dimensions (Rowe & Snow, 2020) may better inform the active ingredients, or catalyst of change, within a parent-implemented intervention (Heidlage et al., 2020). Thus, the findings on parent input in the current study may inform hypotheses about child language performance outcomes in future studies. The See and Say Sequence is hypothesized to increase children's rate of communication by increasing

communication opportunities through balanced interactions and providing frequent reinforcement of both verbal and nonverbal communication attempts through parents' semantically and temporally contingent responses. In addition, it is hypothesized to support children's word learning by simplifying the process of conceptual mapping through single word responsive labeling and strengthening the semantic representation of words through sentences that explicitly teach qualities of the referential object. Studies investigating these hypotheses would be a valuable next step.

The See and Say Sequence delivered with a brief intervention may be a promising approach for early intervention providers. Methodologically, the current study provides a compelling approach for delivery of a brief intervention, including replicable procedures and a strong rationale for design features hypothesized to support parent and child learning. When utilized as one option along a continuum of interventions, this approach may serve to increase families' timely access to early intervention services. For example, this brief approach may be a valuable tool to offer to families placed on an EI waitlist. Thus, the See and Say Sequence should be further studied within the context of the Part C EI system to better understand implementation and clinical utility.

In conclusion, the current study provided evidence that parents can learn the See and Say Sequence in a single session, resulting in significant changes across the interactive, conceptual, and linguistic features of their input immediately following the instruction. Through this approach, I provide preliminary evidence that a brief intervention can bring about change in parent input properties. These findings should be interpreted with caution given that parents in the study had high levels of education and many children in the study were typically developing. Nonetheless, the design of the brief intervention may be a promising approach to decrease the

time needed to teach parents language strategies in future studies. During a single session, the use of the See and Say Sequence resulted in parent input that was developmentally timed to the children's language level and contained appropriate features of the interactive, conceptual, and linguistic dimensions detailed by Rowe and Snow (2020). As a result, children in the study were exposed to increased instances of conceptually simple, linguistically rich parent input delivered in responsive, child-led interactions. The ability to rapidly alter parents' input across these dimensions is encouraging. However, future studies are needed to understand how parents maintain use of the See and Say Sequence and to determine if it is effective in improving children's language outcomes.

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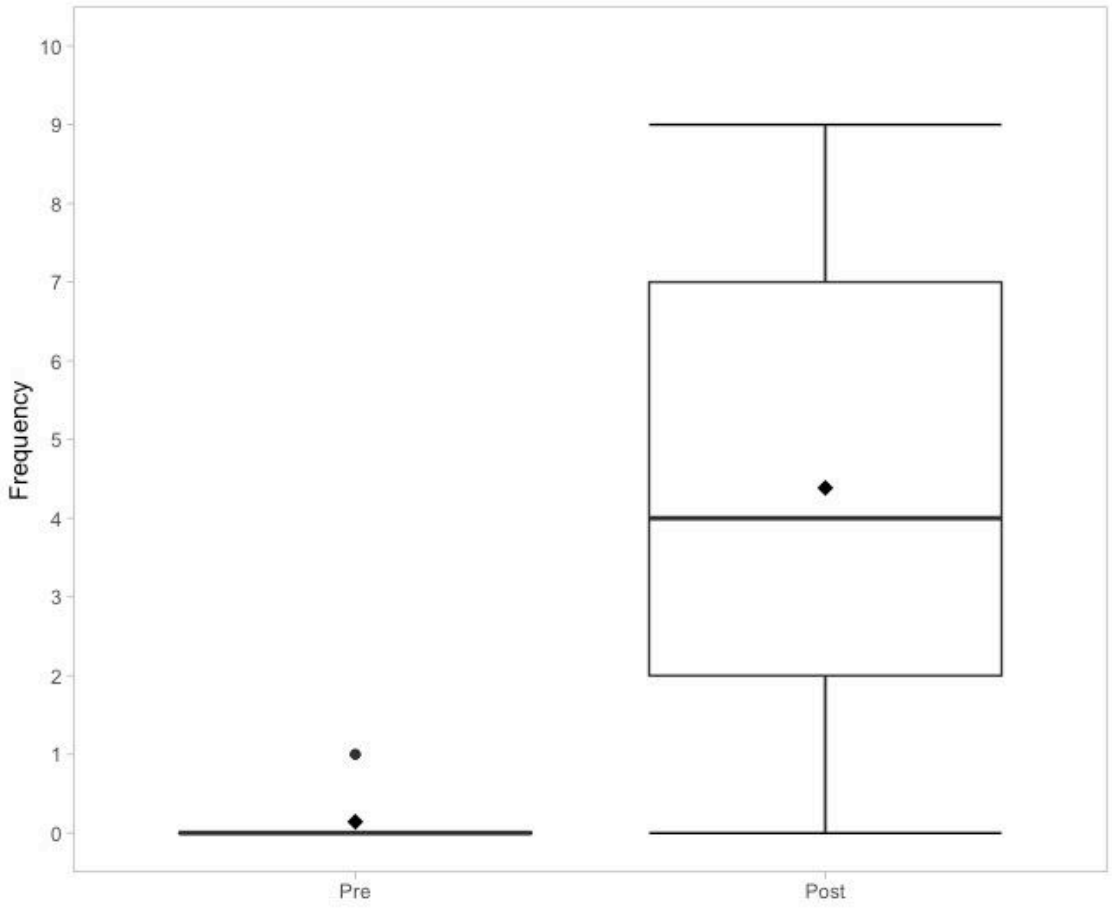
Figure 1

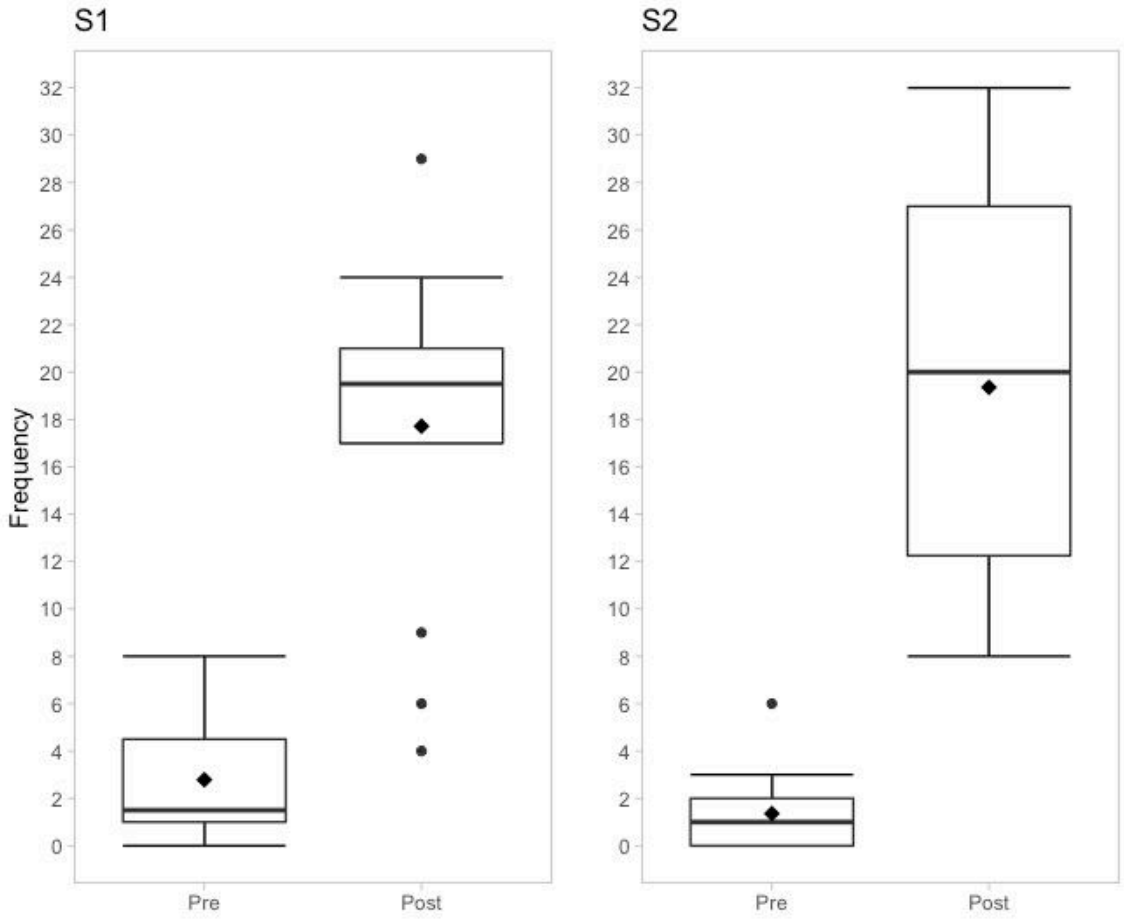
Distribution of the See and Say Sequence Pre- and Post-Intervention



Note. Diamonds represent group means. Circles represent outliers.

Figure 2

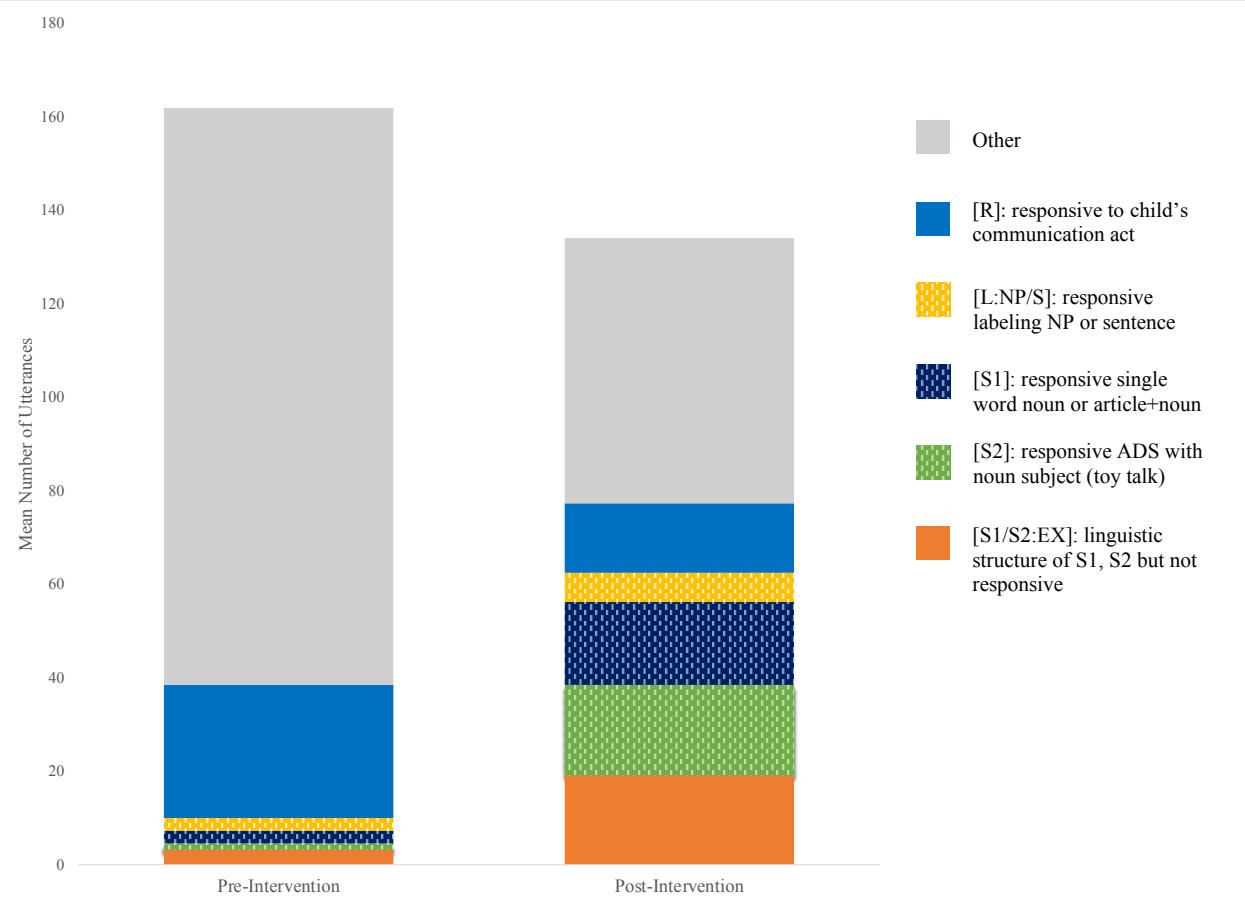
Distribution of See and Say Sequence Responses Pre- and Post-Intervention



Note. Diamonds represent group means. Circles represent outliers.

Figure 3

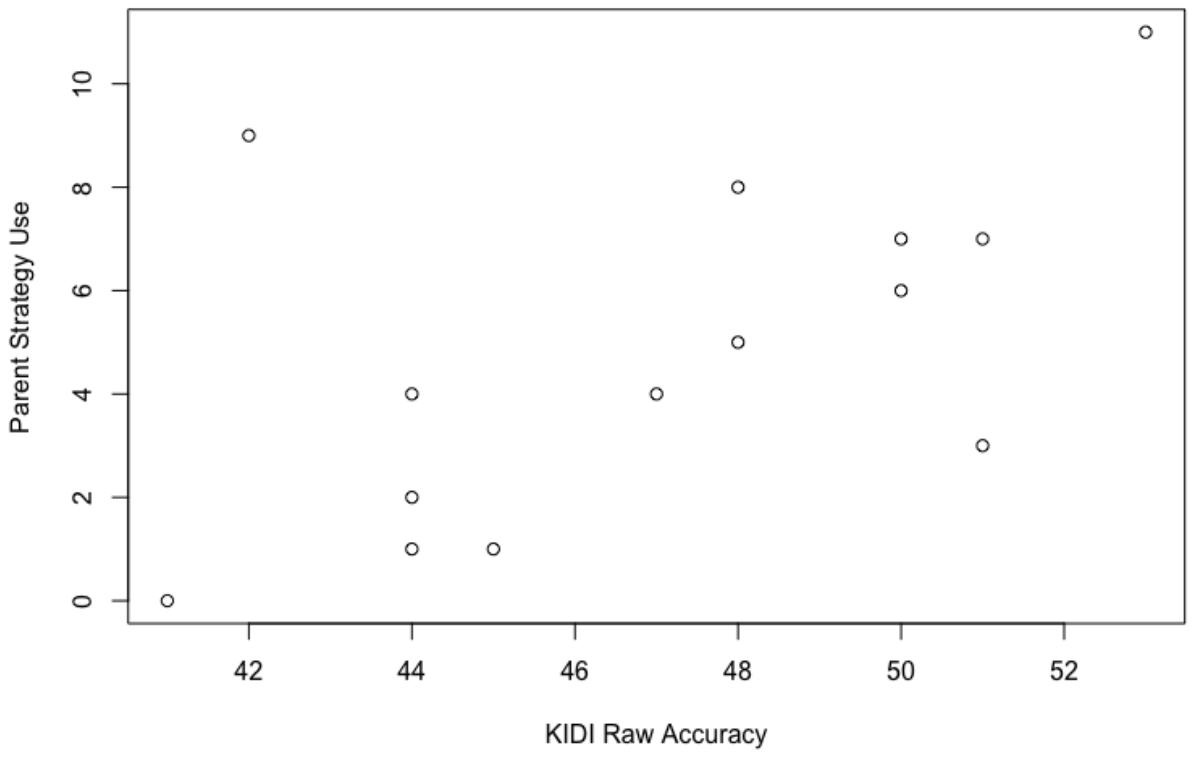
Mean Parent Utterances Across Linguistic Categories Pre- and Post-Intervention



Note. The *Other* category is comprised of utterances not characterized by a code.

Figure 4

Scatterplot of Parent Strategy Use Post-Intervention and Raw Accuracy on KIDI



Note. $r(12) = .52$, $p = .0579$

Appendix A

The See and Say Sequence Handout

See and Say Sequence

1 See your child communicate or show interest

What do I look for?

Pointing, showing, or giving you a toy, "back and forth" looking, making a sound, giggling or gasping, saying a word, or anything that sends a message!

2 Say the name

What do I say?

The name of the object! When children are first learning the names of objects, it helps to say the word by itself.

3 See your child communicate back

What do I look for?

Any response from your child! They might repeat a word you said, make a sound, hold up their toy, or just look at you. Give your child time to respond!

4 Say something about it

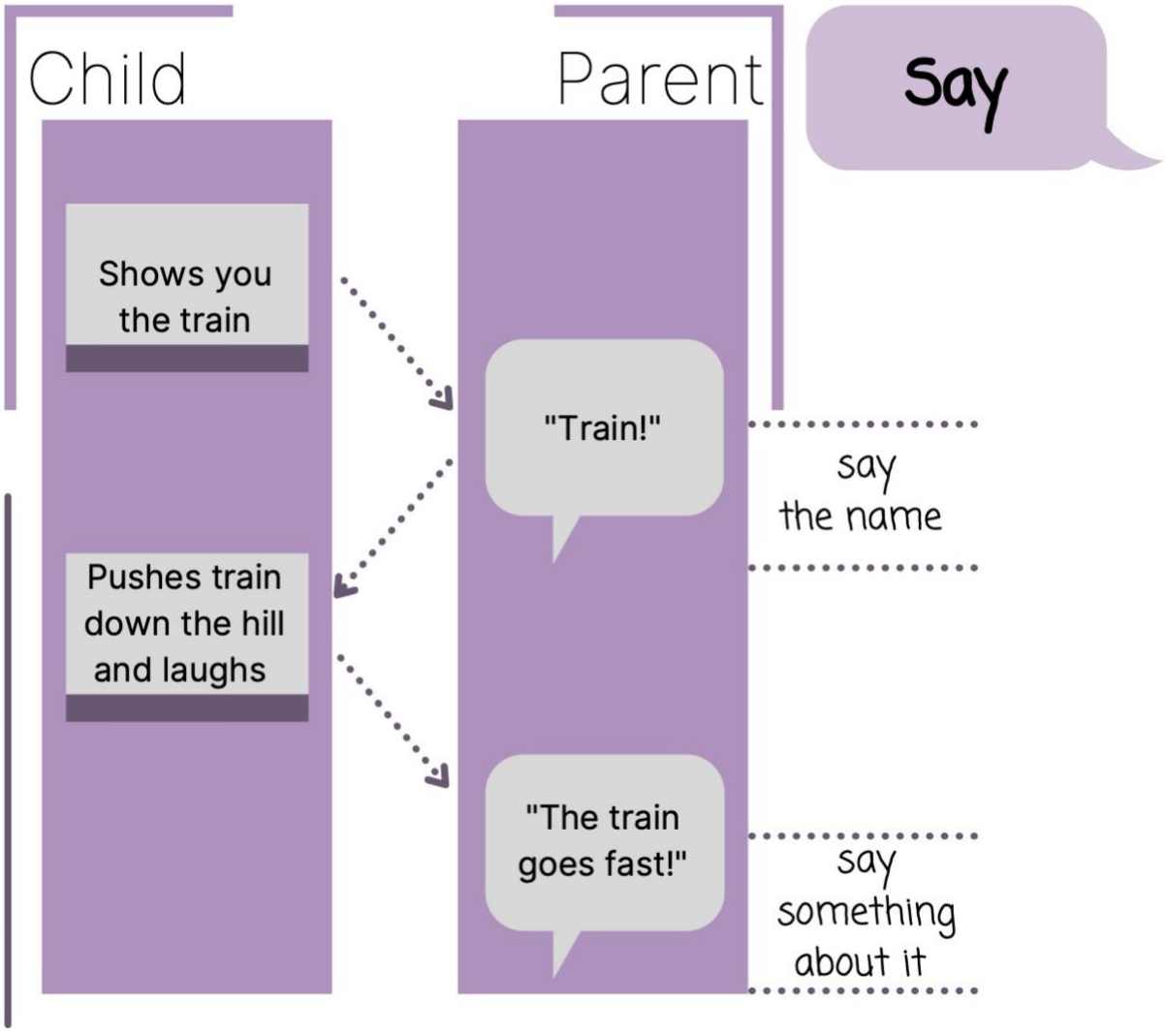
What do I say?

Use a sentence that starts with the name of the object! Say what the toy did, how it moved, or where it went. You are teaching your child about the object!

See

Look for "comment-worthy" moments during play. Moments that are surprising or exciting give you something to communicate about with your child!

Exciting Action		Child Response		
Tower falls over Cars crash Bubble pops	+	"Uh oh" "Oh no" Points and gasps	=	COMMENT WORTHY



Appendix B

The See and Say Sequence Plan and Reflect

See and Say Sequence *plan and reflect*

example

Toy: baby dolls	Toy:	Toy:
How did my child communicate? 1. holding up baby's clothes 2. pointing to spots baby wanted to go 3. making sound effects	How did my child communicate?	How did my child communicate?
Comment worthy moments 1. baby fell out of stroller 2. baby's hat fell off 3. child ran with stroller to the kitchen	Comment worthy moments	Comment worthy moments
Sentences 1. The baby fell down! 2. The stroller is empty. 3. Her hat is gone. 4. The baby is hungry!	Sentences	Sentences

Appendix C

Adult Coding Table

Strategy Codes	Description	Example
Unless otherwise stated, all codes are responsive, defined as utterances that occur with 3 sec. of a child act, refer to the object of the child's interest and is not overlapping or interrupting the child.		
[S1:C] word level	The parent responds to the child's **communication act** (including gestures) with a single word noun or an article + noun utterance.	C [show]. =block M **A Block[S1:C].**
[S1:P] word level	The parent responds to the child's **play act** with a single word noun or an article + noun utterance.	C [play]. =puts dog on the tower M **dog[S1:P].**
[S1:EX] word level	The parent uses a single word noun or an article + noun, but the utterance is not responsive	C xx xx. C <{oink oink} xx>. M **<yeah, a pig[S1:EX]>.** (overlap)
[S2:C] word level	The parent responds to the child's **communication act** (including gestures) with an ADS containing a noun subject.	C [point] xx. =to tower M **The tower[S2:C]** is big.
[S2:W] word level	The parent provides ≥:03 **wait time** before using an ADS containing a noun subject.	M {wow} good job. ; :04 M **Your tower[S2:W] is so tall!**
[S2:EX] word level	The parent uses an ADS with a noun subject, but the utterance is not responsive.	C xx xx. M The tower[S2:C] fell over M **The blocks[S2:EX] are everywhere!**
[SSS] utterance level	The parent uses [S1] and [S2] in order within a single back-and-forth interaction. The sequence code [SSS] will be placed at the end of the second utterance.	C {ba} xx xx. M **Baby[S1:C].** C {sleeping noise}[point]. M **The baby[S2:C] is sleeping [SSS].**
Non-Strategy Codes	**Description**	**Example**
[R] utterance level	The parent responds to the child's communication act with an utterance that does not fit the linguistic requirements of the [S1] and [S2] codes, but is still responsive.	C [point]. **M {wow} that's cool [R].** C cool [im]. **M What is it [R]?**
[L:NP] or [L:S] word level	The parent responds to the child's communication or play act with an isolated NP or pronoun + copula + NP that labels the picture or concrete object of the child's interest.	C bottle **M that is a bottle [L:S]!** C [show]. =shows cup M **your sippy cup[L:NP]!**

Appendix D

Parent Learning Checklist

See and Say Sequence	
Parent Learning Checklist	
Participant ID	
Reliability Checker ID	
Date	
Application	
	Observed Yes=1, No=0
Parent carried out a [S1] with their child during coaching session without researcher support	
Parent carried out a [S2] with their child during coaching session without researcher support	
Parent carried out a [SSS] with their child during coaching session without researcher support	
Knowledge	
	Observed Yes=1, No=0
Parent stated the name of the strategy	
Parent stated Step 1: See your child communicate	
Parent stated Step 2: Say the name	
Parent stated Step 3: Wait for you child to communicate again	
Parent stated Step 4: Say something about it	

Appendix E

Intervention Fidelity Checklist

See and Say Sequence	
Intervention Fidelity Checklist	
Participant ID	
Fidelity Checker ID	
Date	
Length of TMCR	
Teach	
Characteristics (do not need to be in order)	Observed Yes=1, No=0
The researcher introduced the strategy by using the name (See and Say Sequence)	
The researcher explains types of communication children may use (i.e., gestures, eye gaze, sound effects, showing an object, etc.)	
The researcher asks the parent to give examples of how their child communicates with them.	
The researcher explains comment worthy moments (i.e., moments that elicit emotion, such as excitement, surprise, or frustration from the child)	
The researcher asks the parent to give an example of a toy or activity that excites their child (comment worthy moment toy).	
The researcher explains the “see” steps.	
The researcher explains the “say” steps.	
The reseacher provides an illustration of the see and say sequence using specific information provided by the parent.	
The researcher gives a description of the "sequence."	
The researcher explains the importance of wait time and following the child's lead.	
Model	
Characteristics (do not need to be in order)	Observed Yes=1, No=0
The researcher role plays the See and Say sequence with the parent. The parent is the child and the researcher models the parent role.	
The researcher provides clear examples of the four See and Say Sequence steps.	
The researcher gives a brief description of each step following the role-play	
Coach	
Characteristics (do not need to be in order)	Observed Yes=1, No=0
The researcher role plays the See and Say sequence with the parent. The researcher is the child and the adult practices the parent role.	
The researcher provides *specific* feedback (i.e., feedback that references something specific the parent did well or something specific to the parent could change) on parent's first attempt during the role-play.	
The researcher provides *specific* feedback (i.e., feedback that references something specific the parent did well or something specific to the parent could change) on parent's second attempt during the role-play.	
1st Caregiver Practice Attempt: The researcher provides specific feedback on the parent's attempt with the child.	
2nd Caregiver Practice Attempt: The researcher provides specific feedback on the parent's attempt with the child.	
3rd Caregiver Practice Attempt: The researcher prompts the parent to reflect on their responses and give self-feedback	
4th Caregiver Practice Attempt: The researcher provides specific feedback on the parent's attempt with the child.	
Review	Observed Yes=1, No=0
The researchers prompts the parent to state the name and steps of strategy	
If the parent gets any component incorrect, the researcher provides the accurate description and has parent repeat it back. If the parent was accurate in their response, place a 1 in the box.	
	Total
	0