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Examiner and child contributions to therapy

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EXAMINER AND CHILD CONTRIBUTIONS TO THERAPY

by

Rebecca Lyrenmann

A thesis submitted in partial fulfillment
of the requirements for the Master of Arts
degree in Speech Pathology and Audiology in the
Graduate College of
The University of Iowa

May 2016

Thesis Supervisors: Associate Professor Amanda Van Horne
Professor Karla McGregor

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Graduate College
The University of Iowa
Iowa City, Iowa

CERTIFICATE OF APPROVAL

MASTER'S THESIS

This is to certify that the Master's thesis of

Rebecca Lyrenmann

has been approved by the Examining Committee for
the thesis requirement for the Master of Arts degree
in Speech Pathology and Audiology at the May 2016 graduation.

Thesis Committee:

Amanda Van Horne, Thesis Supervisor

Karla McGregor, Thesis Supervisor

Melissa Duff

ABSTRACT

The purpose of this research was to analyze child and clinician factors affecting language therapy outcomes and to analyze the potential bi-directional relationship between child and clinician factors. Transcripts of intervention sessions with one child and one trained examiner were coded for factors relating to children's language ability, examiners' strategies for reaching session targets, and differences in examiners' interactional styles. Differences in children's language ability and examiners' interactional styles did not have a strong relationship with therapy outcomes. Differences were observed in the overall frequency of examiners' strategy use across children; however, examiners were not sensitive to individual children's responsiveness to particular strategies.

This is a secondary data analysis on an intervention study, which affects interpretation of the results: variability in examiner and child behaviors was decreased due to adherence to intervention protocol. However, the mismatch between examiner strategies and child responses is of interest. Making clinicians explicitly aware of the many types of elicitation and response strategies available may increase examiners' effectiveness, efficiency, or responsiveness.

PUBLIC ABSTRACT

Why is language therapy more effective for some children than for others? What are the variables that contribute most to differences in children's progress? What interactions occur between children and therapists within the therapy process?

The purpose of this study is to analyze child and therapist contributions to the progress made by children in language therapy. This study uses transcripts of therapy sessions from an ongoing language intervention study. Transcripts from sessions with one child and one therapist were analyzed for variables that may affect a child's progress, such as the child's language ability prior to therapy and the therapist's style of interaction and use of various strategies for reaching therapy goals.

We found that these variables did not have a strong relationship with therapy outcomes. Variables not analyzed in the current study, such as the strength of the bond between child and therapist, may contribute more to differences in children's progress.

We also found that therapists used many different strategies for reaching goals, and some children responded best to particular strategies. However, therapists did not appear to be conscious of these differences across children. Making therapists overtly aware of possible strategies may increase their therapists' to adapt to individual children, thereby increasing therapy effectiveness.

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INTRODUCTION

Child language intervention is a type of behavioral therapy meant to improve language ability in children who exhibit language impairments or are at risk of developing them. In a typical intervention, a trained specialist, usually a speech-language pathologist, interacts with a child by using specific language behaviors and techniques which scaffold the child's language development and increase functional communication skills.

Language interventions for children fall along a "continuum of naturalness" (Fey, 1986, p.63). Child-centered approaches are highly natural because they follow the direction of the child. In child-centered therapy, the clinician does not explicitly direct the child's language output; instead, he or she uses toys and activities to create a language rich environment and encourage the child to produce spontaneous utterances. In contrast, highly-structured, clinician-directed approaches are at the low end of the naturalness continuum and can readily be used to target specific goals. A clinician using the clinician-directed approach frequently models language targets and prompts the child to produce them.

Hybrid approaches have characteristics of both child-centered and clinician-directed therapy. A clinician using the hybrid approach selects specific language targets and then attempts to elicit the child's spontaneous use of those targets within each therapy session. The clinician also adjusts his or her language behavior to provide modeling, feedback, and reinforcement of the child's utterances (Fey, 1986, p. 205-206). A child's attempt at producing a language target is called a platform utterance because it provides

the clinician with a jumping-off point for intervention. When a child produces a platform utterance, the clinician uses this opportunity to respond in a way that enhances the child's understanding of the language target.

Conversational recasting

One type of hybrid approach is conversational recasting, a technique in which the clinician responds to platform utterances produced by the child. Recasting typically occurs when the child incorrectly uses a language target. The clinician responds to the child's incorrect use with a new utterance that maintains the child's original meaning but uses the target correctly. For example, a child struggling with past tense -ed may produce an utterance such as "Yesterday I play with my doll." This constitutes a platform utterance because it obligates past tense -ed. The clinician may respond many different ways, such as "You played with your doll?" or "Wow, you played with your doll!" Both of these examples repeat the child's original idea while also correcting the child's omission of past tense -ed. Recasts can also occur after the child correctly uses a target form. In this case, the clinician still responds by using the target, but no corrections are needed.

The goals of conversational recasting are to focus the child's attention on language targets and provide feedback on correct and incorrect productions. Recasting offers a number of potential benefits. First, it enables clinicians to interact with children in a functional, realistic way: recasts are connected to children's interests and also serve as natural conversational turns. Another benefit is that recasting reduces demands on

children's memory. A recast uses many of the same words as its platform utterance (Hoodin, 2011, p. 99-100), reducing children's need to process multiple features of language at once. A third benefit of recasts is their "temporal proximity" to the platform utterance (Yoder, Spruytenberg, Edwards, and Davies, 1995, p. 21). Temporal proximity creates a clear connection between the platform utterance and the clinician's recast, helping children attend to similarities and differences between the two utterances.

Conversational recasting is used to treat many types of language disorders. One population typically treated with this approach is children with Specific Language Impairment (SLI). SLI is characterized by expressive and receptive language deficits in the absence of any cognitive, physiological, or environmental causes. Expressive delays in morphology and syntax are most commonly associated with SLI, although receptive language delays also occur (Leonard, 2014, p. 19). Most English-speaking children with SLI have difficulty acquiring function words such as auxiliary and copula verbs and tense/agreement morphemes such as third person singular -s and past tense -ed (Rice, Wexler, and Hershberger, 1998). Overall, the language abilities of children with SLI are comparable to those of younger, typically-developing children (Conti-Ramsden and Hesketh, 2003).

Several studies support the effectiveness of conversational recasting in the treatment of SLI (Camarata and Nelson, 1992; Camarata, Nelson, and Camarata, 1994; Nelson, Camarata, Welsh, Butkovsky, and Camarata, 1996; Hassink and Leonard, 2010). Nevertheless, conversational recasting is not equally effective with all children (Hassink & Leonard, 2010). Characteristics of both the child and the clinician might factor into these discrepant outcomes.

Child factors contributing to the success of conversational recasting

In this section we explore three interconnected factors inherent to the child that contribute to the success of conversational recasting, the child's extant language ability, the child's influence over the therapeutic environment, and the child's tendency to participate or refrain from language practice.

The child's extant ability. Because language areas are interdependent, precursor skills in one area, such as semantics, affect acquisition of targets in other areas, such as syntax. Moyle, Weismer, Evans, and Lindstrom (2007) found that, for both language-impaired and typically-developing children, lexical development predicted later grammatical development, and grammatical development also predicted later lexical development. Pawlowska, Leonard, Camarata, Brown, and Camarata (2008) found that the ability of children with SLI to use subject/verb constructions and the plural -s morpheme predicted their ability to learn subject/verb agreement in therapy because those two grammatical structures are highly related to agreement in English. To put it plainly, the extent to which the child benefits from intervention is related to the language abilities he or she brings to the intervention.

This relationship is also captured by the construct of "modifiability." Modifiability is a clinical judgment of the clinician's effort and the child's response to those efforts over a brief intervention (Peña, 2000; Peña et al., 2006). In Peña et al. (2006), clinicians blinded to diagnostic status provided modifiability judgments after working with children in two 30-minute sessions to improve oral narration. Children

with language impairments were judged as less modifiable than children with typical language abilities and modifiability scores predicted the amount of improvement that children demonstrated. The authors speculate that modifiability scores capture differences in attention, memory, problem solving, and flexibility among learners and that stronger abilities in these areas enable better outcomes.

The child's influence over the therapeutic environment. In the case of conversational recasting, the child's ability to produce platform utterances affects the number of recasts which occur per session, and that number, or dosage, is critically important to the outcome (Warren, Fey, and Yoder, 2007). In a study which examined the relationship between phonetic inventories and expressive language ability in children with SLI, Rescorla and Ratner (1996) found that children with smaller phonetic inventories demonstrated reduced volubility. Likewise, Tomblin, Nippold, Fey, and Zhang (2014), found volubility to be one dimension of language ability that distinguishes children with SLI from children with typical language. Children with low volubility limit the number of opportunities for clinicians to provide feedback and reinforcement.

The child's participation in language practice. Children with low volubility might also "...perpetuate their expressive language delay by depriving themselves of opportunities for vocal practice" (Rescorla & Ratner, 1996, p. 162). How does practice benefit language development? One benefit occurs via the interface of speech and language. Speech, the primary modality of language output in children with SLI, is a fine motor skill and is subject to the same principles of learning as other motor skills. Maas et

al. (2008) describe principles of motor learning for non-speech tasks and discuss how these principles can be applied to the treatment of motor speech disorders. Although children with SLI by definition do not have overt speech motor control deficits, the principles that aid motor learning still apply to individuals without motor disorders. In fact, much of the research on these principles has been conducted on individuals with normal speech ability (Maas et al., 2008, p. 278). According to Maas et al.'s (2008) summary of current research in this area, the most effective motor speech practice occurs in relatively large quantities (p. 282), supporting the idea that frequent productions of platform utterances promote the acquisition of language targets.

In a study by Bishop, Brown, and Robsen (1990), individuals with cerebral palsy and subsequent dysarthria or anarthria were compared to individuals with normal speech on tasks of phoneme discrimination, receptive vocabulary, and grammatical structure. Individuals with these disorders have impaired speech production but relatively preserved language, providing an opportunity to examine the relationship between speech output and language competence. The speech-impaired individuals demonstrated significantly lower phoneme discrimination ability and vocabulary than non-impaired individuals, but no significant differences were found on tasks of grammatical structure. The authors suggest that a plausible explanation for these results is the motor theory of speech perception, which states that the "experience of speaking consolidates and refines knowledge of correspondences between perception and production" (Bishop et al., 1990, p. 214). According to this theory, those with impaired speech production do not learn the motor patterns associated with each phoneme and so have increased difficulty perceiving

those phonemes. In this way, limited speech practice can have knock-on consequences for growth in other aspects of language.

Practice might also contribute to language growth by facilitating awareness of one's own language use. This particular function of practice has been better explored in the literature on second language learning. Swain's (2005) output hypothesis states that "the act of producing language (speaking and writing) constitutes, under certain circumstances, part of the process of second language learning" (p. 471). Although the output hypothesis explicitly describes second language acquisition, its principles can describe first language acquisition as well, especially in older children or in children whose awareness of their own language is heightened via their participation in language intervention. According to this hypothesis, language output has three functions to encourage learning. First, the "noticing, triggering function" allows speakers to notice gaps in their knowledge when they wish to convey a particular message but do not have the ability to do so (Nation, 2007, p. 4). Second, the "hypothesis testing function" occurs as speakers use language productions to explore and analyze their internal hypotheses of how various language forms are used (p. 4). Third, the "metalinguistic function" occurs when language is used to talk about language (p. 5). This aids acquisition by forcing the learner to use developing language abilities as a tool for thinking about language. Children who produce less language have fewer opportunities to learn via these output functions.

Clinician factors related to the success of conversational recasting

Recasts cannot occur without a platform utterance, so the clinician's ability to elicit platform utterances also affects treatment outcome. In a study on elicitation strategies and interactional style, Bruce et al. (2007) state that there are many strategies to elicit platform utterances, such as "Yes/No question[s]" and "Repetition/Imitation" (p. 258). Bruce et al. (2007) found that clinicians used different types of elicitation strategies with different children and in different contexts, suggesting that clinicians adjust to each child, rather than remaining relatively constant with all children.

Bruce et al. (2007) also found that clinician factors such as speech rate, the frequency of feedback, and overall responsiveness affected children's language output. Therefore, elicitation strategies are not the only clinician characteristic that contribute to therapy outcomes. Clinicians' "interactional style", whether child-centered, clinician-directed, or a hybrid approach, influences child language measures such as MLU and frequency of target form use (Bruce, 2007, p. 253). Bruce (2014) describes the ability to interact effectively with a child as "a skill that can be taught and practiced" (p. 118). Experienced clinicians adjust their elicitation strategies and overall interaction style for each child (Sheng, McGregor, and Xu, 2003), but inexperienced clinicians may be less skilled at doing so, leading to fewer successful elicitations of platform utterances, fewer recasts, and lower treatment intensity.

The bi-directional dynamic of conversational recasting

Within every clinician-child interaction, the clinician's utterances influence the child's responses, and the child's utterances influence the clinician's responses. Justice, McGinty, Zucker, Cabell, and Piasta (2013) explored this "bi-directional dynamic" (p. 496) in the context of teachers' interactions with students in a preschool classroom. They found that the frequency of students' complex syntax use was dependent on the frequency of teachers' complex syntax use. They also found that this dependency was bi-directional. Teachers tended to "mirror" students' relative frequency or infrequency of complex syntax productions (Justice et al., 2013, p. 498); the teachers' language complexity both influenced and was influenced by the children's language complexity (p. 504). Similar results were found in an RCT of conversational responsivity training for teachers: children with stronger language abilities upon entry to the intervention made significant gains as a result of the intervention, but children with weaker language abilities did not (Cabell, Justice, Piasta, Curenton, Wiggins, et al., 2011). The investigators pointed out that:

...less conversationally skilled children more frequently experience highly directive and adult-dominated interactions (e.g., File, 1994; Pellegrino & Scopesi, 1990). These types of interactions tend to stifle child verbal productivity (e.g., Girolametto, Hoaken, et al., 2000; Girolametto & Weitzman, 2002), potentially increasing the gap between children with higher and lower expressive language skills. (p. 327)

This bi-directional relationship may also occur in the therapy room. There is a dynamic relationship between the clinician factors and child factors that influence therapy outcomes. Frequency and accuracy of platform utterance production reflects the child's contribution to therapy, whereas successful elicitation of platform utterances and effective responses to platform utterances represents the clinician's contribution. The primary purposes of the present study were to describe a) clinicians' strategies for eliciting platform utterances, b) children's production of platform utterances, and c) clinicians' responses to those platforms. We tested the hypothesis that conversational recasting is an effective therapeutic technique by determining the relationship between the frequency of clinicians' elicitations of platform utterances, the nature of children's platform productions (accurate, inaccurate), the nature of clinicians' responses to platforms (question or comment) and outcome. We measured outcome with a sentence imitation test administered at the beginning of the following session. Finally, we explored the bi-directional nature of the clinician-child interaction by determining whether clinicians vary their use of platform elicitations between children and sessions and by relating modifiability ratings to outcome.

METHOD

Participants

We analyzed transcripts of clinical interactions between 7 children with SLI and 7 trained examiners who were participating in a larger intervention study aimed at teaching the regular past tense. It was typical for multiple examiners to be assigned to a single child, as the scheduling priority was to keep appointments – one examiner might substitute for another to solve family scheduling conflicts, examiner illness, other required absences, or changes in long-term schedules at semester breaks. This was a fortunate situation for us as we could take steps towards disentangling the effect of the child from the effect of the clinician by selecting transcripts for children who were treated by more than one examiner. (Also most examiners treated more than one child.) See Tables 1a and 1b for lists of examiner-child pairs.

Table 1a. Examiner-child pairs by examiner.

Examiner ID	Child 1	Child 2	Child 3	Child 4
A	1597NN14	2240AL14	2298KK14	2306AA14
B	2240AL14	2298KK14	2306AA14	2320AC14
C	1597NN14	2240AL14	N/A	N/A
D	2471JB15	2634MR15	N/A	N/A
E	2471JB15	N/A	N/A	N/A
F	2634MR15	N/A	N/A	N/A
G	2320AC14	N/A	N/A	N/A

Table 1b. Examiner-child pairs by child.

Child ID	Examiner 1 ID	Examiner 2 ID	Examiner 3 ID
1597NN14	A	C	N/A
2240AL14	A	B	C
2298KK14	A	B	N/A
2306AA14	A	B	N/A
2320AC14	B	G	N/A
2471JB15	D	E	N/A
2634MR15	D	F	N/A

To qualify for the past tense study, children were required to be monolingual English speakers between the ages of 4;0 and 9;11 who met the inclusion and exclusion criteria for SLI. These criteria included standard scores below the normal range (below

the 25th percentile) on the *Structured Photographic Expressive Language Test*, 3rd edition (SPELT – III; Dawson, Stout, and Eyer, 2003). A standard score above 83 was required on the *Kaufman Brief Intelligence Test*, 2nd edition, matrices subtest (KBIT-II; Kaufman and Kaufman, 2005), and children were also required to pass a hearing screening following ASHA protocols (*Guidelines for Audiologic Screening*). To allow enough room to improve their skills during the study, all participants began the study using past tense –ed with less than 40% accuracy on structured probes adapted from Redmond and Rice (2001), despite demonstrating at least 80% accuracy with word-final /t/ and /d/ in a phonological screening. Three additional tests were given to document children’s language and speech skills: the *Expressive Vocabulary Test* (EVT; Williams, 1997), the *Peabody Picture Vocabulary Test, 3rd Edition* (PPVT-III; Dunn and Dunn, 1997), and the *Goldman-Fristoe Test of Articulation, 2nd edition* (GFTA-2; Goldman and Fristoe, 2000). The children’s demographic information and pre-treatment test scores are shown in Table 2a. All children who completed the study demonstrated progress, as measured by increases in target verb accuracy from pre-treatment to post-treatment; these scores are shown in Table 2b.

Table 2a. Demographic information and pre-treatment test scores for child participants.

Child ID	Age	SPELT SS	EVT SS	PPVT SS (Form B)	GFTA SS	KBIT SS
1597NN14	10;6	36*	80	86	101	90
2240AL14	4;5	83	96	107	110	95
2298KK14	6;6	76	85	91	92	83
2306AA14	4;0	63	97	93**	N/A***	79
2320AC14	5;6	82	98	101	109	103
2471JB15	4;7	75	108	114	87	94
2634MR15	4;3	93	96	100	85	112

SPELT=Structured Photographic Expressive Language Test. EVT=Expressive Vocabulary Test. PPVT=Peabody Picture Vocabulary Test. GFTA=Goldman-Fristoe Test of Articulation. KBIT=Kaufman Brief Intelligence Test.

*Raw score. Test norms not available for age 10;6.

**Form A used.

***Data not available.

Table 2b. Pre-treatment and post-treatment target verb accuracy.

Child ID	Pre-treatment	Post-treatment	Difference
1597NN14	36%	97%	61%
2240AL14	29%	62%	33%
2298KK14	53%	79%	26%
2306AA14	N/A*	N/A	N/A
2320AC14	22%	52%	30%
2471JB15	14%	29%	15%
2634MR15	29%	58%	29%

*Participant 2306AA14 did not complete the study.

The examiners were four undergraduate and graduate students in the Department of Communication Sciences and Disorders at the University of Iowa, two ASHA-certified speech-language pathologists, and one research assistant with a bachelor's degree in an unaffiliated field. All examiners were trained in intervention procedures for the Past Tense Intervention Study.

The Past Tense Intervention Study

Intervention sessions consisted of one trained examiner and one child. Each intervention session centered on one of 6 lists of 5 target verbs which use the regular past tense –ed morpheme; irregular past tense forms were not a focus of the study. List order was determined by random assignment, with approximately half of the children completing verbs lists in one order, consistent with the main study hypotheses, and approximately half completing an alternative order (see Table 3). In each session, the examiner's goal was to model heavily the correct use of past tense in structured activities and then elicit platform utterances containing the five target verbs through focused stimulation. The examiner responded to platform utterances by recasting incorrect productions and expanding correct productions.

Table 3. Target verb lists and target verbs.

Target Verb List	Target Verbs
A	trip, cry, jump, scare, close
B	sneeze, crawl, hug, climb, remember
C	hop, bake, point, work, stretch
D	bark, plant, paint, count, whistle
E	float, scratch, snore, bounce, clap
F	rest, fish, rake, hum, listen

Each intervention session consisted of four activities designed to provide ample models and production opportunities for the target verbs:

Activity 1: Sentence imitation. The examiner produced ten sentences modeling the child's five target verbs in the past tense and asked the child to imitate each sentence. Each verb was presented once utterance finally and once utterance medially. Correct productions were praised, and the target verb was repeated correctly. Incorrect productions were used as opportunities for drill practice with the child. In these cases, the child was asked to repeat the word in isolation and a sentence before moving on to the next word.

Activity 2: Observational modeling (Leonard, 1975). The examiner used small toys and objects to model the target verb actions and describe them using the past tense. Each target verb was modeled five times with five different agents.

Activity 3: Syntax stories (Fey, 1986; Leonard, Camarata, et al., 2004). The examiner read aloud short stories which featured each target verb in the past tense

3-5 times. The purpose of the stories was to provide additional models of the target verbs and to set the stage for play that included the target verbs

Activity 4: Models and recasts during free play. The examiner and child engaged in play to recreate the actions of the story using the target verbs. The examiner attempted to elicit platform utterances of the target verbs from the child and then recast them using past tense –ed. The examiners had a goal of 3-5 recasts per verb per intervention session. These recasts could be corrective or non-corrective.

Activities 1 and 2 are highly structured and fall on the clinician-directed end of Fey’s “continuum of naturalness” (1986, p. 63), whereas activity 3 uses a more naturalistic, hybrid approach. Activities 3 and 4 alternated with each other, with each session containing 2-3 syntax stories and opportunities for free play, to provide repeated new contexts for verbs to be recast. In activity 4, examiners specifically elicited the target verbs; however, these elicitations occurred in the context of children’s spontaneous utterances, and free play was driven by the children’s interests and attention. Examiners’ use of elicitation strategies during this portion of the intervention sessions provides evidence related to the hypotheses of the current study, so only activity 4 was included in transcription, coding, and analysis on an utterance-by-utterance basis.

Before providing intervention, examiners were trained in study protocols. First, examiners read a training manual, watched videos of the intervention, and listened to 1-3 previously audio recorded intervention sessions. While listening, they identified instances in which the child used the target verb and the examiner responded appropriately with a recast or responded in some other way. After this training, examiners usually had the opportunity to observe an intervention session with the target child provided by another

trained examiner or by the study PI. Not all examiners completed this step, with some moving straight to a coaching session. Next, examiners began providing intervention with a coach present throughout each session. Examiners were considered successful if they could demonstrate the ability to follow study protocols, elicit platform utterances, and respond with appropriate recasts with minimal support from the coach. Immediately following a successful session with a coach, examiners were asked to provide the lab with audio files of all sessions. Fidelity checks and coaching via phone and/or email were regularly provided for the remainder of the child/examiner interactions.

Transcription and coding

Transcripts from 33 intervention sessions were included in the current study. Both examiner and child utterances were transcribed, and the focus of transcription was coding the presence of verbs and the use of grammatical morphology. Transcription was completed by trained undergraduate and graduate students who had demonstrated reliability by comparing three separate transcripts to master transcripts. 90% reliability was required on three measures: word agreement, morpheme agreement, and utterance break agreement. Following transcription, each transcript was checked by another trained examiner. Any discrepancies were resolved by consensus across transcribers, or by discussion in a weekly lab meeting for transcribers.

Following initial transcription, transcripts were coded for platform utterances containing target verbs using the search function in the software *Systematic Analysis of Language Transcripts* (SALT) (Miller and Chapman, 2003). Platform utterances were

defined as any child utterance containing any form of the target verbs. Next, the three utterances immediately preceding and three utterances following each platform utterance were automatically extracted from the transcript and coded for examiner techniques. Examiner utterances preceding platform utterances were coded for types of examiner elicitation strategies, and examiner utterances following platform utterances were coded for types of examiner responses. There was some overlap between utterances that were coded for elicitation and response strategies, as an examiner utterance could simultaneously follow one child platform and precede a second one. Elicitation and response codes were independent of each other, so whether an utterance was coded for examiner elicitation strategies did not affect if or how it was also coded for examiner responses.

Elicitation strategy codes were used to indicate examiners' strategies for eliciting a child platform utterance. These codes are listed in Table 4. Examiner elicitation strategies were coded into five large categories: comments, questions, imperatives, other, and none; these codes indicated the general sentence type of each examiner utterance preceding a platform utterance. Fifteen smaller codes were also used to describe additional characteristics of the examiner utterances – these codes show details such as whether or not the utterance contains the target verb, what type of question is being asked, and whether the examiner was acting out the target verb while producing the utterance.

Table 4. Types of examiner elicitation strategies.

Elicitation Strategy	Example	Type
Comment without target verb	E A monster!	Comment
Comment with target verb	E She is crying.	Comment
Question containing target verb	E Is she crying?	Question
Closed-choice “or” question containing the target verb	E Is she crying or sleeping?	Question
Question using “do” as the main verb	E What did she do?	Question
Questing containing “what happened?”	E And then what happened?	Question
Requests for the child to “fill in the blank”	E She flew and then she...?	Question
Question using “who”, “what”, “when”, “where” or “why”	E Who is that?	Question
Question using “how”	E How is she sleeping?	Question
Any other question type	E Do you want to?	Question
Imperative without target verb	E Get the door.	Imperative
Imperative with target verb	E Close the box.	Imperative
No elicitation strategy occurred	N/A	None

Table 4. Continued

Elicitation Strategy	Example	Type
Acts out the target verb	E {pretends to cry}.	Other
Indicates listening and attention to child's utterances	E Oh my goodness!	Other

Examiner response codes were used to indicate examiners' use of target verb recasts as responses to child platform utterances. These codes are listed in Table 5. Examiner response codes were divided into two large categories: recasts and non-recasts. Recall that the only correct response to child platforms, according to intervention protocol, was a recast of the target verb in the regular past tense form as the main verb in the utterance. Examiner responses, like examiner elicitation strategies, were also subdivided into more specific categories. Examiners sometimes responded by using the target verb incorrectly, as something other than the past tense form of the main verb, such as a progressive or past participle, noun, or bare form. If examiners did not produce utterances after the platform utterance, or if their utterances did not appear related in some way to the platform utterance, the code "None" was used.

Table 5. Types of examiner responses.

Examiner Response	Example	Type
Recast of target verb including past tense –ed	E You scared me!	Recast
Recast of target verb including past tense –ed within a question	E They scared you?	Recast
Target verb is used not as main verb, but as another part of speech incorporating final -ed (i.e., an adjective or past participle form)	E Why are you scared?	No recast
Target verb is used as another part of speech without –ed (i.e., as a noun)	E I like your painting.	No recast
Examiner does not respond to platform utterance	N/A	No recast

Any examiner utterances containing any form of the target verbs can be considered “examiner platform utterances.” To avoid confusion with “child platform utterances,” examiner platform utterances will be called examiner models. Examiner models are similar but not identical to examiner elicitation strategies. By definition, elicitation strategies are always followed by a child platform but do not necessarily contain a target verb. In contrast, examiner models may or may not be followed by a child platform, but always contain a target verb. To explore the potential bi-directional relationship between children and examiners, it is necessary to identify not only children’s uses of target verbs but also examiners’ uses of these same verbs, as

examiners' target verb use may also affect children's acquisition of therapy targets. Following coding based on child platform utterances, a second set of codes was added for examiner models. They were coded into just two categories: questions and comments. Then, the three utterances following each examiner model were coded for child responses. The child response code indicated whether or not the child responded to the examiner's use of the target verb with a child platform, so child response codes were simply "yes" or "no."

A final round of coding was completed with child platform utterances for the purpose of exploring utterance accuracy as discussed in hypothesis 1. Acquisition of the past tense -ed morpheme was the focus of the Past Tense Intervention study, so the accuracy of child platform utterances was determined based on whether utterances did or did not contain correct uses of this morpheme. All child platform utterances containing a grammatical and context-appropriate use of past tense -ed were coded "yes" for accurate while all other utterances were coded "no" for not accurate.

Child and examiner language measures

Using the analysis functions in SALT, several child and examiner language measures were collected for each intervention session. For children, these measures were the total number of intelligible utterances, the mean length of utterance (MLU) in words, the type-token ratio (TTR), and finite verb morphology composite (FVMC). Also, accuracy on the sentence imitation task for the current and following session was collected from data reported in the past tense study. These measures are shown in Table

6. For examiners, the measures included the total number of utterances and MLU in words. These measures are shown in Table 7.

Table 6. Child language measures by intervention session.

Child ID	Session Date	Total Intelligible Utterances	MLU	TTR	FVMC	Sentence imitation accuracy: current session	Sentence imitation accuracy: following session
1597AA14	10/7/2014	215	4.30	0.29	0.899	90%	80%
1597AA14	11/11/2014	263	4.30	0.27	0.952	80%	80%
1597AA14	1/13/2015	381	5.36	0.22	0.939	80%	80%
1597AA14	1/23/2015	313	4.27	0.26	0.959	90%	100%
2240AL14	3/12/2014	279	3.30	0.24	0.867	40%	70%
2240AL14	3/17/2014	378	3.56	0.23	0.840	70%	70%
2240AL14	3/19/2014	376	3.24	0.23	0.900	70%	80%
2240AL14	4/2/2014	180	3.51	0.31	0.908	90%	80%
2240AL14	4/28/2014	281	3.35	0.25	0.918	80%	80%
2240AL14	5/28/2014	235	3.44	0.28	0.947	90%	90%
2298KK14	6/20/2014	240	4.35	0.25	0.727	90%	100%
2298KK14	7/11/2014	301	4.92	0.20	0.653	100%	90%
2298KK14	7/22/2014	488	4.22	0.18	0.878	80%	90%
2298KK14	8/29/2014	186	2.90	0.31	0.904	90%	80%
2306AA14	9/19/2014	177	3.41	0.30	0.522	50%	30%

Table 6. Continued

Child ID	Session Date	Total Intelligible Utterances	MLU	TTR	FVMC	Sentence imitation accuracy: current session	Sentence imitation accuracy: following session
2306AA14	9/26/2014	234	3.25	0.26	0.707	30%	50%
2306AA14	10/3/2014	307	3.50	0.19	0.576	50%	40%
2306AA14	12/5/2014	161	3.55	0.32	0.607	40%	40%
2306AA14	12/12/2014	163	4.01	0.30	0.797	40%	N/A*
2320AC14	7/15/2014	161	2.69	0.30	0.771	90%	80%
2320AC14	7/29/2014	242	3.20	0.24	0.750	90%	80%
2320AC14	8/26/2014	259	3.20	0.24	0.864	70%	90%
2320AC14	9/4/2014	379	3.17	0.19	0.776	100%	90%
2320AC14	9/11/2014	180	2.83	0.32	0.692	70%	90%
2320AC14	9/25/2014	182	2.63	0.35	0.891	100%	100%
2471JB15	2/11/2015	207	2.28	0.28	0.455	50%	40%
2471JB15	2/16/2015	271	2.25	0.27	0.585	40%	50%
2471JB15	5/18/2015	273	2.71	0.26	0.684	50%	50%
2471JB15	6/8/2015	380	3.11	0.21	0.802	50%	80%
2634MR15	9/15/2015	90	2.23	0.47	0.611	70%	70%
2634MR15	9/18/2015	63	1.73	0.48	0.714	70%	80%
2634MR15	10/13/2015	102	2.60	0.45	0.833	70%	60%
2634MR15	10/20/2015	149	2.67	0.37	0.930	60%	80%

*Data not available.

Table 7. Examiner language measures by intervention session.

Examiner ID	Session Date	Total Utterances	MLU	Proportion of recasts to total responses
A	3/17/2014	500	4.28	0.774
A	3/19/2014	506	3.85	0.727
A	6/20/2014	306	3.67	0.808
A	7/11/2014	266	3.87	0.719
A	7/22/2014	575	3.60	0.711
A	9/19/2014	332	3.98	0.690
A	9/26/2014	459	4.13	0.588
A	10/3/2014	479	3.55	0.929
A	1/13/2015	439	4.19	0.786
B	4/28/2014	434	5.58	0.652
B	5/28/2014	399	4.92	0.889
B	7/15/2014	386	5.53	0.933
B	7/29/2014	357	5.55	0.818

Table 7. Continued

Examiner ID	Session Date	Total Utterances	MLU	Proportion of recasts to total responses
B	8/26/2014	307	5.08	0.762
B	8/29/2014	287	4.44	0.675
B	12/5/2014	338	4.78	0.724
B	12/12/2014	339	5.40	0.923
C	3/12/2014	363	4.62	0.707
C	4/2/2014	225	4.76	0.857
C	10/7/2014	230	5.27	0.515
C	11/11/2014	281	5.26	0.640
C	1/23/2015	315	4.77	0.808
D	6/8/2015	546	4.68	0.958
D	9/18/2015	413	4.47	1.000
E	2/11/2015	390	4.70	0.815
E	2/16/2015	402	4.45	0.853

Table 7. Continued

Examiner ID	Session Date	Total Utterances	MLU	Proportion of recasts to total responses
F	9/15/2015	416	4.69	1.000
F	10/13/2015	330	5.00	0.900
F	10/20/2015	371	5.23	1.000
G	9/4/2014	434	4.25	0.606
G	9/11/2014	350	4.17	0.875
G	9/25/2014	375	4.15	0.889

Post-intervention survey data

Following each intervention session, examiners completed a brief survey in which they provided ratings from 0-100 for the following statements: “The child attended well,” “The materials were of interest,” “The child appeared to learn/improve,” and “I felt effective.” They also provided an “Overall session rating” from 0-100. The average of these four ratings for each session was calculated as a measure of examiners’ sense of the session’s overall quality and effectiveness. This also provided information on how hard

examiners felt they needed to work to elicit a platform utterance. These ratings are shown in Table 8.

Table 8. Post-intervention survey data.

Child ID	Examiner ID	Session Date	“The child attended well.”**	“The materials were of interest.”**	“The child appeared to learn/improve.”**	“I felt effective.”**	Overall session rating.*
1597AA14	C	10/7/2014	75	89	80	80	81
1597AA14	C	11/11/2014	72	75	80	82	85
1597AA14	A	1/13/2015	100	97	90	86	90
1597AA14	C	1/23/2015	88	93	88	91	94
2240AL14	C	3/12/2014	73	88	82	84	83
2240AL14	A	3/17/2014	95	95	90	90	90
2240AL14	A	3/19/2014	85	85	80	90	90
2240AL14	C	4/2/2014	62	62	78	77	69
2240AL14	B	4/28/2014	62	72	60	69	63
2240AL14	B	5/28/2014	85	70	82	90	84
2298KK14	A	6/20/2014	95	95	95	95	95
2298KK14	A	7/11/2014	90	90	97	95	95

*Ratings provided on a scale of 0-100.

Table 8. Continued

Child ID	Examiner ID	Session Date	“The child attended well.”*	“The materials were of interest.”*	“The child appeared to learn/improve.”*	“I felt effective.”*	Overall session rating.*
2298KK14	A	7/22/2014	95	88	91	95	100
2298KK14	B	8/29/2014	84	88	89	90	90
2306AA14	A	9/19/2014	90	85	80	94	95
2306AA14	A	9/26/2014	85	92	80	85	85
2306AA14	A	10/3/2014	85	95	92	95	93
2306AA14	B	12/5/2014	87	80	90	89	93
2306AA14	B	12/12/2014	77	82	76	82	80
2320AC14	B	7/15/2014	72	N/A**	69	61	66
2320AC14	B	7/29/2014	68	53	74	62	64
2320AC14	B	8/26/2014	64	82	66	62	76
2320AC14	G	9/4/2014	57	74	63	63	56
2320AC14	G	9/11/2014	62	57	73	75	62

*Ratings provided on a scale of 0-100.

**Data not available.

Table 8. Continued

Child ID	Examiner ID	Session Date	“The child attended well.”**	“The materials were of interest.”**	“The child appeared to learn/improve.”**	“I felt effective.”**	Overall session rating.*
2320AC14	G	9/25/2014	70	67	67	71	67
2471JB15	E	2/11/2015	100	90	80	80	87
2471JB15	E	2/16/2015	90	90	80	80	80
2471JB15	D	5/18/2015	84	87	84	65	87
2471JB15	D	6/8/2015	70	62	70	70	70
2634MR15	F	9/15/2015	N/A**	N/A**	N/A**	98	N/A**
2634MR15	D	9/18/2015	N/A**	N/A**	N/A**	N/A**	N/A**
2634MR15	F	10/13/2015	90	97	97	99	98
2634MR15	F	10/20/2015	100	100	100	100	100

*Ratings provided on a scale of 0-100.

**Data not available.

Outcome

We related the codes detailed above to therapy outcomes to determine examiner and child contributions. Therapy outcome was defined as the change in sentence imitation accuracy between sessions. In this way, children's growth in the ability to use the past tense –ed form could be measured from one session to the next, indicating progress made in a single session with a specific examiner.

RESULTS

Clinicians' elicitation of platform utterances

On average, examiners used 54.93 ($SD = 13.50$) elicitation utterances per session. This number did not differ significantly across examiners, $\chi^2(6) = 3.74, p > .05$. Clinicians' utterances preceding child platform utterances were coded as belonging to 5 categories: comments, questions, imperatives, other, and none (Table 9a). Imperatives, other, and none were so rare that they were not analyzed statistically. More than half of the elicitation utterances were questions and approximately one-third were comments. This difference was significant, $\chi^2(6) = 19.42, p < .05$. These results appear to be driven by three examiners who used questions more frequently than comments, $\chi^2(1) = 6.11, p < .05$; $\chi^2(1) = 5.17, p < .05$; $\chi^2(1) = 4.41, p < .05$. The remaining four examiners did not show differences in these strategies, $\chi^2(1) = 0.00, p < .05$; $\chi^2(1) = 0.00, p < .05$; $\chi^2(1) = 1.81, p < .05$; $\chi^2(1) = 1.90, p < .05$. No examiners used comments more frequently than questions.

Table 9a. Codes by percent of total.

Code	Percent of Total
Questions	52.8%
Comments	33.8%
Imperatives	2.3%
Other	10.1%
None	0.07%

Across the question and comment categories, strategies containing target verbs occurred less frequently than strategies without target verbs (Table 9b). Nine hundred thirty-seven examiner elicitation strategies were questions; only 135 contained a target verb. Examiners used questions containing do as the main verb most often (n = 322), asking questions like “what did he just do?” in an attempt to obtain a platform utterance. 600 examiner elicitation strategies were comments; 253 contained a target verb.

Table 9b. Proportion of codes with target verbs by code category.

Code	Percent With Target Verbs
Questions	14.4%
Comments	42.9%
Imperatives	26.8%
Other	0.0%*
None	N/A

*By definition, codes in the “Other” category cannot contain a target verb.

The average number of examiner models produced per intervention session differed significantly across examiners, $\chi^2(6) = 15.49$, $p < .05$. Examiner models are often, but not always, successful in eliciting a child platform utterance. The proportion of successful models was calculated for each intervention session and did not differ significantly across examiners or children. Furthermore, linear regression indicated no relationship between higher proportions of successful examiner models and increases in sentence imitation accuracy in the following session, $F(2, 30) = 0.25$, $p = .81$. Differences in the proportion of successful examiner models across examiners and children did not predict effectiveness as measured by session-to-session therapy progress.

Children's use of platform utterances

On average, children produced 27.50 platform utterances per session ($SD = 6.36$). Of these, approximately one-quarter contained accurate uses of the past-tense –ed morpheme ($M = 24.15$, $SD = 14.85$). Overall, the average number of platform utterances produced per session did not differ significantly across children, $\chi^2(6) = 3.06$, $p > .05$. The average number of accurate platform utterances produced per session also did not differ significantly across children, $\chi^2(6) = 11.49$, $p > .05$.

A number of other child language characteristics were analyzed for their contribution to differences in therapy outcomes between children. The following measures were considered as potential predictors of growth: child talkativeness (total number of utterances in a session), child utterance length (MLU in words), child lexical diversity (TTR), child verb morphology accuracy (FVMC), and accuracy of child

platform utterances. Of these, none were significant predictors of change in accuracy from session to session.

Clinicians' responses to platform utterances

Recasts accounted for 78% of the total examiner responses coded in the transcripts, with non-recasts representing 22% of total responses. Most frequent were recasts in the form of comments, which account for 51% of all coded responses (see Tables 4 and 5). Next most common were questions containing recasts, which account for 26%. The remaining 23% includes a variety of non-recast codes and one recast code.

Unsurprisingly, the majority of examiners' response strategies were comments. In contrast, the majority of elicitation strategies were questions. The proportion of questions within examiners' total response strategies did not predict the number of child platforms which occurred per session, $F(2, 30) = 5.81$, $p = .44$, or sentence imitation accuracy in the following session, $F(2, 30) = 1.21$, $p = .99$, suggesting that neither comments nor questions are inherently more effective.

Differences in examiner language characteristics, including the number of utterances, MLU in words, and proportion of recasts to total responses, also did not have a strong relationship with therapy outcomes, $F(2,30) = 1.78$, $p = .09$; $F(2, 30) = -0.31$, $p = .78$; $F(2, 30) = 0.92$, $p = .37$.

The relationship between clinicians' and children's platform behaviors and outcome

To determine whether the child and examiner interact in a bi-directional relationship within each therapy session, the overall frequency of examiners' elicitation strategies was analyzed per transcript and per child. Each occurrence of an elicitation strategy represents an examiner's attempt to elicit a platform utterance. Examiners who show differences in the frequency of these strategies with different children or in different sessions are demonstrating that they adjust their interactional style to individual children, using strategies more frequently with less voluble or more reticent children. These differences also indicate that children respond to the same strategies in various ways. Significant differences were observed in the overall frequency of strategy use between children, $\chi^2(6) = 19.79$, $p < .05$, and between individual sessions, $\chi^2(32) = 111.84$, $p < .05$.

Given evidence that examiners do adjust their interactional style to individual children, the elicitation strategies that individual examiners use most frequently may be the strategies to which individual children are most responsive. However, in these transcripts, this was not the case. Two of seven children (2306AA14 and 2634MR15) responded significantly more frequently to questions than to comments; however, both of these children were paired with one examiner who produced more frequent comments as an elicitation strategy and no examiners who produced more questions (see Table 10).

Table 10. Children's preferred strategies and examiner's most frequent strategies.

Child ID	Child's preferred strategy	Examiner ID	Examiner's most frequent strategy	Did examiner frequency match child preference?
1597NN14	None*	A	Comments	No
		C	None	N/A**
2240AL14	None	A	Comments	No
		B	None	N/A
		C	None	N/A
2298KK14	None	A	Comments	No
		B	None	N/A
2306AA14	Questions	A	Comments	No
		B	None	No
2320AC14	None	B	None	N/A
		G	Questions	No
2471JB15	None	D	Comments	No
		E	None	N/A
2634MR15	Questions	D	Comments	No
		F	None	No

*None=No significant difference observed between strategies.

**N/A=Cannot be determined due to lack of significant differences in both child's preferred strategy and examiner's most frequent strategies

From the other point of view, two of seven examiners (A and D) used significantly more comments as an elicitation strategy, one (G) used significantly more questions, and four (B, C, E, and F) did not show a preference for either strategy. No examiner-child pairs were matched on elicitation strategy frequency and the child's responsiveness to that strategy. Overall, examiners do not appear to be sensitive to which strategies are most successful across individual children, at least on the basis of questions or comments.

Child platform utterances typically require the involvement of both the examiner and the child, and so it would be expected that the frequency of child platform utterances across sessions is also affected by this bi-directional relationship; however, linear regression indicated that the frequency of child platform utterances did not predict changes in sentence imitation accuracy in the following session, $F(2, 30) = 0.25$, $p = .81$. As with other outcome measures, these results may be best explained by examiners' consistent adherence to intervention protocol or to the relatively brief time frame over which we are examining progress.

Finally, we examined modifiability as it reflects contributions of the child and efforts of the examiner (Peña et al., 2006). Specifically, we analyzed examiners' post-intervention survey ratings for each session. Although none of the survey questions corresponds directly to modifiability, "The child appeared to learn" appears most closely tied to that construct. Overall, examiners tended to report relatively high ratings for these questions ($M = 82.12$, $SD = 11.94$). However, no significant differences were observed between children for average ratings on any of the questions: "The child attended well," $\chi^2(6) = 6.75$, $p > .05$; "The materials were of interest," $\chi^2(6) = 7.23$, $p > .05$; "I felt effective," $\chi^2(6) = 9.35$, $p > .05$; "The child appeared to learn/improve," $\chi^2(6) = 6.99$, $p >$

.05; “Overall session rating”, $\chi^2(6) = 8.86$, $p > .05$. These ratings also did not predict change in sentence imitation accuracy across sessions, $F(2, 30) = -0.16$, $p = .88$.

DISCUSSION

Which of these factors has the greatest impact on therapy outcomes?

The intervention protocol affects the interpretation of the results. In each session, the examiner was required to elicit a minimum number of platform utterances and respond with recasts using past tense –ed target verbs. The examiner was also directed to move on to other targets and/or end the session when a maximum number of platform utterances per verb was obtained. Examiners may have felt constrained by these requirements, making their interactions with children less variable than they would have otherwise been. Limited variability in the data, which may be explained by this adherence to protocol, led to few significant relationships between most of the child and examiner factors. This makes it difficult to determine which of the factors discussed above had the greatest impact on children's language growth throughout the intervention period.

However, this explanation alone does not address the potential bi-directional relationship between child and examiner. Regardless of issues with the methods of this study, the results provide insight into differences in how conversational recasting may be implemented and how children respond to these differences.

Child factors

It is not surprising that the average number of platform utterances did not differ significantly across sessions, given that examiners closely followed protocol and shifted

the emphasis to a new target word once the target number of recasts had been achieved. If examiners had not had an explicit goal of 3-5 utterances per session, larger variability in platform utterance frequency may have occurred. Despite this, children did show differences in the quality (accuracy) of their platform utterances, which further indicates that children's ability to produce platform utterances is measurably different.

No child language measures predicted growth from session to session. These results are inconsistent with previous findings that children's precursor abilities predict therapy gains (Moyle et al., 2007; Pawlowska et al., 2008). Again, this may be explained by intervention protocol, but the period over which change was measured is also a limitation. The interval between two consecutive sessions tended to be less than a week. Broad language measures such as MLU, TTR, and FVMC are unlikely to show a meaningful change in such a short period.

Children may have produced a wider variety of utterances, leading to greater differences in language measures, if more variable opportunities for practice had been provided in each session. The focus of each session was a specific list of target verbs, with all activities emphasizing that list. If a larger variety of words or morphemes were targeted in each session, children might have shown more variability in utterances overall, leading to stronger relationships between utterance characteristics and overall progress. Children may also have shown more growth with a larger variety of targets due to the increased likelihood of generalization to non-targeted words in the sentence imitation accuracy task.

Finally, there is little variability in the sentence imitation score, making significant results more difficult to attain. The maximum possible sentence imitation score was

10/10, and many children consistently scored above 7 or 8 across all sessions, even at the beginning of the intervention period. Sentence imitation accuracy may not have been sufficiently sensitive to children's growth between sessions because it measured a limited range of ability.

Examiner factors

It is also not surprising that examiners did not show differences in ability to elicit platform utterances due to intervention protocol. All examiners were able to elicit the minimum number of required child platform utterances per session, and there was no incentive to elicit more than this minimum amount. However, examiners did produce significantly different numbers of examiner models per session, suggesting that there are differences in examiners' efficiency of child platform utterance elicitation despite similar numbers of child platform utterances in each session. Some examiners required more examiner models to elicit a platform utterance, whereas others required fewer examiner models to do so.

Elicitation and response strategies. Overall, examiners showed similarities between code categories, so that differences in the frequency of various question and comment types were driven by examiners as a group, rather than by specific examiners who preferred one type over another.

Examiners showed some variation in their preferred strategies for elicitation of platform utterances though there were also many similarities across examiners. Questions

were used most frequently by three of seven examiners in this study, but questions did not prove to be any more effective than other strategies. The most frequent type of question, some form of "what did you do?", did not contain the target verb. Thus, examiners' most frequent strategy was a question without a target verb. Examiners may have found this to be the most obvious strategy or the easiest to use in a variety of situations. For example, examiners frequently acted out a target verb, then asked: "what did I do?" Recall that platform utterances must contain, at a minimum, a target verb, but do not require any other words. Using questions such as "what did you do" is a strategy that obligates a verb in the child's response, and so this appears to be a simple way to elicit, at least, the most basic form of child platform utterance.

The majority of response strategies were recasts, which indicates only that examiners followed intervention protocol and responded to almost all child platforms appropriately. Therefore, it cannot be determined which types of response examiners would naturally prefer. Within the recast category, comments were the most frequent type. Comments may be the most natural recast strategy for examiners, just as questions may be the most natural elicitation strategy. The pattern of examiner question-child platform – examiner comment was extremely common throughout the transcripts. This pattern fits well with the goal of conversational recasting, to focus the child on language targets and provide feedback within a structured but naturalistic conversation.

Strategy awareness. It is unclear whether examiners developed particular strategies because they were emphasized during training. What examiners learned during training about specific techniques to elicit and respond to platform utterances is unclear. In the

future, examiners could be trained on strategies that tend to be more or less effective, leading to less trial-and-error expected from examiners and more efficient sessions. If examiners were made explicitly aware of these strategies, they might become more responsive to differences between children. For example, an examiner who is consciously aware that elicitation strategies can include both questions and comments may observe that a particular child responds best to one or the other form. Whether this would affect children's ultimate acquisition of therapy targets remains to be seen.

Efficiency. Despite differences in examiner efficiency, higher numbers of successful eliciting utterances did not predict overall effectiveness in a session, and children did not experience greater progress in therapy with more efficient examiners. Efficiency may save time and effort for examiners but does not appear beneficial to children's outcomes.

Experience, post-intervention survey data, and child modifiability. Examiners' perceptions of session quality and the effort required in each session were not closely tied to children's progress. This could imply that examiners do not have accurate impressions of session quality and do not accurately judge whether children are making progress within a single session. Examiners may be less likely to modify their intervention strategies for children with low modifiability who are making less progress.

Examiners' ability to respond to differences in individual children and accurately assess session quality may be related to experience. The examiners of the current study were trained in intervention protocol but were not professional clinicians. Although most were undergraduates in the field of communication sciences and disorders, none had

extensive experience providing direct services. It is possible that a more experienced group of examiners would prove more responsive to differences in individual children and better able to adjust to children with high or low modifiability. More experienced examiners may also have more accurate perceptions of the quality of each session, leading to more variability in post-intervention survey ratings. It might also be the case that a longer-term therapeutic relationship between a given examiner and child would have enabled greater sensitivity to the child's learning style and need for scaffolding. In the final section, we situate this issue in the construct of therapeutic alliance.

The therapeutic alliance

Despite these limitations, all children involved in this study did demonstrate growth over the intervention period, and some children showed more growth than others. Another possible explanation for these differences is not related to conversational recasting, child precursor abilities, or examiner strategies. The therapeutic alliance, which can be defined as "the collaborative and affective bond between therapist and patient" (Martin, Garske, & Davis, 2000, p. 438), also makes a significant contribution to progress in therapy. The bi-directional relationship between examiners and children may be more impacted by the therapeutic alliance than by any of the factors discussed above. Conversational recasting is a specific intervention technique from which some children benefit more than others, whereas the therapeutic alliance goes beyond specific techniques. According to Lambert and Barley (2001), this alliance is based on examiners' ability to create environments of "mutual trust, confidence, and acceptance" (p. 359) with

their clients. In the current study, the analyzed factors did not include the quality of the relationship between examiner and child, yet this is known to be consistently related to therapeutic outcome (Horvath & Symonds, 1991). Post-intervention survey data addressed the quality of individual sessions but did not address the quality of the examiner-child relationship overall - doing so may provide additional insight into why some children made more progress than others. Pairing multiple examiners with multiple children is a design which allows for analysis of examiners' ability to form positive relationships with children, as well as children's ability to form relationships with their examiners. In this way, the therapeutic alliance may be analyzed within the bi-directional relationship, just as other factors were. The limitations of the current study make it difficult to draw conclusions about the importance of various examiner and child language factors to therapy progress. However, non-language factors may be just as important, if not more so, and are worthy of future investigation.

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