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Within-Treatment Factors as Predictors of Outcomes Following Conversational Recasting

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Abstract

Purpose—Although conversational recasting has been a generally successful treatment approach, the precise factors that influence children’s learning through recasts are not yet understood. In this study, we examined details of the child utterance – clinician utterance relationship that seemed likely to influence learning.

Method—Three measures were calculated from transcripts of recasting sessions with 17 preschoolers with specific language impairment. In all sessions, third person singular – *s* served as the target. The measures of interest were the frequency of recasts following child utterances that were prompted by clinicians, the frequency of clinicians’ recasts of subjectless sentences, and the frequency of clinicians’ noncorrective recasts. We assessed the short-term and long-term predictive value of these measures through regression analyses.

Results—Noncorrective recasts proved to be a positive predictor of short- and long-term gains in the use of the target form. Recasts of subjectless sentences were associated with poorer outcomes, though their contribution was relatively small.

Conclusions—The nature of learning that takes place varies according to the relationship between child and clinician utterances during the recasting process. These variations have implications for clinical practice and for how learning through recasting is characterized.

Introduction

In the past 15 years, there has been a resurgence of research showing that input plays a significant role in shaping typically developing children’s grammatical development. For example, it now seems clear that children begin to use complex sentences at an earlier age if their input contains a high frequency of complex sentences (Hoff-Ginsberg, 1998). Similarly, children exposed to more complex input show greater comprehension of complex sentences than children whose input contains fewer examples of complex sentences (Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002). The manner in which adults use verbs when interacting with children seems to be an especially important factor. Children produce verbs in sentences in a manner that closely reflects the manner in which these verbs were heard in the input (Naigles & Hoff-Ginsberg, 1998). In fact, if young children hear a new verb in a word order that deviates from the typical word order in their language, they themselves often produce the verb in this atypical word order (Akhtar, 1999).

Clinicians who serve children with language impairments can draw comfort from the growing evidence of strong input effects on typically developing children’s grammatical acquisition, for treatment often involves increasing the frequency with which to-be-learned grammatical forms are presented to children. If input had very little impact on children’s

grammatical acquisition, clinicians' efforts to assist children with language impairments would be severely hampered.

Of the findings in the child input literature that have influenced clinical practice, one particular finding stands out: input effects are especially strong when an adult utterance builds on a preceding child utterance by providing new grammatical information. This seemingly important child utterance – adult utterance sequential relationship has been incorporated into several treatment approaches designed to facilitate the grammatical skills of children with language impairments. The purpose of the present study is to examine the nature of learning that occurs during treatment of this type. We focus on one particular treatment approach, conversational recasting (Camarata & Nelson, 1992, 2006; Camarata, Nelson, & Camarata, 1994; Fey, Cleave, & Long, 1997; Fey & Loeb, 2002; Nelson, Camarata, Welsh, Butovsky, & Camarata, 1996; Proctor-Williams & Fey, 2007; Proctor-Williams, Fey, & Loeb, 2001). In this approach, clinicians typically have selected a predetermined grammatical target and look for instances in which they can produce this target as part of a conversationally appropriate response to a preceding child utterance. The clinician's response in this circumstance is the "recast" and the child utterance that precedes the recast can be referred to as the "platform utterance" (Nelson, 2000). Although there is considerable evidence suggesting that this approach can lead to gains in children's grammatical use, we do not yet have a clear understanding of the precise factors in the child utterance – clinician utterance relationship that are responsible for the observed changes. This is especially important because children with language impairments vary in the degree to which they benefit from this treatment approach, even when their pretreatment abilities appear to be comparable. Because, for any given target, there is considerable flexibility in the type of platform utterance that might be recast and the amount of information that might be contained in the recast, there may well be child utterance – clinician utterance relationships that are more, or less beneficial for learning. In the present study, we sought to identify some of these relationships. We begin with a review of the relevant factors.

Theoretical Basis of Conversational Recasting

Conversational recasting has its origins in the proposal that grammatical learning by typically developing children is especially successful when "rare event" cognitive comparisons are available to the children (Nelson, 1977, 1981, 2000; Nelson, Caraskaddon, & Bonvillian, 1973). According to Nelson and his colleagues, such comparisons are possible when: (1) an adult responds to a child's utterance in a way that maintains the basic elements of the child's utterance but includes grammatical forms that were not present in the child's utterance; and (2) the adult's utterance directly follows the child's utterance. Given that the child initiated the interaction, it is assumed that the adult's semantically related reply – the recast – will be regarded as conversationally responsive and will thus hold the child's attention. In addition, it is assumed that the immediacy of the adult's recast will allow the child to more easily process the difference between his or her utterance and that of the adult.

According to Nelson and his colleagues, in the natural environment, child utterance – adult utterance sequences that meet the above criteria are not frequent; for this reason, they are dubbed "rare events." However, in a series of experimental studies with young typically developing children, Nelson and his colleagues (Nelson, 1977; Nelson et al., 1973; Nelson et al., 1996) found that they could promote the rapid acquisition of a variety of grammatical forms when recasts were systematically applied during adult-child interactions. Grammatical forms serving as targets in these and subsequent studies included auxiliary *be* forms, copula *be* forms, modal auxiliary forms, past tense *-ed*, irregular past forms, third person singular *-s*, tag questions, and passive sentence constructions, among others.

The precise learning mechanisms that are operative in the proposed cognitive comparisons are not yet clear, in part because the factors in the child utterance – adult utterance relationship that are assumed to be critical to learning have not been studied in a manner that reveals the separate contribution of each factor. In the present study, we examine the contribution of several factors that are central to current assumptions about the learning that occurs during conversational recasting in the clinical setting. First, we ask whether successful recasts depend on platform utterances being initiated by the child or, alternatively, whether benefit can also be derived when platform utterances are elicited by clinician prompts. Second, we ask whether recasts must closely follow the semantic and structural details of the platform utterance or, alternatively, whether the recast can provide information (in addition to the target form) that was not present in the platform utterance. Third, we ask whether recasts must serve as a correction of the child's platform utterance or, alternatively, whether noncorrective recasts can also lead to gains in learning. Finally, we ask whether the role played by these recast types changes over time, as children progress through an intervention program.

Must Platform Utterances be Child-Initiated?

An important assumption in conversational recasting is that a recast of a platform utterance initiated by the child is likely to be facilitative because it continues a theme that evidently was of interest to the child. The recast in this circumstance should be regarded by the child as conversationally relevant, increasing the likelihood that the target form will be noted. However, in many conversational recasting studies, adults attempt to elicit a platform utterance by the child by asking questions or providing other kinds of prompts that might lead the child to produce an utterance that can be recast. These are often open-ended questions such as *What's happening here?*, but they can also involve "choice" questions such as *Will the dog chase the girl, or will she give him a bone?* (e.g., Camarata et al., 1994; Leonard et al., 2004).

The potential hazard in prompting platform utterances is that the clinician, not the child has dictated the topic of conversation. Therefore, when the child responds to the clinician's prompt, the resulting platform utterance may not have particular communicative importance to the child. Consequently, the recast that follows may not have sufficient relevance to promote a comparison between the platform utterance and the recast. According to Nelson (2000), such a comparison is more likely when the interchange begins with a meaning that the child wants to convey.

The first goal of the present study was to determine if recasts of platform utterances that had been prompted by the clinician are facilitative. We hypothesized that recasts under these conditions will not prove beneficial to children's learning of the target form. In particular, we reasoned that such recasts run counter to one of the important tenets of recasting, namely, that children learn target forms readily from recasts because these recasts build on comments that the children have themselves found relevant to communicate.

Adding Non-Target Information to Recasts

A second assumption behind the benefit of conversational recasting is that the clinician's recast will be closely related semantically to the child's platform utterance, increasing the likelihood that the child will attend to the recast and draw benefit from the target form contained within the recast (e.g., Camarata et al., 1994). However, the amount of new information the clinician adds over and above that found in the platform utterance is not typically controlled. The most common constraint imposed on recasts is the requirement that the recast make use of the same lexical verb that appeared in the child's platform utterance. Recasts, however, can differ from platform utterances in many ways. Unfortunately, any

new information contained in the recast in addition to the target form might reduce the processing advantages that Nelson (2000) and his colleagues argue are important in recasting and the reason for providing a recast that immediately follows the child's platform utterance.

In instances where a child's platform utterance has no overt subject, a recast that contains a subject provides new semantic as well as structural information. These recasts could be problematic because, besides drawing the child's attention away from the verb, the subject supplied in the recast might not be the one that the child had in mind when producing the original utterance. Such changes in meaning could distract the child from the target form. For example, if a platform utterance such as *Drive in the garage* is followed by a recast such as *Yes, the man drives in the garage* and the child was referring to himself rolling a toy car into the garage rather than a toy character, the third person singular *-s* serving as the target form might not be noticed by the child.

A second goal of the present study was to determine the relationship between recasts of subjectless platform utterances and children's gains in the use of the target form across treatment. We hypothesized that frequent use of recasts following such subjectless platform utterances would be associated with relatively limited improvement in the children's use of the target form over the course of treatment. We reasoned that the addition of both a subject and the target form in the recast would place a processing burden on the child.

Must Recasts be Corrective?

A major function of recasts is to alert the child to a new grammatical form. However, recasts might also signal the unacceptability of the grammatical form used by the child in the platform utterance. The latter is often termed "negative evidence" (e.g., Bohannon & Stanowicz, 1988; Farrar, 1992). The term refers to the conclusions children may draw when their utterance is followed by an adult utterance that contains a grammatical detail that may have been lacking in their own utterance. Proponents of the importance of input in children's grammatical learning have provided data suggesting that grammatical gains may in fact be promoted by such evidence.

Saxton (1997, 2000) has distinguished his "direct contrast theory" from conversational recasting by noting that only the former is explicit about the role of negative evidence. Specifically, Saxton proposes that when a child utterance containing an error is followed immediately by an adult utterance that constitutes the correct (grammatical) version of the utterance, the child may view the two utterances as in contrast. Recognition of such a contrast can then lead the child to view the adult version as the more appropriate form to use. In Saxton's model, then, the identification of a new form (in the adult's recast) is not sufficient; there must also be some basis for the child to assume that the recast is being offered as a correction.

However, in practice, it is not always the case that the adult's provision of the target form represents a grammatical correction of the child's preceding utterance. In some cases, the preceding utterance is not ungrammatical. For example, Fey et al. (1997) recast children's declarative utterances such as *I can play too* by restating the utterance in interrogative form, as in *Can you play too?* In their study designed to teach children the use of novel irregular past tense verbs, Proctor-Williams and Fey (2007) provided recasts such as *You doke the ball* in response to platform utterances such as *I was daking the ball*. Nelson (2000) provided a similar example for recasts involving irregular past tense with real verbs (Child: *The bird was singing*; Adult: *Yes, it sang*).

The third goal of the present study was to determine whether gains associated with recasting depend on the recast serving as a correction of an error in the child's platform utterance, or whether the target form modeled in the recast can be shown to have facilitative effects even if it does not serve as a correction. Given the positive findings from previous recast studies that did not require recasts to have a corrective function, we hypothesized that noncorrective recasts would prove to be facilitative. We defined noncorrective recasts as those recasts that followed platform utterances that showed no evidence of lacking the target form. Often these platform utterances were ungrammatical, but the error did not involve the target. For example, a recast might contain a target such as third person singular *-s* (e.g., *That guy just sits there*) even though the preceding platform utterance was missing an auxiliary form (e.g., *That guy sitting there*).

Recast Measures and Increases in Proficiency

Finally, we attempted to determine whether the positive or negative influence of the factors of interest would change from an earlier point in the intervention process to a later point. We had reason to believe that such changes would be observed given previous findings. In particular, Saxton (2000) found that young children were just as likely to benefit from hearing positive instances of grammatical forms as from hearing instances of these same grammatical forms when these forms constituted corrections of their preceding utterance. Not until the children showed substantial use of the grammatical forms (at least 50% accuracy), did the children provide evidence that the corrections were having a differential effect. Because the children in the present study were extremely limited in their use of the target form when treatment began, we hypothesized that several changes in the relationships between the factors of interest and child outcomes might be noted as the children became more proficient users of third person singular *-s*. First, it seemed possible that the children's ability to attend to details in a recast might increase over time, even if the topic had been initiated by the clinician. Second, the children's use of subjectless sentences might decrease over time and, therefore, the semantic and structural characteristics of recasts may more closely resemble those of platform utterances. Finally, as children gained some degree of proficiency with the target form, their ability to draw comparisons between the structure of their platform utterance and that of the recast might increase. Given these possible changes in the children's language abilities, we predicted a reduction in the strength of the association between children's outcomes and prompting of platform utterances, recasts of subjectless sentences, and clinician's use of noncorrective recasts when these measures are obtained at a later point in the treatment program.

The Source of Evidence: the Leonard et al. (2004, 2006) Study

To pursue the goals of this study, we examined transcriptions of treatment sessions from an intervention study conducted by Leonard et al. (2004, 2006). One of the purposes of the Leonard et al. work was to employ recasting as a means of facilitating the use of third person singular *-s* use by children with SLI who were not yet using, or only just beginning to use this inflection. This inflection was selected as a target because, as a morpheme that expresses tense and agreement, it constitutes an area of extraordinary difficulty for children with SLI (Rice & Wexler, 1996; Leonard, 1998), and serves a clinical marker for language impairment (Rice, 2003).

Leonard et al. (2006) found that, at the group level, children's gains in the use of the target form were significant and much greater than their gains in the use of a control form, past tense *-ed*; however, there was wide variation in the degree to which individual children made gains with the target form. This variation permitted us to determine whether details in the child utterance – clinician utterance relationship during the treatment sessions might account for some of these differences.

The specific recasting guidelines employed by Leonard et al. (2004, 2006) lent themselves very well to the goals of the present study. First, clinicians were free to ask questions or provide other prompts to elicit platform utterances that could then be recast by the clinician using the target form. In addition, recasts could follow platform utterances that lacked subjects as well as those that contained subjects. Furthermore, clinicians provided conversationally relevant recasts containing the target form whether or not the recast actually corrected an error in the child's platform utterance. These features of the recasting procedure in the Leonard et al. work permitted us to test the following hypotheses: (1) recasts of platform utterances that were prompted by the clinician would serve as a negative predictor of the children's gains with the target form; (2) recasts of subjectless platform utterances would serve as a negative predictor of gains in the children's use of the target form; (3) noncorrective recasts would serve as a positive predictor of gains in the children's use of the target form; and (4) the positive or negative influence of these recast types would diminish as children increased their use of the target form over the course of treatment.

There are also important factors to control in any study of the relationship between child and clinician utterances during intervention. One of these is "dosage", which in this case pertains to the density of recasts provided during the treatment sessions (Proctor-Williams et al., 2001; Proctor-Williams & Fey, 2007). In the Leonard et al. (2004, 2006) work, dosage was strictly controlled. Using the terminology suggested by Warren, Fey, and Yoder (2007), the following characteristics were held constant in the Leonard et al. work. First, "dose", defined as the number of recasts provided during a single treatment session, was exactly 12 recasts (0.8 recasts per minute) for all children. Second, "dose frequency", defined as the number of times a recast was provided per week, was 48 for all children, as there were four sessions per week. Third, "total intervention duration", defined as the time period over which treatment was provided, was 6 months for all children, during which each child participated in exactly 96 treatment sessions. Finally, "cumulative intervention intensity", defined as the product of dose X dose frequency X total intervention duration, was the same for all children, with each child hearing 1,152 recasts containing the target form. Another very important factor is attendance, as children who attend intervention sessions regularly are likely to have better outcomes (Justice, Mashburn, Pence, & Wiggins, 2008). In the Leonard et al. study, the children's attendance was excellent; absences were rare and missed sessions were made up within one week, enabling all children to attend 96 treatment sessions within the same time span. Finally, all children met the same criteria for SLI and showed a narrow range of (very limited) use of the target form prior to treatment.

Given the wide variation in the children's outcomes in the face of the uniformity of the children's pretreatment use of the target form, the treatment procedure employed, and the dosage, Paw owska, Leonard, Camarata, Brown, and Camarata (2008) attempted to determine whether other characteristics of the children's language abilities might prove predictive. They found that the children's pretreatment mean lengths of utterance and receptive vocabulary scores were unrelated to the children's outcomes. On the other hand, the children's pretreatment use of noun plurals and the degree to which verbs were preceded by subjects in the children's utterances proved to be positive predictors. However, all factors considered by Paw owska et al. could explain only 50% of the variance in the children's gains during treatment. The goals of the present study are concerned with factors that occur within the treatment sessions themselves, and deal specifically with how children's learning might be shaped by details of the child utterance – clinician utterance relationship. We predicted that the factors of interest would account for significant amounts of variance in the children's outcomes when measured early in the treatment program, and, as a result, could contribute to a better understanding of the nature of learning that occurs during conversational recasting.

Method

Participants

Seventeen children studied by Leonard et al. (2004, 2006) served as the source of data for the current study. Treatment for these children focused on third person singular *-s*. At the beginning of the study, the participants were between the ages of 3;0 and 4;4. The children were of European descent and all of them lived in monolingual English-speaking households. All subjects passed a hearing screening at 20 dB HL at 500, 1000, 2000, and 4000 Hz for both ears before being admitted to the study. In addition, they scored 85 or above on the Leiter International Performance Scale-Revised (LIPS-R; Roid & Miller, 1997) and between 16.0 and 25.5 on the Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1988) placing them at the “nonautistic” end of the instrument’s continuum.

Besides exhibiting intact auditory acuity, age-level performance on nonverbal intelligence tasks, and adequate social awareness and function, each child met four additional criteria. First, all of the parents independently contacted a speech-language pathologist because of their concerns regarding their children’s expressive language development. These clinicians presented information about the study to the parents who then independently contacted the research project coordinators. It was assumed that such parental involvement increased the validity of the child’s diagnosis and the likelihood that the children would remain enrolled throughout the duration of the study.

Second, the children scored 80% or higher on a screening test of word- final/s/and/z/in monomorphemic words. These phonemes are required for the production of third person singular *-s*. This screening ensured that an underlying phonological deficit was not the cause of the children’s problems with this inflection.

Third, the children demonstrated impaired expressive language abilities as noted by their performance on the Structured Photographic Expressive Language Test-Preschool (SPELT-P; Werner & Kresheck, 1983) and by their Developmental Sentence Score (DSS; Lee, 1974). While all of the participants in the study scored below the 10th percentile on both of these measures, they exhibited use of some grammatical morphemes including progressive *-ing*, noun plural *-s*, and the prepositions *in* and *on*.

Finally, the children exhibited no use or only limited use of third person singular *-s* in spontaneous speech and probes that were administered before the commencement of the study (see the following section). The spontaneous speech sample was also used to determine DSS and MLU for each child.

Participants in this study were not prohibited from receiving additional therapy prior to or during their participation in the experimental intervention. For those receiving therapy, vocabulary, concepts, and conversational participation were targeted. The development of specific morphosyntactic structures was not targeted in any child’s intervention program.

Pretreatment Third Person Singular *-s* Probes

Probe items were developed to determine the degree to which the children produced third person singular *-s* in obligatory contexts. The children first watched as toy figures acted out various scenes. The experimenters then elicited descriptions of the scenes during a sentence completion task. This two-experimenter probe was adapted from a task developed by Schütze and Wexler (2000). Experimenter 1 manipulated the toy figures and described what was happening within each scene. Experimenter 2 watched the scene with the child while

maneuvering a toy dinosaur, Egbert, who hid in his egg as each scene was presented. Because Egbert missed the scenes, he asked the child to describe the action, as in (1) below:

- (1) Experimenter 1/Ernie: Here's my bathtub. Every time I'm in my bathtub, I sing. (demonstrates)

Experimenter 2/Egbert: Uh-oh, I didn't see. What does Ernie always do in his bathtub?

Experimenter 2: He _____

Twelve action sequences were presented and probed in this manner. The results from the probe administration immediately prior to treatment showed that the children were limited in their use of third person singular *-s*, ranging from 0% to 18% in obligatory contexts, with a mean of only 3.94%.

Treatment Procedures

The participants received four individual treatment sessions per week for a total of 96 sessions each. Sixteen clinicians provided therapy across the 96 sessions which were transcribed, coded, and analyzed for the present study, with eight among the 16 supplying intervention to multiple participants. Clinicians were speech-language pathologists and students in speech-language pathology. During the sessions, clinicians consecutively implemented two different intervention activities. At the commencement of each session, the experimenter read a story and used toy figures and props to act out the scenario as the children listened and watched. Forty-eight stories, each used twice during the course of the study, were written and engineered to provide the children with a broader scope of the form and function of each verb and to help them generalize the target morpheme.

During the second part of the session, clinicians provided participants with toys and props which had been used during the story-telling. Additional toys were added to the scene as needed to elicit further conversation. As the children played with these objects, clinicians were required to provide 12 recasts of participant utterances, with each recast containing the third person singular *-s* form of a verb. To help them accomplish this task, the clinicians were given a list of the verbs which had appeared in the story. Recasts included all conversationally related responses to child utterances which contained the target form.

Procedural Fidelity

Prior to the study, all clinicians underwent training and practice sessions with pilot children. During this training, clinicians were taught not only the details of recasting but also how to remain an active conversationalist with the child during instances that did not allow for a recast containing the target form. None of the non-recasts produced by the clinician could contain the target form or the control form, past tense *-ed*. In addition, the clinicians were encouraged to avoid auxiliary and copula *be* forms as these conveyed information about person and number, and it seemed plausible that frequent use of these forms by the clinician might have had some influence on the children's acquisition of the target, third person singular *-s*. To assist clinicians in their attempts to avoid particular constructions while remaining responsive to the children, clinicians were given a list of constructions that could be used in non-recast contexts. These included utterances with modal verbs, as in *Wow, he can drive really fast*, questions with auxiliary *do*, as in *Do you need another block?*, and first person references, as in *I like the red one*.

To assess procedural fidelity, recordings for 14 treatment sessions were randomly selected and scored for accuracy of implementation. In all 14 treatment sessions, the clinician produced the target form exactly 12 times when interacting with the child; each of these

instances was in a recast. The control form was not produced in any of these sessions. However, a total of 15 instances of copula *is* occurred across the 14 treatment sessions. These instances were not taken as a serious deviation from the treatment protocol as they were much lower in frequency than the instances of the target form heard in recasts (14 sessions X 12 recasts per session = 168 instances of third person singular *-s* in recasts).

Third Person Singular *-s* Probes at Mid- and Posttreatment

After 48 intervention sessions and again after 96 intervention sessions, the participants were again probed on their production of third person singular *-s* using the task described previously. Their percentage correct scores pre-, mid- and post-intervention were compared to determine improvement at each time point. Leonard et al. (2006) reported significantly larger gains in the children's use of third person singular *-s* than in their use of a control morpheme, past tense *-ed*, at both the 48-session mark and the 96-session mark. Effect sizes were large. The effect size *d* for the gains in the use of the target form from pre- to mid-intervention was 1.03; for the gains from mid- to post-intervention, *d* was 1.47. Despite the significant gains made by the children in their use of third person singular *-s* when considered as a group, the children exhibited a wide range of outcomes, from 0% to 92% accuracy ($M = 32.88\%$) at midpoint and 0% to 100% accuracy ($M = 52.53\%$) during the final probes.

Recast-Related Measures Obtained from Treatment Sessions

To pursue the goals of the present study, audio recordings from six sessions were coded and analyzed by the first author for each child, including sessions 30 through 32 which occurred before the midpoint and sessions 50 through 52 which occurred after the midpoint. The individual who transcribed the child and clinician utterances in these sessions was blind to all children's performance on the third person singular *-s* probes administered prior to treatment, after 48 sessions, and after 96 sessions. By using two sets of three consecutive sessions (30, 31, 32 and 50, 51, 52) we could combine the data from each of the three adjacent sessions, as these sessions were spaced within a seven-day period. Sessions 30–32 provided data that could serve as near-term predictors of the children's use of the target in the probes administered after 48 sessions and as long-term predictors of the children's use of the target form in the probes administered after 96 sessions. Sessions 50–52 occurred 18 sessions after Sessions 30–32 and thus allowed opportunity for learning that we assumed would alter the degree of influence of particular clinician – child utterance sequences on the children's outcomes. Data from these sessions could serve as predictors of the children's probe performance after 96 sessions.

There were three measures of primary interest. The first was the frequency of child platform utterances that were prompted by the clinicians. The prompts took the form of questions, direct requests, and indirect requests. Questions were either general in nature, as in *What's happening here?* or took the form of choice questions such as *Should Spiderman climb up on the roof, or should Superman fly up there?* Direct requests were explicit requests to describe an activity, as in *Tell me about this*. Indirect requests were statements by the clinician such as *I wonder what he's going to do*. Only those prompts that were followed by a response and, in turn, a recast were counted in this measure.

The second measure of interest was the frequency of clinicians' recasts of subjectless sentences, as in (2). These utterances usually appeared in declarative contexts but the intended subject was omitted and often unclear. We focused specifically on subjectless sentences that involved bare verb stems, as the recast changed the verb only minimally by adding third person singular *-s*.

- (2) Child: Call Superman

Clinician: Spiderman calls Superman on the phone

The final measure of interest was the frequency of noncorrective recasts by clinicians. Noncorrective recasts followed platform utterances that may have been ungrammatical but involved a structure that did not obligate use of third person singular *-s*, as in (3). Other noncorrective recasts followed platform utterances that were grammatical but made use of a verb form other than third person singular *-s*, as in (4). Finally, any recast that followed a child's use of third person singular *-s* was also considered to be a noncorrective recast. These were very infrequent, constituting only 2.5% of the platform utterances of the children. Only those recasts that followed platform utterances containing a subject as well as a verb were included in the noncorrective recast measure.

(3) Child: That guy drinking again

Clinician: He drinks his milk every day

(4) Child: The penguin's taking a bath

Clinician: He takes a bath in the cold water

Transcription and Coding Reliability

An independent judge who was blind to the children's outcomes transcribed the sessions from four children selected randomly. Utterance by utterance transcriptions of the independent judge and those of the first author were compared, resulting in 83% agreement. The disagreements primarily involved one judge transcribing a particular word or phrase and the other judge deeming the same word or phrase unintelligible.

A different independent judge, similarly blind to the children's outcomes, coded 25% of the sessions. These sessions were also selected randomly. This judge was instructed on the coding procedures and was provided data sheets on which to record the findings. An item by item comparison of this judge's coding with those of the first author resulted in 96% agreement.

Results

Preliminary Analyses

Before performing the statistics on the principal measures of interest, we considered the factor of chronological age. Although the children meeting the selection criteria for the study were quite homogeneous in their pretreatment language abilities, their age range (3;0 to 4;4) allowed for the possibility that age could prove to be a predictor that would have to be considered in any model designed to explain the children's treatment outcomes. However, we found no relationship between the children's age and their use of third person singular *-s* after 48 treatment sessions, $r = -.157$, $p = .564$. Consequently, age was not used as an additional predictor in the principal analyses to follow.

Short-Term Prediction of Third Person Singular *-s* Use After 48 Treatment Sessions

As a first step in determining the possible role of the measures of primary interest (prompted platform utterances, recasts of subjectless sentences, noncorrective recasts), we calculated correlations between each of these measures and the children's use of third person singular *-s* after 48 treatment sessions. A negative relationship was expected for prompted platform utterances and recasts of subjectless sentences; a positive relationship was expected for noncorrective recasts. Results from these analyses revealed that the frequency of prompted platform utterances showed no relationship to midpoint outcome, $r = -.052$, $p = .844$, whereas the frequency of recasts of subjectless sentences was negatively correlated with

midpoint outcomes, $r = -.479$, $p = .052$, with the probability approaching significance. The frequency of noncorrective recasts provided by the clinicians was positively correlated with midpoint outcomes, $r = .665$, $p = .004$.

Regression analyses were then carried out to determine the role of noncorrective recasts and recasts of subjectless sentences as individual predictors of performance on third person singular *-s* probes at midpoint. Prompted platform utterances were not included in these analyses given the absence of a relationship with midpoint outcome. Results indicated that noncorrective recasts accounted for 44% of the variance ($p = .004$) and recasts of subjectless sentences accounted for 23% of the variance ($p = .052$).

Given the amount of variance explained by noncorrective recasts, it was important to gain a better understanding of the nature of this measure. Recall that noncorrective recasts could occur if the platform utterance was either grammatical (e.g., Child: *She's running* Clinician: *She runs fast*) or ungrammatical (e.g., Child: *She running* Clinician: *She runs fast*). If most of the platform utterances followed by a noncorrective recast were grammatical, it could be the case that children who are usually grammatical in their utterances (their limited third person singular *-s* use notwithstanding) might be more responsive to treatment. To determine if the frequency of noncorrective recasts simply reflected the frequency of grammatical platform utterances, the results for noncorrective recasts were divided into noncorrective recasts following children's grammatical verb forms (noncorrective-grammatical) and noncorrective recasts following children's ungrammatical verb forms (noncorrective-ungrammatical). Regression analyses were carried out with these factors as individual predictors for midpoint outcomes. Noncorrective-grammatical recasts were significant and accounted for 29% ($p = .025$) of the variance. However, noncorrective-ungrammatical recasts approached statistical significance and accounted for 22% ($p = .058$) of the variance. Importantly, the combined variable – our original noncorrective recasts measure – accounted for a larger portion of the variance (44%, $p = .004$) than either noncorrective-grammatical recasts or noncorrective-ungrammatical recasts alone. Therefore, we retained our original measure of noncorrective recasts in subsequent analyses.

Although our focus was on noncorrective recasts, we also examined the relationship between the frequency of recasts that were corrective and the children's midpoint outcomes, given the importance of corrective recasts in earlier work (e.g., Saxton, 2000). These were instances in which the child's platform utterance had an obligatory context for the target, third person singular *-s*, but this inflection was absent (e.g., Child: *Cookie Monster like cookies*). The clinician's recast provided the target (e.g., Clinician: *Cookie Monster likes cookies*). No relationship was found between the frequency of corrective recasts and the children's outcomes at the midpoint, $r = -.409$, $p = .103$, and the coefficient was negative. This result was largely predictable given the significant and positive relationship between the frequency of noncorrective recasts and midpoint outcomes, and the fact that the number of recasts provided by the clinician was held constant at 12 per session. Although noncorrective and corrective recasts did not together constitute all of the recasts (as both dealt only with platform utterances that contained a subject), these two frequency measures cannot be viewed as wholly independent.

Stepwise linear regression analyses were carried out to test joint and unique contributions of noncorrective recasts and recasts of subjectless sentences to the prediction of midpoint scores (see Table 1). A combination of noncorrective recasts and recasts of subjectless sentences accounted for 45% of the variance ($p = .016$), with recasts of subjectless sentences accounting for only 1% of the variance over and above that accounted for by noncorrective recasts. Furthermore, the unique contribution was not significant ($p = .716$). While the

contribution of recasts of subjectless sentences did not reach significance in the second model, noncorrective recasts remained significant in each model (see Table 2).

Long-Term Prediction of Third Person Singular –s Use After 96 Treatment Sessions

Correlations were then computed to determine which of the three measures of principal interest from Sessions 30–32 were significantly related to performance on the third person singular –s probes after 96 sessions (final outcome). As we found at midpoint, the relationship between the number of child platform utterances that were prompted by clinicians and the children's final third person singular –s performance proved non-significant, $r = .183$, $p = .482$. On the other hand, the frequency of subjectless sentences was negatively correlated with final third person singular –s performance, $r = -.488$, $p = .047$. Again, noncorrective recasts was positively related to final scores, $r = .548$, $p = .023$. (For corrective recasts, the relationship was nonsignificant and the coefficient was negative, $r = -.317$, $p = .215$, as would be expected given the findings for noncorrective recasts.)

A series of regression analyses was then performed to determine the role of noncorrective recasts and recasts of subjectless sentences as individual predictors of performance on third person singular –s probes after 96 sessions. The results of these analyses indicated that noncorrective recasts accounted for 30% of the variance ($p = .023$) and recasts of subjectless sentences accounted for 24% of the variance ($p = .047$).

Stepwise linear regression analyses were then carried out to test joint and unique contributions of these two measures to the prediction of final scores (see Table 3). The combination of noncorrective recasts and recasts of subjectless sentences accounted for 31% of the variance ($p = .076$) with recasts of subjectless sentences contributing an additional 1% to the predictive power of the model. The addition of this variable did not prove statistically significant ($p = .690$). Neither variable was significant in the second model (see Table 4).

Effects of Individual Clinicians

The findings suggest that particular characteristics relating to recasts may be either facilitative or detrimental to the acquisition of third person singular –s. However, because treatment was provided by a number of different clinicians and because several clinicians saw more than one child, it was necessary to determine whether participant outcomes were possibly due to clinician intervention style rather than to the principal measures of interest. To gain an impression of the contribution that clinicians' own tendencies may have made to the results, two kinds of relationships were examined. First, for the 10 clinicians who saw more than one child during Sessions 30–32, two children per clinician were selected at random and within-participant averages for the two variables proving to be significant predictors (noncorrective recasts and recasts of subjectless sentences) were calculated. Correlations were computed between the values for Child 1 and Child 2 across the clinicians. No significant correlations were found for noncorrective recasts, $r = -.330$, $p = .351$ or recasts of subjectless sentences, $r = -.142$, $p = .695$. These findings suggest that clinicians' degree of use of these forms of recasts was probably not a fixed tendency of the clinician but instead varied according to the child.

Then, for the seven clinicians who saw at least one child more than once during Sessions 30–32, between-session correlations were computed for each variable. Significant correlations were found for both noncorrective recasts, $r = .760$, $p = .029$, and recasts of subjectless sentences, $r = .852$, $p = .007$. These findings suggest that a clinicians' use of these two forms of recasts was relatively consistent when working with the same child.

Can Measures That Are Predictive When Obtained at Sessions 30–32 Remain Predictive When Obtained at Sessions 50–52?

The measures of interest, prompted platform utterances, recasts of subjectless sentences, and noncorrective recasts, were also obtained during sessions 50–52. At this point, many of the children had made significant gains during the treatment sessions, from a mean of 3.94% use of third person singular *-s* in obligatory contexts on the probes administered immediately prior to treatment to a mean of 32.88% use in obligatory contexts on the probes administered after 48 treatment sessions. Given the changes seen in many of the children's abilities with third person singular *-s*, we expected that the relationships between the three measures of interest when obtained after the midpoint and the children's final outcomes would be weaker than the relationships observed when the three measures had been obtained at an earlier point in treatment.

Correlations were calculated to assess the relationship between each of the three measures obtained at sessions 50–52 and the children's use of third person singular *-s* on the final probes. Although the coefficients showed the same positive or negative values that were seen in the earlier analyses, no correlation was statistically significant (for prompted platform utterances, $r = -.107$, $p = .683$; for recasts of subjectless sentences, $r = -.300$, $p = .242$; for noncorrective recasts, $r = .319$, $p = .212$).

Discussion

Conversational recasting has been used with considerable success in studies aimed at facilitating children's grammatical skills. This procedure is assumed to foster the children's ability to make cognitive comparisons by allowing the children to hear a new grammatical form in a conversationally relevant utterance (the recast) that immediately follows their own utterance (the platform utterance). However, relatively little is known about the precise factors in the child utterance – clinician utterance relationship that are responsible for the observed gains in the children's grammatical abilities. In this study, we tested several hypotheses designed to uncover important details of the learning that occurs during this process. The data took the form of transcriptions we prepared of treatment sessions from a recast intervention study conducted by Leonard et al. (2004, 2006) that focused on facilitating children's use of third person singular *-s*.

The first hypothesis was that the clinician's use of prompts to elicit platform utterances would be counterproductive; recasts of prompted platform utterances would be associated with limited change in the children's ability to use the target form. The second hypothesis was that utterances produced by the child that lacked subjects were not good candidates for recasting. Higher frequencies of recasts of subjectless sentences would be predictive of poorer outcomes. The third hypothesis was that children would benefit from recasts that were noncorrective. According to this hypothesis, successful learning did not depend on a recast serving as a grammatical correction of the child's preceding platform utterance. Finally, we expected that the strength of the observed associations would weaken when the same measures were obtained later in the treatment program, after the children had made gains in their use of the target form. The findings provided support for all but the first hypothesis. Before discussing the implications of these findings, we make explicit some of the limitations of our study and consider alternative interpretations of the findings.

Limitations of the Study and Alternative Interpretations of the Findings

One limitation is that the number of children seen by each clinician and the number of clinicians seeing the same child over the 96 treatment sessions were not controlled in the Leonard et al. (2004, 2006) study. Priority was placed on ensuring that children did not

differ in dose frequency, total intervention time, and attendance. This proved challenging given that the overlap among different families' schedules meant that more than one child had to be seen during the same time slot, thus requiring separate clinicians. In other instances, family schedules changed, creating a schedule conflict with the child's original clinician. In such circumstances, a change in clinicians was often necessary. An intervention design that avoided these imbalances would have been preferable. In particular, if children had been assigned to clinicians in a more systematic manner, a nested design could have been employed in which "clinician" could have served as a factor in a manner akin to treatment condition.

It might be argued that the positive predictive value of noncorrective recasts should be interpreted as a "rich get richer" finding. That is, a high frequency of such recasts might be taken to mean that the children had relatively little need for correction. However, this would be an oversimplification. First, recall that the children recruited for the study were very limited in their use of the target form and, in fact, noncorrective recasts usually involved the clinician changing the child's utterance from a non-third person singular –s context to a recast that contained third person singular –s. Second, we found that the noncorrective measure accounting for the greatest amount of variance in the children's outcomes was one that included noncorrective recasts of ungrammatical platform utterances (e.g., *She getting in there*) as well as grammatical platform utterances (e.g., *She's hiding*).

When Platform Utterances Are Not Initiated by the Child

One of the assumptions of conversational recasting is that children can benefit from recasts because they build on comments that the children themselves had initiated. However, as applied in intervention studies, researchers have found it practical to allow clinicians to elicit platform utterances that they would then recast with the target form. We had hypothesized that such prompted platform utterances would be negative predictors of outcomes. Instead, we found that the frequency of prompted platform utterances was unrelated to outcome. More research is clearly needed on this question, because if prompted platform utterances yield the same results as child-initiated platform utterances, it would mean that the children's original intention to communicate an idea is less critical to the benefit that they can derive from a recast.

On Refining the Notion of "Platform" Utterances

A "platform" utterance is one that allows for a conversationally relevant recast that contains the target form. The procedure employed in the Leonard et al. (2004, 2006) study operated with this rather broad definition. As a result, children's subjectless sentences were candidates for recasting. Thus, a child utterance such as *Put on shoes* could be recast with an utterance such as *Yes, the girl puts on her shoes*. However, given the findings of the present study, the utterances that are deemed appropriate as platform utterances should probably be defined according to the level of the child's ability as well as the grammatical form serving as the target. We found that child utterances lacking subjects functioned relatively poorly as platform utterances for recasts containing third person singular –s. The additional effort required to process new semantic information as well as the new structure (subject-verb) that is created by the addition of a subject might undermine one of the assumptions of recasting, namely, that the immediacy of a recast can reduce the processing load on the child, thereby facilitating learning (Nelson, 2000). Such adult input might neutralize any processing advantage that the recast might otherwise offer.

The Nature of Children's Learning During Conversational Recasting

At the outset of this paper we noted that the available evidence had not established that correction is a necessary condition for learning to occur during conversational recasting.

Several studies reporting success with this procedure had employed guidelines for recasting that allowed noncorrective as well as corrective recasts (e.g., Fey et al., 1997; Proctor-Williams & Fey, 2007). In the present study, we found that the frequency of noncorrective recasts in particular served as a positive predictor of children's gains in the use of the target form.

Noncorrective recasts provide some of the essential components that Nelson (2000) had proposed as responsible for learning during conversational recasting. Specifically, a noncorrective recast continues the child's topic of conversation, it occurs immediately after the child's platform utterance, and it contains a grammatical form with which the child is not yet proficient. On the other hand, by definition, noncorrective recasts do not serve as a correction of the child's platform utterance.

We interpret the findings for noncorrective recasts to mean that providing a new grammatical form in a recast will set in motion a learning process that is separable from the type of learning that may occur when children view a recast as providing a correction of their preceding utterance. The children in the present study were quite limited in their use of the target form, third person singular *-s*. The conversational relevance and immediacy of recasts might have drawn the children's attention to the grammatical details being displayed in the recast. However, it is not clear that these children had sufficient ability with the target form to make a direct comparison between the structure of their own utterance and the structure reflected in the recast. The latter ability, we assume, is seen as children gain more experience with the target form. This interpretation is not incompatible with previous views concerning correction. In particular, Saxton (2000) concluded from his findings that corrections of typically developing children's platform utterances are more beneficial in the later stages of grammatical development, when children have attained a certain level of spontaneous use of the target form.

The findings of the present study suggest that some modifications in the theoretical framework underlying conversational recasting are probably in order. In particular, the "comparison" assumption might need to be refined. This assumption is that immediate (and semantically and conversationally relevant) recasts allow children to process the differences between their utterances and the adult utterances that follow. However, our findings suggest that this assumption might not be accurate when children are in the earliest stages of acquiring the target form. We suggest that if comparisons are made, they are made at a much more global level, given that, in noncorrective recasts, the target form (e.g., *runs*) usually differed from the form of the verb (e.g., *running* or *is running*) appearing in the child's platform utterance. In fact, when children's ability with the target form is still quite limited, larger differences between the platform utterance and the recast utterance may avoid potential misinterpretations on the children's part. For example, Proctor-Williams et al. (2001) found that children with SLI did not acquire the use of auxiliary forms when clinicians' recasts took the form of auxiliary-fronted questions (e.g., Child: *Daddy driving the truck*; Clinician: *Is Daddy driving the truck?*) Proctor-Williams et al. proposed that the children may not have understood the syntactic details of auxiliary fronting and interpreted the subject-nonfinite verb sequence in the question (e.g., *Daddy driving*) as confirmation of their platform utterance.

The Influence of Recast-Related Measures Will Change with Increases in Children's Proficiency

The measures that were predictive of outcome when obtained early in the treatment program were no longer associated with outcome when they were obtained again later in the treatment program. We had expected this result, given that children gained proficiency with the target form as they progressed through the treatment program. Of course, the differences

in predictive value as a function of when the measures were obtained carry implications for how learning within recasting is characterized. The same type of child utterance – clinician utterance sequence may be interpreted by children in different ways depending on their level of ability at the time of occurrence.

Clinical Implications

Several clinical implications arise from the findings of the present study. In discussing these implications, we use examples that follow the details of the present study rather closely. The clinical applicability of the findings should be viewed as less certain the greater the children's ages and language abilities differ from those of the children in the present study. Similarly, target forms other than third person singular –s may be associated with a different pattern of findings.

We interpret the findings for prompted platform utterances to mean that the degree to which children's platform utterances are prompted by clinicians as opposed to initiated by the children themselves might not affect the impact that recasts have on the children's gains in the use of third person singular -s. We are somewhat surprised by that finding, and believe that additional research on this question is warranted.

Given that higher frequencies of recasts of subjectless sentences were associated with poorer outcomes, it would appear that third person singular –s would not be an appropriate target form for children producing large percentages of utterances without subjects. It might be the case that when clinicians include subjects in their recasts of subjectless platform utterances, the processing advantages of recasts are neutralized. The additional semantic and structural information resulting from the clinician's provision of a subject may draw the child's attention away from the target form also contained in the recast. These findings also suggest that clinicians might include the use of subjects as one of their treatment goals for children who produce a high percentage of subjectless sentences. After acquiring greater use of subjects in their sentences, the children might be in a better position to benefit from treatment designed to foster the use of grammatical forms such as third person singular –s.

Most importantly, for preschoolers with SLI showing limited use of third person singular –s, it would appear that clinicians can provide recasts without the requirement that these recasts serve a corrective function. Furthermore, the platform utterance can be either grammatical or ungrammatical. These implications have practical value, because clinicians would probably have much lower recast rates per session if they had to depend on platform utterances for which recasts would be corrective, running the risk of dosage that falls below the level assumed to be facilitative (Proctor-Williams & Fey, 2007).

Given the results of the present study, the use of such noncorrective recasts might prove beneficial to the children's near-term use (after three months, when children show approximately 33% use in obligatory contexts) and longer term use (after six months, when the children show approximately 50% use in obligatory contexts) of third person singular –s. Furthermore, based on our findings regarding individual clinicians' use of noncorrective recasts across different children and across different sessions with the same child, it appears that the frequency with which these recasts are used will depend more on individual characteristics of the children than on the particular clinician who happens to be interacting with the child.

Conclusions

The learning that results from conversational recasting seems to vary across children even when the children's pretreatment abilities with the target form are similar and dosage during treatment is carefully controlled. In this study we found that some of the differences in

outcome are associated with the nature of the relationship between child utterances and clinician utterances within the recasting process. When ability levels are low at the outset of treatment, conversationally relevant recasts containing the new form can be facilitative even when these recasts serve no direct corrective function. However, at least for target forms such as third person singular –s, the benefits of recasts are likely to be greater if the platform utterances contain subjects. Following gains in ability level, these dynamics appear to change, suggesting that children's interpretation of particular child utterance – clinician utterance sequences might be altered as children progress through treatment. These findings should lead to a refinement of how learning within conversational recasting is characterized during the early stages of learning a new grammatical form.

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Table 1

Session 30–32 Stepwise Regression Analysis: Midpoint

Step	Predictors	R	R ²	p	R ² change	p
1	Noncorrective	.665	.442	.004	.442	.004
2	Noncorrective					
	Subjectless	.669	.448	.016	.006	.716

Note: Noncorrective = noncorrective recasts; Subjectless = recasts of subjectless sentences.

Table 2

Significance of Individual Session 30–32 Variables in Midpoint Regression Models

Step	Predictors	t	p
1	Noncorrective	3.449	.004
2	Noncorrective	2.352	.034
	Subjectless	.3720	.716

Note: Noncorrective = noncorrective recasts; Subjectless = recasts of subjectless sentences.

Table 3

Session 30–32 Stepwise Regression Analysis: Final

Step	Predictors	R	R ²	p	R ² change	p
1	Noncorrective	.548	.300	.023	.300	.023
2	Noncorrective					
	Subjectless	.555	.308	.076	.008	.690

Note: Noncorrective = noncorrective recasts; Subjectless = recasts of subjectless sentences.

Table 4

Significance of Individual Session 30–32 Variables in Final Regression Models

Step	Predictors	t	p
1	Noncorrective	2.536	.023
2	Noncorrective	1.194	.252
	Subjectless	–.408	.690

Note: Noncorrective = noncorrective recasts; Subjectless = recasts of subjectless sentences.