

Supplemental Table S1. Study descriptions and outcome summaries for systematic review.

Citation	Participants	Research Design	Outcome Summary
Feasibility			
Baker & Nelson (1984)—Study 1	<i>N</i> = 2 TD Ages: 3;5 and 3;10	<p><i>Design:</i> Within-subject design with two sets of grammatical targets. For first 2 weeks, Set 1 was in the recast condition and Set 2 was in the modeling condition for one child, with the reverse for the other child. After a 2-week break, there was a second intervention period in which the input was reversed.</p> <p><i>Targets:</i> Passives, gerunds, compound verbs, auxiliaries, reflexives, tag questions</p> <p><i>Recast condition:</i> The experimenter recast the child's utterances to include target forms during play.</p> <p><i>Comparison condition:</i> The experimenter modeled the target forms during play.</p> <p><i>Session length/frequency/duration:</i> 30 min of intervention, 6 sessions/wk for 4 wks.</p> <p><i>Rate of recasts:</i> Proportion of recasting and modeling were reported to be equivalent. Actual rate was not reported.</p>	Outcome measure from language samples collected with the experimenter and the child's mother, and from intervention sessions. The children produced the target forms more under the recast condition.
Baker & Nelson (1984)—Study 2	<i>N</i> = 6 TD Ages: 2;6–3;2	<p><i>Design:</i> Group design, with 3 children randomly assigned to each group.</p> <p><i>Targets:</i> Auxiliaries (e.g., <i>may/could</i>), relative clauses, and passives.</p> <p><i>Traditional recast condition:</i> The experimenter recast the child's utterances to include target forms during play.</p> <p><i>Comparison condition:</i> The experimenter recast her own utterances to include target forms during play.</p> <p><i>Session length/frequency/duration:</i> 15 min, 4 days/wk for 3 wks.</p> <p><i>Rate of recasts:</i> Proportion of recasts was reported to be equivalent in the two conditions. Actual rate was not reported.</p>	Outcome measure from language samples collected with the experimenter and the child's mother, and from intervention sessions. The children who heard their own utterances recast produced more spontaneous productions of passives and auxiliary targets than did children who heard the experimenter recast her own utterances.

<p>Girolametto et al. (1999) [Using data from Girolametto et al., 1996]</p>	<p><i>N</i> = 12 expressive vocabulary delays</p> <p><i>Ages</i>: 2;1–2;11</p>	<p><i>Design</i>: Correlational study exploring the relationship between the mother's language, including the use of recasts at T1 and T2 and children's language at T2. T1 is pre-intervention, and T2 is following a parent training program based on the interactive model of intervention (i.e., the Hanen Program).</p> <p><i>Targets</i>: n/a</p> <p><i>Recast condition</i>: n/a</p> <p><i>Comparison condition</i>: n/a</p> <p><i>Session length/frequency/duration</i>: Parent training program lasted 11 weeks, with 8 parent group sessions and 3 individual parent-child sessions.</p> <p><i>Rate of recasts</i>: n/a</p>	<p>Outcome measures taken from language samples collected with the mother.</p> <ul style="list-style-type: none"> There were significant correlations between mothers' use of recasts at T1 and children's number of word combinations at T2 ($p < .05$; $r = .76$) and Expressive Language Age on the Sequenced Inventory of Communication Development (SICD; $p < .05$; $r = .68$). There were significant correlations between mothers' use of recasts at T2 and children's number of word combinations at T2 ($p < .01$; $r = .77$) and Expressive Language Age on the SICD ($p < .05$; $r = .66$).
<p>Hassink & Leonard (2010)</p>	<p><i>N</i> = 17 SLI</p> <p><i>Ages</i>: 3;0–4;4</p> <p>Note: This study is a further analysis of data reported in Leonard et al. (2004, 2006; see two entries in the "Early Efficacy" section below).</p>	<p><i>Design</i>: Correlational study. Children all received recasting treatment for third person singular (3s). Intervention sessions were explored for the nature of recasts provided. Specifically, the study explored the impact of prompted platform utterances, the impact of recasts of subjectless sentences (i.e., complex recast adding semantic information – the subject, and grammatical information – 3s), and the impact of noncorrective recasts.</p> <p><i>Target</i>: 3s</p> <p><i>Recast condition</i>: Specially designed story with 12 exemplars of the target 3s was read at the beginning of each session. This was followed by play during which the clinician provided 12 recasts that contained the target.</p> <p><i>Comparison condition</i>: n/a</p> <p><i>Session length/frequency/duration</i>: 15 min, 4 sessions/wk for 24 wks.</p> <p><i>Rate of recasts</i>: 0.8 recasts/min; 12/session</p>	<p>Outcome measures from probes administered pretreatment, after 48 sessions, and after 96 sessions. Frequency of prompted platform utterances was not correlated with the use of "3s" after 48 sessions ($p = .844$, $r = .05$) or after 96 sessions ($p = .482$, $r = -.183$). Recasts of subjectless sentences were negatively correlated with the use of "3s," accounting for 23% ($p = .052$) of the variance after 48 sessions and 24% ($p = .047$) of the variance after 96 sessions. Noncorrective recasts were positively correlated with the use of "3s," accounting for 44% ($p = .004$) of the variance after 48 sessions and 30% ($p = .023$) of the variance after 96 sessions.</p>

Hovell et al. (1978)	<p><i>N</i> = 4 TD</p> <p>Ages: 1;10–2;0</p>	<p><i>Design:</i> Replicated single-subject design with multiple baselines with a treatment reversal. Two word combinations were trained using single pictures containing familiar nouns. At pretest, the children were not producing adjectives. Mothers were trained to provide recasts or models. One color adjective and one size adjective were trained in Phase 1, one with recasts (9 pictures) and one with models (9 pictures). Once an effect was seen, a second pair of adjectives was trained, with the type of input reversed for the second color and size adjectives. In addition, there were probe trials with untrained pictures.</p> <p><i>Target:</i> Adjective + noun utterances</p> <p><i>Recast condition:</i> Mother held up picture and asked "What is this?" If child responded with noun or adjective, parent recast child's utterance to adjective + noun.</p> <p><i>Comparison condition:</i> Modeling trials—mother held up picture and provided "adjective + noun" model.</p> <p><i>Session length/frequency/duration:</i> 10–20 min, 3–4 times/wk for 52–60 sessions.</p> <p><i>Rate of recasts:</i> 9 recasts/session: 0.9–0.45/min.</p>	<p>Outcome measures were percentage of trials with spontaneous adjective–noun responses during training and to probe pictures. In probe trials, mothers held up a picture and asked "What is this?" Spontaneous language samples were also collected 3 times. Children showed greater spontaneous adjective–noun productions in the recast condition during training sessions in response to both training and probe pictures. However, this did not generalize to the spontaneous language samples.</p>
McLean & Vincent (1984)	<p><i>N</i> = 5 ID</p> <p>Ages: 2;5–4;2</p>	<p><i>Design:</i> Replicate single-subject design. Targets were nonexistent or used in < 1% of child utterances at pretest. Graduate students were trained to be the interventionist. A follow-up language sample was collected 3–8 wks later.</p> <p><i>Target:</i> Increase utterance by 1 word, resulting in a 2- to 3-word utterance</p> <p><i>Recast condition:</i> Child utterances were recast during play.</p> <p><i>Comparison condition:</i> None.</p> <p><i>Session length/frequency/duration:</i> 20 min., 4×/wk. for 4 wks.</p> <p><i>Rate of recasts:</i> Not reported.</p>	<p>Outcome measure was use of target in language samples with experimenter, collected preintervention and at follow-up, and from productions during one intervention session per week. Children produced target structures more frequently during intervention than at baseline ($p < .05$, $\chi^2 = 132.93$). The difference between baseline and follow-up did not reach significance. 3 of 5 children demonstrated increased production of their target in intervention and at follow-up.</p>

Nelson (1977)	<p><i>N</i> = 12 TD</p> <p>Ages: 2;4–2;5</p>	<p><i>Design:</i> Group design with alternate treatment goals. Children were nonrandomly assigned to intervention for complex verbs or complex questions. As a group, the children demonstrated partial knowledge of the targets at pretest. Control goals were MLU and average complexity of noun phrases.</p> <p><i>Target:</i> Complex verbs, complex questions</p> <p><i>Recast condition:</i> Experimenter recast children's utterances during play.</p> <p><i>Comparison condition:</i> None (recasts used in both conditions).</p> <p><i>Session length/frequency/duration:</i> Five 1-hr sessions over 2 months</p> <p><i>Rate of recasts:</i> 2.43/min for question group and 1.94/min for verb group in final two intervention sessions.</p>	<p>Outcome measures derived from language samples collected during last 2 intervention sessions. All children in the question group produced complex questions in their final sessions, whereas only 1 child in the verb group did so. All children in the verb group produced complex verbs in their final sessions, whereas only 1 child in the question group did. The groups differed significantly ($p < .01$) on outcomes for target goals. The groups did not differ on the control goals.</p>
Nelson et al. (1973)	<p><i>N</i> = 27 TD</p> <p>Ages: 2;8–3;4</p>	<p><i>Design:</i> Group design with three groups: recast intervention, new-sentence intervention, or no-treatment control group. Triplets were created based on MLU, and the members of each triplet were randomly assigned to group with restrictions to control for gender and age balance.</p> <p><i>Targets:</i> Subject and predicate expansions</p> <p><i>Recast condition:</i> Experimenter recast grammatically incomplete sentences in a book-reading task whenever reasonable. Complete children's utterances were recast in a new syntactic form.</p> <p><i>Comparison condition:</i> Experimenter responses to child utterances were shorter or of equal length and did not include the content words used by the child.</p> <p><i>Session length/frequency/duration:</i> 20 min., 2×/wk for 11 wks.</p> <p><i>Rate of recasts:</i> Not reported.</p>	<p>Outcome measures calculated from language samples (4 measures) and a sentence imitation test collected by a tester blind to group assignment. Children in the recast condition performed better on all 5 measures posttest than did the control group, although only 3 of 5 measures reached statistical significance ($p < .05$). Children in the new sentence group did not differ significantly from the control group on any measure. Children in the recast group showed a trend toward better performance than did those in the new sentence group on 2 measures ($p = .08$).</p>

<p>Pawlowska et al. (2008)</p>	<p><i>N</i> = 25 SLI Ages: 3;0–4;4 Note: This study is a further analysis of data reported in Leonard et al. (2004, 2006; see two entries in the "Early Efficacy" section below).</p>	<p><i>Design:</i> Correlational study. Study explored pre-treatment predictors of progress in intervention. <i>Targets:</i> Auxiliary <i>be</i> (<i>is/are/was</i>), third person singular (3s) <i>Recast condition:</i> A specially designed story with 12 exemplars of the target was read at the beginning of each session. This was followed by play, during which the clinician provided 12 recasts that contained the target. <i>Comparison condition:</i> n/a <i>Session length/frequency/duration:</i> 15 min, 4×/wk for 24 wks. <i>Rate of recasts:</i> 0.8 recasts/min; 12/session</p>	<p>Outcome measures from probes administered pretreatment, after 48 sessions, and after 96 sessions. For the analysis of predictors of progress, the groups were combined, and the children's performance on probes for their treatment goal, both of which mark tense and agreement, were used. Predictors were preintervention use of the plural marker in a probe task and subject–verb sentences in a language sample. Both noun plural ($p = .02$, $r = .46$) and subject–verb sentences ($p = .02$, $r = .46$) predicted performance on tense/agreement marker after intervention.</p>
<p>Proctor-Williams et al. (2001)</p>	<p><i>N</i> = 10 SLI [and 10 TD at equivalent language level] Ages: SLI: 2;5–4;2 TD: 1;9–2;2 Note: Participants drawn from Fey & Loeb (2002; see entry in the "Early Efficacy" section below).</p>	<p><i>Design:</i> Correlational study. Language samples collected at T1, T2 (4 months later) and T3 (8 months later). Primary question was the relationship between parental recasts of copula and article forms at T1 and children's productions of these forms at T3. Five children from the SLI group and 5 children from the TD group were in experimental recasting condition in larger study, but different structures were targeted. <i>Targets:</i> Copula and article forms <i>Recast condition:</i> n/a <i>Comparison condition:</i> n/a <i>Session length/frequency/duration:</i> n/a <i>Rate of Recasts:</i> Copulas: 0.13–0.21/min Articles: 0.18–0.37/min</p>	<p>Outcome data from language samples collected with parent–child dyads. For the TD group, there were significant correlations between parental recasts of copula at T1 and child's rate of production of copula ($p = .05$, $r = .63$) and accuracy ($p = .001$, $r = .87$). Correlations were nonsignificant for articles in the TD group and for both copula and articles in the SLI group.</p>

Saxton (1998)	<p><i>N</i> = 26 TD</p> <p>Ages: 3;8–4;6</p>	<p><i>Design</i>: Within-subject design. Children were taught the irregular past tense form of 2 novel verbs, one by recasting and the other by modeling.</p> <p><i>Target</i>: Irregular past tense</p> <p><i>Recast condition</i>: Experimenter elicited the verb, asking "What happened?" and recast the child's response with the irregular past tense form.</p> <p><i>Comparison condition</i>: Experimenter modeled the irregular past tense form.</p> <p><i>Session length/frequency/duration</i>: 10 sessions over 5 wks.</p> <p><i>Rate of recasts</i>: 2/session. 20 recasts and models were presented.</p>	<p>Outcome measures were child's response following the recast or model in the experimental task and a grammatical judgment task conducted 1 wk later. Correct responses were significantly greater in the recast condition ($p < .001$) than in the comparison condition. Children were more accurate in the grammatical judgment task for past-tense forms in the recast condition ($p < .001$) than in the comparison condition.</p>
Scherer & Olswang (1984)—Study 2	<p><i>N</i> = 4 TD</p> <p>Ages: 1;11–2;0</p>	<p><i>Design</i>: Replicated staggered multiple baseline. Targets were comprehended at pretest but not produced. Staggered treatment start for each target.</p> <p><i>Target</i>: Two-word or three-word semantic relations (2 per child)</p> <p><i>Recast condition</i>: Mother presented a picture depicting the target relation. When the child labeled the picture, mother recast the child's response to the target semantic relation. Mother then paused to give the child time to respond.</p> <p><i>Comparison condition</i>: None.</p> <p><i>Session length/frequency/duration</i>: Not reported; 5 days/wk for 5 wks.</p> <p><i>Rate of recasts</i>: Not reported.</p>	<p>Outcome measures were imitated and spontaneous productions of the target 2-word utterances by the child during treatment. All 4 children showed treatment effects, with imitated productions occurring first, followed by spontaneous productions.</p>

Schwartz et al. (1985a)	<p><i>N</i> = 17 TD</p> <p>Ages: 1;5–2;1</p>	<p><i>Design:</i> Group design with random assignment to recasting (<i>n</i> = 6 children) or alternate treatment control group (<i>n</i> = 11 children). Children all at single-word stage at pretest.</p> <p><i>Targets:</i> Noun–noun semantic relations</p> <p><i>Recast condition:</i> 10 play sessions, during which 16 stimuli representing various noun–noun semantic relations were presented, once each. Vertical structuring was used. Prompts were used to elicit the two target nouns, and the experimenter recast children’s single-word productions into multiword productions.</p> <p><i>Comparison condition:</i> 10 play sessions targeting lexical acquisition.</p> <p><i>Session length/frequency/duration:</i> 2–3×/wk for 3–4 wks.</p> <p><i>Rate of recasts:</i> 16 were presented in each session.</p>	<p>Outcome measure was a 24-item probe administered as pre- and posttest. There was a significant difference between pre- and posttest scores for the experimental group ($p < .05$) but not for the control group ($p > .05$). The change from pre- to posttest was significantly larger for the experimental group ($p < .05$).</p>
Weistuch & Brown (1987)	<p><i>N</i> = 28 LI, some with ID [experimental, <i>n</i> = 16; control, <i>n</i> = 12]</p> <p>Ages: 2;6–5;0</p>	<p><i>Design:</i> Group design with experimental and waiting list (nonrandom) control group.</p> <p><i>Recast condition:</i> Mothers were trained to gauge their input to their child’s language level using linguistic mapping and contingent responding, including recasts. During the parent training sessions, the children participated in group sessions with an SLP.</p> <p><i>Targets:</i> None</p> <p><i>Comparison condition:</i> Delayed treatment control group formed from waiting lists.</p> <p><i>Session length/frequency/duration:</i> 2-hr group parent training session twice per wk for 20 wks.</p> <p><i>Rate of recasts:</i> Not reported.</p>	<p>Outcome measures were taken from mother–child language samples pre- and posttreatment. More mothers in the experimental group increased their use of linguistic mapping than in the control group. There was no group difference in use of recasting, although both groups showed an increase.</p> <p>Child variables showed a significant difference in gain scores between the groups in MLU. However, these gains cannot be attributed to mother’s use of recasts, as there was no difference between the groups on mothers’ use of recasts.</p>

Early Efficacy			
Bradshaw et al. (1998)	<p><i>N</i> = 2 SLI</p> <p>Ages: 4;1, 4;2</p>	<p><i>Design:</i> Single-subject, alternating treatments.</p> <p><i>Targets:</i> Phrases/sentences and interpretations</p> <p><i>Recast condition:</i> Clinician elicited child's production with a question or cloze and then recast the child's production within a book-reading task. No specific grammatical target.</p> <p><i>Comparison condition:</i> Clinician elicited child's production using a question. Child's response was not recast. If no response, the clinician provided the answer.</p> <p><i>Session length/frequency/duration:</i> 30-min sessions (15 min each treatment), 3×/wk, 12 sessions total</p> <p><i>Rate of recasts:</i> 1.47–2.93/min</p>	<p>Outcome measures taken from child responses during intervention. Both children used more clauses with subject/predicate phrases and past-tense markers in the recast condition. One child also produced more modal verb phrases and utterances, with more than one verb in the recast condition.</p>
Camarata & Nelson (1992)	<p><i>N</i> = 4 SLI</p> <p>Ages: 4;9–5;11</p>	<p><i>Design:</i> Within subject; grammatical targets randomly assigned to recasting or imitation condition. Two children had 2 targets, and 2 children had 4 targets. All targets were not produced by the children at pretest.</p> <p><i>Targets:</i> Auxiliaries, gerunds, passives, regular past tense, questions</p> <p><i>Recast condition:</i> Clinician used prompts to elicit target attempt during play and then recast child's utterance if target not included.</p> <p><i>Comparison condition:</i> Out-of-context imitation drill using pictures.</p> <p><i>Session length/frequency/duration:</i> 15 min/target, 2×/wk for 16 wks.</p> <p><i>Rate of recasts:</i> Not reported.</p>	<p>Outcome measures taken from child responses during intervention. The first spontaneous production of a target occurred after fewer presentations by the clinician for targets in the recasting condition ($d^* = 1.65$, 95% CI [0.34, 2.97]). Total number of spontaneous productions was higher for targets in the recasting condition ($d^* = 0.37$, 95% CI [–0.63, 1.36]). This varied somewhat by target.</p>

Camarata et al. (1994)	<p><i>N</i> = 21 SLI</p> <p>Ages: 4;0–6;10</p>	<p><i>Design:</i> Within subject; grammatical targets randomly assigned to recasting or imitation condition. All targets were not produced by the children at pretest.</p> <p><i>Targets:</i> Assorted morphology and syntax</p> <p><i>Recast condition:</i> Clinician used prompts to elicit target attempt during play and then recast child's utterance if target not included.</p> <p><i>Comparison condition:</i> Out-of-context imitation drill using pictures and objects.</p> <p><i>Session length/frequency/duration:</i> 25 min/target, 2×/wk for 12 wks.</p> <p><i>Rate of recasts:</i> 0.82/min (as reported in Fey & Loeb, 2002).</p>	<p>Outcome measures taken from child responses during intervention. The first elicited production of a target occurred after fewer therapy sessions and presentations by the clinician for targets in the imitation condition ($d^* = 1.32$, 95% CI [1.09, 1.54]). However, the first spontaneous production of a target occurred after fewer therapy sessions and presentations by the clinician for targets in the recasting condition ($d^* = 1.26$, 95% CI [1.04, 1.49]). Total number of elicited productions was higher for targets in the imitation condition ($d^* = 2.74$, 95% CI [2.38, 3.10]), whereas the total number of spontaneous productions was higher for targets in the recasting condition ($d^* = 0.73$, 95% CI [0.53, 0.93]).</p>
Fey & Loeb (2002)	<p><i>N</i> = 34 [SLI group, <i>n</i> = 16; TD group, <i>n</i> = 18]</p> <p>Ages: $M_{SLI} = 3;4$ $M_{TD} = 2;0$</p> <p>Both groups had MLUs of 1.5–2.75.</p>	<p><i>Design:</i> Group design, with 4 groups: SLI recasting, SLI play, TD recasting, and TD play. At pretest, children were not producing auxiliary verbs, with the possible exception of negative modals.</p> <p><i>Targets:</i> Sentence-initial auxiliaries <i>is</i> or <i>will</i> (inverted questions)</p> <p><i>Recast condition:</i> During play, clinician responded to a child's comment about ongoing action with a recast sentence that was a question with auxiliary <i>is</i> in initial position. A comment about a future action was recast into a question with auxiliary <i>will</i> in initial position.</p> <p><i>Comparison condition:</i> Play sessions where the clinician limited questions and did not use auxiliaries <i>is</i> or <i>will</i> in interrogative forms or in recasts.</p> <p><i>Session length/frequency/duration:</i> 30 min, 3×/wk for 8 wks.</p> <p><i>Rate of recasts:</i> 1/min. 30 recasts/session (15/target auxiliary).</p>	<p>Outcome measure was from experimental probes given every 2 wks. There was no evidence that recasts involving inverted auxiliaries facilitated acquisition of target auxiliaries for either group.</p>

<p>Gillum et al. (2003)</p>	<p><i>N</i> = 4 SLI Ages: 4;3–6;8</p>	<p><i>Design:</i> Within subject; grammatical targets randomly assigned to recasting or imitation condition. All targets were not produced by the children at pretest.</p> <p><i>Targets:</i> Passives, irregular past tense, <i>wh</i>-noninfinitive, inverted <i>wh</i>-questions</p> <p><i>Recast condition:</i> Clinician used prompts to elicit target attempt during play and then recast child's utterance if target not included.</p> <p><i>Comparison condition:</i> Out-of-context imitation drill using pictures and objects.</p> <p><i>Session length/frequency/duration:</i> 25 min/target, 2×/wk for 12 wks.</p> <p><i>Rate of recasts:</i> Not reported.</p>	<p>Outcome measures were taken from child responses during therapy. Data were plotted using growth curves. Spontaneous child productions occurred following fewer clinician presentations of the target in the recasting condition within each session.</p>
<p>Loeb & Armstrong (2001)</p>	<p><i>N</i> = 5 [expressive language delay, <i>n</i> = 3; history of expressive language delay, <i>n</i> = 2] Ages: 2;0–2;10</p>	<p><i>Design:</i> Single subject with multiple baselines across targets; 3 children to recasting condition, 2 children to SVO condition, assigned randomly.</p> <p><i>Target:</i> MLU (addition of 1–2 words)</p> <p><i>Recast condition:</i> Target goal—increased MLU. Clinician recast the child's utterance by adding 1 or 2 words during play. Recasts resulted in telegraphic utterances (e.g., "puppy jump"). 20 recasts/session.</p> <p><i>Comparison condition:</i> SVO. Target goal—SVO sentences. Clinician modeled reversible SVO sentences during play. 20 models/session.</p> <p><i>Control goals:</i> "in" or "on"</p> <p><i>Session length/frequency/duration:</i> 30 min, 3×/wk for 6 wks.</p> <p><i>Rate of recasts:</i> 0.67/min.</p>	<p>Outcome measures from baseline and probe sessions that took place every 4th treatment session. Language sample and probe data were combined. In both treatments, gains were seen on the treatment goal in all children, and no gains were seen on the control goal.</p>

Leonard et al. (2004)	<p><i>N</i> = 31 SLI</p> <p>Ages: 3;0–4;4</p>	<p><i>Design:</i> Group design with alternate treatment goal. Also, control goals were monitored for all children. Children were assigned to treatment for “auxiliary <i>be – is/are/was</i>” or “3s” based on site. All children displayed no use of any treatment or control goal prior to intervention.</p> <p><i>Targets:</i> 3s and auxiliaries (<i>is, are, was</i>)</p> <p><i>Recast condition:</i> A specially designed story with 12 exemplars of the target was read at the beginning of each session. This was followed by play, during which the clinician provided 12 recasts that contained the target.</p> <p><i>Comparison condition:</i> n/a</p> <p><i>Control goals:</i> past <i>–ed</i> and infinitive <i>to</i> or nonthematic <i>of</i></p> <p><i>Session length/frequency/duration:</i> 15 min, 4×/wk for 12 wks (as calculated from Hassink & Leonard, 2010).</p> <p><i>Rate of recasts:</i> 0.8 recasts/min; 12/session.</p>	<p>Outcome measures from probes administered pre- and immediately posttreatment (48 sessions). Both groups showed significantly greater use of target form than the control forms at posttest ($p > .05$; auxiliary group, $d = 1.07$, 95% CI [0.75, 1.39]; 3s group, $d = 2.08$, 95% CI [1.73, 2.44]).</p>
Leonard et al. (2006)	<p><i>N</i> = 25 SLI</p> <p>Ages: 3;0–4;4</p> <p>Note: This is Phase 2 of the study reported in Leonard et al. (2004). 18 of 25 participants are the same as those in previous report.</p>	<p><i>Design:</i> Group design with alternate treatment goal. Also, control goals were monitored for all children. Children were assigned to treatment for “auxiliary <i>be – is/are/was</i>” or “3s” based on site.</p> <p><i>Targets:</i> 3s and auxiliaries (<i>is, are, was</i>)</p> <p><i>Recast condition:</i> A specially designed story with 12 exemplars of the target was read at the beginning of each session. This was followed by play, during which the clinician provided 12 recasts that contained the target.</p> <p><i>Comparison condition:</i> n/a</p> <p><i>Control goals:</i> past <i>–ed</i> and copula <i>is/are/was</i></p> <p><i>Session length/frequency/duration:</i> 15 min, 4×/wk for 12 wks (as calculated from Hassink & Leonard, 2010).</p> <p><i>Rate of recasts:</i> 0.8 recasts/min; 12/session.</p>	<p>Outcome measures from probes administered pretreatment, after 48 sessions, and after 96 sessions. Both groups showed significantly greater use of target form than the control form <i>–ed</i> at posttest ($p > .05$; auxiliary group, $d = 2.09$, 95% CI [0.98, 1.61]; 3s group, $d = 1.30$, 95% CI [1.49, 2.70]).</p>
Leonard et al. (2008)	<p><i>N</i> = 33 SLI</p>	<p><i>Design:</i> Group design with alternate treatment goal and a group with general language stimulation. Also, control goals were monitored for all children.</p>	<p>Outcome measures from probes administered pretreatment, after 48 sessions, and after 96</p>

	<p>Subgroups matched on pre-treatment scores were selected for analyses. There were three analysis groups, $n = 8$ for each group.</p> <p>Ages: 3;0-4;8</p> <p>Note: This is Phase 3 of the study reported in Leonard et al. (2004) & in Leonard et al. (2006).</p>	<p>Children were assigned to treatment for "auxiliary <i>be – is/are/was</i>" or "3s" or general language stimulation based on site.</p> <p><i>Targets:</i> 3s, auxiliaries (<i>is, are, was</i>), and general recasts</p> <p><i>Focused recast condition:</i> A specially designed story with 12 exemplars of the target was read at the beginning of each session. This was followed by play, during which the clinician provided 12 recasts that contained the target.</p> <p><i>Comparison condition:</i> General language stimulation (GLS), including broad recasts, using the same stories and toy play as in the 3s condition but plural subjects were used, so no verb morpheme was used in the stories or recasts.</p> <p><i>Session length/frequency/duration:</i> 15 min, 4×/wk for 12 wks (as calculated from Hassink & Leonard, 2010).</p> <p><i>Rate of recasts:</i> 0.8 recasts/min; 12/session.</p>	<p>sessions and 1 month posttreatment. The recast treatment groups showed greater gains on their treatment targets compared with control targets, which were maintained 1 month posttreatment. These gains were greater than those seen in the general language stimulation group for "auxiliary <i>be</i>" and "3s."</p> <p><i>Between groups, comparing target tx to GLS:</i> 3s: $d^* = 0.62$, 95% CI [-20.12, 21.78] Aux: $d^* = 0.97$, 95% CI [14.33, 15.97]</p> <p><i>Within-participants, comparing treated target to past –ed:</i> 3s: $d^* = 0.70$, 95% CI [0.18, 1.22] Aux: $d^* = 0.81$, 95% CI [0.28, 1.34]</p>
Nelson et al. (1996)	<p>$N = 14$ [SLI, $n = 7$; TD, $n = 7$]</p> <p>Ages: SLI: 4;7–6;7 TD: 2;2–4;2</p>	<p><i>Design:</i> Within subject; grammatical targets randomly assigned to recasting or imitation condition. Targets included 3 structures absent and 3 structures partially mastered at pretest. For each child, absent and partially mastered targets were randomly assigned to condition: recasting, imitation, or control. Both SLI and TD groups matched on language level were included.</p> <p><i>Targets:</i> 15 different morphosyntactic goals targeted</p> <p><i>Recast condition:</i> Clinician used prompts to elicit target attempt during play and then recast child's utterance if target not included.</p> <p><i>Comparison conditions:</i> (1) Out-of-context imitation drill using pictures and objects (2) No-treatment control</p> <p><i>Session length/frequency/duration:</i> 2×/wk for 10 wks.</p> <p><i>Rate of recasts:</i> Not reported.</p>	<p>Outcome measures were elicited use and spontaneous use (i.e., used in parts of session when it was not the focus and used in samples collected in the home) of the targets. More absent targets were acquired in both treatment conditions compared with no-treatment condition ($p = .001$). Recasting resulted in fewer clinician presentations before acquisition than imitation for absent targets ($p = .01$; $d = 0.50$, 95% CI [-0.07, 1.08]). Spontaneous production in home samples with mothers was significantly more likely for targets in recast condition ($p = .02$). For partially mastered targets, recasting intervention resulted in more spontaneous productions compared with control targets ($d = 0.54$, 95% CI [-0.04, 1.12]), whereas there was no difference between the targets in the imitation condition and the control targets.</p>

Proctor-Williams & Fey (2007)	<p><i>N</i> = 16 [SLI, <i>n</i> = 13; TD, <i>n</i> = 13]</p> <p><i>Ages:</i> SLI Range = 7;0–8;0 <i>M</i> = 7;10</p> <p>TD Range = 5;0–6;0 <i>M</i> = 5;6</p>	<p><i>Design:</i> Mixed design with between-subjects (TD & SLI) and within-subject (recast density: none, conversational rate, and intervention rate) variables. 6 novel irregular past-tense verb forms were trained, 3 were randomly assigned to each condition.</p> <p><i>Target:</i> Irregular past-tense verbs</p> <p><i>Recast conditions:</i> At both density rates, the clinician provided models and used prompts to elicit target attempt during play and then recast child's utterance if target was not included. Noncorrective recasts were used to reach target number of recasts if the child produced the irregular past-tense form correctly.</p> <p><i>Comparison condition:</i> Models of the target forms were produced.</p> <p><i>Session length/frequency/duration:</i> 31 min, 1-2×/day (5 sessions in total) over 4–44 days.</p> <p><i>Rate of recasts:</i> Low density: 0.2/min; high density: 0.5/min.</p>	<p>Outcome measure was percent correct use of irregular past-tense forms in the therapy sessions.</p> <ul style="list-style-type: none"> The TD group showed better performance in the recasting condition compared with the modeling condition ($d = 0.58$). Better performance was also seen in the low-density compared with the high-density recast condition ($d = 0.58$, 95% CI [0.26, 0.89]). For the SLI group, there was no difference between the low-density recasting condition and the modeling condition, and there was no difference between the low-density and high-density conditions.
Schwartz et al. (1985b)	<p><i>N</i> = 10 LI</p> <p><i>Ages:</i> 2;8–3;4</p>	<p><i>Design:</i> Group design. 8 children in experimental group, 2 children in control group. Pre–post data in the experimental group were statistically analyzed and also descriptively compared to those of the two control children.</p> <p><i>Recast condition:</i> 16 experimental stimuli (pictures and enactments with toys) were used. A noun was elicited using "What's/who's this?" A second noun was then elicited in a similar manner. The experimenter recast the child's production into a complete sentence (e.g., <i>The block is in the truck.</i>). Items were individually chosen and included words within the child's single-word vocabulary. Specific semantic relations were randomly chosen as targets for each child.</p> <p><i>Comparison condition:</i> Equivalent time in a lexical training program.</p> <p><i>Session length/frequency/duration:</i> n/a, 3 days/wk for 3–4 wks for a total of 10 sessions.</p> <p><i>Rate of recasts:</i> 16 recasts/session.</p>	<p>Outcome measure was multiword productions in a probe presented pre- and postintervention. Children in the experimental group produced more multiword utterances at posttest than at pretest ($p < .05$, $d^* = 0.733$, 95% CI [–4.13, 5.60]). For the experimental group, median scores were 1.5 pretest and 9.0 posttest. The scores for the control children were 5 and 6 at pretest and 2 and 7 at posttest.</p>

Late Efficacy			
Girolametto et al. (1996)	<p><i>N</i> = 25 LI</p> <p>Ages: 1;11–2;11</p>	<p><i>Design:</i> Group design with random assignment to immediate treatment of delayed-treatment control group. For each child, 20 words that were comprehended but not produced were identified; 10 were randomly selected as treatment targets, and 10 were randomly selected as control targets.</p> <p><i>Recast condition:</i> The parent training program, Hanen Program for Parents, was conducted. Parents were taught to focus on the target words and to respond contingently using facilitative techniques including recasts.</p> <p><i>Comparison condition:</i> Delayed-treatment control group.</p> <p><i>Session length/frequency/duration:</i> 11-week parent program, including eight 2.5-hr group sessions and 3 home visits.</p> <p><i>Rate of recasts:</i> Not reported.</p>	<p>Outcome measures were taken from the MacArthur Communicative Development Index (CDI; Vocabulary size and Sentence Complexity), from probes on target and control words, and from language samples (number of multiword utterances) collected with the child's mother. In terms of grammatical outcomes, children in the experimental group had higher complexity ratings on the CDI ($p < .01$, $d^* = 0.96$, 95% CI [−3.56, 5.48]) and produced more multiword utterances ($p < .05$, $d^* = 0.68$, 95% CI [−17.09, 18.45]) than the control group when tested 3 wks after intervention.</p>
Yoder et al. (1995)	<p><i>N</i> = 4 [with mild ID]</p> <p>Ages: 2;0–4;6</p> <p>Note: Three children were at Brown's Stage I. One child was at Brown's Stage IV at the beginning, and another child achieved Stage IV for his second book.</p>	<p><i>Design:</i> Replicated single-subject design with staggered multiple baselines. Baseline and generalization sessions involved toy play with an adult who was not the child's interventionist.</p> <p><i>Target:</i> Added 1 major grammatical component to child utterance.</p> <p><i>Recast condition:</i> A book reading context was used. The clinician asked the child a question about the pictures and recast the child's response using a complete sentence.</p> <p><i>Comparison condition:</i> None.</p> <p><i>Session length/frequency/duration:</i> 4×/wk.</p> <p><i>Rate of recasts:</i> 0.0–5.2 /min.</p>	<p>Outcome measure was MLU in generalization sessions. For children at Brown's Stage I, there was evidence that recasting resulted in an increase in their MLU. For the children at Brown's Stage IV, there was no effect of intervention.</p>

Yoder et al. (2005)	<p><i>N</i> = 52 specific speech and language impairment</p> <p><i>Ages:</i> $M = 3.65$ $SD = 0.71$</p>	<p><i>Design:</i> Group design with random assignment to experimental treatment or usual services.</p> <p><i>Targets:</i> No specific targets (recast any grammatical or speech sound error).</p> <p><i>Recast condition:</i> Broad target recasts were used during play. Child utterances that were well articulated were followed by grammatical recasts. Utterances that were poorly articulated were followed by speech recasts.</p> <p><i>Comparison condition:</i> Usual services.</p> <p><i>Session length/frequency/duration:</i> 30 min, 3×/wk for 6 months</p> <p><i>Rate of recasts:</i> 2.1/min for grammatical recasts; 2.6/min for speech recasts.</p>	<p>Outcome measures were MLU and intelligibility scores from language samples collected posttreatment and at 8 months follow-up. The groups did not differ at either measurement time ($p > .38$).</p>
Yoder et al. (2011)	<p><i>N</i> = 57 SLI</p> <p><i>Ages:</i> $M = 3.6$ $SD = 0.60$</p>	<p><i>Design:</i> Group design with random assignment to treatment condition. There were 6 measurement points: pretest, 3 months, 5 months, 7 months (posttreatment), 9 months (follow-up), and 11 months (follow-up).</p> <p><i>Targets:</i> No specific targets (recast any grammatical error).</p> <p><i>Recast condition:</i> Broad recasts were used in play following children's utterances in instances where developmentally appropriate grammar structures would be recast.</p> <p><i>Comparison condition:</i> Milieu language teaching (MLT). Three language targets identified per child. Treatment procedures included prompts to produce, direct imitation, and recasts.</p> <p><i>Session length/frequency/duration:</i> 30 min, 3×/wk for 6 months</p> <p><i>Rate of recasts:</i> 4.3/min ($SD = 0.74$).</p>	<p>Outcome measure was the Index of Productive Syntax (IPSyn) calculated from language samples. Mixed-level modeling of growth curves was conducted. The growth curves of the groups demonstrated growth ($p < .001$), but the groups did not differ ($p = .26$ $d^* = -0.09$, 95% CI [-3.08, 2.90]). Children with initial MLU < 1.84 showed faster growth in the MLT condition ($p = .049$). For children with initial MLU > 1.84, there was no difference. The majority of children maintained their growth at the 4-month follow-up.</p>

Effectiveness			
Camarata et al. (2006)	<p><i>N</i> = 6 [with DS]</p> <p>Ages: 4;3–7;4</p>	<p><i>Design:</i> Replicated single subject, with staggered baselines across subjects.</p> <p><i>Targets:</i> No specific target (any developmentally appropriate grammatical or speech structure).</p> <p><i>Recast condition:</i> Both grammatical and speech recasts provided during play contexts.</p> <p><i>Comparison condition:</i> None.</p> <p><i>Session length/frequency/duration:</i> Length not reported, 2×/wk for 6 months</p> <p><i>Rate of recasts:</i> Target rate was 4/min.</p>	<p>Outcome measures were speech comprehensibility and MLU taken from language samples. 5 of 6 participants showed growth in MLU, whereas 2 of 6 showed evidence of treatment effects (i.e., no more than 2 data points in treatment phase overlapped with points in baseline. 4 of 6 showed growth in comprehensibility, whereas 2 of 6 showed treatment effects.</p>
Fey et al. (1993) [Parent-administered program, Phase 1]	<p><i>N</i> = 30 [SLI & LI] Parent, <i>n</i> = 10 Control, <i>n</i> = 9 Clinician, <i>n</i> = 11</p> <p>Ages: 3;8–5;10</p>	<p><i>Design:</i> Group design, with random assignment to parent-administered program and delayed-treatment control group. There was also a clinician-administered program that involved an imitation component, so it was not included in the systematic review.</p> <p><i>Targets:</i> Noun phrases, verb phrases, morphemes in noun or verb phrase, sentence modality.</p> <p><i>Recast condition:</i> Parents were trained to use focused stimulation techniques, including recasts, to target a specific grammar treatment goal per week. Four goals were targeted, with a cyclical approach.</p> <p><i>Comparison condition:</i> Delayed-treatment control group.</p> <p><i>Session length/frequency/duration:</i> 2-hour group parent training sessions per week for 12 weeks followed by monthly group sessions for 2 months. Throughout program, each parent(s) and child was seen for individual sessions monthly.</p> <p><i>Rate of recasts:</i> 1.89/min in parent–child posttreatment language sample.</p>	<p>Outcome measure was Development Sentence Score (DSS) from parent–child language samples. The treatment group had significantly higher DSS scores than the control group at posttest ($p = .0001$, $d = 0.89$, 95% CI [0.18, 1.61]).</p>

<p>Fey et al. (1997) [Parent administered program, Phase 2]</p>	<p><i>N</i> = 28 [SLI & LI] Parent, <i>n</i> = 9 Dismissed, <i>n</i> = 10 Clinician, <i>n</i> = 9</p> <p><i>Ages</i>:</p> <p>Note: This is Phase 2 of the study reported in Fey et al., 1993.</p>	<p><i>Design</i>: Group design, with random assignment to group. Growth in Phase 2 of treatment was compared to that in Phase 1 and to that made by a group dismissed after Phase 1.</p> <p><i>Targets</i>: Noun phrases, verb phrases, morphemes in noun or verb phrase, sentence modality.</p> <p><i>Recast condition</i>: Parents were trained to use focused stimulation techniques, including recasts, to target a specific grammar treatment goal per week. Four goals were targeting with a cyclical approach.</p> <p><i>Comparison conditions</i>:</p> <ul style="list-style-type: none"> (1) Growth in Phase 1 (2) Dismissal group who received only Phase 1 <p><i>Session length/frequency/duration</i>: 2-hr parent group sessions held monthly for 4 months. Each parent(s) and child was also seen for individual sessions monthly.</p> <p><i>Rate of recasts</i>: 1.11/min in parent–child videotaping session.</p>	<p>Outcome measure was DSS score from parent–child language sample. The treatment group showed continued improvement in Phase 2 ($p = .04$). The dismissal group showed no growth ($p = .33$). Greater growth was seen in children whose parents produced a higher rate of recasts (38 or more in a 30-min sample) than those who produced a lower rate (20 or fewer in a 30-min sample; $p = .03$).</p>
<p>Weistuch et al. (1991)</p>	<p><i>N</i> = 10 LI, <i>n</i> = 5 ID, <i>n</i> = 5</p> <p><i>Ages</i>: Preschoolers</p> <p>Results compared to data from previous study with 28 LI (2 of 3 with ID)</p>	<p><i>Design</i>: Group design. Children in current study compared to experimental group ($n = 16$) and no-treatment control group ($n = 12$) from previous study.</p> <p><i>Targets</i>: None.</p> <p><i>Recast condition</i>: Weekly parent training program during which language development and language facilitation techniques were addressed.</p> <p><i>Comparison condition</i>: No-treatment control group.</p> <p><i>Session length/frequency/duration</i>: 1 hr, weekly, for 40 wks.</p> <p><i>Rate of recasts</i>: Not reported.</p>	<p>Outcome measure was MLU calculated from language samples with mother pre- and posttreatment. Both experimental groups made greater gains in MLU than did the control group ($p < .04$ and $p < .01$, respectively). There was a significant association between mothers' expansions and children's growth in MLU in the experimental groups ($p < .04$) only.</p>

Note. TD = typically developing; SLI = specific language impairment; ID = intellectual disability; MLU = mean length of utterance; LI = language impairment; DS = Down syndrome; 3s = third person singular; SLP = speech-language pathologist; SVO = subject–verb–object; SICD = Sequenced Inventory of Communication Development; tx = treatment; Aux = auxiliary.