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Research Article

Morphology and Syntax in Late Talkers at Age 5

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Purpose: This study reports age 5 morphology and syntax skills in late talkers identified at age 2 (n = 34) and typically developing comparison children (n = 20).
Results: The late talkers manifested significant morphological delays at ages 3 and 4 relative to comparison peers. Based on the 14 morphemes analyzed at age 5, the only significant group difference was on the third person regular –*s* inflection. This was also the only significant difference when we compared late talkers with continuing delay, late bloomers (who scored within 1 standard deviation of the comparison group in mean length of utterance), and typically developing peers. The late talker and comparison children differed greatly in mean total scores on the Index of Productive Syntax (Scarborough, 1990), a measure of syntactic complexity. The group with continuing delay scored significantly lower on the IPSyn than the late bloomer and typically developing groups, which did not differ from each other.
Conclusions: Findings are consistent with the higher order language group differences found through adolescence in these late talkers relative to comparison peers with similar socioeconomic status and similar nonverbal abilities, supporting the notion that late talkers have an ongoing weakness in language endowment that manifests differently over the course of development.

Epidemiological studies indicate that approximately 10% to 15% of 2-year-olds are categorized as late talkers (LTs; Law, 2013; Taylor, Zubrick, & Rice, 2013). Furthermore, late talking is one of the most common reasons that young children are referred for clinical evaluation (Rescorla & Lee, 2000). LTs are typically identified at age 2 to 3 years with delayed vocabulary and syntax but no significant neurological, sensory, or cognitive deficits (Desmarais, Sylvestre, Meyer, Bairati, & Rouleau, 2008). Some LTs have expressive language delay only, whereas others have delayed receptive language as well (Rescorla, 2013).

Most LTs catch up to age expectations for expressive language by the time they enter school, as described in Rescorla's (2002) follow-up in subjects ages 6 to 9 years. This same LT cohort showed significant language differences relative to comparison peers at age 13 (Rescorla, 2005) and age 17 (Rescorla, 2009), as summarized by Rescorla (2013). These findings led Rescorla (2009, 2013) to argue for a dimensional account of early language delay, according to which LTs have a weaker language endowment than typically developing (TD) peers. The theoretical construct of weak language endowment accounts for the fact that even when LTs have caught up to age expectations, they still have worse skills than peers with similar socioeconomic status (SES) backgrounds and similar nonverbal skills.

LTs, who are typically identified at age 2 to 3 years, have delayed language development despite normal nonverbal ability and typical personality development. Children who meet these same criteria at ages 4 and older are typically diagnosed with specific language impairment (SLI). Thus, despite the fact that LTs and children with SLI are defined by essentially the same criteria, by convention they are referred to with different labels, although some question the validity of this distinction (Rescorla, 2009, 2013). LTs and children with SLI are typically not the same individuals; that is, most children identified with SLI at ages 4 or 5 were not LTs at 2 years (Ellis Weismer, 2007). Furthermore, many 2-year-old LTs no longer meet the criteria for SLI by age 4 or 5, although some continue to do so (Rescorla, 2013).

Ellis Weismer (2007) endorsed the theoretical notion of a language endowment spectrum, noting that LTs share similarities with children diagnosed with SLI as well as with TD peers. This hypothesized language endowment spectrum may explain why LTs appear to manifest what Scarborough and Dobrich (1990) called *illusory recovery* (Rescorla, 2005). Specifically, differences in a skill between LTs and comparison children at one age might no longer

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be evident at a later age, but a new difference in a related skill might then appear at the later age, due to an ongoing underlying weakness in language endowment.

A consistent finding in LT studies is ongoing delay in morphological and syntactic development throughout the preschool period. For example, Paul and Alforde (1993) found significant differences in morphological development at age 4 in children identified at 2 years as LTs compared with age-matched peers with typical histories. Paul and Alforde also found that the "late bloomers" (LBs) among their LTs, namely, those who did not differ from comparison children in mean length of utterance (MLU; Brown, 1973), still scored below the TD children in mastery of grammatical morphemes at age 4. Rescorla, Dahlsgaard, and Roberts (2000) found that although LTs made greater gains than age-matched peers between ages 3 and 4 on both MLU and the Index of Productive Syntax (IPSyn; Scarborough, 1990), they still lagged behind their comparison peers on both measures by about 2.5 standard deviations at both ages (Rescorla et al., 2000). Rescorla et al. (2000) did not compare LBs in their LT sample with either the comparison group or with continuing LTs.

Rescorla and Roberts (2002) evaluated morphological development at ages 3 and 4 in Rescorla et al.'s (2000) cohorts of LTs and TD peers. At both ages, the LTs had significantly fewer analyzed morphemes (due to fewer than four obligatory contexts in some children), suggesting that because their utterances were simpler, they were creating fewer obligatory contexts for morpheme suppliance than their age-matched peers (Rescorla & Roberts, 2002). Furthermore, LTs had lower suppliance levels than TD peers on several morphemes at both ages. By age 4, LTs showed mastery (i.e., ≥90% suppliance) of plural *–s,* articles, nominative pronouns, preposition *in*, other prepositions, progressive *–ing,* and modal verbs (Rescorla & Roberts, 2002). Most of the unmastered morphemes were verbal, not nominal, in nature. However, this pattern was also true of TD children. LBs at age 4 (i.e., those with MLUs comparable to the typical group) did not differ from TD peers of the same age on any morphemes (Rescorla & Roberts, 2002). In addition, age 4 LTs performed quite similarly in morpheme suppliance to TD age 3 MLU-matched typical peers, suggesting delay rather than deviance in their morphological development.

Few studies have reported morphological findings for LTs at age 5, but Rescorla (2002) reported age 5 scores for her LT and TD cohorts on the Patterned Elicitation Syntax Test (Young & Perachio, 1993), which assesses syntactic skills using a sentence repetition paradigm. The LTs obtained a score in the average range (52nd percentile), but the comparison children had a significantly higher mean score (82nd percentile), a difference of about 1 *SD*. However, no details were provided about morphological mastery.

E. Lee and Rescorla (2008) reported that 53% of the LTs in the Rescorla cohort scored within 1 standard deviation of the TD children on MLU at age 5. However, the LTs' age 5 mean MLU score was still lower than the mean age 3 MLU for the TD peers (E. Lee & Rescorla, 2008). E. Lee and Rescorla (2008) did not report any details about morpheme mastery. However, an important syntactic finding they reported is that only 55% of the age 5 LTs used any propositional complements (e.g., "The baby thinks this is a park but it is a jail"), compared with 100% of the comparison children. Propositional complements are an important syntactic form because they are required for correct use of most cognitive state words and hence for expression of theory-of-mind understanding (E. Lee & Rescorla, 2008).

In one of the few follow-ups of LTs to report morphological and syntactic findings past age 4, Rice, Taylor, and Zubrick (2008) reported age 7 outcomes for 128 Australian children with late language emergence at 2 years and 109 children with typical language histories. Rice et al. found that some but not most LTs identified at age 2 showed morphosyntactic weaknesses at age 7 compared with TD peers, with particular problems in tense marking, as manifested by substantial effect sizes according to Cohen's (1988) *d*. Specifically, the LTs had weaker performance on probes for third person singular *–s* ($d = 1.93$), past tense *–ed* ($d = 0.50$), use of the BE copula and auxiliary ($d = 0.63$), and use of the DO auxiliary ($d = 0.49$), as well as on a grammatical composite of these four forms ($d = 0.94$; Taylor et al., 2013).

Although few studies have reported details of morphological and syntactic development of LTs at age 5 or older, morphological deficits have been widely studied in children with SLI identified at age 4 or older. Specifically, children with SLI appear to have morphological deficits that are greater than their MLUs would typically predict (Leonard, Davis, & Deevy, 2007; Maillart & Parisse, 2006). Specific weaknesses within SLI verb morphology identified include the underuse of past tense *–ed* (Leonard et al., 2007) and past tense auxiliaries such as *was* and *were* (Leonard, Deevy, Miller, Charest, & Kurtz, 2003; Rice & Wexler, 1996), as well as inconsistent use of third person *–s*. In addition, children with SLI are more likely than TD peers to omit the nonfinite particle *to*, arguments in finite clauses, and the optional complementizer *that* (Owen & Leonard, 2006). Children with SLI show such marked morphology deficits that some have proposed them as a clinical marker for the condition (Rice, Wexler, & Hershberger, 1998). Furthermore, Rice and Wexler (1996) argued that tense-marking inflections may even more accurately identify SLI than morphology in general.

Goals of the Current Study

Rescorla and Roberts (2002) reported morphological delays at ages 3 and 4, and Rescorla et al. (2000) reported syntactic delays at ages 3 and 4 when LTs were compared with SES- and age-matched TD peers. However, little is known about LTs' morphological and syntactic development at age 5, the age by which TD children generally show strong mastery in both areas. Thus, the first goal of the current study was to determine if differences in morphological mastery between LTs and age-matched TD children persisted to age 5. The second goal was to examine syntactic differences between the LTs and age-matched TD children on the basis of their IPSyn scores at age 5. The third goal

was to test whether the subgroup of LTs who were LBs at age 5 differed from TD peers or continuing LTs in either morphology or syntax skills.

To determine what morphemes should be analyzed in our study, we started with Brown's (1973) typology. In his classic study of morphological development, Brown outlined the order of acquisition of 14 morphemes seen in TD children, namely, five early morphemes (progressive *–ing*, prepositions *in* and *on*, plural *–s*, and possessive *–'s*), five middle morphemes (irregular past tense verb endings, contractible copula BE, articles, regular past tense *–ed*, and regular third-person present tense *–s*), and four later morphemes (irregular third person present tense, uncontractible auxiliary BE, uncontractible copula BE, and contractible auxiliary BE). For the current study, we added nine additional morphemes to Brown's 14. These morphemes were modal verbs (such as *can*, *could*, *should*), derivational morphemes (such as *un–*, *–ly*), irregular plurals, auxiliary DO, auxiliary HAVE, adjectival verb suffixes (*–ed*, *–ing*), personal pronouns (such as *I* and *you*), possessive personal pronouns (*my*, *his*), and negation (*–n't*; see Table 1). Every utterance in each 100-utterance transcript was coded for suppliance or omission in obligatory contexts of these 23 grammatical morphemes as well as for each morpheme's oversuppliance (adding the morpheme where it was not required) and substitution (using the wrong morpheme in an obligatory context).

Table 1. Number (%) of children per group analyzed for each morpheme.

Morpheme	Late talkers (*n* = 34)	Typically developing (*n* = 20)
*Progressive *–ing*	20 (59)[a]	14 (70)
*Personal pronouns	34 (100)	20 (100)
Possessive personal pronouns	9 (27)	6 (30)
*Plural *–s*	22 (65)	17 (85)
*Preposition *in*	24 (71)	18 (90)
Preposition *on*	5 (15)	4 (20)
Possessive *–'s*	1 (3)	1 (5)
Past tense *–ed*	4 (12)	2 (10)
*Irregular past tense	20 (59)	12 (60)
*Regular third person *–s*	20 (59)	15 (75)
*Irregular third person	31 (91)	19 (95)
*Article	34 (100)	20 (100)
*Contractible copula *be*	33 (97)	20 (100)
*Uncontractible copula *be*	33 (97)	20 (100)
*Contractible auxiliary *be*	22 (65)	8 (40)
Uncontractible auxiliary *be*	2 (6)	3 (15)
*Modal	29 (85)	19 (95)
Derivational	0 (0)	0 (0)
Irregular plural	6 (18)	3 (15)
*Auxiliary *do*	22 (65)	13 (65)
Auxiliary *have*	0 (0)	0 (0)
Adjectival	3 (9)	2 (10)
*Negation	26 (77)	14 (70)

Note. A morpheme was not analyzed for a child if fewer than four obligatory contexts were present. A morpheme was analyzed only if at least eight children in each group had at least four obligatory contexts. The 14 analyzed morphemes are marked with an asterisk.

[a]No significant group differences by χ^2 for any morpheme.

To examine group differences in morphology, we tested the number of morphemes with sufficient obligatory contexts to be analyzed and the percentage suppliance in obligatory contexts for each of these morphemes. Our hypothesis, based on findings from Rescorla and Roberts (2002), was that the age 5 LTs would display more impaired morphology than SES-matched, age-matched TD peers. To examine group differences in syntax, we compared the LT and TD groups on IPSyn total score as well as on the four IPSyn subscales (Noun Phrase, Verb Phrase, Question/Negation, and Sentence Structure). On the basis of E. Lee and Rescorla's (2008) study, we hypothesized that age 5 LTs would have significantly lower IPSyn scores than TD children, particularly with respect to Sentence Structure. To examine whether the LB subgroup of LTs, who were similar to the TD group in MLU, differed from either the TD or continuing LT groups in morphology and syntax, we conducted three-group analyses on morpheme suppliance and ISPsyn scores. We hypothesized that the LB and TD groups would not differ in morphology or IPSyn scores and that both groups would be superior to the continuing LT group.

Method

Participants

The current study involved the 34 LTs and 20 TD comparison children drawn from the cohorts previously studied by Rescorla (2002, 2005, 2009) with follow-up data at age 5. All children were boys except for one girl in each group, and all children were tested within approximately 2 months after their 5th birthday. LTs were recruited through advertisements in newspapers, pediatricians' offices, and a local infant lab. All participants were Caucasian and from middle-/upper SES families, and the groups did not differ in nonverbal IQ scores at intake (Rescorla, 2013). Intake occurred between 24 and 31 months of age, and the LTs exhibited an expressive language delay only, without receptive deficits (Rescorla, 2013). Children in both groups had a Bayley Mental Development Index (Bayley, 1969) score of 85 or greater and a Reynell Receptive Language (Reynell, 1977) score within 3 months of chronological age, except for one LT who was 4 months delayed. The LT and TD groups differed significantly in intake receptive language score (E. Lee & Rescorla, 2008). The children in the TD group had to score within 3 months of chronological age on the Reynell Expressive Language scale as well (one was within 4 months), whereas the LTs were all at least 6 months below chronological age on this measure. The LTs had significant delays in expressive speech at intake, as documented in naturalistic observation and parental reports (E. Lee & Rescorla, 2008). Mean vocabulary size, as measured by Rescorla's (1989) Language Development Survey, was 19 words for the LT group and 233 words for the TD group.

To conduct three-group comparisons, we subdivided the LT group into those with continuing delay (continuing LTs, n =10) and LBs (n = 24), using the criterion of an MLU within 1 *SD* of the TD group mean (4.41) based on

the TD group *SD* (0.62). As would be expected, a one-way analysis of variance (ANOVA) indicated a significant group difference in MLU, $F(2, 52) = 17.79$, $p = .001$. A Student–Neuman–Keuls (SNK) post hoc test indicated that the continuing LT group had a significantly lower mean MLU (3.37) than the LB and TD groups, which did not differ from each other (4.32 and 4.41, respectively).

Procedure

As at ages 3 and 4 (Rescorla & Roberts, 2002), speech samples were obtained from 30-min recordings of mother–child free play sessions using the Fisher Price play village, which contains many people, animals, furniture, and vehicles conducive to pretend play. The play sessions were videotaped and audiotaped, while a speech-language pathologist present during the play session took notes of all utterances. The play sessions were transcribed using the conventions established by the Children's Data Exchange System (CHILDES) consortium (MacWhinney, 1991) and reviewed by multiple raters based on the audio- and videotapes and the handwritten utterance notes, as in Rescorla and Roberts (2002). Prior to the current study, Computerized Language Analysis (CLAN; MacWhinney, 1991) procedures had been used to identify a corpus of the first 100 complete child utterances, after excluding imitations, immediate self-repetitions, single-word "yes" or "no" responses to questions, memorized songs/rhymes, and unintelligible utterances, as reported by E. Lee and Rescorla (2008). These 100 utterance samples were then used to obtain MLU in morphemes for each child using the CLAN program, as described by E. Lee and Rescorla (2008). The same transcripts had also been previously coded using the IPSyn, using scoring instructions provided by Scarborough (1990). The "extended" IPSyn used for this coding, provided by Scarborough, included the upper-level items from Scarborough's (1990) version plus 26 additional items (eight Noun Phrase items, seven Verb Phrase items, six Question/Negation items, and five Sentence Structure items). The new items tapped language structures suitable for 5-year-olds, such as reciprocal pronouns, bitransitive predicates, *wh*– complex sentences, passive forms, and comparative conjunctions.

Morpheme Analysis

After all 23 morphemes had been coded for suppliance in obligatory contexts, omission in obligatory contexts, substitution for another morpheme in obligatory contexts, or oversuppliance (i.e., added where unnecessary), we identified nine morphemes for which fewer than eight children in each group had four or more obligatory contexts. These nine morphemes (preposition *on*, possessive *–'s*, regular past tense *–ed*, uncontractible auxiliary BE, derivational morphemes, irregular plurals, auxiliary HAVE, and adjectival verb suffixes) were excluded from further analysis because the obligatory contexts were too rare in one or both groups to afford a meaningful group comparison of morpheme use. This left us with 14 morphemes for analysis (marked by an asterisk in Table 1), nine of which were from Brown's (1973) set of 14 morphemes (progressive *–ing*, plural *–s*, preposition *in*, regular third person *–s*, irregular third person, articles, contractible copula BE, uncontractible copula BE, contractible auxiliary BE) and five of which were additional morphemes not studied by Brown (personal pronouns irregular past tense, modal verbs, auxiliary DO, and negation).

Data Analyses

To assess interrater reliability of morpheme coding, the first author independently coded 6 of the 54 transcripts coded by the second author. The six transcripts, three per group, were drawn randomly from each cohort. The mean percentage agreement between the two coders was calculated across the 100 utterances of the six transcripts. For each utterance, the numerator was the number of identical codes and the denominator was the total number of codes made by the rater with the most codes (which could exceed the 23 morphemes coded if there were multiple instances of a morpheme in a single utterance). For example, if both coders agreed that a given utterance demonstrated correct suppliance of one article, one plural *–s*, and one contractible copula in obligatory contexts and had no other obligatory contexts, then agreement was 23/23 = 100% for that utterance. If one rater coded a given utterance as demonstrating suppliance of two personal pronouns, one uncontractible auxiliary, one progressive *–ing*, and two articles in obligatory contexts plus omission of an auxiliary DO in an obligatory context (hence, 25 codes), whereas the other rater coded only one article and coded the uncontractible auxiliary as contractible but agreed on all the other codes (hence, 24 codes), then agreement was 23/25 = 92%. Across the six transcripts coded for interrater reliability, the mean percentage agreement was 99%. The few disagreements in these six transcripts were discussed and corrections were made after the two raters finalized all coding rules. The raters then reviewed the remaining 48 transcripts and made any changes necessary to reflect the final coding rules.

As noted above, a morpheme was analyzed for a given child only if he or she had at least four obligatory contexts for that morpheme, based on the procedure used by Rescorla and Roberts (2002). The morphemes thus varied with respect to the percentage of children in each group analyzed (see Table 1). In addition, as noted above, a morpheme was analyzed only if at least eight children in each group had four or more obligatory contexts for that morpheme, which is why only 14 of the 23 coded morphemes were analyzed. Percentage suppliance for each morpheme for each child was calculated by dividing the number of overtly marked morphemes by the total number of obligatory contexts in which that morpheme should have appeared; children who did not have four obligatory contexts for a given morpheme were not included in analyses of that morpheme. A child reaching 90% suppliance on a particular morpheme was considered to have mastered that morpheme, in accordance with Brown (1973) and subsequent work.

Our requirement of eight or more children per group with at least four obligatory contexts for a morpheme

resulted in exclusion of the important verbal morphemes of past tense *–ed* and the uncontractible auxiliary BE from any further analysis. This requirement also excluded some children from analysis of the other verbal morphemes. We therefore created a verbal composite based on Rice et al. (2008) that aggregated suppliance in obligatory contexts of third person *–s*, past tense *–ed*, plus BE and DO forms, which we could calculate for all children in both groups.

Group differences in the percentage of participants scored for each morpheme were tested by χ^2. Group differences in suppliance for each of the 14 analyzed mophemes were examined by *t* tests, after converting percentages to arcsines. Group differences in MLU and on the IPSyn were also tested using *t* tests. A one-way ANOVA was used to test differences between the LBs, continuing LT, and TD groups on morpheme suppliance and IPSyn scores, with SNK post hoc tests used for pairwise comparisons. Because of the number of tests (14 morphemes plus six syntax measures), we set the Bonferroni-corrected *p* value (.05/20 = .003) as the stringent test of significance, but we also report results of tests yielding $p < .05$. In addition, we tested consistency in morpheme acquisition order between the LT and TD groups by correlating the arcsine percentage suppliance values obtained for children scored on each morpheme.

Results

Morpheme Results

There were no significant differences in the percentage of LT versus TD children analyzed on any of the morphemes when tested by χ^2. However, as can be seen in Table 1, the percentage of children analyzed was often slightly lower in the LT than in the TD group.

Our *t* tests comparing (arcsine) percentage suppliance for each of the 14 analyzed morphemes yielded only one significant difference between the LT and TD groups, even when using $p < .05$ (without the Bonferroni correction). The single significant difference found (without the Bonferroni correction) was that LTs supplied 83% of required third person regular *–s* morphemes, compared with 96% for the TD children, $t(33) = -2.74$, $p = .01$, for the arcsine value. There was also a large difference in omission of the third person singular *–s* morpheme (16% vs. 4%), but the *t* test was not significant for either the arcsine or regular percentage. Thus, contrary to our predictions, third person regular *–s* was the only morpheme showing a significant group difference, with the two groups of children performing quite similarly with respect to suppliance in their obligatory contexts of most of the 14 morphemes we could analyze. These results are presented in Table 2, which displays the actual percentages rather than the arcsine values used in the statistical analysis.

The group difference in percentage suppliance of morphemes in the verbal composite (composed of third person *–s*, past tense *–ed*, plus BE and DO forms) was not significant, $t(52) = -1.85$, $p = .07$, for the arcsine value (or for the regular percentages). Both groups had high levels of suppliance, but the LT mean percentage was slightly lower, the *SD* was much larger, and the range was wider: LT = 89% (*SD* = .15, range = .30–1.00) versus TD = 95% (*SD* = .04, range = .87–1.00). The *t* test for omission of morphemes in the verbal composite was also not significant, $t(52) = -1.90$, $p = .06$, for the arcsine value, although the LT mean percentage was higher (11% vs. 4%). These results suggest that the LTs were slightly weaker than the TD children in verbal morphemes at age 5 but that the small size of the group difference, the relatively small sample size, and the large within-group variability in the LT group rendered the *p* values nonsignificant. It should also be noted that although the *SD*s for the verbal composite were larger in the LT than the TD group, they were not significantly so by Levene's test (e.g., suppliance *SD*s = 0.15 vs. 0.04; omission *SD*s = 0.15 vs. 0.03).

As shown in Table 2, use of an incorrect morpheme in obligatory contexts (i.e., a substitution) was rare in both groups. Substitutions were made in 0% to 3% of obligatory contexts (from zero to seven total substitutions per morpheme per group). There were no significant group differences in either percentage substitutions or in mean substitutions (LT = 0.68, TD = 0.95). Most substitutions involved a morpheme from the same category (e.g. "her has to use this;" "here comes a ambulance," "here is the animals"). Oversuppliance was also rare. As there are no obligatory contexts for oversuppliance, Table 2 lists only the sum of oversupplied uses per morpheme per group rather than percentages, based on the full sample for each group. Across the 14 morphemes, total instances of oversuppliance ranged from 0 to 8 for the LT group and from 0 to 4 for the TD group. There was not a significant group difference in mean oversuppliance (1.1 vs. 1.0). Several instances of oversuppliance involved use of an article where it did not belong (e.g., "a big a window"), but others involved verbs (e.g., "yeah, that's is it").

As at age 4 (Rescorla & Roberts, 2002), Brown's (1973) earliest mastered morphemes were at ≥90% suppliance for both LT and TD groups at age 5: progressive *-ing* (99% and 97%, respectively) and prepositional *in* (99% and 100%). Personal pronouns were also mastered at age 5 (95% and 97%), as they had been at age 4. Modal verbs, such as *could*, *would*, and *might*, had also been mastered by both groups of children (96% and 99%, respectively) at age 5.

Several morphemes that had not been mastered at age 4 by LT and TD children were used with ≥90% accuracy by both cohorts at age 5. Plural *–s* (99% and 98%, LT and TD) and irregular past tense verbs (95% and 99%, LT and TD), two of Brown's (1973) earlier acquired morphemes, were newly mastered at 5. Articles were also newly mastered by both age 5 groups, with 93% (LT) and 95% (TD) correct usage. Irregular third person verbs were used with 98% and 96% accuracy by the LT and TD groups, respectively. The contractible copula and contractible auxiliary forms of BE, which Brown (1973) considered the last morphemes to be acquired, were used frequently and proficiently by LT and TD children (94% and 96% for contractible copula and 92% and 97% for contractible auxiliary). Both LTs and comparison children had mastered negation

Table 2. Results for suppliance, omission, substitution, and oversuppliance for late talker/comparison groups.

Morpheme	*n* per group	Percentage suppliance[a]	Percentage omission	Percentage substitution	Sum substitutions[b]	Sum oversuppliance[b]
Progressive *–ing*	20/14	99/97	1/3	0/0	0/1	5/0
Personal pronouns	34/20	95/97	4/3	1/0	6/0	0/3
Plural *–s*	22/16	99/98	1/2	0/0	0/0	4/2
Preposition *in*	24/17	99/100	1/0	0/0	0/0	2/1
Irregular past tense	19/12	95/99	2/0	3/1	5/2	0/1
Regular third person *–s*	20/15	83/96	16/4	1/0	1/0	5/3
Irregular third person	29/18	99/96	1/1	0/2	1/3	1/0
Articles	34/20	93/95	6/3	11	7/7	6/4
Contractible copula BE	32/20	94/96	6/3	0/1	2/2	8/4
Uncontractible copula BE	33/20	89/94	9/4	1/2	6/5	2/1
Contractible auxiliary BE	21/8	92/97	8/3	0/0	0/0	5/1
Modal verbs	29/19	96/99	4/1	0/0	0/0	0/0
Auxiliary DO	22/13	91/88	9/12	0/0	0/0	0/0
Negation *–n't*	27/14	99/98	1/2	0/0	0/0	0/0
Verbal composite[c]	34/20	89/95	11/4	1/1	9/7	

[a]Percentage suppliance, omission, and substitution do not always sum to 100% due to rounding. [b]The values for "sum substitutions" and "sum oversuppliance" represent total occurrences per group. [c]The verbal composite represents a sum of regular third person, regular past tense, BE copula and auxiliary, and DO auxiliary morphemes divided by sum of their obligatory contexts.

(*–n't*, *–not*, as in *can't*, *shouldn't*, *don't*), with 99% and 98% accuracy, respectively.

A few analyzed morphemes had not yet been mastered by both groups of children. Most important, the TD group had attained mastery of the regular third person *–s* (96%), whereas the LT group had not (83%), a significant difference at $p < .05$. Nonsignificant differences straddled the 90% threshold for the uncontractible copula (89% in the LT group and 94% in the TD group) and for the auxiliary DO (91% in the LT groups and 88% in the TD group).

Some of Brown's (1973) 14 morphemes were not analyzed in our study because fewer than eight children in each group had greater than or equal to four obligatory contexts. These morphemes included possessive *–'s*, regular past tense *–ed*, the uncontractible auxiliary BE, and the preposition *on*. The number of obligatory contexts for these morphemes was similarly low across both groups; that is, not only the LTs but also the TD children failed to provide them in enough obligatory contexts for these morphemes to be analyzed.

A correlation was calculated between the mean correct suppliance percentages (arcsine values) for the 14 analyzed morphemes for the LT versus TD groups to determine the consistency in acquisition order between the groups. A significant and large correlation ($r = .60$, $p = .02$) was found, indicating that the order of morpheme acquisition between the two groups was somewhat, though not entirely, consistent. This correlation was lower than the r of .82 at age 4 reported by Rescorla and Roberts (2002), which is probably due to the restricted range of correct morpheme suppliance at age 5 (83%–100%, with the majority of percentages falling between 94% and 100%).

MLU and IPSyn Findings

As can be seen in Table 3, LTs had lower MLUs at age 5 than comparison children did (4.04 vs. 4.41), $t(51) = -2.23$, $p = .03$ (significant at $p < .05$ but not with the Bonferroni correction of .003; MLU was missing for one LT and one TD child). There was a significant group difference for total IPSyn score at age 5 (41.00 vs. 48.25), $t(51) = -3.08$, $p = .003$, $d = -0.87$, a large effect size based on Cohen's (1988) benchmarks (IPSyn score was missing for one child in the TD group). There were no significant differences in the Noun Phrase or Verb Phrase scales, which is where most morphemes are found. Instead, the group differences were found in the Question/Negation and Sentence Structure scales. As presented in Table 3, LTs employed advanced question and negation structures less frequently than TD children did, $t(49) = -2.36$, $p = .023$, $d = -0.66$. LTs also used significantly simpler sentence structures, as measured by the IPSyn, than comparison children did, $t(49) = -2.48$, $p = .017$, $d = -.71$ (significant at $p < .05$ but not with the Bonferroni correction of .003).

Three-Group Comparisons

To conduct three-group comparisons, we compared the LTs with continuing delay (continuing LT, $n = 10$) and the LTs who were LBs at age 5 ($n = 24$) with the 20 children in the TD group on morpheme use. A one-way ANOVA yielded a group difference in total obligatory contexts, a variable derived by summing each child's obligatory contexts across all 23 morphemes, $F(2, 53) = 5.29$, $p = .008$. An SNK post hoc test indicated that the continuing LT group had significantly fewer total obligatory contexts for morphemes (136.60) than the LB group (173.79) or the TD group (176.15), which did not differ significantly from each other. In addition, MLU was correlated at .79 with total obligatory contexts. These findings, which are not surprising, demonstrate that very short utterances typically offer few opportunities for provision of morphemes.

Table 3. Means and standard deviations for age 5 MLU and IPSyn scores by group.

Two-group analysis	TD (*n* = 20)	LT (*n* = 34)	
MLU	4.41 (0.62)	4.04 (0.56)	
IPSyn total score**	48.25 (8.49)	41.00 (8.21)	
IPSyn noun phrase	7.72 (1.53)	6.97 (1.38)	
IPSyn verb phrase	17.61 (2.95)	16.42 (3.79)	
IPSyn question/negation*	7.94 (3.37)	6.00 (2.48)	
IPSyn sentence structure*	14.83 (4.82)	11.64 (4.17)	
Three-group analysis	**TD (*n* = 20)**	**LB (*n* = 24)**	**CLT (*n* = 10)**
MLU***	4.41 (0.62)	4.32 (0.36)	3.37 (0.37)
IPSyn total score***	48.25 (8.49)	43.61 (7.36)	35.00 (7.04)
IPSyn noun phrase	7.72 (1.53)	7.13 (1.52)	6.60 (.97)
IPSyn verb phrase*	17.61 (2.95)	17.13 (3.22)	14.80 (4.54)
IPSyn question/negation	7.94 (3.37)	6.26 (2.38)	5.40 (2.71)
IPSyn sentence structure***	14.83 (4.82)	13.13 (3.44)	8.20 (3.77)

Note. MLU = mean length of utterance (Brown, 1973); IPSyn = Index of Productive Syntax (Scarborough, 1990); TD = typically developing; LT = late talker; LB = late bloomer; CLT = continuous late talker. Late bloomers were defined by an MLU score within 1 *SD* of the TD group mean, using the TD group *SD*.

*$p < .05$. **$p < .01$. ***$p < .001$.

When ANOVAs were conducted to compare the LTs with continuing delay, the LBs, and the TD children on suppliance, omission, and substiution of the 14 analyzed morphemes, there were no significant group differences on 13 of the 14 morphemes. As in the LT versus TD two-group comparison, there was a significant group difference in the three-group comparison on the arcsine percentage for suppliance of third person regular *–s*, $F(2, 34) = 7.21$, $p = .003$, which had sufficient obligatory contexts to be scored for 15 children in the TD group and 20 children in the LT group (15 in the LB subgroup and five in the continuing LT subgroup). The SNK post hocs using both the arcsine and regular percentages indicated that the continuing LT percentage (63%) was significantly lower than the LB (90%) and TD (96%) percentages, which did not differ from each other. There was also a group effect for omission of the third-person regular *–s* inflection (38% for the continuing LTs vs. 9% for the LBs and 4% for the TD), $F(2, 34) = 6.74$, $p = .004$, for the arcsine values, which was significant at $p < .05$ but missed the Bonferroni level of .003.

The three-group comparison for suppliance of the verbal composite (composed of third person *–s*, past tense *–ed*, plus BE and DO forms) was not significant for the arcsine value, $F(2, 53) = 2.50$, $p = .09$, but was significant at $p < .05$ for the regular percentages, $F(2, 53) = 4.23$, $p = .021$. The SNK post hoc test indicated that the continuing LT group had significantly lower suppliance than the LB and TD groups, which did not differ from each other: continuing LT = 82% (*SD* = .24, range = .30–1.00) versus LB = 91% (*SD* = .09, range = .60–1.00) and TD = 95% (*SD* = .04, range = .87–1.00). There was also a group difference in omission of the morphemes in the verbal composite, $F(2, 53) = 4.85$, $p = .012$ (arcsine), significant at $p < .05$ but above the Bonferroni level of .003. The SNK post hoc test indicated that the continuing LT group had significantly more omissions (18% of obligatory contexts) than the LB and TD groups (8% and 4%), which did not differ from each other.

All three groups showed mastery (correct suppliance >90%) of the morphemes progressive *–ing*, pronouns, plural *–s*, prepositional *in*, irregular past tense, irregular third person, articles, modal verbs, and negation *–n't*. The continuing LT group had suppliance percentages below the 90% mastery level for four of the 14 morphemes analyzed: 63% for third person regular *–s*, as reported above, as well as 89% for the contractible copula BE, 87% for the uncontractible copula BE, and 81% for the contractible auxiliary BE. The LB and TD groups exceeded 90% suppliance for all 14 morphemes, except for 89% for auxiliary DO for the LB group and 88% for auxiliary DO for the TD group.

The one-way ANOVA yielded a significant group effect for total IPSyn score, $F(2, 52) = 9.73$, $p = .001$. Based on the SNK post hoc test, the continuing LT group had a significantly lower mean IPSyn total score (35.00) than the LB group (43.61) and the TD group (48.25). There was also a significant group effect for the Sentence Structure subscale, $F(2, 50) = 8.85$, $p = .001$, with the continuing LT group having the lowest mean (8.20) and the other two groups not being significantly different from each other (13.13 and 14.83).

Discussion

Methodological Limitations

The findings of our study must be interpreted in light of the limitations of the methodology we used. Consistent with our age 3 and 4 studies of these cohorts (Rescorla et al., 2000; Rescorla & Roberts, 2002), we used a naturalistic pretend play context to obtain a 30-min speech sample at age 5. These age 3, 4, and 5 speech samples were collected to serve a variety of uses, such as scoring MLU and IPSyn

(Rescorla et al., 2000), scoring psychological state words (E. Lee & Rescorla, 2008), scoring morpheme use in naturalistic speech (Rescorla & Roberts, 2002), and scoring conversational skills (Rescorla, Bascome, Lampard, & Feeny, 2001). The naturalistic speech sample collected during toy play was thus not obtained with the express purpose of extensively sampling morphemes, and the play session did not involve any elicitation probes for testing specific morphemes.

After coding of the 23 morphemes had been completed, it emerged that we were able to analyze only 14 of the morphemes, namely, those for which at least eight children in both groups had at least four obligatory contexts, which we set as the minimal criterion for reliable analysis. Given that verbal morphology has been identified as an important deficit for children with SLI (Leonard et al., 2007), it is unfortunate that regular past tense *–ed* and the uncontractible auxiliary BE were among the nine morphemes we could not analyze. Had we used elicitation probes or a narrative/story-telling task, we would most likely have been able to analyze all 23 morphemes, including these important verbal forms as well as derivational morphemes, which we coded but were too infrequent to analyze.

Additional limitations of our study are that all of the LTs had normal receptive language and were from Caucasian and middle- to upper-middle-class SES backgrounds. Thus, our results have only limited generalizability to more diverse samples of late-talking children from different racial and socioeconomic backgrounds. In addition, our sample size, although reasonably large by the standards of many LT studies, may have afforded insufficient power for some differences to be significant.

Morphology Findings

Our results indicated no significant differences between LTs and their SES-matched TD peers for 13 of the 14 morphemes we analyzed, in contrast to the significant differences in several morphemes at ages 3 and 4 found in these same cohorts. Although LTs generally had slightly fewer obligatory contexts for some morphemes (see Table 1), none of these differences were significant. As shown in Table 2, both groups had greater than 90% suppliance (mastery level) for 12 of the 14 morphemes studied. The only morpheme with a significant difference was third person *–s*, with 83% suppliance in the LT group and 96% suppliance in the TD group. Regular third person *–s* was also the only significant morpheme in the three-group analysis, with the continuing LT group different from the other two groups (which did not differ from each other) in both suppliance and omission percentages.

Our verbal composite variable, which was composed of third person *–s*, past tense *–ed*, plus BE and DO forms, was scored for all children in both groups. Group differences were not significant for suppliance (89% vs. 95%) or omission (11% vs. 4%), although the LT group had lower suppliance and higher omission percentages than the TD group did. In the three-group analysis, we separated out the 10 LTs who still scored >1 *SD* below the TD group in MLU (continuing LT group) from the 24 LTs who scored within 1 *SD* of the TD mean (LB group). In this three-group analysis, the verbal composite showed marginally significant differences for suppliance (regular percentages only, not arcsine) and omission, with the continuing LT group different from the other two groups on both percentages.

Our findings of a significant lag in verbal morphemes for the continuing LT group and nonsignificant differences between the LB and TD groups are similar to findings Rice et al. (2008) reported for age 7 outcomes of 128 Australian children who were LTs at age 2. Specifically, some but not most of their LTs manifested delays at age 7 relative to comparison peers on probes for third person singular *–s*, past tense *–ed*, use of BE copula and auxiliary, and DO auxiliary, as well as on the composite of these four forms (Taylor et al., 2013), the same verbal composite we used in the current study. Our findings are also consistent with the work of Rice and Wexler (1996) and Rice et al. (1998), who argued that tense-marking deficits can serve as a clinical marker for SLI because these deficits are so persistent. Taken together, results from the current study and the Australian study, along with those from Rescorla and Roberts (2002), suggest that verbal tense markings are among the most challenging morphemes to master for children acquiring English. They are among the last morphemes that TD children master, and LTs take even longer to master them. By age 5, most LTs (i.e., the 24 LBs) had mastered the verbal morphemes that we were able to analyze in this study (which did not include regular past tense *–ed* or uncontractible auxiliary BE), but some LTs (i.e., the 10 continuing LT children) were still below the 90% mastery level on both third person regular *–s* and the verbal composite.

There were no group differences in substitutions, which were quite rare. Substitutions occurred with a variety of morphemes, including pronouns (*her/she, him/her*), articles (*a/an*), and verbs (*is/are*). In addition, the LT and TD groups did not differ in oversuppliance, which was also rare. These findings are consistent with many other studies of LTs as well as children with SLI in showing that omissions are the primary kind of morphological error made by English-speaking children with language delays.

Although our correlation of .60 indicated that rank orderings of morpheme suppliance percentages were not identical in the two groups, this correlation was still quite large, in particular when one considers that the restricted range of suppliance certainly attenuated the correlation. It should be noted that the ordering produced by the rank ordering of suppliance cannot be taken as a direct indication of the order of acquisition in either group. However, insofar as our data for age 5 and our previous data for ages 3 and 4 do suggest an acquisition order, they do not indicate that this order differs markedly between our LT and comparison groups.

The correlation of .79 between MLU and total obligatory contexts, and the fact that the continuing LT group had significantly fewer obligatory contexts for morphemes than the other two groups, suggests that the children who could be analyzed for a given morpheme may have been more advanced in their language skills than those not

analyzed. This certainly appears to be true for third person regular *–s*, for which only 20 of the 34 LTs had sufficient obligatory contexts to be included in the analysis and which showed a significant group difference in both the two-group and three-group analysis (in the latter of which only five continuing LT children could be included). However, it does not appear to be the case for regular past tense *–ed*, for which the few children with at least four obligatory contexts (12% of LTs and 10% of TDs) were not those with the highest MLUs. For past tense *–ed*, it seems more likely that the toy play context did not elicit much use of past tense forms, and when they were used, they tended to be past copula forms such as "was" or past auxiliaries such as "were" or "did."

In summary, children in both groups showed age-appropriate mastery of most of the morphemes that we were able to analyze in this study, unlike what we found at age 4. The only significant morpheme difference found, whether in the two-group or the three-group analysis, was for third person regular *–s.* In addition, when we analyzed the verbal composite used by Rice et al. (2008), we found that the most delayed children in the LT group (i.e., the 10 continuing LT children) were significantly different from the LB and TD groups in both suppliance and omission percentages. Given these findings, it is unfortunate that lack of sufficient obligatory contexts precluded analysis of regular past tense *–ed* and the uncontractible auxiliary BE separately. Furthermore, we assessed morpheme mastery only via naturalistic speech samples. Had our age 5 methodology included production probes, a narrative task, or grammaticality judgments, additional weaknesses in morpheme mastery might have been observed.

Syntax Findings

More dramatic than the morphological differences between our LT and TD groups were the syntactic differences found. In our two-group analysis, group differences in MLU were significant at $p < .05$, and there was a significant group difference for total IPSyn score, with a Cohen's d of −0.87, a large effect. When the four IPSyn subscales were analyzed, it emerged that the LT and TD groups did not differ significantly on the Noun Phrase and Verb Phrase subscales, but they differed greatly on the Question/Negation and Sentence Structure subscales, with ds of −0.66 and −0.71, respectively.

When we used MLU to subdivide the LT group into continuing LTs and LBs, we not surprisingly found stark differentiation between the continuing LT group and the LB and TD groups in MLU (3.37 vs. 4.32 and 4.41, respectively). Furthermore, the continuing LT group had much lower total IPSyn scores as well as lower scores on the IPSyn Sentence Structure subscale.

The significant differences in the Question/Negation and Sentence Structure subscales in the two-group analysis and in the Sentence Structure subscale in the three-group analysis indicate ongoing syntactic weaknesses in the LT group, particularly when those with the lowest MLUs are considered. These IPSyn subscales measure complex features of language such as yes/no questions with inverted copula, tag questions, propositional complements, relative clauses, bitransitive predicates, and passive constructions, features that allow children to convey complex thoughts and propositions. It is in these areas that the age 5 LTs appeared to still lag behind their comparison peers.

Conclusions and Implications

An important finding from the three-group morpheme analyses yielding significant findings (i.e., third person regular *–s* and verbal composite) was what might be termed a group *decalage*, whereby the continuing LT group had the lowest suppliance and highest omission scores, the LB group had intermediate scores, and the TD group had the highest suppliance and lowest omission scores. This decalage is clearly seen in the third person regular *–s* inflection, with the lowest level of mastery (63%) evident in the continuing LTs (with only five of the 10 having enough obligatory contexts to be scored on this morpheme), an intermediate level of mastery in the LBs (90% level), and solid mastery in the TD group (96%). A similar decalage was seen in the omission of the third person regular *–s* inflection (38%, 9%, and 4%) and in the verbal composite (suppliance: 82%, 91%, and 95%; omission: 18%, 8%, and 4%). In all four of these analyses the LB group was not significantly different from the TD group, but their intermediate scores suggest that the LTs who had closed the gap in MLU with the TD children had also almost closed the gap in morpheme usage but were still slightly less proficient (e.g., twice as many omissions of the verbal composite morpheme, 2.5 times more omissions of third person *–s*). A similar decalage was seen in the IPSyn total score, whereby the continuing LT group had a very low score (35.00) and the LB group scored close to the TD group, but the LB group still had a lower score (43.61) than the TD group (48.25) by about 0.5 of their averaged *SD*.

This group decalage pattern of LBs performing at an intermediate level between continuing LTs and TD children was also reported by Paul, Murray, Clancy, and Andrews (1997). In that study, the LTs classified as "recovered" based on a Developmental Sentence Score (L. Lee, 1974) >10th percentile did more poorly than the TD comparison children at age 7 on the Test of Language Development Primary–Second Edition (Newcomer & Hammill, 1988) but not on receptive language, reading, spelling, IQ, or phonological skills. In contrast, children who were still delayed (Developmental Sentence Score ≤10th percentile) were worse than comparison children on everything except receptive language and reading/spelling. Similarly, Armstrong, Marchman, and Owen (2007) reported findings through fifth grade for 131 LTs identified from the National Institute of Child Health and Human Development Early Child Care Research Network who were classified as continuing LTs versus LBs at 54 months. Significant differences among the continuing LTs, the LBs, and the TD children persisted through fifth grade on the Woodcock–Johnson–Revised (Woodcock & Johnson, 1989) Picture Vocabulary, Letter Word Identification, and Memory for Sentences subtests, with little change in the pairwise group differences over time.

This pattern of group decalage was also reported by Stothard, Snowling, Bishop, Chipchase, and Kaplan (1998), who reported age 15 outcomes for children identified with SLI at age 4. The subgroup with continuing SLI at age 5 performed worse than controls on virtually all language and academic measures at age 15. However, the LB subgroup, who had good outcomes at age 5, were still significantly different from controls at age 15 on sentence and nonword repetition, spoonerisms, and reading/spelling, despite their average scores in these areas.

The pattern of group decalage found in the current study as well is in other studies of LTs and SLI is consistent with the dimensional view of language endowment, whereby children are presumed to vary in the skills that support language development. By this account, LTs identified at age 2 have sufficient weakness in language endowment to be very delayed in expressive vocabulary acquisition, despite having normal nonverbal abilities. In our sample, the LTs also were significantly weaker in receptive language skills at age 2 relative to TD peers with the same SES level and comparable nonverbal abilities. The dimensional account is also consistent with the individual differences in outcome found within our LT group, with some LTs performing close to TD children by age 5 and others continuing to manifest significant delays.

The results of this study should be considered in light of other findings at age 5 for this LT cohort. As summarized by Rescorla (2013), the age 5 LTs as a group were delayed relative to their comparison peers in several aspects of complex language, notably use of cognitive state terms, propositional complement syntax, defining words, and describing concepts. Furthermore, although the LTs at age 5 scored in the average range relative to age-based norms on the Patterned Elicitation Syntax Test, a sentence imitation task tapping various grammatical structures, they scored about 1 *SD* lower than the comparison group. However, there was also considerable variation within the LT group, with many scoring close to the level of comparison children but some still showing substantial delays.

All children experience periods when their morphology is immature, but this immature period extends longer in LTs, as shown by their delays at ages 3 and 4. However, our age 5 LTs performed comparably to their TD peers on 13 of the 14 morphemes we analyzed. This represents a significant closing of the gap relative to their performance at age 4, indicating that their delay was temporary and suggesting that their pattern of acquisition was similar to that of TD peers but more protracted. To the extent that the LTs had recovered in morphology, this may represent the pattern of illusory recovery noted by Scarborough and Dobrich (1990), whereby one skill appears to have normalized but an underlying weakness is still present and may manifest in other areas. That the LTs still showed a residual delay in third person regular *–s* and verb morphology more generally (as seen in the verbal composite) and that they had lower IPSyn scores indicated their ongoing weaknesses in complex syntax.

Our age 5 findings should also be considered in light of follow-up findings from our LTs and comparison peers though age 17. As summarized by Rescorla (2013), LTs as a group manifested weaker higher order skills than their peers in follow-ups at ages 9, 13, and 17. Specifically, differences between the LT and TD groups were in the range of .50 to 1.0 *SD* on tasks assessing verbal memory, reading comprehension, listening comprehension, narrative skills, complex syntax, and grammatical judgment. Thus, early morphological weakness, which had largely resolved by age 5 in even the most delayed LTs, as well as weaker syntactic skills, which persisted in the continuing LTs at age 5, suggests an underlying language endowment that is weak relative to TD peers and that is manifested differently across development but nonetheless persists well into adolescence. This weaker endowment is first manifest in delayed phonology and vocabulary, then in delayed morphology, and later in higher order language skills such as understanding complex syntax and relating narratives.

Clinical Implications

Because most children who were LTs at age 2 have language skills in the normal range based on nationally standardized tests by age 5, they are unlikely to qualify for school-based services by speech-language pathologists and other clinical professionals. However, our findings indicate that some of these LTs still have weaker language skills than peers of the same SES background with comparable nonverbal skills, even though they are performing in the normal range on standardized tests. These weaker language skills may be of concern to their parents, who may therefore seek independent speech-language consultation or intervention. On the basis of our results, it seems that these possible language issues are unlikely to be morphological difficulties, although some residual weakness in verb morphology may be present. Instead, these language issues may be weaknesses in sentence structure complexity. Mastery of complex syntax is required for narrative and expository discourse and for reading comprehension, so being alert to possible deficits in these areas as LTs reach school age is good proactive practice.

The variability within our LT cohort and the consequent group decalage observable in outcomes between ages 3 and 5 (Rescorla & Roberts, 2002) is an aspect of the natural history of LTs about which it is important for speech-language pathologists to be knowledgeable. Furthermore, our findings have implications for assessment practices. Specifically, the findings suggest the importance of including an assessment of complex syntax in the evaluation of 5-year-olds with a history of late talking, as this is the area in which the most important residual deficits may be present. Being able to understand and produce propositional complements, relative clauses, bitransitive predicates, passive constructions, and other features of complex syntax is central to reading comprehension and sophisticated written language. These skills develop over time in TD children and appear to develop even more slowly in LTs. Although deficits in these areas would not typically be noticeable in everyday conversational speech and hence are easy to overlook, such deficits have a negative impact on reading and writing skills and hence could be important targets of intervention.

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