Pulling it all Together: Examples from our Case Study Files

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Incorporating language sample analysis into your practice can best be illustrated by working through a series of case studies. These cases are from our clinical collaborations with SLPs who have graciously granted permission to present their work. We have taken some liberty with commentary to explain why certain measures contribute to the overall picture of the oral language skills presented by each case. The focus is on the description and diagnostic value of the measures with only general consideration of intervention plans.

A main theme of this book is that language disorders take a variety of forms. In each case, LSA provides insight into the overall picture of oral language skill in naturalistic, everyday communication demands. As you read through these cases, focus on the story that the test scores and language sample measures tell us about overall communication effectiveness. The challenging part of our work as SLPs is figuring out what it means once diagnostic information is collected. Enjoy the cases as they capture a range of oral language problems. For additional case studies, please visit the SALT website or go to www.marleenwesterveld.com.

Case Study 1: DANIEL

SALT Transcripts: Daniel Nar AGL.slt and Daniel Nar NZPN.slt[7]

Daniel is 5 years, 10 months old and attends Year 1 of his local primary school (in New Zealand). Daniel has a history of speech/language difficulties and has received speech-language intervention for articulation, language comprehension, vocabulary, expressive syntax and morphology, and phonological awareness. The current language samples were elicited as part of a six-monthly intervention review process.

Clinical Evaluation of Language Fundamentals-Preschool (CELF-P2) (Wiig, Secord, & Semel, 2004)

Word Structure:	SS 6
Expressive Vocabulary:	SS 9
Recalling Sentences:	SS 6
Sum of Expressive language scores:	SS 83
Basic Concepts:	SS 11
Concepts and Following Directions:	SS 5
Sentence Structure:	SS 8
Sum of Receptive language scores:	SS 89

The language sample was elicited to review Daniel's language skills in two language contexts relevant to the school curriculum, i.e., story retelling and personal narratives. It was decided to start with a warm-up activity as Daniel was unfamiliar with the examiner. This was followed by the story retelling task *Ana Gets Lost* (Swan, 1992), in which Daniel listened to the story once, answered the comprehension questions, then listened to the story again, before retelling the story without referring to the pictures. Refer to Appendix B for the story retelling protocol. Daniel only answered one question correctly (Question: "who found Ana?" Answer: "the policeman"). This puts him well below expectations for his age (Fig 9-1).

In between the two exposures to the *Ana Gets Lost* story, the Personal Narrative section of the Language Sampling Protocol was administered (see Appendix C for the prompts and elicitation procedures). The examiner adhered closely to the language sampling protocols and Daniel was attentive throughout the session and happy to participate. The results are therefore considered to be representative of Daniel's spoken language skills. The samples were recorded using a digital voice recorder and transcribed using SALT.

Daniel's story retelling sample contained 7 C&I utterances and 45 words. His personal narrative language sample contained 42 C&I utterances (215 words). Both samples were compared to a database of age-matched peers to assign age-specific performance levels. They will be discussed, in turn, below.

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[7] *Daniel's* sample transcripts are included with the software.

STORY RETELLING (AGL)

Daniel's sample was compared to the NZ-AU Story Retell database using the following settings:

Subgroup: AGL
Ethnicity: all - Location: all
Age match plus or minus 6 months
110 samples matched by age: 5;4 – 6;4
110 samples based on entire transcript, regardless of length

Database Menu: Standard Measures Report (Figure 9-1 – next page)
Daniel produced fewer utterances than his peers to retell the story and the sample contained fewer total words compared to the database. In contrast, mean length of utterance in words, number of different words, and intelligibility were appropriate. While Daniel produced very few maze words (only 2.2%) compared to his peers, his % utterances with errors was significantly higher than his peers. He produced significantly more errors at word level than expected for his age – this warrants further investigation.

Analyze Menu: Word Code Tables (Figure 9-2)
To investigate the type of errors Daniel made when retelling the story (he made 6 word errors and 1 utterance error), the Word Code Tables (Table Expanded by Words & Codes) was selected from the Analyze menu. It was noted that most of his errors were pronoun errors. There was also one

Daniel Nar AGL
Analysis Set: C&I Verbal Utts

	Child			Examiner
WORD CODE TABLE **Table Expanded By Words And Codes** **C&I Verbal Utts - Main Body** **1st Speaker**				
	Total	**Expanded**		**Total**
[EP:HER]	1			0
HIS[EP:HER]		1		
[EP:SHE]	3			0
HE[EP:SHE]		1		
HIM[EP:SHE]		2		
[EW:TOOK]	1			0
TAKE[EW:TOOK]		1		
[EW]	1			0
OF[EW]		1		

instance of a verb tense error.
Figure 9-2

Daniel Nar AGL

TRANSCRIPT INFORMATION	DATABASE INFORMATION
Speaker: Daniel (Child) Sample Date: Current Age: 5;10 Context: Narration (AGL)	Database: NZ-AU Story Retell 110 Samples Matched By Age 97 Samples Cut at 45 Number Total Words Context: Narration (AGL)

STANDARD MEASURES REPORT
Compared to 110 Samples Matched by Age

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
Current Age (5;10)	5.83	-0.34	5.95	5.33	6.33	0.34
TRANSCRIPT LENGTH						
Total Utterances	7 *	-1.21	12.61	4	25	4.63
C&I Verbal Utts	7 *	-1.12	12.08	4	23	4.54
All Words Including Mazes	45 *	-1.24	96.83	19	226	41.87
Elapsed Time (0:59)	0.98	-0.72	1.56	0.43	6.50	0.80
INTELLIGIBILITY						
% Intelligible Utterances	100%	0.31	98.87	75.00	100.00	3.72
% Intelligible Words	100%	0.32	99.82	97.06	100.00	0.56
MACRO ANALYSIS						
Oral Narrative Quality	16 *	-1.22	24.16	12	40	6.68
Oral Narrative Comprehension	1 **	-3.76	6.26	2	8	1.40
SYNTAX/MORPHOLOGY						
MLU in Words	6.43	-0.37	6.87	3.85	10.38	1.18
MLU in Morphemes	6.86	-0.34	7.29	4.23	11.13	1.26
% Utterances With Verbs	85.7% *	-1.18	94.49	72.73	100.00	7.46
Mean Verbs per Utterance	1.29	-0.59	1.45	0.91	2.78	0.29
SEMANTICS						
Number Total Words (NTW)	45 *	-1.12	83.25	18	183	34.16
Number Different Words (NDW)	32	-0.88	46.20	13	94	16.19
Moving-Average NTW	45	0.29	43.67	18	45	4.61
Moving-Average NDW	32	0.89	28.71	13	36	3.68
Moving-Average Type-Token Ratio (TTR)	0.71	0.94	0.66	0.51	0.80	0.06
VERBAL FACILITY						
Words per Minute	45.76	-0.89	67.45	14.15	133.33	24.38
Pause Time As % of Total Time	0.0%	-0.65	6.42	0.00	52.22	9.81
Maze Words As % of Total Words	0.0% *	-1.40	12.04	0.00	42.42	8.57
% Abandoned Utterances	0.0%	-0.51	2.73	0.00	20.00	5.35
ERRORS						
% Utterances With Errors	100% **	5.04	18.03	0.00	77.78	16.27
Number of Omissions	1	0.99	0.34	0	3	0.67
Number of Error Codes	7 **	2.54	2.05	0	10	1.95

* At least 1 SD (** 2 SD) from the database mean
Italicized measures count occurrences and can be significantly affected by the different sample lengths.
Calculations based on C&I Verbal Utts: Syntax/Morphology and Semantics sections, Maze Words As % of Total Words
Database selection criteria: Age +/- 6 months (5;4 - 6;4)

Figure 9-1

Analyze Menu: Bound Morpheme Tables (Figure 9-3)

Daniel omitted one bound morpheme (/ed). He used two types of bound morpheme when retelling the story, present progressive /ing, and past tense /ed. Past tense /ed was used correctly on one occasion and omitted on one occasion, resulting in %Obligatory context of 50%.

	BOUND MORPHEME TABLE **C&I Verbal Utts - Main body** **1st Speaker**			
	Child			
	Number Occurred	**Number Omitted**	**% Obligatory Context**	
/ED	1	1	50.00	
/ING	2	0	100.00	

Figure 9-4

Database Menu: Explore Plus Line Values - ONQ

The quality of Daniel's story retelling was analyzed using the Oral Narrative Quality Rubric (see Appendix B). Daniel obtained a total score of 16, which was hand coded and the template was inserted at the end of the transcript (Edit > Insert Template > Oral Narrative Quality (AGL)). Scores for individual characteristics were: intro: 1; theme: 3; main: 3; supporting: 1; conflict: 1; coherence: 1; resolution: 3; conclusion: 3.

Comparing Daniel's performance to that of his peers reveals (see Standard Measures Report – Figure 9-1) below average performance.

Database Menu: Explore Plus Line Values - ONC

Daniel's story comprehension was evaluated using the ONC (see Appendix B). Daniel obtained a total score of 1, which was entered and the template was inserted at the end of the transcript (Edit > Insert Template > Oral Narrative Comprehension (AGL)).

Comparing Daniel's performance to that of his peers reveals (see Standard Measures Report – Figure 9-1) severely below average performance (i.e. more than 3SD below the mean).

INTERPRETATION OF DANIEL'S STORY RETELLING PERFORMANCE

The results from the SALT analysis indicates poor performance in story retelling in areas of verbal productivity (number of utterances), grammar (pronouns and verb tense), story quality, and story comprehension. Because the story retelling sample only contained 7 utterances, it is important to analyze a longer language sample (e.g., the personal narratives), so that a more complete analysis of Daniel's strength and weaknesses across the domains of semantics, syntax, and morphology can be conducted.

You may choose to run a Database: Quick Look report.

Alternatively you can create a Performance Report (Database: Performance Report):

Performance Report
Daniel Nar AGL
Age: 5;10
Language Sample Analysis with SALT Software
Elicitation Task and Database Overview

Daniel completed a narrative story retell of 'Ana gets lost' (Swan, 1992). He listened to the story once and was then asked 8 comprehension questions. He listened to the story a second time and then retold the story using his own words, without the use of the pictures. Measures of sample length, intelligibility, narrative quality, comprehension, syntax/morphology, semantics, verbal facility, and errors were calculated from his language sample and compared with samples from 110 speakers completing the same task. These speakers were within 6 months of Daniel's age. Although most measures were calculated from the entire sample, a few measures, such as total pause time and number of errors, can be affected by different sample lengths, i.e., the longer the sample, the more opportunity to produce them. For these measures, Daniel's sample was compared with a subset of 97 samples matched in length by the same number of words. All measures were interpreted using a standard deviation interval of 1.00 SD.

Transcript Length
Daniel produced 7 utterances using a total of 45 words, which were both less than his database peers completing the same task. His number of utterances and words were 1.21 SD lower and 1.24 SD lower, respectively, than the database mean. He took 59 seconds to complete this task, which was within normal limits.

Intelligibility
Daniel's sample was 100% intelligible.

Macro Analysis
The Oral Narrative Quality rubric was used to assess the structure and content of Daniel's narrative. The following categories were included: introduction, theme, main character, supporting characters, conflict, coherence, resolution, and conclusion. Daniel's composite score of 16 out of a possible 40 points was 1.22 SD below the database mean of 24.16. He demonstrated particular difficulty with the category of supporting characters.

Comprehension
After listening to the story for the first time, Daniel was asked 8 comprehension questions. He answered 1 of them correctly, which was more than 3 SD below the database mean of 7.39.

Syntax/Morphology
Daniel's mean length of utterance (MLU) in words was 6.43, which was within the normal range compared to his database peers. His MLU in morphemes was 6.86, which was also within the normal range. 85.7% of Daniel's utterances contained verbs with an average of 1.29 verbs per utterance. The percent of utterances with verbs was lower than the database mean by 1.18 SD, while the average number of verbs per utterance was within normal limits.

Semantics
Daniel used 32 different words (NDW) within an analysis set of 45 total words (NTW). This compares with database means of 46 different words within 83 total words to complete the same task. NDW can be affected by the length of the sample, so the moving-average NDW was calculated for the database samples by averaging NDW across the sample, looking at each set of 44 NTW. This showed that Daniel's NDW was within the normal limits, indicating typical vocabulary diversity.

Verbal Facility
Daniel's rate of speech, at 46 words per minute, was within the normal range. No pauses were marked in his sample. None of the words in Daniel's sample were filled pauses, false starts, repetitions, or reformulations. This was a strength at 1.40 SD lower than the database mean of 12.0% of the words.

Errors
100.0% of Daniel's utterances contained errors, which was more than 3 SD higher than the database mean. He omitted the past tense bound morpheme once, although he produced it once. He used the present progressive bound morpheme twice. His sample contained the following pronoun errors: HE[EP:SHE] once, HIM[EP:SHE] twice, and HIS[EP:HER] once, the following extraneous word: OF[EW], and the following other word-level error: TAKE[EW:TOOK]. His sample also contained the following utterance-level error:
C Anna was go/ing out of the door [EU].

PERSONAL NARRATIVES (NZPN)

Daniel's personal narrative sample was compared to the NZ-AU Personal Narrative database using the following settings:
   129 samples matched by age: 5;4 - 6;4
   119 samples matched by age and same number of analysis-set utterances (42)

Daniel Nar NZPN						
TRANSCRIPT INFORMATION Speaker: Daniel (Child) Sample Date: Current Age: 5;10 Context: Narration (NZPN)			DATABASE INFORMATION Database: NZ-AU Personal Narrative 129 Samples Matched By Age 119 Samples Cut at 178 Number Total Words Context: Narration			

STANDARD MEASURES REPORT Compared to 129 Samples Matched by Age						
LANGUAGE MEASURE	**Child**		**DATABASE**			
	Score	+/-SD	Mean	Min	Max	SD
Current Age (5;10)	5.83	-0.25	5.92	5.33	6.33	0.35
TRANSCRIPT LENGTH						
Total Utterances	59	-0.80	86.36	5	227	34.08
C&I Verbal Utts	42*	-1.17	80.34	5	219	32.83
All Words Including Mazes	215*	-1.31	512.10	17	1453	227.46
Elapsed Time	---		7.58	0.00	16.60	2.98
INTELLIGIBILITY						
% Intelligible Utterances	89.6%**	-2.96	97.62	85.71	100.00	2.71
% Intelligible Words	97.6%**	-2.90	99.49	95.96	100.00	0.66
SYNTAX/MORPHOLOGY						
MLU in Words	4.24*	-1.20	5.49	3.18	8.07	1.04
MLU in Morphemes	4.57*	-1.26	5.96	3.60	8.41	1.10
% Utterances With Verbs	38.1%**	-3.64	74.73	44.29	94.81	10.06
Mean Verbs per Utterance	0.50**	-2.65	1.01	0.60	1.52	0.19
SEMANTICS						
Number Total Words (NTW)	178*	-1.33	443.45	17	1328	198.99
Number Different Words (NDW)	89*	-1.34	158.15	14	344	51.67
Moving-Average NTW	100	0.10	99.26	17	100	7.34
Moving-Average NDW	53	-0.61	56.61	14	66	5.40
Moving-Average Type-Token Ratio (TTR)	0.53	-0.87	0.57	0.44	0.82	0.04
VERBAL FACILITY						
Words per Minute	---		67.45	15.33	133.35	23.00
Pause Time As % of Total Time	---		2.15	0.00	20.34	3.54
Maze Words As % of Total Words	5.3%	-0.79	9.76	0.00	40.45	5.59
% Abandoned Utterances	1.7%	-0.04	1.77	0.00	9.30	1.99
ERRORS						
% Utterances With Errors	18.6%**	2.17	8.01	0.00	28.75	4.89
Number of Omissions	0	-0.86	1.57	0	12	1.82
Number of Error Codes	12*	1.48	5.72	0	23	4.25

*At least 1 SD (** 2 SD) from the database mean
Italicized measures count occurrences and can be significantly affected by the different sample lengths.
Calculations based on C&I Verbal Utts: Syntax/Morphology and Semantics sections, Maze Words As % of Total Words
Database selection criteria: Age +/- 6 months (5;4 - 6;4)

Figure 9-4

Database Menu: Standard Measures Report (Figure 9-4)

- *Transcript Length*: Daniel produced a total of 57 utterances of which 15 were either incomplete or unintelligible.
- *Intelligibility:* Intelligibility was only 89% (well below expectations).
- *Syntax/Morphology:* Daniel produced significantly shorter utterances than his peers. Closer inspection of his utterance types reveals there were no complex sentences (containing dependent clauses). There was also a higher than expected number of errors. This warrants further investigation.
- *Semantics:* Number of Different Words (NDW) was within normal limits.
- *Verbal facility:* Mazing behavior was within normal limits. However, there was a higher than expected number of within utterance pauses.

Additional information is provided in subsequent reports.

Analyze Menu: Word Code Tables (Figure 9-5)

To investigate the type of errors Daniel made when narrating personal narratives, the Word Code Tables (Table Expanded by Words & Codes) was selected from the Analyze menu. Daniel showed two instances of overgeneralization, pronoun errors, and two prepositional errors.

	Child	
	Total	Expanded
[EO:FELT]	1	
FEEL/ED[EO:FELT]		1
[EO:SEALICE]	1	
SEALICE/S[EO:SEALICE]		1
[EP:HE]	2	
HIM[EP:HE]		2
[EW:IN]	1	
AT[EW:IN]		1
[EW:MANY]	1	
MUCH[EW:MANY]		1
[EW:PERSON]	1	
PEOPLE[EW:PERSON]		1
[EW:TO]	1	
AT[EW:TO]		1
[EW]	1	
CAUSE[EW]		1

Figure 9-5

Analyze menu: Utterance Code Tables (Figure 9-6)

As shown in Figure 9-6, the errors at utterance level consist of word order difficulties and omission of clauses. Further visual inspection of Daniel's language sample shows little syntactic complexity.

UTTERANCE CODE TABLE Table Expanded by Utterances C&I Verbal Utts - Main body 1st Speaker		
	Child	Examiner
[EU]	3	0
c and the ball/s lots [EU].		
c made the earth quake [EU].		
c then him[ep:he] got dirty (because) cause got bomb/s on him [eu].		

Figure 9-6

INTERPRETATION OF PERSONAL NARRATIVES – MACROSTRUCTURE

Inspection of Daniel's personal narratives from a quality point-of-view shows difficulty relating a past event narrative. Using McCabe and Rollins' (1994) narrative structure scoring procedure, the following conclusions can be drawn:
1. Are there two past tense events? – Yes
2. Are there more than two past tense events? – No

Furthermore, his narratives are often difficult to understand and do not take the listener's perspective into consideration (see Figure 9-7 for an example).

```
e so what happened in Fiji?
c made the earth quake [EU].
e did it make the earth quake?
c a little bit.
e ok.
e so what happened?
c it was broken a little bit.
e it was broken a little bit.
e hm ok.
e anything else?
c {shakes no}.
```

Figure 9-7

OVERALL PERFORMANCE

Strengths

Daniel was happy to participate in the tasks and seemed to enjoy the story as well as the photos that were used in the personal narrative task. He showed adequate vocabulary in both narrative conditions (NDW), which is in line with his performance on the Expressive Vocabulary subtest of the CELF-Preschool. Mazing behavior was not an issue. His mean length of utterance in story retelling was within normal limits.

Challenges

Daniel's language sample results reveal difficulties with grammar at word- and utterance-level. This is in line with the results from the CELF-Preschool which showed impaired performance on subtests measuring expressive morphology and syntax (Word Structure and Recalling Sentences). Specific difficulties include overgeneralization errors (e.g., "feeled", "sealices"), pronoun errors, and verb tense errors. At utterance-level, Daniel shows difficulty constructing sentences using correct word order.

Daniel's verbal productivity was low as characterized by a short story retelling sample, and low number of total words in both the retelling and the personal narrative contexts. Daniel only produced 42 utterances in the personal narrative condition (compared to a mean of 85 utterances for children aged 5;4 – 6;4).

At macrostructure level, Daniel's ability to retell a good quality story (ONQ) was below expectations. He also demonstrated difficulty relating a personal narrative containing more than two past events. His ability to answer questions related to a story was also well below expectations (ONC). This finding seems in line with his performance on the Concepts and Directions subtest of the CELF-P.

Finally, intelligibility was low in the personal narrative condition and needs further investigation.

Clinical Impressions

Daniel is a child who has a history of speech and language difficulties. Daniel's performance on the CELF-P, a standardized broad-spectrum language test, indicates low average performance in receptive language and just below average performance on expressive language subtests. Despite reportedly satisfactory performance following speech and language intervention, and standardized test results that indicate a 'mild' language impairment, the language sample analysis results clearly show the significant difficulties Daniel has in two spoken language contexts that are highly relevant to the (New Zealand) education curriculum. The results indicate that during a typical school day Daniel will struggle understanding novel stories, will have difficulty retelling stories, and will be unable to effectively share his personal experiences during show and tell. LSA results also reveal the significant difficulties Daniel has in applying grammatical rules at word- and sentence-level and provide descriptive detail across the domains of syntax and morphology that is needed to set intervention goals.

Ideas for Intervention

Recommendations include:

- Working on story grammar to aid comprehension and retelling of fictional stories (see Westerveld & Gillon, 2008).
- Direct instruction on syntax and morphology within narrative contexts.
- Introducing a personal narrative structure template to aid personal narrative organization (to include orientation, past tense events, evaluation).
- Practising personal event narratives, using the template and scaffolding from the examiner.

Case Study 2: LUCY

SALT Transcript: Lucy NZPN.slt[8]

BACKGROUND

Lucy is a 12;6 year old girl with Down syndrome who attends her local year 1-8 mainstream primary school. Lucy has received speech and language therapy services from infancy. She currently receives services via a consultative service delivery model once per school term. She also receives teacher aide support services in the classroom for five hours per week.

ASSESSMENT MEASURE

Lucy completed a Personal Narrative language sample as part of a wider assessment of her speech, phonological awareness, and literacy skills. The narrative was elicited using the NZ Personal Narrative protocol (see Appendix C). Lucy's personal narrative sample was cut after the presentation of 10 photo prompts, and contained 102 complete and intelligible utterances. There is no age-matched database comparison for Lucy's personal narrative sample, with the NZ-AU Personal Narrative database containing samples from children aged between 4;5 and 7;7. One method for interpreting the language sample measures is to compare the sample to those from younger children, based on cognitive age or language age, with the assumption that they would have comparative language profiles. However, such a comparison does not fully take into account the impact of cognitive delay, years of schooling, or life experiences on the children's language skills, nor the phenotypic language profile associated with Down syndrome. Lucy's transcript differs significantly on all language measures from samples taken from the youngest group of children in the database. Therefore this case study will examine language measures independent of a database using measures taken from the Analyze menu, and analyzing both Lucy and her examiner's performance.

ADDITIONAL ASSESSMENT MEASURES

New Zealand Articulation Test (Moyle, 2004)
This single word articulation test assesses single and multi-syllabic words elicited by naming pictures. The test was normed on New Zealand children, with standard scores available for children aged 5;0 to 7;11. The sample was transcribed via broad transcription and analysed using PROPH (Long, Fey, & Channel, 2008).

Percent Consonants Correct Revised (PCC-R): 88.5
PCC early: 89.7
PCC mid: 89.2
PCC late: 79.5
Percent Vowels Correct (PVC): 94

Clinical Evaluation of Language Fundamentals – Preschool Edition 2 (CELF-P2) (Wiig et al., 2004)
Phonological awareness subtest Raw Score: 24/24

Burt Word Reading Test- New Zealand Revision (Gilmore, Croft, & Reid, 1981)
This single-word decoding test assesses a child's ability to read real words. Words are presented on a sheet in order of increasing difficulty. The test provides age-equivalence bands for children aged over 6.
Raw score: 50
Equivalent Age band: 8;1 - 8;7 (girls' norms)

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[8]*LucyNZPN.slt* is one of the sample transcripts included with the software

Neale Analysis of Reading-Revised (NARA; Neale, 1999).

This reading test consists of a series of passages of increasing difficulty. The child is required to read each passage aloud to achieve a reading accuracy score, with any reading inaccuracies prompted or corrected by the examiner. Subsequently, children are required to answer a number of questions related to the story to achieve a reading comprehension score. The test is standardized on Australian children and provides normative data on reading levels of children in their first seven years of schooling. Reading age-equivalent scores in (years;months):

Accuracy: 8;3

Comprehension: 6;10

Rate: 8;9

SALT ANALYSIS

Analyze Menu: Standard Measures Report (Figure 9-8)

Lucy produced a total of 116 utterances, of which 102 were complete and intelligible (C&I). Lucy's mean length of utterance in morphemes (MLUm) was extremely low at 3.43. Her number of different words used was 148 words and she omitted 9 words. Intelligibility was 85.8%, but was influenced by the fact that Lucy had her fingers in her mouth during one of the narratives. Her maze words as a percentage of total words was low at 6.6%. Finally, she made one word level error and no utterance level errors. We did notice a high number of omissions.

Lucy NZPN

STANDARD MEASURES REPORT		Child	Examiner
TRANSCRIPT LENGTH			
Total Utterances		122	139
Analysis Set (C&I Verbal Utts)		102	138
All Words Including Mazes		436	572
Elapsed Time		(6:34)	6.57
INTELLIGIBILITY			
% Intelligible Utterances		85.8%	100%
% Intelligible Words		94.8%	100%
SYNTAX/MORPHOLOGY			
MLU in Words		3.21	4.12
MLU in Morphemes		3.43	4.32
% Utterances With Verbs		53.9%	60.9%
Mean Verbs per Utterance		0.66	0.85
SEMANTICS			
Number Total Words (NTW)		327	568
Number Different Words (NDW)		148	194
Moving-Average NTW		100	100
Moving-Average NDW		62	61
Moving-Average Type-Token Ratio (TTR)		0.62	0.61
VERBAL FACILITY			
Words/Minute		66.40	87.11
Pause Time As % of Total Time		0.5%	
Maze Words As % of Total Words		6.6%	0.7%
% Abandoned Utterances		0.8%	0.0%
ERRORS			
% Utterances With Errors		6.6%	0.0%
Number of Omissions		9	0
Number of Error Codes		1	0

Calculations based on C&I Verbal Utts: Syntax/Morphology and Semantics sections, Maze Words As % of To

Figure 9-8

Analyze Menu: Syntax/Morphology Summary (Figure 9-9 & 9-10)
Lucy's very low MLU in morphemes (MLUm) warrants further investigation. The Syntax/Morphology Summary reveals her MLUm equates to an expected age range of 28-45 months, which appears low considering her reading ability. As shown in the Utterance Distribution Table (Analyze > Utterance Distribution Table), although Lucy was able to produce some longer sentences, nearly 60% of her utterances had an MLUm of 3 or less.

Lucy NZPN
Analysis Set: C&I Verbal Utts

SYNTAX/MORPHOLOGY SUMMARY	Child		Examiner	
	Analysis Set	Total Utterances	Analysis Set	Total Utterances
MLU in Words	3.21	3.30	4.12	4.09
MLU in Morphemes	3.43	3.53	4.32	4.29
Brown's Stage	Early IV	te IV/Early V	Late V	Late V
Expected Age Range (Months)	28 - 45	31 - 50	37 - 52	37 - 52
% Utterances With Verbs	53.9%	50.0%	60.9%	60.4%
Mean Verbs per Utterance	0.66	0.61	0.85	0.84
Number Total Words	327	402	568	568
Number of Bound Morphemes	23	29	28	28
/'D	0	0	2	2
/'RE	0	0	3	3
/'S	4	4	3	3
/'VE	1	1	0	0
/3S	0	0	2	2
/ED	5	7	3	3
/ING	1	1	3	3
/N'T	6	6	2	2
/S	4	8	9	9
/Z	2	2	1	1
Number of Omitted Words	9	9	0	0
Number of Omitted Bound Morphemes	0	0	0	0

Figure 9-9

Lucy NZPN

UTTERANCE DISTRIBUTION TABLES

NUMBER OF UTTERANCES BY UTTERANCE LENGTH
C&I Verbal Utts

Utterance Length in Words

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	0	27	18	22	12	11	5	2	1	2	1	0	0	0	0	1	102
Examiner	0	30	20	17	20	10	12	9	10	3	3	3	1	0	0	0	138

Utterance Length in Morphemes

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	0	26	17	16	17	9	9	3	0	2	2	0	0	0	0	1	102
Examiner	0	30	18	17	20	10	13	8	5	5	7	1	3	1	0	0	138

NUMBER OF UTTERANCES BY UTTERANCE LENGTH
Total Utterances

Utterance Length in Words

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	2	34	20	22	12	13	6	4	3	4	1	0	0	0	0	1	122
Examiner	1	30	20	17	20	10	12	9	10	3	3	3	1	0	0	0	139

Utterance Length in Morphemes

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	2	33	19	16	17	11	10	5	0	4	3	0	1	0	0	1	122
Examiner	1	30	18	17	20	10	13	8	5	5	7	1	3	1	0	0	139

Figure 9-10

Analyze Menu: Bound Morpheme Tables (Figure 9-11)

Next, Lucy's use of bound morphemes is investigated. Lucy used the bound morphemes *plural s* and *es, possessive s, irregular* and *regular past tense (ed)*, *ing forms*, and *contractions* (copula, negative, and auxiliary). Furthermore, she did not omit any obligatory bound morphemes.

	Child		
	Number Occurred	Number Omitted	% Obligatory Context
/'S	4	0	100.00
/'VE	1	0	100.00
/ED	5	0	100.00
/ING	1	0	100.00
/N'T	6	0	100.00
/S	4	0	100.00
/Z	2	0	100.00

Figure 9-11

Analyze Menu: Standard Word Lists (Figure 9-12)

To further investigate Lucy's low MLUm, her use of conjunctions was examined. The list of conjunctions, selected from the Standard Word List Tables, shows Lucy used predominantly *and*, with limited use of *but, or,* and *so.*

STANDARD WORD LISTS C&I Verbal Utts Main body	
Conjunctions	
	Child
AFTER	0
AND	7
AS	0
BECAUSE	0
BUT	0
IF	0
OR	2
SINCE	0
SO	2
THEN	0
UNTIL	0
WHILE	0
Total Frequency	11

Figure 9-12

Analyze Menu: Omissions and Error Codes (Figure 9-13)

Next, the high incidence of omitted words (9) needs further inspection. The Omissions and Error Codes report reveals that Lucy often omits the subject of the sentence (*omitted words are preceded with an asterisk*). When reading through Lucy's personal narratives transcript, it is noticed that she frequently starts with a single word or abbreviated phrase without the subject and on occasion she also omits the verb.

Lucy NZPN
Analysis Set: C&I Verbal Utts

OMISSIONS AND ERROR CODES Total Utterances 1st Speaker		
	Child	
	Total	**Expanded**
Omitted Words	9	
*HAD		1
*HAVE		1
*I		3
*IT		1
*WE		2
*WENT		1
79 C *we *had something to eat.		
107 C *I hit my head.		
138 C *we *went to the marae.		
223 C I *have been to a dentist before.		
254 C *it did/n't even hurt.		
255 C *I did/n't scream or anything.		
290 C *I think it was.		
Omitted Bound Morphemes	0	
Word-Level Error Codes		
=[EW:=]	1	
THEM[EW:THOSE]		1
49 C (we xx, we had a) we play/ed hide_and_go_seek (in the) in behind them[ew:those] xx thing/s.		
Utterance-Level Error Codes		

Figure 9-13

Explore Menu (Figure 9-14)

Lucy's use of nonspecific vocabulary such as *thing*, *thingy*, and *thingy-ma-bob* suggests that she may have low expressive vocabulary or experience word finding difficulties. The Explore menu was used to look at all the words beginning with "thing" (select Explor > List > Word and Code List: enter thing=, click OK). In the dialogue box (Explore >List) select Total utterances as the Utterance Base and click Expand words and codes (under List Words and Codes) and click List. This will ensure we look for "thing=" anywhere it occurs in the transcript. Figure 9-14 shows the results.

Explore Words and Codes Table Expanded by Words Total Utterances Main body & Mazes		
	Child	
	Total	**Expanded**
thing=	6	
THING/S		1
THINGY		4
THINGY_MA_BOB		1
28 C well we had birthday thingy (you know) food.		
52 C (we xx, we had a) we play/ed hide_and_go_seek (in the) in behind them[ew:those] xx thing/s.		
90 C thingy_ma_bob.		
94 C xx this wee (cup) cup thingy.		
161 C xx crash xx down xx thingy.		
247 C I think they got this thingy.		

Figure 9-14

Macrostructure analysis of personal narrative quality

Lucy's personal narratives were analyzed and coded for personal narrative quality (PNQ) with the best three narratives analysed using "high point analysis" (McCabe & Rollins, 1994). The narratives of children with typically developing language normally follow a developmental sequence of two-event narratives by age 2 to 3;6, leapfrog narratives by age 4, end-at-high-point narratives by age 5, and classic narratives by age 6 (McCabe & Rollins, 1994). Lucy was able to produce narratives which demonstrated an ability to correctly sequence past tense events including one example of a classic narrative (the dentist) where the narrative built to a high point with a resolution (see also van Bysterveldt, Westerveld, Gillon, & Foster-Cohen, 2012).

INTERPRETATION

Lucy's language production is characterized by low MLUm and simplified sentence structure. These skills appear out of line with her other spoken and written language skills. Lucy's intelligibility is further reduced by her stop-start speech and finger mouthing.

Strengths

Lucy was engaged with the task and was responsive during the assessment. She enjoyed the visual prompts and was enthusiastic about relating her own narrative. With support Lucy was able to sequence her ideas to relay a series of past tense events in a chronological order with a high point and resolution.

Challenges

Lucy has a very low MLUm which gives her language a telegraphic quality. She has difficulty connecting her ideas and needs considerable support from her listening partner to enable her to get her ideas across. She struggles to find specific words for items and events and resorts to generic words such as *thing* or *thingy*. Lucy also uses phrases such as "*that's handy*" which she uses as a filler-phrase to give herself time to think or as a place holder for her turn, but this is not always appropriate.

Clinical impressions

The stop-start nature of Lucy's narrative along with the low MLUm results in making Lucy a challenging discourse partner. When recalling her personal narrative, Lucy frequently began with a single word or abbreviated phrase without the subject and on occasion she also omitted the verb. As well as requiring a considerable amount of effort by the listener to make sense of the narrative, Lucy's narrative lacked cohesion and was not easy to follow. When a repetition of the word or phrase was provided by the listener, Lucy was then able to expand on the narrative using longer phrases and more complete sentences. This required patience and support by the listener to enable Lucy to tell her story. These challenges are likely to limit Lucy's opportunities to engage with her peers and to contribute in the classroom setting.

Ideas for Intervention

- Vocabulary enrichment around topics to support Lucy to participate more fully in class-, peer-, and teacher interactions.
- Linking ideas using coordinating conjunctions to create longer and more complex sentences and reduce the telegraphic nature of her narratives.
- Use of a personal narrative graphic organizer to provide visual supports for Lucy to recall, sequence, and organize her ideas.
- Improve metalinguistic awareness by providing Lucy with feedback when she is not understood.

Case Study 3: CARTER

SALT Transcript: Carter PGHW.slt[9]

BACKGROUND

Carter is 8;1 and is in the second grade. He is diagnosed with Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD). He has a normal IQ according to neuro-psychological testing. He is receiving speech/language services for speech articulation, which has improved his speech intelligibility. Carter also received therapy services as a preschooler that focused on expressive/receptive language and social skills. He is being assessed for language skills following teacher concerns and SLP observations of difficulty with utterance formulation in both speaking and writing. Carter was attentive to assessment tasks and followed directions well throughout the evaluation.

ASSESSMENT MEASURE

A story retell narrative task was the best choice to assess Carter's presenting language challenges. The narrative task challenged his word, utterance, and text-level proficiency, and the skills required for the narrative closely mirror the demands of the school curriculum. Carter listened to the story *Pookins Gets Her Way* (Lester, 1987) and then retold the story using the book with the text covered. He listened carefully to the instructions and gave his best effort retelling the story. The results are considered to be representative of his oral language skills. The recorded sample was transcribed and then coded for sentence complexity (SI, see Appendix O) and narrative structure and content (NSS, see Appendix P). It took Carter 5½ minutes to retell the story and his sample contained 480 words and 46 utterances. Carter's sample was compared to samples selected from the Narrative Story Retell database (see Appendix I).

Selected database samples:
   82 samples matched by age: 7;7 - 8;7
   39 samples matched by age and same number of total words (NTW)

<u>Database Menu: Standard Measures Report</u> (**Figure 9-15**)
- *Transcript Length*: The sample was age appropriate in length for the number of utterances and words, as well as elapsed time.
- *Intelligibility*: Intelligibility did not impact the sample.
- *Macro Analysis*: Analysis of the Carter's story revealed that his NSS Composite Score, although low, was within the normal range of performance.
- *Syntax/Morphology*: MLU in words and morphemes were also within normal limits. However, Carter's utterances, while of appropriate length, did not include the more complex structure typical for his age and grade. This was evidenced by the SI Composite Score, a measure of clausal density.
- *Semantics*: Carter's number of different words (NDW) was higher than the database average. So was his Moving-Average NDW, a comparison of NDW which is independent of sample length. These are measures of vocabulary diversity and the positive SDs indicate a strength in the area of semantics.
- *Verbal Facility*: Carter's rate of speech was comparable to his peers at 86.75 Words per Minute (WPM). Also noted were a high number of pauses within utterances at 1.80 SD above the database mean. Slightly over 25% of Carter's words were maze words. This is just over three standard deviations higher than the database mean and warrants a more in-depth look at mazes.

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[9] *Carter PGHW* is one of the sample transcripts included with the software.

- *Errors*: 17% of Carter's utterances contained errors, which was within normal limits. However, Carter's sample contained 2 omissions and 11 errors which should be examined for patterns.

SALT ANALYSIS

Carter PGHW
Word Base: Exclude ((parenthetical remarks))

TRANSCRIPT INFORMATION	DATABASE INFORMATION
Speaker: Carter (Child)	Database: Narrative Story Retell
Sample Date:	82 Samples Matched By Age
Current Age: 8;1, Grade: 2	39 Samples Cut at 312 Number Total Words
Context: Narration (PGHW)	Context: Narration (PGHW)

STANDARD MEASURES REPORT
Compared to 82 Samples Matched by Age

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
Current Age (8;1)	8.08	-0.06	8.10	7.58	8.58	0.29
TRANSCRIPT LENGTH						
Total Utterances	46	0.36	41.51	22	85	12.46
C&I Verbal Utts	40	0.09	39.00	21	76	11.66
All Words Including Mazes	480	0.86	375.38	186	923	121.41
Elapsed Time (5:32)	5.53	0.83	4.26	1.47	10.57	1.52
INTELLIGIBILITY						
% Intelligible Utterances	90.9%	-0.82	96.30	63.41	100.00	6.59
% Intelligible Words	98.6%	-0.97	99.50	94.64	100.00	0.91
MACRO ANALYSIS						
NSS Composite Score	19	-0.94	22.89	12	32	4.13
SYNTAX/MORPHOLOGY						
MLU in Words	7.80	-0.46	8.24	6.12	10.64	0.96
MLU in Morphemes	8.85	-0.37	9.25	6.92	12.00	1.07
% Utterances With Verbs	97.5%	0.12	97.07	84.85	100.00	3.55
Mean Verbs per Utterance	1.48	-0.85	1.65	1.09	2.12	0.21
SI Composite Score	1.13 *	-1.14	1.27	1.00	1.62	0.12
SEMANTICS						
Number Total Words (NTW)	312	-0.09	321.40	139	718	105.69
Number Different Words (NDW)	145	0.57	129.04	69	225	28.20
Moving-Average NTW	100	0.00	100.00	100	100	0.00
Moving-Average NDW	66 *	1.93	57.06	41	65	4.39
VERBAL FACILITY						
Words per Minute	86.75	-0.23	91.68	40.25	144.26	21.70
Pause Time As % of Total Time	16.0%	0.27	13.39	0.00	35.98	9.59
Maze Words As % of Total Words	25.4% **	2.52	11.27	2.48	28.24	5.58
% Abandoned Utterances	0.0%	-0.57	1.24	0.00	14.67	2.19
ERRORS						
% Utterances With Errors	17.4%	0.21	15.59	0.00	45.45	8.76
Number of Omissions	2	-0.39	3.12	0	17	2.90
Number of Error Codes	11 **	2.29	4.20	0	12	2.97

* At least 1 SD (** 2 SD) from the database mean
Italicized measures count occurrences and can be significantly affected by the different sample lengths.
Calculations based on C&I Verbal Utts: Syntax/Morphology and Semantics sections, Maze Words As % of Total Words
Database selection criteria: Age +/- 6 months (7;7 - 8;7)

Figure 9-15 (*Standard Measures Report* based on entire transcript)

Database Menu: Quick Look (Figure 9-16)
The Quick Look report is generated from the database menu and provides a very broad overview of skills in an easy-to-read table format, which is convenient for summary meetings to show strengths and weakness. Carter's Quick Look shows that his relative weaknesses are in SI (syntax skills) and in Verbal Facility, specifically a high number of mazes. His relative strength is his semantic skills (Moving-Average NDW). All other language measures were within normal limits.

LANGUAGE MEASURE	Strength	WNL	Weakness
QUICK LOOK Compared to 82 Samples Matched by Age			
MACRO ANALYSIS			
NSS Composite Score		X	
SYNTAX/MORPHOLOGY			
MLU in Words		X	
% Utterances With Verbs		X	
SI Composite Score			X
SEMANTICS			
Moving-Average NDW	X		
VERBAL FACILITY			
Words per Minute		X	
Pause Time As % of Total Time		X	
Maze Words As % of Total Words			X
% Abandoned Utterances		X	
ERRORS			
% Utterances With Errors		X	

Database selection criteria: Age +/- 6 months (7;7 - 8;7)

Figure 9-16 (*Quick Look* based on entire transcript)

Based on these reports, additional information would be valuable for several measures: SI, mazes, and error codes. Additional information is provided in subsequent reports.

Database Menu: Subordination Index (Figure 9-17)
The Subordination Index (SI) is a relatively fast way to document the use of complex syntax (see Appendix O). This is an important measure from Carter's sample to confirm the SLP's observation of infrequent use of complex syntax and the frequent mazes which may be associated with utterance formulation problems, i.e., limited command of complex syntax. SI is a measure of clausal density, calculated by dividing the number of clauses by total number of utterances. SALT calculated the score and compared it to the matched database samples. Carter's SI composite score was 1.13, which is 1.81 SD below the database mean of 1.30. Most of his utterances contained one clause.

LANGUAGE MEASURE	Child Score	+/-SD	DATABASE Mean	Min	Max	SD
[SI-0]	0	-0.51	0.46	0	4	0.91
[SI-1]	34 *	1.59	26.13	16	38	4.96
[SI-2]	5 *	-1.36	8.72	2	14	2.74
[SI-3]	0 *	-1.07	1.13	0	4	1.06
[SI-4]	0	-0.23	0.05	0	1	0.22
[SI-5]	0	-0.16	0.03	0	1	0.16
SI Composite Score	1.13 *	-1.81	1.30	1.00	1.52	0.10

SUBORDINATION INDEX Calculations Based on C&I Verbal Utts Compared to 39 Samples Equated By Same Number of Total Words

* At least 1 SD (** 2 SD) from the database mean
Database selection criteria: Age +/- 6 months (7;7 - 8;7)

Figure 9-17 (*SI* based on the first 312 words)

Database Menu: Verbal Facility Summary (Figure 9-18)
The *Verbal Facility Summary* shows that Carter produced mazes at the word and phrase level. His word-level mazes were mostly repetitions while the revisions were more prominent at the phrase level. These data points provide support for both word retrieval as well as utterance formulation problems.

MAZE SUMMARY						
Total Maze Words		106 **	3.57	41.69	8	74	18.02
Maze Words As % of Total Words		25.4% **	3.05	11.56	2.50	19.17	4.53
Total Number of Mazes		37 **	2.09	20.36	5	40	7.97
Average Words per Maze		2.86 *	1.59	2.05	1.00	3.07	0.51
Average Mazes per Utterance		0.93 *	1.62	0.55	0.17	1.26	0.23
Utterances With Mazes		25 **	2.11	15.33	5	25	4.58
Utts With Mazes As % of Total Verbal Utts		62.5% *	1.78	40.90	17.24	70.97	12.12
Total Maze Components		69 **	4.44	24.18	8	53	10.10
Revisions	Part Word	2	-0.08	2.15	0	8	1.84
	Word	7 **	2.64	2.33	0	8	1.77
	Phrase	12 *	1.77	6.41	0	13	3.15
Repetitions	Part Word	7 **	2.72	2.26	0	9	1.74
	Word	26 **	7.04	3.79	0	13	3.16
	Phrase	8 **	2.29	2.28	0	9	2.50
Filled Pauses	Single Word	7	0.42	4.69	0	24	5.55
	Multiple Words	0	-0.29	0.26	0	5	0.88
Maze Components As % of Total Components		18.1% **	4.01	7.11	2.50	14.52	2.74

Figure 9-18 (*Verbal Facility Summary: Maze Summary* based on the first 312 words)

Explore Menu: Utterances without mazes (Figure 9-19)

To better understand Carter's frequent use of mazes, let's examine his utterances which don't contain any mazes.

Selected Utterances	15	
20	C She sticked|stick[EO:stuck] her tongue out [SI-1].
24	C She threw apple/s [SI-1].
25	C She yell/ed [SI-1].
32	C So she gave it[EW:them] to her cat [SI-1].
34	C She had all the toy/s she want/ed which was no fair ((maybe)) [SI-1].
44	C She brought her apple/s just in case [SI-1].
46	C The troll[REF] rub/ed his hat [SI-1].
47	C And she had cowboy boots [SI-1].
50	C The troll[REF] rub/ed her[EW:his] hat [SI-1].
51	C It came true [SI-1].
52	C Next she want/ed to be a flower [SI-1].
59	C He rub/ed his hat, %poof [SI-1].
61	C She turn/ed into a flower [SI-1].
66	C She grew and grew_and_grew_and_grew_and_grew [SI-1].
73	C "First you have to give me all your temper tantrum/s stuff to me [SI-1].

Figure 9-19

Notice that all of the fluent utterances had simple syntax (grammatical form). *Was he attempting to produce more than one proposition at a time without command of complex syntax to accomplish the task?* Further analysis of complex syntax is warranted. Also notice that the code [REF] was applied during transcription to mark referencing difficulty, which may be contributing to word retrieval impairment. The [REF] code was applied to the *troll* character because Carter referred to this character previously as an *elf*.

Analyze Menu: Standard Utterance Lists (Figure 9-20)

Selecting "Utterances with Error Codes" from the *Standard Utterance Lists* displays all the words and utterances coded as errors. This follow-up report should be used to look for patterns of errors. Carter made several pronoun errors, e.g., *it* for *them*, *her* for *his*, and several word-choice errors, e.g., *before* for *after*, and *elf* and *troll* both used to refer to the same character.

STANDARD UTTERANCE LISTS
Total Utterances
1st Speaker

Utterances with Error Codes	
20	C She sticked|stick[EO:stuck] her tongue out [SI-1].
22	C She made (fu*) goofy face/s, sticked|stick[EO:stuck] her tongue out [SI-1].
32	C So she gave it[EW:them] to her cat [SI-1].
39	C And she rollerskate/*ed in the living room which made the cat jump up on the couch and then make[EW:made] the lamp fall over and then made (the pot) the pot crack and X [SI-X].
40	C Then (all) she stay/ed *up all night (before the) before[EW:after] the owl/s went to bed [SI-2].
50	C The troll[REF] rub/ed her[EW:his] hat [SI-1].
67	C Finally, when she is big, (the) the elf[REF] (ask/ed :02) ask/3s, "(are y*) you (made a w* not wise choice :05) made a not wise choice" [EU].
69	C (The the) the elf[EW:troll][REF] cry/ed, "Oh, I/'m go/ing to lose my power/s in the rain" [SI-2]!

Figure 9-20

STANDARDIZED TEST INFORMATION

Clinical Evaluation of Language Fundamentals-5th Edition
Language Domain with Composite Score:
Core Language: 76
Receptive Language: 59
Expressive Language: 80
Language Content: 78

Peabody Picture Vocabulary Test-4 (PPVT-4)
Standard Score: 116
Percentile: 86
Age Equivalent: 8;9

Expressive Vocabulary Test: 2 (EVT-2)
Standard Score: 117
Percentile: 87
Age Equivalent: 8;1

Database Menu: Performance Report (Figures 9-21a & 9-21b)

And to "pull it all together", SALT includes the *Performance Report*. This report provides a cohesive narrative summarizing the language sample analysis outcomes, noting both strengths and weaknesses. This report can be edited to add your clinical impressions and incorporate outcomes from standardized testing and/or other informal measures. Or just copy and paste relevant information from this report into your own report format. The *Performance Report* is extremely comprehensive and can save a lot of time when writing up reports.

Performance Report
Carter PGHW
Age: 8;1, Grade: 2

Language Sample Analysis with SALT Software

Elicitation Task and Database Overview
Carter completed a narrative story retell of 'Pookins Gets Her Way' (Lester, 1987). He listened to the story and then retold the story using his own words. Measures of sample length, intelligibility, syntax/morphology, semantics, verbal facility, and errors were calculated from his language sample and compared with samples from 82 speakers completing the same task. These speakers were within 6 months of Carter's age. Although most measures were calculated from the entire sample, a few measures, such as total pause time and number of errors, can be affected by different sample lengths, i.e., the longer the sample, the more opportunity to produce them. For these measures, Carter's sample was compared with a subset of 40 samples matched in length by the same number of words. All measures were interpreted using a standard deviation interval of 1.00 SD.

Transcript Length
Carter produced 46 utterances using a total of 479 words in 5 minutes and 32 seconds, which were all within normal limits for this task.

Intelligibility
Carter's intelligibility was within normal limits with 90.9% intelligible utterances and 98.6% intelligible words.

Syntax/Morphology
Carter's mean length of utterance (MLU) in words was 7.78, which was within the normal range compared to his database peers. His MLU in morphemes was 8.75, which was also within the normal range. 97.5% of Carter's utterances contained verbs with an average of 1.42 verbs per utterance. The percent of utterances with verbs was within normal limits while the average number of verbs per utterance was lower than the database mean by 1.09 SD.

Figure 9-20a

Semantics
Carter used 141 different words (NDW) within an analysis set of 311 total words (NTW). This compares with database means of 129 different words within 321 total words to complete the same task. NDW can be affected by the length of the sample, so the moving-average NDW was calculated by averaging NDW across the sample, looking at each set of 100 NTW. Carter produced a moving-average NDW of 64, which was 1.67 SD above the database mean of 57, indicating relative strength in vocabulary diversity.

Verbal Facility
Carter's rate of speech, at 87 words per minute, was within the normal range. Carter's sample contained 8 within-utterance pauses for a total time of 30 seconds, with an average pause time of 3.75 seconds. The total number of pauses and total pause time were both higher than the database mean by 1.83 SD and 2.10 SD, respectively, while the average pause time was within normal limits. His sample also contained 9 between-utterance pauses for a total time of 23 seconds, with an average pause time of 2.56 seconds. These between-utterance pause values were within normal limits. Pause time as a percent of total time was 16.0%, which was within normal limits. In Carter's sample, 25.4% of the words were filled pauses, false starts, repetitions, or reformulations. This percentage of words in mazes was 2.53 SD higher than the database mean of 11.3%. His sample contained 37 mazes, which were found in 62.5% of his utterances. Carter's mazes consisted of a high number of both phrase-level and word-level revisions and repetitions. A high number of pauses and mazes may indicate difficulty with word retrieval and/or utterance formulation.

Errors
21.7% of Carter's utterances contained errors, which was comparable to his database peers. He omitted the past tense bound morpheme once, although he produced it 19 times. He used the plural bound morpheme 18 times, the 3rd person singular bound morpheme once, the present progressive bound morpheme twice, and the contracted verb form four times. He also omitted the word UP once. His sample contained the following overgeneralization error: STICKED[EO:STUCK] twice, the following pronoun errors: HER[EP:HIS] and IT[EP:THEM], and the following other word-level errors: BEFORE[EW:AFTER] once, ELF[EW:GNOME] once, MAKE[EW:MADE] once, and TROLL[EW:GNOME] twice. His sample also contained the following utterance-level error:
     C Finally, when she is big, (the) the elf (ask/ed :02) ask/3s, "(are y*) you (made a w* not wise choice

Figure 9-20b

INTERPRETATION

Performance Profile

Carter's language sample results are consistent with the word retrieval and utterance formulation profile. His simple sentence attempts are produced without mazes, consistent with limited complex syntax use and confirmed by the SI measure. The *Verbal Facility Summary* provides evidence for both word retrieval as well as utterance formulation issues. The phrase level mazes are revisions for the most part, while repetitions are at the word level. His pauses within utterances fit these observations as his repetitions and revisions did not create enough time to find the right word or the syntax to combine more than one idea into one utterance.

Strengths

Carter was enthusiastic and enjoyed listening to and retelling the story. He used diverse vocabulary with number of different words (NDW) being 145, which is slightly higher than the database mean. And his Moving-Average NDW, a measure of NDW which is independent of sample length, was significantly higher than the database mean. He also had adequate mean length of utterance at 7.8. These results are substantiated by his score on the Expressive Vocabulary Test, where he scored well above average on single word expression. Another area of relative strength is the length of his story. Carter told the story in average time and his story contained an average number of words and utterances.

Challenges

Carter's sample contained an abundance of mazes (repetitions, revisions, and filled pauses) with 25% of his words being maze words. His mazes consisted of part-word, word, and phrase repetitions as well as word and phrase revisions. The prevalence of pauses within utterances, at 1.80 standard deviations above the mean, indicates that he spent more time pausing within an utterance than age-matched peers. This might indicate difficulty with word retrieval as well as overall utterance organization. Word-level errors were also common throughout Carter's sample. Errors included overgeneralization, e.g., *sticked* for *stuck*, and pronoun errors, e.g., *it* for *them* and *her* for *his*. Of note, Carter was inconsistent when referring to one of the main characters in the story; the gnome. He referred to the gnome as *elf*, and *troll* but not *gnome*. Carter requested from the clinician the name of the main character, Pookins, saying that he forgot her name. Some of these errors suggest delays in specific areas of language, overgeneralization of past tense, and lack of complex sentence use. The frequent mazes suggest that his self-monitoring of language production results in numerous changes to get the utterance that he has in mind produced correctly. Improving verbal fluency will require both direct instruction on complex syntax and strategies to find the right word.

Clinical Impressions

Carter performs in the average range on standardized tests. With the exception of his receptive language on the CELF-5, all other language domains are in low-average range. His receptive language score may be due to reduced attention to the task versus actual issues with auditory comprehension. When looking at his score on the PPVT-4 and EVT-2, Carter presents as though he has very high expressive and receptive language skills, which is true in some aspects as he has an average MLU and NDW. However, these tasks are decontextualized and isolate language in a way that does not assess functional language. When Carter has to use the whole language system simultaneously, i.e., comprehend picture book, organize thoughts, formulate utterances, his language system breaks down and he demonstrates utterance and word retrieval difficulties along with pauses. This can be frustrating as he has complex ideas as well as strong vocabulary skills but cannot always get his intended message across to the listener. He also uses gestures and non-specific vocabulary to convey his ideas.

Ideas for Intervention

Recommendations include:

- Working on references so the listener clearly knows who/what Carter is talking about
- Word retrieval strategies, e.g., description, synonyms, etc.
- Taking time to formulate and organize thoughts before talking
- Direct instruction on complex syntax within a narrative context
- Fluency practice producing only simple sentences, one proposition at a time

Case Study 4: MAX

SALT Transcript: Max Expo.slt[10]

BACKGROUND

Max is 11;2 and is in the 5th grade. He began receiving speech/language services when he was four years old. He was identified with a learning disability in the first grade. Teacher concerns include difficulty expressing himself in a clear and concise manner. In speech-language therapy Max has been working on word retrieval, thought organization, and staying on topic. Max's conversational skills are very good. It is unlikely that someone would realize he has a language impairment from a casual conversation with him. He asks appropriate questions, makes appropriate comments, stays on topic (most of the time), and listens to his partner.

ASSESSMENT MEASURE

Max completed an expository language sample where he was asked to tell how to play his favorite game or sport. The expository task began with a planning phase of 3-5 minutes where Max was asked to make notes on a template addressing ten required categories for a complete exposition. Max chose to explain how to play the board game Monopoly. He was compliant during the task and appeared to give his best effort. The recorded sample was transcribed and then coded for sentence complexity (SI, see Appendix O) and expository structure (ESS, see Appendix Q). Max's sample was compared to samples selected from the Expository database (see Appendix J).

Selected database samples:
    88 samples matched by age: 10;8 - 11;8
    83 samples matched by age and same number of total words (NTW)

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[10] *Max Expo* is one of the sample transcripts included with the software.

SALT ANALYSIS

Max Expo

TRANSCRIPT INFORMATION	DATABASE INFORMATION
Speaker: Max (Child)	Database: Expository
Sample Date:	88 Samples Matched By Age
Current Age: 11;2, Grade: 5	83 Samples Cut at 265 Number Total Words
Context: Exposition	Context: Exposition

STANDARD MEASURES REPORT
Compared to 88 Samples Matched by Age

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
Current Age (11;2)	11.17	-0.07	11.19	10.67	11.67	0.32
TRANSCRIPT LENGTH						
Total Utterances	32	-0.98	55.76	13	180	24.24
C&I Verbal Utts	30 *	-1.03	53.88	13	170	23.08
All Words Including Mazes	376	-1.00	695.51	172	2422	320.45
Elapsed Time (4:02)	4.03	-0.73	5.45	1.30	15.32	1.95
INTELLIGIBILITY						
% Intelligible Utterances	100%	0.63	99.19	95.45	100.00	1.29
% Intelligible Words	100%	0.61	99.92	99.49	100.00	0.13
MACRO ANALYSIS						
ESS Composite Score	15 **	-3.21	32.80	13	44	5.54
SYNTAX/MORPHOLOGY						
MLU in Words	8.83 *	-1.44	11.52	7.67	16.24	1.87
MLU in Morphemes	9.43 *	-1.59	12.63	8.54	17.62	2.02
% Utterances With Verbs	90.0% **	-2.14	96.76	86.96	100.00	3.17
Mean Verbs per Utterance	2.13	-0.31	2.25	1.61	3.35	0.39
SI Composite Score	1.28 *	-1.73	1.67	1.21	2.22	0.23
SEMANTICS						
Number Total Words (NTW)	265 *	-1.27	614.52	169	2108	274.72
Number Different Words (NDW)	94 *	-1.68	176.95	74	344	49.47
Moving-Average NTW	100	0.00	100.00	100	100	0.00
Moving-Average NDW	51 *	-1.48	56.76	45	66	3.91
VERBAL FACILITY						
Words per Minute	93.22 *	-1.23	126.64	52.16	199.89	27.23
Pause Time As % of Total Time	20.7% *	1.12	8.70	0.00	49.80	10.70
Maze Words As % of Total Words	29.7% **	3.96	10.33	0.85	29.70	4.89
% Abandoned Utterances	6.3% **	2.39	1.52	0.00	6.90	1.98
ERRORS						
% Utterances With Errors	15.6%	0.81	10.52	0.00	27.50	6.28
Number of Omissions	3	0.49	1.97	0	12	2.12
Number of Error Codes	2	-0.81	4.39	0	14	2.94

* At least 1 SD (** 2 SD) from the database mean
Italicized measures count occurrences and can be significantly affected by the different sample lengths.
Calculations based on C&I Verbal Utts: Syntax/Morphology and Semantics sections, Maze Words As % of Total Words
Database selection criteria: Age +/- 6 months (10;8 - 11;8)

Figure 9-22 (*Standard Measures Report* based on entire transcript)

Database Menu: Standard Measures Report (Figure 9-22)

- *Transcript Length*: Max's expository sample was somewhat shorter in terms of number of utterances, number of words, and time than what was produced by his age-matched peers.
- *Macro Analysis:* Max's ESS Composite Score, which measures the structure and content of the exposition, was more than 3 SDs below the database mean.
- *Syntax/Morphology*: Max's average utterance length was shorter than expected with MLUw at 1.44 SD and MLUm at 1.59 SD below the database mean. His SI Composite Score, which measures clausal density, was low.
- *Semantics*: Number of different words (NDW) was 1.68 SD below the database average and his Moving-Average NDW, a more meaningful comparison of NDW because it is independent of sample length, was also below the mean at -1.48 SD. These measures indicate weak semantic skills. Perhaps eliciting a language sample from another context would provide evidence to determine whether or not this is of significance.
- *Verbal Facility*: All measures were one or more standard deviations from the database means. Max's rate of speech, measured in words per minute, was 1.23 SD below the database mean. The low rate of speech was a result, at least in part, of the high number of silent pauses. Almost 30% of Max's words were in mazes and he abandoned over 6% of his utterances.
- *Errors*: 15.6% of the utterances in Max's sample contained errors which was within normal limits for the task.

Based on this report, additional information would be especially valuable in several areas: Macro Analysis (low ESS), Syntax/Morphology (low MLU and SI), and Verbal Facility (low WPM, high number of pauses, mazes, and abandoned utterances). Additional information is provided in subsequent reports.

Database Menu: Expository Scoring Scheme (Figure 9-23)

The Expository Scoring Scheme (ESS, see Appendix Q) was used to score the structure and content of Max's expository sample. His sample was scored on ten categories such as preparations, rules, and terminology. Most of these categories are based on the planning sheet that Max used to complete his expository sample. Max's composite score was 15 out of 50 compared to an average composite score of 32.8 for age-matched peers. The structure and content of Max's expository language sample was in the minimal/emerging range for his age.

EXPOSITORY SCORING SCHEME Compared to 88 Samples Matched by Age						
ESS Category	**Child**			**DATABASE**		
	Score	**+/-SD**	**Mean**	**Min**	**Max**	**SD**
Object of Contest	2 *	-1.49	3.39	1	5	0.93
Preparations	1 **	-3.15	3.30	1	5	0.73
Start of Play	2 *	-1.44	3.34	1	5	0.93
Course of Play	2 *	-1.83	3.47	1	5	0.80
Rules	2 *	-1.56	3.30	1	5	0.83
Scoring	1 **	-2.57	3.24	1	5	0.87
Duration	2 *	-1.03	3.14	0	5	1.11
Strategy	1 **	-2.41	3.27	1	5	0.94
Terminology	1 **	-2.49	3.19	1	5	0.88
Cohesion	1 **	-3.11	3.17	2	4	0.70
ESS Composite Score	15 **	-3.21	32.80	13	44	5.54

* At least 1 SD (** 2 SD) from the database mean
Database selection criteria: Age +/- 6 months (10;8 - 11;8)

Figure 9-23

Database Menu: Syntax/Morphology Summary (Figure 9-24 & Figure 9-25)

Max's MLU in words and morphemes was lower than his age-matched peers.
The *Syntax/Morphology Summary* from the Database menu (Figure 9-24) was produced to try and gain further information about words and utterances produced in his sample. This report can often assist in determining if there are particular forms that may be the primary contributor to low MLU.

Max produced fewer total bound morphemes than his age-matched peers retelling the same story, though he used similar types of bound morphemes, e.g., contractions, plurals, and possessives. However, Max omitted 3 words in obligatory context compared to the database mean of less than 1.

The low MLU can be validated by looking at the *Number of Utterances by Utterance Length* distribution tables (Figure 9-25). Notice that Max's sample contained three utterances which were only 1 – 3 words in length, while none of the database samples contained such short utterances. Also, only 5 of his 30 utterances contained more than 11 words compared to the database mean of 9 out of 21 utterances.

SYNTAX/MORPHOLOGY SUMMARY
Calculations Based on C&I Verbal Utts
Compared to 83 Samples Equated By Same Number of Total Words

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
MLU in Words	8.83 *	-1.43	11.86	7.82	19.50	2.12
MLU in Morphemes	9.43 *	-1.54	12.98	8.76	21.00	2.30
% Utterances With Verbs	90.00 *	-1.60	96.88	80.95	100.00	4.30
Mean Verbs per Utterance	2.13	-0.39	2.32	1.13	4.07	0.49
SI Composite Score	1.28 *	-1.45	1.66	1.04	2.41	0.26
Number Total Words	265	0.00	265.00	265	265	0.00
Number of Bound Morphemes	18 *	-1.27	25.05	11	37	5.57
/'D	0	-0.22	0.29	0	10	1.31
/'LL	0	-0.57	0.41	0	3	0.72
/'M	0	-0.62	0.45	0	3	0.72
/'RE	1	-0.05	1.07	0	6	1.34
/'S	1	-0.86	3.34	0	13	2.72
/'T	1	0.51	0.53	0	4	0.93
/'US	0	-0.21	0.06	0	2	0.29
/'VE	0	-0.16	0.02	0	1	0.15
/3S	2	-0.89	4.92	0	16	3.28
/ED	0	-0.49	0.22	0	2	0.44
/ING	1	0.02	0.98	0	5	1.13
/N'T	0	-0.51	0.35	0	3	0.69
/S	12	0.01	11.93	1	26	4.93
/Z	0	-0.68	0.49	0	3	0.72
Number of Omitted Words	3 *	1.63	0.86	0	9	1.32
Number of Omitted Bound Morphemes	0	-0.33	0.12	0	2	0.36

* At least 1 SD (** 2 SD) from the database mean
Database selection criteria: Age +/- 6 months (10;8 - 11;8)

Figure 9-24 (*Syntax/Morphology Summary* based on the first 265 words)

UTTERANCE DISTRIBUTION TABLES
Calculations Based on C&I Verbal Utts
Compared to 83 Samples Equated By Same Number of Total Words

NUMBER OF UTTERANCES BY UTTERANCE LENGTH
Utterance Length in Words

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	0	1	1	1	1	0	4	2	4	4	3	4	0	1	2	2	30
Db Mean	0	0	0	0	1	1	2	2	2	2	1	1	1	1	1	6	21

Utterance Length in Morphemes

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	0	1	1	1	1	0	2	1	6	4	2	4	2	1	0	4	30
Db Mean	0	0	0	0	1	1	2	2	2	2	1	1	1	1	7		23

Database selection criteria: Age +/- 6 months (10;8 - 11;8)

Figure 9-25 (*Utterance Distribution Table* based on utterances in the first 265 words)

<u>Database Menu: Subordination Index</u> (Figure 9-26)

The Subordination Index (SI, see Appendix O) was applied to Max's sample. The SI measures clausal density and is computed by dividing the total number of clauses by total number of C-units. Max yielded a composite score of 1.28 whereas the database mean for age-matched peers is 1.66. Max's score was 1.45 SD below the database mean. He used mostly one-clause utterances (14 total) and 9 two-clause utterances.

	SUBORDINATION INDEX					
	Calculations Based on C&I Verbal Utts					
	Compared to 83 Samples Equated By Same Number of Total Words					
LANGUAGE MEASURE	**Child**			**DATABASE**		
	Score	**+/-SD**		**Mean**	**Min**	**Max**	**SD**
[SI-0]	2 **	3.49		0.13	0	3	0.54
[SI-1]	14	0.40		12.33	4	23	4.24
[SI-2]	9	0.75		7.07	1	15	2.57
[SI-3]	0 *	-1.48		2.02	0	6	1.37
[SI-4]	0	-0.81		0.60	0	3	0.75
[SI-5]	0	-0.52		0.25	0	2	0.49
[SI-6]	0	-0.16		0.02	0	1	0.15
[SI-7]	0	-0.19		0.04	0	1	0.19
[SI-8]	0	-0.11		0.01	0	1	0.11
[SI-9]	0	-0.11		0.01	0	1	0.11
SI Composite Score	1.28 *	-1.45		1.66	1.04	2.41	0.26

* At least 1 SD (** 2 SD) from the database mean
Database selection criteria: Age +/- 6 months (10;8 - 11;8)

Figure 9-26 (*SI* based on the first 265 words)

<u>Database Menu: Verbal Facility Summary</u>
The *Verbal Facility Summary* gives detailed information about speaking rate, pauses, and mazes, comparing this information to the database. Each of these sections is highlighted and described below.

- Rate and Pause Summary (Figure 9-27)

  Max's sample was 4 minutes, 2 seconds in length which was within normal limits for the expository task. His speaking rate was slower than age-matched peers and his sample contained a larger number of pauses. His sample contained 10 within-utterance pauses, which totaled 38 seconds and lasted, on average, 3.8 seconds. Max also had 5 between-utterance pauses, which totaled 12 seconds and lasted 2.4 seconds on average.

LANGUAGE MEASURE		Child		DATABASE			
		Score	+/-SD	Mean	Min	Max	SD
RATE SUMMARY							
Elapsed Time (4:02)		4.03 **	2.75	2.38	1.38	4.83	0.60
Words per Minute		93.22 *	-1.45	130.85	58.34	200.96	26.01
Utterances per Minute		7.93 *	-1.06	10.64	4.97	17.21	2.55
PAUSE SUMMARY							
Pause Time As % of Total Time		20.7% *	1.60	5.68	0.00	46.69	9.34
Pauses Within Utterances							
No. of pauses		10 **	5.13	1.00	0	8	1.75
Total pause time (seconds)		38 **	2.44	4.17	0	120	13.87
Average pause time (seconds)		3.80	0.28	3.15	2.00	15.00	2.29
Pauses Between Utterances							
No. of pauses		5 *	1.26	1.58	0	15	2.71
Total pause time (seconds)		12	0.38	6.40	0	110	14.85
Average pause time (seconds)		2.40	-0.70	3.35	2.00	7.33	1.34

Figure 9-27 (*Verbal Facility Summary: Rate and Pauses* based on first 265 words)

- Maze Summary (Figure 9-28)

29.7% of Max's total words were in mazes. This is 3.56 standard deviations higher than the database mean. The number of total mazes was also high as was the average words per maze, indicating that he produced frequent and relatively long mazes. Max's mazes were made up of primarily phrase revisions and word repetitions. The maze distribution tables revealed that a high percentage of utterances, even utterances that were relatively short, contained mazes. In fact, Max had mazes in most of his utterances that were longer than 2 morphemes. Compare Max's values with the much lower database mean values provided in this distribution table. As the length of his utterances increased, mazes continued to be present.

LANGUAGE MEASURE		Child		DATABASE			
		Score	+/-SD	Mean	Min	Max	SD
MAZE SUMMARY							
Total Maze Words		112 **	4.07	31.71	2	122	19.72
Maze Words As % of Total Words		29.7% **	3.56	10.33	0.75	31.52	5.44
Total Number of Mazes		29 *	1.83	15.00	2	54	7.67
Average Words per Maze		3.86 **	2.71	2.07	1.00	4.57	0.66
Average Mazes per Utterance		0.97	0.98	0.64	0.07	2.08	0.33
Utterances With Mazes		21 **	2.63	10.57	2	22	3.96
Utts With Mazes As % of Total Verbal Utts		70.0% *	1.53	45.05	7.14	84.62	16.26
Total Maze Components		49 **	2.92	18.14	2	77	10.56
Revisions	Part Word	1	-0.10	1.11	0	5	1.09
	Word	3	0.42	2.25	0	7	1.78
	Phrase	19 **	4.66	5.11	0	13	2.98
Repetitions	Part Word	3	0.88	1.29	0	15	1.94
	Word	9 **	3.27	1.39	0	13	2.33
	Phrase	3 *	1.32	1.05	0	8	1.48
Filled Pauses	Single Word	11	0.96	5.82	0	28	5.38
	Multiple Words	0	-0.30	0.13	0	3	0.44
Maze Components As % of Total Components		15.6% **	2.86	6.29	0.75	22.51	3.25

Figure 9-28 (*Verbal Facility Summary: Maze Summary* based on first 265 words)

<u>Analyze Menu: Abandoned Utterances</u> (Figure 9-29)

The *Standard Measures Report* (see Figure 9-22) indicated that Max abandoned 6.3% of his utterances which was 2.39 SD above the database mean. Since abandoned utterances are not common at this age level, with most speakers producing less than one abandoned utterance, it would be valuable to look at Max's abandoned utterances. The *Standard Utterance Lists*, selected from the Analyze menu, displays lists of various types of utterances, including *Abandoned Utterances*, as well as their context within the sample. Max's language contained two abandoned utterances. These utterances are displayed in context with 2 preceding and 2 following utterances.

Max Expo
Analysis Set: C&I Verbal Utts

	STANDARD UTTERANCE LISTS **Total Utterances** **1st Speaker**
Abandoned Utterances	
20	C And then you try to go around (the um) the board one time.
21	C Then you get a two hundred dollar bonus.
22	C And then you get>
23	C Like the basic rule/s[EW:rule] for this game is (you have to like if you like) you can/'t steal from the banker.
24	C And if you do, like you get sent to jail.
37	C (Or the other time the other t* to like get like) And you could sell your property/s too.
38	E Mhm.
39	C And>
40	: :04
41	E Is there anything else you can tell me to learn the game?

Figure 9-29

INTERPRETATION

Performance Profile

The delayed language profile is characterized by low mean length of utterance, low number of different words, slow speaking rate, and word and utterance-level errors. Max's language production fits into this profile. His syntax was limited to simple sentences with few attempts at complex sentence forms as evidenced by his low SI scores. All of Max's language sample scores contribute to his low scores on the ESS in that his sample is short and syntactic forms do not allow him to express complex relationships.

Strengths

As mentioned earlier, Max has good conversational skills. He was a willing participant in the assessment process and made only a few word or utterance errors.

Challenges

Max demonstrated limited lexical diversity with low MLU and NDW. His low SI score indicates that he uses simple syntax with limited use of subordination. Verbal fluency was decreased as evidenced by increased mazes and pause times. This could be related in part to utterance formulation difficulty. Max's ESS scores indicated problems with cohesion, e.g., overall flow of the sample, organization, sequencing, etc., and terminology, e.g., adequately defining new terms. Max also scored lower on the content of his expository sample in areas such as explaining how the game is scored, strategies used, and preparations for the game.

Clinical Impressions

Max's performance could be related in part to formulation difficulties as seen by the length of his mazes and the fact that mazes were present even in short, simple utterances. The expository task is challenging but revealing of his oral language issues. Comparing his conversational skills with his expository skills may suggest opportunities to improve his overall verbal output.

Ideas for Intervention

- Foster vocabulary enrichment, such as pre-teaching content words related to specific areas of the curriculum
- Organize thoughts before speaking by practicing with the ESS matrix to fulfill expectations for detail
- Practice narrative retell to improve sequencing of events and story structure
- Teach complex sentence forms beginning with conjunctions to expand utterances

> **Case Study 5: TIMMY**

SALT Transcript: Timmy FWAY.slt[11]

BACKGROUND

Timmy is a 5-year, 8-month old boy who was in early childhood when he first received therapy for language delay. He is now in kindergarten and his therapist wants to assess his language production using a story retell as it relates directly to the kindergarten curriculum.

ASSESSMENT MEASURE

Timmy completed a narrative story retell using the wordless picture book *Frog, Where are You?* (Mayer, 1969). First, the clinician told the story using a script, and then Timmy retold the story using the pictures from the book. Timmy completed the task without prompting and the therapist thought the sample was a valid indicator of his current level of oral language. The recorded sample was transcribed and then coded for sentence complexity (SI, see Appendix O) and narrative structure (NSS, see Appendix P). Timmy's sample was compared to samples selected from the Narrative Story Retell database (see Appendix I).

Selected database samples:
    69 samples matched by age: 10;8 - 11;8
    66 samples matched by age and same number of total words (NTW)

SALT ANALYSIS

Database Menu: Standard Measures Report (Figure 9-30)
- *Transcript Length*: Timmy used significantly fewer utterances, words, and time to retell the story than his age-matched peers.
- *Macro Analysis*: Timmy's NSS Composite Score, which measures the structure and content of the narrative, was 1.83 SD below the database mean.
- *Syntax/Morphology*: Timmy's MLU in words and morphemes was lower than his age-matched peers though his SI Composite Score, a measure of sentence complexity, was within the normal range for his age.

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[11] *Timmy FWAY* is one of the sample transcripts included with the software.

Timmy FWAY

TRANSCRIPT INFORMATION	DATABASE INFORMATION
Speaker: Timmy (Child)	Database: Narrative Story Retell
Sample Date:	69 Samples Matched By Age
Current Age: 5;8, Grade: K	66 Samples Cut at 139 Number Total Words
Context: Narration (FWAY)	Context: Narration (FWAY)

STANDARD MEASURES REPORT
Compared to 69 Samples Matched by Age

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
Current Age (5;8)	5.67	-0.10	5.69	5.17	6.17	0.29
TRANSCRIPT LENGTH						
Total Utterances	26 *	-1.35	38.58	22	60	9.30
C&I Verbal Utts	24 *	-1.35	34.87	20	56	8.05
All Words Including Mazes	154 *	-1.72	285.59	150	458	76.57
Elapsed Time (1:54)	1.90 *	-1.71	3.52	1.72	7.03	0.95
INTELLIGIBILITY						
% Intelligible Utterances	96.2%	0.19	94.88	70.59	100.00	6.74
% Intelligible Words	99.3%	0.14	99.17	94.30	100.00	1.13
MACRO ANALYSIS						
NSS Composite Score	13 *	-1.83	18.83	11	26	3.18
SYNTAX/MORPHOLOGY						
MLU in Words	5.79 *	-1.32	6.88	4.93	8.85	0.82
MLU in Morphemes	6.54 *	-1.17	7.62	5.17	9.77	0.93
% Utterances With Verbs	91.7%	-0.76	95.23	80.00	100.00	4.72
Mean Verbs per Utterance	1.13	-0.83	1.25	0.97	1.64	0.15
SI Composite Score	1.05	-0.76	1.10	0.96	1.27	0.07
SEMANTICS						
Number Total Words (NTW)	139 *	-1.67	240.03	125	368	60.46
Number Different Words (NDW)	62 *	-1.62	89.74	55	136	17.15
Moving-Average NTW	100	0.00	100.00	100	100	0.00
Moving-Average NDW	49	0.10	49.01	38	62	4.59
VERBAL FACILITY						
Words per Minute	81.05	-0.13	83.96	28.15	132.12	21.63
Pause Time As % of Total Time	30.7%	0.94	17.75	0.00	59.93	13.71
Maze Words As % of Total Words	4.1%	-0.93	9.69	0.48	25.49	5.96
% Abandoned Utterances	3.8%	0.73	1.98	0.00	13.89	2.55
ERRORS						
% Utterances With Errors	19.2%	0.63	15.01	0.00	27.78	6.74
Number of Omissions	2	0.13	1.81	0	5	1.46
Number of Error Codes	3	-0.52	4.42	0	11	2.74

* At least 1 SD (** 2 SD) from the database mean
Italicized measures count occurrences and can be significantly affected by the different sample lengths.
Calculations based on C&I Verbal Utts: Syntax/Morphology and Semantics sections, Maze Words As % of Total Words
Database selection criteria: Age +/- 6 months (5;2 - 6;2)

Figure 9-30 (*Standard Measures Report* **based on entire transcript)**

- *Semantics*: Timmy's Number of different words (NDW) was 1.62 SD below the database average; however the Moving-Average NDW, a more meaningful comparison of NDW because it is independent of sample length, was within normal limits.
- *Verbal Facility*: Timmy's words per minute (WPM) score was within the normal range for his age. His sample contained very few mazes or a significant number of silent pauses.
- *Errors*: Although about 20% of Timmy's utterances contained errors, this was not significantly more than his age-matched peers.

Based on this report, additional information would be especially valuable in several areas: Macro Analysis (low NSS) and Syntax/Morphology (low MLU). Additional information is provided in subsequent reports.

Database Menu: Narrative Scoring Scheme (Figure 9-31)
Timmy's sample was scored using the Narrative Scoring Scheme (NSS), a tool to assess the structure and content of a narrative (see Appendix P). Timmy's composite score on the NSS was 13 out of 35, which is -1.83 SDs below the mean compared to age-matched peers. Timmy had lower scores on the categories of introduction, mental states, and cohesion. He appeared to have difficulty grasping the structure of the narrative task.

NARRATIVE SCORING SCHEME Compared to 69 Samples Matched by Age							
NSS Category	**Child**		**DATABASE**				
	Score	**+/-SD**	**Mean**	**Min**	**Max**	**SD**	**%SD**
Introduction	1 *	-1.43	2.33	0	4	0.93	40%
Character Development	2	-1.13	2.72	1	4	0.64	23%
Mental States	1 *	-1.31	2.01	1	4	0.78	39%
Referencing	3	0.03	2.97	1	5	0.89	30%
Conflict Resolution	2	-1.52	2.88	1	4	0.58	20%
Cohesion	2 *	-1.79	3.06	2	5	0.59	19%
Conclusion	2	-0.95	2.84	0	5	0.88	31%
NSS Composite Score	13 *	-1.83	18.83	11	26	3.18	17%

* At least 1 SD (** 2 SD) from the database mean
Database selection criteria: age +/- 6 months (5;2 - 6;2)

Figure 9-31

Database Menu: Syntax/Morphology Summary (Figure 9-32 & Figure 9-33)

Timmy's MLU in words and morphemes was lower than his age-matched peers.

The *Syntax/Morphology Summary* from the Database menu (Figure 9-32) was produced to try and gain further information about words and utterances produced in his sample. This report can often assist in determining if there are particular forms that may be the primary contributor to low MLU. Timmy produced more plural and possessive bound morphemes than his age-matched peers retelling the same story and his overall use of bound morphemes is comparable to age-matched peers from the database samples. However, Timmy uses fewer verbs/utterance.

SYNTAX/MORPHOLOGY SUMMARY Calculations Based on C&I Verbal Utts Compared to 66 Samples Equated By Same Number of Total Words						
LANGUAGE MEASURE	**Child**		**DATABASE**			
	Score	**+/-SD**	**Mean**	**Min**	**Max**	**SD**
MLU in Words	5.79 *	-1.25	7.16	4.93	9.33	1.09
MLU in Morphemes	6.54 *	-1.19	7.94	5.21	10.47	1.17
% Utterances With Verbs	91.67	-0.93	96.27	81.48	100.00	4.93
Mean Verbs per Utterance	1.13 *	-1.02	1.33	0.86	1.82	0.20
SI Composite Score	1.05	-0.72	1.12	0.94	1.47	0.11
Number Total Words	139	0.00	139.00	139	139	0.00
Number of Bound Morphemes	18	0.75	15.17	7	26	3.76
/'RE	0	-0.12	0.02	0	1	0.12
/'S	0	-0.41	0.76	0	12	1.87
/'T	0	-0.17	0.05	0	2	0.27
/3S	0	-0.25	0.26	0	6	1.01
/ED	10	0.75	7.82	0	13	2.90
/H'S	0	-0.12	0.02	0	1	0.12
/ING	1	-0.90	3.11	0	12	2.33
/N'T	1	0.10	0.89	0	5	1.08
/S	5 **	2.11	1.97	0	6	1.44
/Z	1 *	1.30	0.29	0	2	0.55
Number of Omitted Words	2 *	1.57	0.67	0	3	0.85
Number of Omitted Bound Morphemes	0	-0.52	0.36	0	4	0.69

* At least 1 SD (** 2 SD) from the database mean
Database selection criteria: Age +/- 6 months (5;2 - 6;2)

Figure 9-32 (*Syntax/Morphology Summary* based on the first 139 words)

The low MLU can be validated by looking at the *Number of Utterances by Utterance Length* distribution table (Figure 9-33). His utterances primarily clustered in length between three and eight words. This seems reasonable since his MLU in words was 5.79.

Timmy FWAY																
TRANSCRIPT INFORMATION Speaker: Timmy (Child) Sample Date: Current Age: 5;8, Grade: K Context: Narration (FWAY)								DATABASE INFORMATION Database: Narrative Story Retell 69 Samples Matched By Age 66 Samples Cut at 139 Number Total Words Context: Narration (FWAY)								

UTTERANCE DISTRIBUTION TABLES
Calculations Based on C&I Verbal Utts
Compared to 66 Samples Equated By Same Number of Total Words

NUMBER OF UTTERANCES BY UTTERANCE LENGTH

Utterance Length in Words

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	0	2	1	3	2	2	5	4	2	0	1	0	2	0	0	0	24
Db Mean	0	0	0	1	3	4	3	3	2	1	1	1	1	0	0	1	21

Utterance Length in Morphemes

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	0	2	1	1	3	1	3	3	6	1	1	0	1	0	0	1	24
Db Mean	0	0	0	1	2	3	3	3	2	2	1	1	1	0	0	1	20

Database selection criteria: Age +/- 6 months (5;2 - 6;2)

Figure 9-33 (*Utterance Distribution Tables* based on utterances in the first 139 words)

Database Menu: Subordination Index (Figure 9-34)

The Subordination Index (SI) was applied to Timmy's sample. The SI is a fast measure of complex syntax, computed by dividing the total number of clauses by total number of C-units (see Appendix O). Timmy yielded a composite score of 1.05 which is within normal limits compared to the database mean. This means that most of his utterances contained one clause.

SUBORDINATION INDEX
Calculations Based on C&I Verbal Utts
Compared to 66 Samples Equated By Same Number of Total Words

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
[SI-0]	0	-0.47	0.21	0	2	0.45
[SI-1]	21 *	1.04	17.00	8	26	3.85
[SI-2]	1	-0.71	2.20	0	7	1.69
[SI-3]	0	-0.39	0.14	0	1	0.35
SI Composite Score	1.05	-0.72	1.12	0.94	1.47	0.11

* At least 1 SD (** 2 SD) from the database mean
Database selection criteria: Age +/- 6 months (5;2 - 6;2)

Figure 9-34

Analyze Menu: Omissions and Error Codes (Figure 9-35)

The *Omissions and Error Codes* report lists all of the omissions and error codes marked in the transcript. In this transcript, there were two omitted words and three word-level errors. According to the *Standard Measures Report* (Figure 9-30), omissions and errors are within normal limits when compared to peers. However, they should be looked at in case there are patterns of errors that could be identified. Notice that all three error codes marked problems with verbs, including two instances of over-generalized past tense verbs.

OMISSIONS AND ERROR CODES Total Utterances 1st Speaker			
	Child		
	Total	Expanded	
Omitted Words	2		
*BRANCHES		1	
*WERE		1	
36 C And they *were look/ing over tree branch/s [SI-1].			
37 C But they were/n't *branches [SI-1].			
Omitted Bound Morphemes	0		
Word-Level Error Codes			
=[EO:=]	2		
LIKEDED|LIKE/ED[EO:LIKED]		1	
ROLLEDED|ROLL/ED[EO:ROLLED]		1	
14 C {C sighs} Well the boy likeded|like/ed[EO:liked] the frog [SI-1].			
26 C And he rolleded|roll/ed[EO:rolled] [SI-1].			
=[EW:=]	1		
WERE[EW:WAS]		1	
48 C And then there were[EW:was] one still down there [SI-1].			
Utterance-Level Error Codes			

Figure 9-35

INTERPRETATION

Performance Profile

Timmy's language production is characterized by low MLU. His sample was far shorter than those of his age-matched peers and his narrative organization and structure scores revealed his story was less mature and effective. This fits the profile of delayed language which is often associated with low MLU and shorter samples.

Challenges

Timmy produced a short narrative with short utterances. His vocabulary use, albeit not significantly lower than his peers, did lack overall diversity and use of verbs. Timmy simply did not talk very much. His short sample contained several errors and he had difficulty with the narrative task. It would be beneficial to elicit another sample, possibly a conversation, to determine if MLU and vocabulary diversity increase.

Strengths

Timmy's sample contained very few mazes and the number of errors produced were not significant compared with his database peers.

Clinical Impressions

Overall, Timmy's sample reveals a reticent talker, possibly because he has not been a successful communicator. His limited verbal output may account for his low scores for syntax and limited ability with narrative structure. He is a fluent speaker with slightly limited lexical diversity, using mostly simple syntax.

Ideas for Intervention

- Set up language-facilitating games to encourage more verbal output
- Provide vocabulary enrichment related to curriculum phrases with increased length and mature forms
- Practice story retell using the NSS scoring categories to teach story structure

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Case Study 6: ALEX

SALT Transcript: Alex 16;7 Con.slt[12]

BACKGROUND

Alex is a 16;7 year-old high school sophomore who has received special education services since age seven for speech and language. In addition, he currently receives support services for math and language arts. His productive language skills are being assessed as part of his three-year Individualized Education Plan (IEP) re-evaluation.

ASSESSMENT MEASURE

A conversational sample was collected as part of an assessment of Alex's spoken language skills. Alex was cooperative throughout the elicitation process. The results are considered to be an accurate representation of his oral language ability. The sample was transcribed using SALT software and SALT transcription conventions. There is no age-matched database comparison for Alex's conversational sample since the Conversational database contains samples from participants in the age range 2;9 to 13;3 (see Appendix G). Two options are available to help interpret the language sample measures. An informal option is to compare his sample to the oldest age group from the Conversation database. It seems reasonable to assume that a 16-year-old should have at least the skills of a 13-year-old. However, there may be unknown factors which come into play suggesting that this might not be a valid comparison. The other option is to use the Analyze menu which produces language measures for Alex and the examiner, but does not include normative data. For this case study we will use the second option and look at his measures independent of the database. To help with interpretation, SALT contains a variety of graphs generated from the SALT reference databases. They are included as PDFs accessible by selecting "Normative Graphs" from the Help menu. For conversational samples, data is presented for ages 3 – 13.

    Criteria: Measures produced from the Analyze menu

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[12] *Alex 16;7 Con* is one of the sample transcripts included with the software.

Alex 16;7 Con
Word Base: Exclude ((parenthetical remarks))

STANDARD MEASURES REPORT	Child	Examiner
TRANSCRIPT LENGTH		
Total Utterances	70	38
Analysis Set (C&I Verbal Utts)	65	35
All Words Including Mazes	672	133
Elapsed Time	(4:05)	4.08
INTELLIGIBILITY		
% Intelligible Utterances	98.6%	100%
% Intelligible Words	99.8%	100%
SYNTAX/MORPHOLOGY		
MLU in Words	8.78	3.63
MLU in Morphemes	9.58	3.83
% Utterances With Verbs	90.8%	45.7%
Mean Verbs per Utterance	1.77	0.71
SI Composite Score	1.33	---
SEMANTICS		
Number Total Words (NTW)	571	127
Number Different Words (NDW)	217	73
Moving-Average NTW	100	100
Moving-Average NDW	63	61
DISCOURSE		
Mean Turn Length (utterances)	3.04	1.81
Mean Turn Length (words)	25.87	6.29
% Responses to Questions	66.7%	0.0%
% Responses to Intonation Prompts	---	---
% Utts With Overlapping Speech	11.4%	23.7%
% Utts Interrupted Other Speaker	1.4%	2.6%
VERBAL FACILITY		
Words/Minute	164.57	32.57
Pause Time As % of Total Time	0.8%	
Maze Words As % of Total Words	13.1%	0.8%
% Abandoned Utterances	4.3%	0.0%
ERRORS		
% Utterances With Errors	7.1%	0.0%
Number of Omissions	0	0
Number of Error Codes	5	0

Calculations based on C&I Verbal Utts: Syntax/Morphology and Semantics sections, Maze Words

Figure 9-36

Analyze Menu: Standard Measures Report (Figure 9-36)

The *Standard Measures Report* is an overview report showing scores for each of the standard language measures. Data from the normative graphs computed from the SALT Conversation database (Appendix G) for 13-year-olds (13;0 – 13;11) are used below to help with interpretation.

- *Transcript Length*: Alex produced a total of 70 utterances in his four-minute, five-second sample; twice as many utterances as the examiner.
- *Intelligibility*: There were no significant issues with intelligibility.
- *Syntax/Morphology*: Alex's MLUw was 8.78, which is likely within normal limits considering the context of the sample (conversation) and his age (16;7). His SI Composite Score indicates that his utterances contained an average of 1.33 clauses. Note that the normative graphs for 13-year-olds show a mean MLUw of 6.0 and a mean SI composite score of 1.2.
- *Semantics*: His Moving-Average NDW (number of different words based on a window of 100 words) was 63, an indication that his vocabulary diversity was adequate. Note that the normative data graph for ages 7 - 13 show a mean Moving-Average NDW of approximately 60.

- *Discourse*: Alex's turn length in words was 25.87 compared to the examiner's 6.29 words. Alex responded to just 67% of questions posed by the examiner. Note that the normative data graph 13-year-olds show a mean turn length in words of 12.4 and a mean response to questions of 85%.
- *Verbal Facility*: Alex's speaking rate, measured in words per minute (WPM), appeared elevated at 164.57. His % mazes (maze words as a % of total words) was 13.1%. Note that the normative data for 13-year-olds show mean WPM of 116 and mean % mazes of 8%.
- *Errors*: There were five error codes in the sample; 7.1% of Alex's utterances contained one or more errors. Note that the normative data graph for 13-year-olds shows mean % utterances with errors of just over 5%.

Additional information is provided in subsequent reports.

Analyze Menu: Standard Utterance Lists → Questions (Figure 9-37)

Alex's low response to questions prompts a closer look. The *Standard Utterance Lists*, selected from the Analyze menu, displays lists of various types of utterances, including *Questions*, as well as their context within the sample. Using SALT to display the examiner's questions along with the two subsequent entries is revealing. After examining these utterances more closely and listening to the audio, Alex's low rate of responses to questions was likely due to the examiner asking consecutive questions. Alex did not have the opportunity to respond before the next question was asked. His failure to respond to questions was pragmatically appropriate.

STANDARD UTTERANCE LISTS
Total Utterances
2nd Speaker

Questions

11	E Can you tell me anything else about the Badger/s?
12	C (Um) they/'re my favorite team.
13	E Mhm.
28	E Anything else you wanna tell me about sport/s?
29	E What get/3s you really excited?
30	C (Um) mostly (uh) it get/3s me excited when (uh) I hear that I can go somewhere.
31	E <Like> where?
32	C <Like i*>>
33	E Like <tell me>, <tell me>^
36	E <Have you> ever had to do that?
37	C Yes, I have.
38	C (I d* I d*) I had the chance (w*) this year, in January, to go when the Minnesota game was, with Ms_Fifer.
59	E So your favorite part was kind of see/ing what the coach was gonna say?
60	E What <Bo_Ryan> said to the player/s.
61	C <Yeah>.

Figure 9-37

Analyze Menu: Verbal Facility Summary (Figure 9-38)

Thirteen percent of Alex's total words were contained in mazes, which is higher than expected (8% is typical for 13-year-olds) and interferes with getting his intended message across. His mazes averaged 2.10 words in length. The mazes consisted primarily of phrase-level revisions. Filled pauses, e.g., *er* and *um*, were also frequent throughout Alex's sample.

VERBAL FACILITY SUMMARY					
	Child			**Examiner**	
RATE SUMMARY					
Elapsed Time: 4 minutes 5 seconds					
Words per Minute	164.57			32.57	
Utterances per Minute	17.14			9.31	
PAUSE SUMMARY					
Pause Time As % of Total Time: 0.8%					
Pauses Within Utterances	**Main Body**	**Mazes**		**Main Body**	**Mazes**
No. of pauses	0	0		0	0
Pauses Between Utterances	**Within Turn**	**Preceding Turn**		**Within Turn**	**Preceding Turn**
No. of pauses	0	0		1	0
Total pause time	---	---		0:02	---
Average pause time	---	---		0:02	---

	Child			**Examiner**	
	Analysis Set	**Total Utterances**		**Analysis Set**	**Total Utterances**
MAZE SUMMARY					
Total Maze Words	86	89		1	1
Maze Words As % of Total Words	13.1%	13.0%		0.8%	0.8%
Total Number of Mazes	41	43		1	1
Average Words per Maze	2.10	2.07		1.00	1.00
Average Mazes per Utterance	0.63	0.61		0.03	0.03
Utterances With Mazes	29	31		1	1
Utts With Mazes As % of Total Verbal Utts	44.6%	44.3%		2.9%	2.8%
Total Maze Components	50	53		1	1
Revisions — Part Word	2	2		0	0
Revisions — Word	7	7		1	1
Revisions — Phrase	11	11		0	0
Repetitions — Part Word	2	4		0	0
Repetitions — Word	1	1		0	0
Repetitions — Phrase	3	3		0	0
Filled Pauses — Single Word	23	24		0	0
Filled Pauses — Multiple Words	1	1		0	0
Maze Components As % of Total Components	8.1%	8.2%		0.8%	0.8%
ABANDONED UTTERANCES					
% Abandoned Utterances	4.3%			0.0%	
Number of Abandoned Utterances	3			0	

Figure 9-38

Analyze Menu: Utterance Code Table (Figure 9-39)

There were three utterance-level errors in Alex's language sample. These utterances are shown in the *Utterance Code Table* for further investigation. Alex switched tenses within the same utterance. This occurred when he attempted longer (more complex) utterances as in the first utterance shown in the table. This tendency to switch tenses makes utterances awkward and difficult to comprehend

UTTERANCE CODE TABLE Error Codes Only Table Expanded by Utterances			
	Child	**Examiner**	
[EU]	3	0	
C And we were sit/ing down right where they are, near the Coach_Ryan and Coach_Gard before they/'re done play/ing the game [EU].			
C And what I was amazed about is that (he talk/3s about) at the end I/'ve never heard what he say/3s [EU].			
C He last/ed until the sixth inning to do that with (nothing nothing) score nothing nothing [EU].			

Figure 9-39

Analyze Menu: Subordination Index (Figure 9-40)

The Subordination Index (SI) was completed on Alex's sample. The SI measures clausal density and is computed by dividing the total number of clauses by total number of C-units (see Appendix O). Alex scored a 1.3, meaning most of his utterances consisted of one clause (40 utterances with a score of SI-1). Alex had nine utterances with two clauses and five utterances with three clauses.

SUBORDINATION INDEX		
	Child	**Examiner**
[SI-0]	1	0
[SI-1]	40	0
[SI-2]	9	0
[SI-3]	5	0
SI Score	1.33	---

Figure 9-40

Explore Menu: Utterances Coded as [SI-3] (Figure 9-41)

The Explore menu was used to pull up the five utterances which contained three clauses (coded as [SI-3]). Four of the five utterances contained direct quotes which increased the number of clauses without, necessarily, increasing sentence complexity.

Alex 16;7 Con
Word base: Exclude ((parenthetical remarks))
Analysis Set: C&I Verbal Utts

Explore Words and Codes C&I Verbal Utts - Main body		
	Child	
[SI-3]	5	
30 C (Um) mostly (uh) it get/3s me excited when (uh) I hear that I can go somewhere [SI-3].		
54 C I thought he/'d just say, "Nice job" and, "(Go in the locker) go into your (uh) locker and get changed" [SI-3].		
103 C And then I was like, "Oh, I don't think I wanna watch this anymore" [SI-3].		
107 C When I call/ed her, she was like, "Stop watching it" [SI-3].		
110 C And I/'m like, "Yeah, I guess you/'re right" [SI-3].		
Total Frequency	5	
Isolated codes are word and utterance codes		

Figure 9-41

INTERPRETATION

Performance Profile
Alex's sample showed a fast speaking rate with low semantic content. This profile of language disorder features accelerated speaking rate (high WPM), high turn length, high MLU, and less complex sentence use. It is supported by Alex's elevated turn length which was more than four times longer than the examiner's turns. His messages were not always effectively completed as indicated by frequent rephrasing, circumlocutions, and filled pauses. He also had limited content given his high MLU and NDW, and less mature clausal structure.

Strengths
Alex used a variety of words in his language sample as seen by the high NDW. He was friendly and completed the task with enthusiasm. He also stayed on topic during the conversation, and responded appropriately to questions.

Challenges
Alex's speaking rate was fast which made his language hard to follow at times. Alex talked more than twice as much as his conversational partner. He tended to be verbose and didn't often allow his speaking partner to "chime in." He tended to rush to complete his thoughts as evidenced by revised word selection and sentence structure as well as utterance-level errors. Combined, these characteristics made his language relatively difficult to understand. Alex's SI score indicated that he

used mostly one-clause utterances, a simplified sentence structure. His utterance-level errors occurred when he attempted longer, more complex utterances.

Clinical Impressions

This conversational sample allowed for careful examination of Alex's speaking rate in relation to a speaking partner, his responsiveness to that partner, and his ability to express coherent utterances syntactically and semantically. The sample showed overall thought organization problems since Alex's mazes consisted mostly of phrase-level revisions and filled pauses. With repeated samples, his progress on intervention goals can be tracked. It might also be beneficial to elicit an expository sample to monitor his progress. An expository sample might better provide an opportunity to examine semantic content, syntax, and overall text organization.

Ideas for Intervention

- Organization: language-based planning activities using the expository template or the narrative scoring categories as targets
- Generate utterances using various subordinating conjunctions to create more complex sentences
- Guided speaking rate practice using a metronome or digital counter
- Practice slower speaking rate with known content like story retelling or expository tasks

SALT Transcripts: Sam DDS Pre.slt & Sam DDS Post.slt[13]

This case study was contributed by Maureen Gonter, M.S., CCC-SLP and Jane Morgan, M.S. Speech and Language/AVID Resource Teacher from Madison Metropolitan School District.

BACKGROUND: RtI PROGRAM

This case study is an example of how to use language sample analysis as part of assessing a Response to Intervention (RtI)[14] program. This RtI study was completed with 6th grade students who were selected based on:
- lower scores on 5th grade Wisconsin Knowledge and Concept Examination (WKCE), a state standardized test
- 6th grade Scholastic Reading Inventory score (fall semester)
- teacher recommendations based on moderate difficulty meeting 6th grade standards across academic areas
- outcomes of Assessment of Classroom Communication and Study Skills, a 6th grade whole class screener

Students in the RtI program were involved in a literacy intervention group and were seen for 15 sessions over 10 weeks during the course of one school quarter. The students received Tier 2 literacy instruction focusing on four areas: reading, writing, listening, and speaking. The focus of the intervention was to teach the students specific strategies and then give them opportunities to practice and apply the strategies to classroom activities and tasks. For example, the students were given a strategy to use in the classroom to signal to the teacher if they were having difficulty with vocabulary (make a "v" with two fingers) or understanding content/ideas (make a "w" for "what?" with three fingers). In this case study we look at one specific student, Sam, and his response to intervention.

BACKGROUND

In the classroom, Sam struggles with staying focused and on task. He engages in off-task behaviors which distract others such as humming and singing. He particularly struggles with attention and focus during math. Teachers believe this is because math is a more challenging subject for him. If the task is more engaging, Sam is better able to focus. He sometimes does not attempt tasks if he feels he will not be successful. He tends to do better on tasks that allow him to be creative. His language sample scores seem to reflect his functioning in the classroom (as measured by the Assessment of Classroom Communication and Study Skills) better than the results of his standardized testing.

STANDARDIZED TEST INFORMATION

Peabody Picture Vocabulary Test-4th Edition (PPVT-4), Form A
Pre RtI Therapy Program:
- Standard Score: 104,
- Percentile: 61
- Age Equivalent: 13;5

Score on the on the PPVT-4 was within normal range. Sam used verbal mediation throughout this assessment. He would comment about word parts, rhymes, or other connections he could make as he tried to figure out the meaning of an unfamiliar word.

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[13] *Sam DDS Pre* and *Sam DDS Post* are sample transcripts included with the software.

[14] Response to Intervention is a variation of an old diagnostic method formerly known as Diagnostic Therapy (Miller, 1981) and later as Dynamic Assessment (Olswang, Bain, & Johnson, 1991).

INFORMAL MEASURES

Assessment of Classroom Communication and Study Skills
- Reading Comprehension   1 of 4 points
- Following Directions   7 of 20 points
- Language Detective   2 of 5 points
- Vocabulary   8 of 10 points

- Total   18 of 39 points
- Percentage   46%   (> 70 % is considered passing)

Narrative Language Sample
Sam retold the story *Doctor De Soto* (Steig, 1982) using the book with the text covered as per the elicitation protocol (see Appendix I). A retell sample was collected at the beginning of the RtI program and then again after participating in the 8-10 week intervention.

The focus in this case study is on the differences seen between the pre and post intervention language samples. Using the Link menu in SALT, Sam's pre and post samples were linked for side-by-side analysis with the samples equated by the same number of total words (NTW = 545). Sam's linked samples were compared to age-matched peers retelling the same story selected from the Narrative Story Retell database (see Appendix I).

Selected database samples Pre RtI:
    79 samples matched by age: 11;7 – 12;7
    31 samples matched by age and same number of total words (NTW)

Selected database samples Post RtI:
    55 samples matched by age: 11;10 – 12;8
    24 samples matched by age and same number of total words (NTW)

SALT ANALYSIS

<u>Database Menu: Standard Measures Report</u> **(Figure 9-42)**
The *Standard Measures Report* shows the results of the pre and post samples with the relevant standard scores for each of the standard measures.
- *Transcript Length*: In each story retell Sam used an adequate number of utterances and retold the narrative in average elapsed time.
- *Macro Analysis*: Sam's NSS Composite Score, which measures narrative structure and content, increased from 17 (1.79 SD below the database mean) to within normal limits at 26 (0.34 SD above the database mean).
- *Syntax/Morphology*: His mean length of utterance in morphemes (MLUm) was low in both retells. MLUm was 9.27 (1.32 SDs below the mean) on his first retell which but increased to 10.33 (0.69 SD below the database mean) on his second retell. His SI Composite Score, a measure of clausal density, was also low for both retells, but increased from 1.20 in the first retell to 1.43 in the second retell.

Sam DDS Pre & Sam DDS Post
Word Base: Exclude ((parenthetical remarks))

	PRE RTI Sample Date: 1/11/2011 Current Age: 12;1, Grade: 6 Context: Narration (DDS) Database: Narrative Story Retell 79/31 Database samples			POST RTI Sample Date: 4/15/2011 Current Age: 12;4, Grade: 6 Context: Narration (DDS) Database: Narrative Story Retell 55/24 Database samples		

STANDARD MEASURES REPORT
Compared to 79/55 Samples Matched by Age

LANGUAGE MEASURE	Pre RtI			Post RtI		
		Score	+/-SD		Score	+/-SD
Current Age	(12;1)	12.08	0.11	(12;4)	12.33	0.37
TRANSCRIPT LENGTH						
Total Utterances		68	0.88		64	0.59
C&I Verbal Utts		66	0.83		61	0.46
All Words Including Mazes		732	0.85		695	0.48
Elapsed Time (minutes)	(5:17)	5.28	-0.02	(6:03)	6.05	0.33
INTELLIGIBILITY						
% Intelligible Utterances		97.1% *	-1.01		100%	0.46
% Intelligible Words		99.6% *	-1.36		100%	0.46
MACRO ANALYSIS						
NSS Composite Score		17 *	-1.79		26	0.34
SYNTAX/MORPHOLOGY						
MLU in Words		8.26 *	-1.46		8.93 *	-1.01
MLU in Morphemes		9.27 *	-1.32		10.33	-0.69
% Utterances With Verbs		97.0%	-0.46		100%	0.87
Mean Verbs per Utterance		1.59 *	-1.69		1.66 *	-1.49
SI Composite Score		1.20 *	-1.96		1.43	-0.56
SEMANTICS						
Number Total Words (NTW)		545	0.06		545	-0.04
Number Different Words (NDW)		174	-0.19		193	0.18
Moving-Average NTW		100	0.00		100	0.00
Moving-Average NDW		59	-0.21		57	-0.66
VERBAL FACILITY						
Words per Minute		138.55	0.72		114.88	-0.09
Pause Time As % of Total Time		3.5%	-0.86		12.9%	0.13
Maze Words As % of Total Words		18.5% *	1.96		21.7% **	2.45
% Abandoned Utterances		0.0%	-0.55		0.0%	-0.60
ERRORS						
% Utterances With Errors		8.8%	-0.04		9.4%	0.02
Number of Omissions		4 *	1.05		0	-0.72
Number of Error Codes		3	-0.14		6	0.80

* At least 1 SD (** 2 SD) from the database mean
Italicized measures count occurrences and can be significantly affected by the different sample lengths.
Calculations based on C&I Verbal Utts: Syntax/Morphology and Semantics sections, Maze Words As % of Total Words
Pre RtI: Database selection criteria: Age +/- 6 months (11;7 - 12;7)
Post RtI: Database selection criteria: Age +/- 6 months (11;10 - 12;8)

Figure 9-42 *Standard Measures Report* based on entire transcript

- *Semantics*: Sam used a higher number of different words (NDW) on his second sample.
- *Verbal Facility*: Areas of challenge included increased pause times and increased mazes. Sam's pause time increased significantly from 3.5% of total time on his first sample to 12.9% on the second sample, although both were within normal limits. Sam's mazes also increased in the second sample – from 18.5% of words to 21.7%.
- *Errors*: Sam's first retell contained 4 omissions while there were no omissions in his second retell. Error codes, however, increased from 3 in his first retell to 6 in his second retell even though the number of errors was within normal limits

Additional information is provided in subsequent reports.

Database Menu: Narrative Scoring Scheme (Figure 9-43)

Sam's sample was scored using the Narrative Scoring Scheme (NSS, see Appendix P) specific to the story *Doctor De Soto*. The NSS is a tool to assess the structure and content of a narrative. The narrative is scored on seven features of a narrative such as introduction, character development, mental states, and referencing, for a total of 35 possible points. Sam's composite score on the NSS was 17 (1.79 standard deviations *below* the mean) on the first assessment and increased to 26 (0.34 standard deviations *above* the mean) on the post-therapy assessment.

NARRATIVE SCORING SCHEME Compared to 79/55 Samples Matched by Age					
NSS Category	**Pre RtI**			**Post RtI**	
	Score	**+/-SD**		**Score**	**+/-SD**
Introduction	2 *	-1.90		4	0.52
Character Development	2 **	-2.10		3	-0.74
Mental States	2 *	-1.69		3	-0.47
Referencing	2 **	-2.15		3	-0.61
Conflict Resolution	3	-0.76		4	0.68
Cohesion	2 **	-2.01		4	0.64
Conclusion	4	0.43		5 *	1.65
NSS Composite Score	17 *	-1.79		26	0.34

*At least 1 SD (** 2 SD) from the database mean*
Pre RtI: Database selection criteria: Age +/- 6 months (11;7 - 12;7)
Post RtI: Database selection criteria: Age +/- 6 months (11;10 - 12;8)

Figure 9-43

Database Menu: Subordination Index (Figure 9-44)

The Subordination Index (SI, see Appendix O) measures clausal density and is computed by dividing the total number of clauses by total number of C-units. The SI was calculated and compared to the database of peers for both pre and post intervention assessment. The pre-treatment score was 1.20 (1.90 standard deviations below the mean) and the post-treatment score was 1.43 (0.67 standard deviations below the mean) indicating that Sam used utterances with more clauses, i.e., increased syntactic complexity, in the post-intervention sample. He had more scores of [SI-2] and [SI-3] in the second sample. His scores showed a decrease in utterances marked as [SI-0].

SUBORDINATION INDEX Calculations Based on C&I Verbal Utts Compared to 31/24 Samples Equated By Same Number of Total Words					
LANGUAGE MEASURE	**Pre RtI**			**Post RtI**	
	Score	**+/-SD**		**Score**	**+/-SD**
[SI-0]	3 **	3.67		0	-0.34
[SI-1]	46 *	1.37		39	0.75
[SI-2]	14	-0.36		18	0.63
[SI-3]	1 *	-1.60		4	-0.17
[SI-4]	0	-0.94		0	-0.81
[SI-5]	0	-0.53		0	-0.63
SI Composite Score	1.20 *	-1.90		1.43	-0.67

*At least 1 SD (** 2 SD) from the database mean*
Database selection criteria: Age +/- 6 months (11;7 - 12;7)

Figure 9-44 *SI* based on first 545 words

Database Menu: Verbal Facility Summary (Figure 9-45)

The *Verbal Facility Summary* indicated that Sam used an abundance of pauses during his second story retell as compared to his first story retell. Over 12 percent of his total time retelling the story was spent in a pause. He had 12 pauses throughout his language sample. This is in stark contrast to his first story retell where he rarely paused. Sam used more mazes in his second sample than his first. His percent maze words to total words increased from 18.5% to 21.7%. His mazes were mostly phrase revisions which may indicate utterance formulation difficulty

VERBAL FACILITY SUMMARY
Compared to 31/24 Samples Equated By Same Number of Total Words

LANGUAGE MEASURE		Pre RtI		Post RtI	
		Score	+/-SD	Score	+/-SD
RATE SUMMARY					
Elapsed Time (minutes)		(5:17) 5.28	0.58	(6:03) 6.05 *	1.74
Words per Minute		138.55	0.62	114.88	-0.70
Utterances per Minute		12.87	0.45	10.58	-0.44
PAUSE SUMMARY					
Pause Time As % of Total Time		3.5%	-0.68	12.9% *	1.03
Pauses Within Utterances					
No. of pauses		0	-0.51	12 **	5.81
Total pause time (seconds)		---		31 **	5.69
Average pause time (seconds)		---		2.58	-0.29
Pauses Between Utterances					
No. of pauses		3	-0.65	7	0.20
Total pause time (seconds)		11	-0.48	16	-0.25
Average pause time (seconds)		3.67	0.57	2.29 *	-1.07
MAZE SUMMARY					
Total Maze Words		124 **	2.41	151 **	3.22
Maze Words As % of Total Words		18.5% **	2.28	21.7% **	2.93
Total Number of Mazes		49 **	2.00	50 **	2.06
Average Words per Maze		2.53 *	1.34	3.02 **	2.31
Average Mazes per Utterance		0.74 *	1.09	0.82 *	1.49
Utterances With Mazes		30 *	1.24	35 *	1.95
Utts With Mazes As % of Total Verbal Utts		45.5%	0.42	57.4% *	1.44
Total Maze Components		58 *	1.96	72 **	3.16
Revisions	Part Word	4	0.37	5	0.83
	Word	9 *	1.65	5	0.16
	Phrase	23 **	2.48	26 **	2.90
Repetitions	Part Word	0	-0.95	3	0.66
	Word	3	-0.02	7 *	1.57
	Phrase	3	0.42	5 *	1.63
Filled Pauses	Single Word	15	0.96	20 *	1.62
	Multiple Words	1 **	2.04	1 *	1.73
Maze Components As % of Total Components		9.6% *	1.89	0.0% **	-2.73
ABANDONED UTTERANCES					
% Abandoned Utterances		0.0%	-0.53	0.0%	-0.62
Number of Abandoned Utterances		0	-0.55	0	-0.63

* At least 1 SD (** 2 SD) from the database mean
Calculations based on C&I Verbal Utts: Maze Summary section
Pre RtI: Database selection criteria: Age +/- 6 months (11;7 - 12;7)
Post RtI: Database selection criteria: Age +/- 6 months (11;10 - 12;8)

Figure 9-45

Analyze Menu: Standard Utterance Lists (Figure 9-46 & Figure 9-47)

The *Standard Utterance Lists*, selected from the Analyze menu, displays lists of various types of utterances, including *utterances with errors* and *utterances with parenthetical remarks*.

- Standard Utterance Lists → Error Codes (Figure 9-46)
  There were more word-level errors in the second sample than the first with an increase from three errors to six. The errors that Sam made seemed to be varied with no specific pattern. His language sample included errors in overgeneralization, word choice, conjunctions, and tense markers.

Utterances with Error Codes	
Pre RtI	
50	C Then he was say/ing (stuff like) delicious and stuff and (the fox I mean) the mouses[EO:mice] (knew what they were talk/ing) knew (he) what he was dream/ing about [SI-2].
64	C (The wife come/3s) the mouse come/3s[EW:Go/3s] into the mouth [SI-1].
65	C And the fox close/3s and saying[EW:says] "I/'m just kidding" [SI-2].
Post RtI	
17	C And (he work/ed um) he work/ed with patient/s that are[EW:were] (a*) other animal/s [SI-2].
19	C And in this picture (he/'s stand/ing on) he use/3s a ladder on[EW:for] (um) tall animal/s or bigger animal/s [SI-1].
25	C (And s*) and he has (rubber um rubber um ((what are they called)) :03 these rubber) these[EW:this] rubber (glove thing/s) stuff that go/3s over his feet so he does/n't get his feet wet [SI-3].
28	C They look down[EW:out] the window [SI-1].
63	C Over here they/'re talk/ing about (how he) if[EW:whether] he might eat them [SI-2].
86	C And the fox[EW:mouse] climb/3s up into the fox/z mouth and start/3s painting all the teeth with the formula [SI-1].

Figure 9-46

Utterances with Parenthetical Remarks	
Pre RtI	
14	C (Um Dr_Sukudo) ((wait, what/'s his name)) <> (De_soto) Dr_De_Soto, (um he was being) he/'s just a really nice doctor in this page.
30	C And then the (dr_sudo*) ((I/'m just going to say doctor)) <> (um) doctor saw this fox he said he did/n't want to *treat.
40	C (He was wash/ing) ((I don/'t remember this page)) he was wash/ing his hand/s get/ing all ready.
44	C They saw that tooth ((I don't remember the name something with a v, I think)).
59	C And on this page they/'re just talk/ing about stuff ((I don't remember)).
74	C And (they/'re say/ing and he was think/ing) ((I think it was on this page)) he was thinking um sure he did/n't want any tooth pain/s anymore.
77	C And ((ugh I don/'t remember)) (she/'s) the fox (is just think/ing xx oh yeah he) was think/ing yeah, I/'m going to eat them.
86	C And (then the fox is I mean the doctor is say/ing um) ((x be on the page)) the doctor was say/ing "yeah you won't be able to open you mouth for one (to or) to two days".
89	C And (the two the two mouse doctor/s) ((I missed this one part)) (the two doc*) the two (doctor/s were) dentist/s (um) were happy.
Post RtI	
25	C (And s*) and he has (rubber um rubber um ((what are they called)) :03 these rubber) these[EW:this] rubber (glove thing/s) stuff that go/3s over his feet so he does/n't get his feet wet.
30	C ((I don't know what/'s go/ing on here)).
42	C (He/'s) ((I don't know)) he/'s wash/ing his hand/s.
47	C ((I think)).
62	C ((I think)).

Figure 9-47

- Standard Utterance Lists → Parenthetical Remarks (Figure 9-47)
  Parenthetical remarks are comments that to do not contribute to the story. They are excluded from analysis and marked in ((double parentheses)). Sam used an abundance of parentheticals that mostly related to word retrieval or perhaps working memory difficulty. He specifically stated, "What's his name?", "I'm just going to say doctor", "I don't remember", and "I don't know." There were significantly less parenthetical remarks in the second sample than in the first sample.

INTERPRETATION

Performance Profile

Sam's oral language skills best fit with the word retrieval and utterance formulation profile. His language samples are characterized by increased mazes and frequent utterances where Sam stated he "can't remember" words. Additionally, Sam's samples were marked by pauses that occurred within utterances, usually within mazes, which indicates utterance formulation difficulty.

Strengths

Subsequent to the intervention phase, Sam's MLU in words increased as did his syntactic complexity and vocabulary diversity. He had a decrease in word omissions. He improved his Subordination Index score indicating that he used more complex utterances after completing the intervention. He also increased his narrative structure and content score demonstrating improved organization and content of his narrative. He also increased the structural components of his narrative in the areas of cohesion, introduction, and conclusion.

Challenges

Sam was responsive to intervention as seen by the many areas of improvement. However, he continues to demonstrate difficulty with organization, word retrieval, and utterance formulation. He also had significant amount of pausing. Difficulty in these areas was highlighted in his second narrative retell. As many of his syntactic and semantic features improved, he demonstrated increased difficulty with mazes and pauses. He used more complex syntax with richer vocabulary but with more difficulty.

Clinical Impressions

Sam's attempts at longer and more complex utterances support that he is generalizing his increase in MLU and NDW, the strategies learned, and the general language learning from the intervention program. As he attempted the longer and more complex utterances, his mazes, pauses, and utterance-level errors increased. These increases likely reflect the production challenges to Sam's language system and his struggle to put what was learned into practice. Sam's improved NSS and SI scores also support these impressions.

Sam would most likely not be a candidate for speech and language programming within a special education program since he was responsive to intervention and many of his language measures are now within functional limits. As Sam begins 7th grade the following suggestions might help him be more successful in his academic classes:

Ideas for Intervention

- Consult with parents at the start of the school year to provide word retrieval and language formulation strategies.
- Encourage Sam to take his time to formulate and organize thoughts before speaking.
- Consult with teachers to provide reminders and cues to use with Sam during classroom discussions and/or presentations.
- Suggest placement in a supported Social Studies classroom where large group vocabulary instruction and language activities occur once per month. Keep monthly data to monitor his progress.
- Provide Sam with a visual reminder of the RtI strategies to be kept in his planner