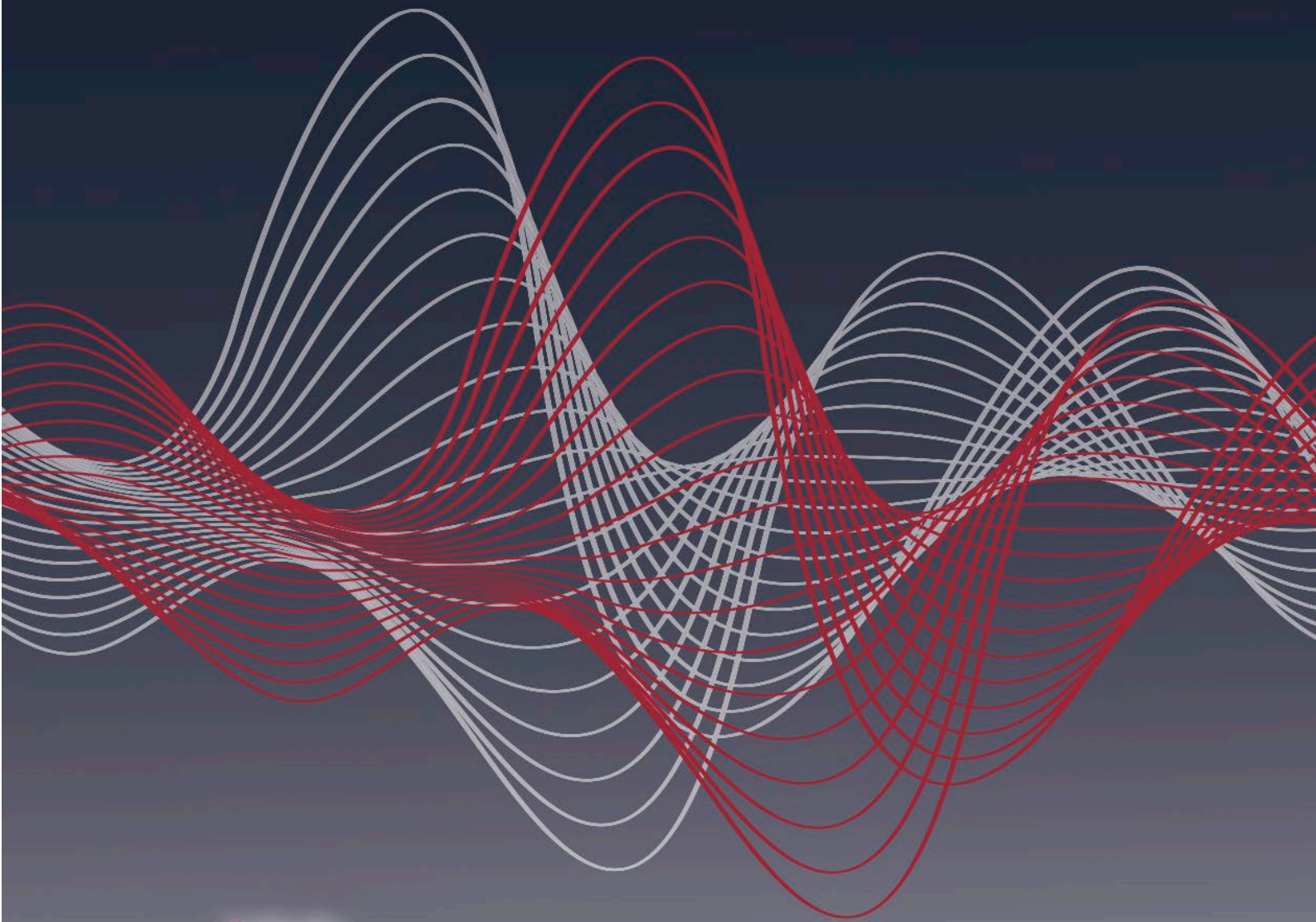
NEW ZEALAND - AUSTRALIA VERSION

ASSESSING LANGUAGE PRODUCTION USING SALT SOFTWARE

A Clinician's Guide to Language Sample Analysis



3RD EDITION

JON F. MILLER KAREN ANDRIACCHI ANN NOCKERTS
MARLEEN WESTERVELD GAIL GILLON

ASSESSING LANGUAGE PRODUCTION USING SALT SOFTWARE AUSTRALIA / NEW ZEALAND VERSION

A Clinician's Guide to Language Sample Analysis

Edited by: Jon F. Miller, Karen Andriacchi, Ann Nockerts, Marleen Westerveld, & Gail Gillon

Chapters contributed by
Chapters 1–6: Jon F. Miller, Karen Andriacchi, and Ann Nockerts
Chapter 7: Marleen Westerveld and Gail Gillon
Chapter 8: Joyelle DiVall-Rayan, Jon F. Miller, Karen Andriacchi, and Ann Nockerts
Chapter 9: Marleen Westerveld, Anne van Bysterveldt, Joyelle DiVall-Rayan, and Jon F. Miller

Published by SALT Software LLC, Madison, WI.

Publication History:
May, 2012: New Zealand Version, First Edition.
April, 2016: Australia/New Zealand Version, Second Edition.
January 2020: Australia/New Zealand Version, Third Edition.

SALT Software, LLC
414 D'Onofrio Drive
Madison, WI 53719

www.saltsoftware.com

FOREWORD TO AU/NZ VERSION

It is with great pleasure that we bring you the third edition of the Australia/New Zealand version of *Assessing Language Production using SALT software: A Clinician's Guide to Language Sample Analysis.*

We unreservedly endorse the view that language sample analysis is best practice in the assessment and verification of language disorders and have been pleased to notice a slow but steady shift away from relying on standardized test results to make a diagnosis. Instead, as outlined in the recently published CATALISE papers (Bishop et al., 2016; 2017), assessment needs to draw upon multiple sources of information. Computer-aided analysis of naturalistic language samples clearly saves time (see also Pezold, Imgrund, & Storkel, 2020) and provides a wealth of data to facilitate the identification of language disorders and to enable detailed goal setting and progress monitoring.

This Australia/New Zealand version of the manual differs from the US version in several ways. It does not include chapters related to assessing the Spanish/English population or describing the dialect features of AAE. Instead we have added a chapter (Chapter 7) outlining how to use the New Zealand – Australia databases and have incorporated NZ-AU specific examples in Chapter 9. We have also embedded information relevant to the Australian / New Zealand context throughout the guide.

Acknowledgements
In 2019, we celebrated our 20-year partnership with the founders of SALT Software, LLC, Professor Emeritus Jon Miller and Ann Nockerts. Without their enduring support, we would not have been able to create our suite of language sample databases collected from Australian and New Zealand children and adolescents using culturally appropriate language sample protocols. By allowing us to embed these databases into the SALT software program, we now have access to an invaluable tool that will no doubt enhance clinical practice. We also wish to thank all the speech pathologists involved in collecting the language samples that have been included in the NZ-AU reference databases.

Marleen Westerveld
January 2020

FOREWORD

This 3rd Edition of the SALT text brings you all the details you need to master language sample analysis in the most expeditious manner using the most recent version of the software, SALT 20. The chapters detail the process, the reference databases, and specific issues you will face in practice. There are chapters covering how to code dialect, fluency, and written language. And there is a chapter filled with case studies that will shed enormous light on just how important language sample analysis (LSA) is to the diagnostic process. Use the material in this text to supplement the free online training materials available on the SALT website.

Our aim has always been a strong dedication to improving and facilitating the assessment of language acquisition and disorders through the use of language sampling. We are happy to report the use of LSA in research and practice continues to increase and is considered part of best practice in the assessment of Spoken Language Disorders.

Communication is central to daily living, whether in person, in writing, or via phone, FaceTime, or social media platforms. Good communication skills are essential at work or in school, at home or with friends. And LSA is the most comprehensive and authentic method of evaluating spoken communication skills. In the school setting, LSA provides you the opportunity to assess student language within contexts fundamental to the curriculum; conversation, narration, exposition, and persuasion. It helps you understand how student language skills compare with peers', documenting strengths and weaknesses. LSA can be used to track progress, validate other assessments, and support the need for services or dismissal from services.

Although we've streamlined the process of LSA, we understand there is time and effort involved in eliciting and transcribing language samples. The arguments for putting in the time and effort far outweigh skipping the process or minimizing it to an extreme. The outcomes from a thorough analysis of the language produced, in the manner in which it was spoken, yield a valid picture of real-life communication skills. No other method of assessment can do this. Someday we may have speech recognition software that takes a recorded sample and accurately converts it to text - every part we are interested in - the filled pauses, repetitions, revisions, part-word productions, and the errors. At present, this technology is not available. So we take the time to elicit and transcribe our language samples, and use SALT to quickly and easily generate the assessment reports. We continue to use best practices in the assessment of spoken language.

Because this text is in your hands, it is our hope that you will be a user and proponent of LSA in your practice. Whether you work with children or adults, assessment of spoken language should include a look at functional, natural language production in real-life contexts via language sample analysis.

Acknowledgements

This book could not have been written without the help of many colleagues and students over the past 35+ years. Our gratitude is great. Special thanks go to John Heilmann, Aquiles Iglesias, Tom Malone, Raúl Rojas, and Marleen Westerveld who have contributed to SALT development over the years. They have helped to answer key questions about sample length, elicitation contexts, bilingual assessment, and the reliability and validity of new measures. They have provided the impetus for building databases and making improvements to SALT in myriad ways. Thanks also to the many clinicians who elicited samples included in the reference databases.

Jon
November 2019

About the Editors

Jon F. Miller, PhD., CCC-SLP
Jon is a Professor Emeritus in the Department of Communicative Disorders at the University of Wisconsin–Madison. He is also Co-founder and CEO of SALT Software, LLC. Jon is a Fellow of the American Speech-Language-Hearing Association and has conducted research for the past 40 years on language development and disorders in children with a variety of disabilities.

Karen Andriacchi, M.S., CCC-SLP
Karen graduated from the University of Wisconsin-Madison with a Bachelor's degree in secondary education and a Master's degree in Communicative Disorders. She worked for many years as a clinician in the public schools with students in grades K-12 with speech-language and/or cognitive impairments. She also managed multiple child-language research projects at UW-Madison. In her role as Vice President of Services and Marketing for SALT Software, LLC, Karen manages marketing, transcription, and consultation services. Her expertise is in the many aspects of using language sample analysis to assess spoken language.

Ann Nockerts, M.S.
Ann is Co-founder and lead programmer for SALT Software, LLC. She is responsible for the design and development of the SALT software as well as numerous other tools for analyzing language samples. She has consulted with researchers, clinicians, and students to design coding schemes, adapt SALT for other languages, and to provide general guidance for using the software.

Marleen Westerveld, PhD., CPSP
Marleen is an Associate Professor in Speech Pathology at Griffith University, Queensland, Australia. She has been a practising speech-language pathologist since 1987 and has extensive experience in working with children with speech, language, and literacy difficulties. Marleen's research focuses on investigating children's spontaneous language skills that are needed to participate in everyday activities at home, school, and in the community. She has been associated with the team at SALT Software LLC since 1999.

Gail Gillon, PhD.
Professor Gail Gillon is Director of the Child Well-being Research Institute at the University of Canterbury, Christchurch, NZ and is also Co- Director of A Better Start National Science Challenge, A 10 year programme of research focused on ensuring all children's learning success and wellbeing. Gail has received Life Member Honours from the New Zealand Speech Language Therapy Association (NZSTA) and is also a Fellow of ASHA. She has an extensive publication record in children's speech, language and literacy development. Gail has a particular interest in intervention research which seeks to advance both spoken and written language outcomes for young children facing potential challenges in their literacy learning.

About the Contributors

Joyelle DiVall-Rayan, M.S., CCC-SLP
Director of Education for SALT Software, LLC

Ms. DiVall-Rayan received her Master's degree in Communicative Disorders at the University of Wisconsin-Madison. She worked several years in an outpatient medical setting working with adult and pediatric patients as well as in the public school setting. In her current position with SALT Software, she is responsible for continuing education and course development.

Chapter 8: Additional Applications of SALT
Chapter 9: Pulling it all Together: Examples from our Case Study Files

Anne van Bysterveldt, PhD., MNZSTA
Champion Centre, Burwood Hospital, Christchurch, New Zealand
Anne completed qualifications in education from Massey University and received her PhD in Speech and Language Therapy at the University of Canterbury, New Zealand. She has worked at a specialist early intervention centre for children with developmental disabilities, including children with Down syndrome and their families.
Chapter 9: Pulling it all Together: Examples from our Case Study Files

Nickola Nelson, PhD., CCC-SLP
Professor in the Department of Speech Pathology and Audiology at Western Michigan University, and Program Director of the Ph.D. program in interdisciplinary health sciences.

Dr. Nelson's research involves curriculum-relevant language assessment and intervention and working with doctoral students to extend interdisciplinary evidence-based interventions across populations and contexts. She is the author of many books, chapters, and articles on children with language disorders and has been the editor of Topics in Language Disorders (Lippincott, Williams, and Wilkins/Wolters-Kluwer) since 2006. Dr. Nelson is a Fellow of the American Speech-Language-Hearing Association and the International Academy for Research in Learning Disabilities.

Chapter 8: Additional Applications of SALT

CONTENTS

Chapter 1: Introduction to LSA Using SALT 1
Chapter 2: Eliciting Language Samples 7
Chapter 3: Transcribing Language Samples 19
Chapter 4: Analyzing Language Samples 27
Chapter 5: Interpreting Language Samples 47
Chapter 6: Beyond Standard Measures 57
Chapter 7: Assessing Children's Language Using the NZ-AU Reference Databases 71
Chapter 8: Additional Applications of SALT 75
Chapter 9: Pulling It All Together: Examples from our case study files 93
Afterword 143
Guide to the Appendices 145
Appendix A: NZ-AU Conversation Database 147
Appendix B: NZ-AU Story Retell Database 151
Appendix C: NZ-AU Personal Narrative Database 159
Appendix D: NZ-AU Expository Database 163
Appendix E: AU-USA Persuasion Database 167
Appendix F: Play Database 173
Appendix G: Conversation Database 175
Appendix H: Narrative SSS Database 179
Appendix I: Narrative Story Retell Database 183
Appendix J: Expository Database 189
Appendix K: ENNI Database 195
Appendix L: TNL2 & TNL Narrative Samples Databases 197
Appendix M: Summary of SALT Transcription Conventions 203
Appendix N: C-Unit Segmentation Rules 213
Appendix O: Subordination Index 219
Appendix P: Narrative Scoring Scheme 225
Appendix Q: Expository Scoring Scheme 231
Appendix R: Persuasion Scoring Scheme 235
Appendix S: Oral Narrative Quality 239
Appendix T: Guide to the SALT Variables 243
Appendix U: Understanding SALT Measures: Standard Deviation 247
References 251
Index 259

CHAPTER

1

Introduction to LSA Using SALT

Jon F. Miller
Karen Andriacchi
Ann Nockerts

Language sample analysis (LSA) is the only assessment measure that captures a speaker's typical and functional language use. Although traditional standardized tests play an important role in spoken language assessment, LSA shows how language is put to use in the home, with friends, at school, and within the community.

The goal of this book is to show how LSA using *Systematic Analysis of Language Transcripts* (SALT) software can be used to measure the real-life spoken language of essentially any speaker. SALT standardizes the entire LSA process from selecting the sampling context to interpreting the results, thus giving consistent and reliable measures of spoken language.

Background: The History of LSA

Language sample analysis has a long history as a tool used to investigate language development. Studying what children said over time was seen as a reasonable index of what they knew. Since the stream of speech is transitive, writing down exactly what was said created a permanent record. This record made evident the words and sentence structures used and how they changed through childhood. Because this process required writing down by hand what was said as it was spoken, it was limited by the rate of speech and by the attention of the investigator. Also, there was no way to verify the accuracy of the record. As electronic recording equipment emerged, investigators recorded speech samples for later transcription. They were no longer limited by the speaking rate or the length of the sample. Larger samples increased the likelihood of capturing every vocabulary word and grammatical feature the child was capable of using at that time. Systematic investigations of several children at a time were undertaken in the 1960s, electronically recording samples every few weeks. These studies made a number of ground breaking discoveries that radically changed our views of language development from a passive imitation-based process to an active rule-based process. This work revived research interest in language development and promoted interest in children who experienced difficulty developing language.

The most prominent example of this work was Roger Brown and his students at Harvard (Brown, 1973). Brown and his students recorded samples of more than 700 utterances from three children every few weeks, capturing their advancement from single-word utterances to utterances that were four to five morphemes in length. These samples were transcribed and grammars were written for each child following linguistic discovery methods. This approach revealed two major discoveries; first, children were constructing grammatical rules for producing utterances longer than one word that were consistent across children. Second, these grammars advanced systematically as utterance length increased. Mean utterance length defined stages of syntactic development up to utterances five morphemes in length. These concepts seem commonplace to us now, but at the time they were revolutionary and prompted a great deal of research on all aspects of language development. Those of us interested in language disorder followed this work with great interest and used the LSA

methodology to develop measures of syntax using the findings of the research on language development in typical children. These measures focused on identifying the types of sentences used at the different stages of development.

The use of very large language samples was impractical for clinical work, but LSA was still viewed as an essential part of clinical problem solving. Several clinical measures of syntax which emerged from research have withstood the test of time and are in use today; Developmental Sentence Scoring (DSS, Lee & Canter, 1971); Language Assessment, Remediation, and Screening Procedure (LARSP, Crystal, Garman, and Fletcher, 1976); Assigning Structural Stage (Miller, 1981). These measures were calculated by hand from conversational samples between mothers and children. As time consuming as these measures were, the results provided a detailed account of a child's syntactic development.

This early work provided the pathway for identifying language delay in children using tested methods that had at least some data from research studies. These efforts elevated LSA from a descriptive method to a criterion referenced method when using summary data from the developmental literature to interpret the results (Miller, 1981). The key components from this early research, powerful for both researchers and clinical practitioners, have driven the revitalization of the LSA process with the use of computer technology. It is agreed within the field that LSA is an essential component to the assessment of spoken language. Best practice guidelines (per ASHA) across a number of populations, including developmental delays, developmental language disorder, and autism spectrum disorders, suggest LSA as an approach to 1) problem solve language differences or deficits, 2) generate clear goals for intervention, and 3) assist in monitoring progress.

LSA Has Stood the Test of Time and Should Be Part of Your Clinical Tool Set

Re-thinking the LSA process

The LSA process provides a way to preserve the auditory speech signal for analysis. Representative samples of spontaneous language provide direct access to language use in everyday communication. Historically, listening to and transcribing the sample by hand, using paper and pencil, was the method for this procedure. This wasn't as simple as one might think. In order to accurately and authentically capture the language, rules to define utterances, words, and morphemes had to be created, and they had to remain consistent. To analyze the transcript required manually counting words and morphemes per utterance as well as the number of different words produced across the sample. To interpret those results required knowledge of language development through direct experience with children and knowledge of the research literature on language development. Without this knowledge, one was unable to document what constituted typical, or atypical, oral expression of three, four, or five-year-olds. Rigorous as LSA was, it did not fall to the wayside even when it was all done by hand. This difficult and time-consuming process was far too valuable to abandon, and our efforts have focused on making the process more accessible for clinical use. Since the mid-1980s SALT has employed computer technology to standardize the LSA process. We now have a defined transcription system, high-speed analyses in all domains of spoken language, and databases of typical speakers to facilitate the interpretation process.

How LSA provides insight into language use

Even difficult-to-test individuals have some means of communicating. Usually direct observation of communication with familiar partners, such as family members, provides insight into the frequency and complexity of their language use. Recording and transcribing this language allows for a detailed analysis at all language levels. Additional samples can be recorded at home or school to complete the communication profile. Analysis and interpretation of these samples is enhanced with the use of SALT by providing instant analysis at all language levels. Reference databases provide sets of typical age-matched or grade-matched peers for comparison to aid interpretation of the results. LSA

provides a key resource for the resolution of complex clinical problems and allows for monitoring change over time in everyday communication contexts.

A review of key features

There are a number of key features of the LSA process that have prompted its continued use and motivated its revitalization and improvement.

1. *LSA is flexible*. It allows for multiple analysis of the same sample, offering many different views of the speaker's performance in each of the language domains; syntax, semantics, and discourse. LSA can be used with anyone who can produce language regardless of cognitive, perceptual, or motor ability. Speakers who have challenges such as learning a second language, speaking a dialect, developmental disabilities, or who are on the autism spectrum are excellent candidates for LSA. Additionally, LSA is culturally unbiased; if the examiner is sensitive to cultural characteristics, bias will be eliminated.

2. *LSA is repeatable*. Language samples can be recorded daily, weekly, or monthly to document change in performance or to note differences between spoken language tasks such as conversation and narration. "Everyday" language, authentic to the speaker, is elicited in natural and functional communication contexts (i.e., in an uncontrived setting) as often as deemed necessary. Because a language sample is basically a snapshot of the speaker's typical spoken language, realistic therapy goals, which highly impact communication and language learning, can be developed directly from the analyses. From the assessment we learn how the speaker puts to use his or her knowledge of the language. As soon as we know this, we then have an avenue for remediation. Once intervention is underway, generalization of skills can be readily assessed and documented by eliciting another language sample. Test-retest reliability issues, which can be a problem with standardized measures, are not a factor in LSA.

3. *LSA is valid*. It documents change in everyday communication skills or in spoken language requirements in school. Performance on grade-level state and school district standards can be documented through the use of LSA. Examples might include the ability to debate or produce an exposition such as "how the heart pumps blood" or "how a bill becomes a law". Research by Miller, et.al. 2006, found significant correlations between several measures of oral narrative performance and reading achievement in both Spanish and English. The higher children's oral narrative language skills were in either language, the higher their reading scores. The measures of oral narrative skill taken from Miller's story retell protocol predicted reading scores better than the Passage Comprehension subtest from the Woodcock Language Proficiency Battery Revised: English and Spanish (Woodcock, 1991).

4. *LSA is accountable*. It can measure language growth at all levels and at frequent intervals to meet evidence-based practice standards. LSA augments standardized measures and can substantiate the results of those measures as well as the reason for referral. It is important to know how a child performs compared to his or her peers using the norms from standardized tests. Standardized tests are required by school districts to qualify students for speech-language services but their sensitivity in diagnosing language disorders is inconsistent. They tend to look at language use narrowly, requiring only morpheme, word, or phrase responses. Whereas, LSA assesses spoken language from a functional use perspective. A student with language impairment could score within the average range on some standardized measures yet fail to retell a coherent narrative or provide an organized exposition.

5. *LSA aligns with the national curriculum.* Implementation of the national curriculum in Australia and New Zealand inherently requires methods to measure outcomes, or progress, related to those standards. In Australia the curriculum outlines the expected academic competencies, including narrative, expository and persuasive discourse (Australian Curriculum, Assessment and

Reporting Authority, 2014). For example, in grade 8 students are expected to "create imaginative, informative and persuasive texts that raise issues, report events and advance opinions, using deliberate language and textual choices." There are a range of appropriate language sample contexts for eliciting samples that will reflect achievement of, or progress on, academic competencies.

Streamlining the Process to Make LSA Accessible

LSA has always been time consuming, particularly in clinical settings. Transcription and analysis, sometimes still completed by hand, can take hours. Streamlining the process was a necessity in order for the benefits of the process to outweigh the arduousness of the procedure. Consistency of the process was historically a problem in terms of the types of samples, the length of sample, the different transcription procedures and rules used, and the specific analyses generated. Until computers came into general use, interpreting the results of language samples relied solely on the users' knowledge of language development. There were no databases of typical children's language performance in specific speaking contexts.

Over the past 40+ years, there have been a few groups of researchers using computer technology to work out solutions to the LSA implementation problems. One group developed tools for child language researchers to enhance research productivity (McWhinney, 2000). A second group computerized analyses from classic research on language development (Long, Fey, & Channell, 2008). The third group, the focus of this book, automated the LSA process, making it as standardized as possible by providing reference databases for comparison (Systematic Analysis of Language Transcripts (SALT), Miller & Iglesias, 2015).

SALT Solutions to Improving LSA Accessibility: Overcoming the barriers to efficient clinical use of LSA

Since its inception, SALT has continually focused on developing solutions to make the LSA process quicker, easier, and more accessible for both clinicians and researchers. The improvements in computer technology, including more advanced programming languages, more sophisticated operating systems, and higher performing hardware, have improved the process of LSA. Fast-forward to the present day and consider how the current version of SALT improves the LSA process by addressing the most common misconceptions.

Time: *It takes too much time to transcribe and analyze a language sample.*
The practice of eliciting 100 utterances (or 15 minutes) of spoken language was the standard for many years. LSA research shows that shorter, focused samples provide robust measures of language performance (Miller, et al., 2006). SALT's transcription format uses minimal coding to gain maximal analysis outcomes. A story retell narrative, for example, with 3 – 6 minutes of talking, will take, on average, 15-30 minutes to transcribe, less time than it takes to give most standardized language tests. Our research has shown it takes roughly five minutes for a trained transcriber to transcribe each minute of spoken language. This assumes that the speaker is fluent and intelligible, the context is familiar, and the recording is of high quality. SALT analyses are generated in seconds.

Consistency: *Consistency of the process is a problem in terms of the types of samples, sample length, transcription procedures and rules used, and the specific analysis performed.*
The SALT language sample elicitation protocols, transcription format, and computer analyses guarantee consistency across language samples. This consistency allows for comparison across speakers or within the same speaker over time. Sample length can be controlled within SALT. Comparisons can be made using same amount of elapsed time, same number of utterances, or same number of words.

Interpreting the results: *Interpretation of the results relies solely on the user's knowledge of language development. There are no databases of typical speakers' language performance in specific speaking contexts.*
SALT has moved beyond charts of typical development, though they are still useful. Our databases of several thousand typical speakers allow the user to compare an individual speaker to age-matched or grade-matched peers in the same speaking conditions. An individual's performance can be monitored relative to typical language growth over time.

SALT has improved the entire process of LSA at the sampling, transcription, analysis, and interpretation levels with:

- detailed elicitation protocols used to collect the samples from typical speakers
- transcription tools to facilitate the process, e.g., specialized editor and error checking routine
- online contextual help systems to provide information wherever you are in the program; available using F1 key when in the SALT editor
- instant analysis reports from standard measures of syntax, semantics, discourse, rate, fluency, errors, and omissions
- databases of more than 7,000 typical speakers in a variety of speaking contexts to aid interpretation
- automated comparison of the target sample to a set of age or grade-matched peers selected from the relevant database in standard deviation units
- routines to search transcripts for specific features, e.g., responses to questions or a list of the different words used and their inflections
- analysis tables, a comprehensive narrative report, and selected utterances which can be incorporated into clinical reports
- online courses and YouTube videos to take the learner through each step of the LSA process

The strength of language sample analysis is its flexibility to capture language use in everyday communication contexts, accurately measuring lexical, morphemic, syntactic, discourse, rate, and fluency features of the same sample. This procedure has been a research staple for more than sixty years and has provided the means to document language development in typical and atypical populations. The validity of this procedure is beyond question, and the reliability has been documented (Heilmann, et al., 2008). We established standardized protocols and transcription procedures for several genres and across ages (Miller, Andriacchi, & Nockerts, 2016). This led us to confirm the stability of the LSA measures calculated by SALT.

Over the years, our research on LSA measures has produced a range of results that inform us about how these measures can characterize spoken language performance. Here is a summary of what we have learned about typical children and how LSA measures inform us about language production.

- Mean length of utterance (MLU), number of different words (NDW), number of total words (NTW), and words per minute (WPM) significantly correlate with age in 3 – 13 year olds, r = .65 - .72.
- MLU is longer and WPM is higher when producing a narrative than a conversation.
- Children produce more mazes in narration than conversation suggesting narration is the more difficult context.
- Number of mazes increase as utterance length increases.
- Measures of MLU and SI increase as the difficulty of the context increases: conversation -> narration (story retell) -> exposition-> persuasion.
- Short conversational samples produce relatively the same data as longer samples, i.e., 50 vs. 100 utterances.
- Narrative story retell samples of 35 – 65 utterances provide stable and robust results.

- Measures calculated from story retell samples predict reading achievement in Spanish and English better than the Passage Comprehension subtest from the Woodcock Language Proficiency Battery Revised: English and Spanish (Miller, et al., 2006).
- Expository samples result in significantly longer samples with more complex syntax than conversation or narrative retell samples.
- Persuasion samples are shorter than expository samples, but facilitate the production of more complex language.
- Standardizing the LSA process results in reliable measures across ages and speaking conditions.
- LSA produces valid measures of functional language use.

The remainder of the book provides detailed considerations of each step in the process; elicitation, transcription, analysis, and interpretation. Our goal is to walk you through the process of learning to use SALT to facilitate the clinical use of LSA.

CHAPTER

2

Eliciting Language Samples

Jon F. Miller
Karen Andriacchi
Ann Nockerts

We have learned a great deal about language sample analysis as an assessment tool through our research and that of others over the past 40 years. Eliciting "the best" sample for an individual can be considered from several perspectives at this point in time.

- Developmental. Sampling contexts expand with advancing age and ability level. Up through age four, children are acquiring conversational skills. After age four narrative skills emerge and branch into several narrative types such as personal narratives, story retell, and exposition.

- Functional. Functional considerations focus on how language difficulties manifest themselves. In the preschool years, this will be language use in conversation. In elementary school years, language problems usually concern aspects of the curriculum which require oral narrative ability. This can involve written language as well. In the late elementary and early adolescent years, the curriculum requires expository abilities in spoken and written form, that is, explaining how to do something (*find a library book*) or how to play a game. Adults may experience difficulties in any one or all of these language genres.

- Precision of interpretation. SALT offers an additional consideration to selecting the type of sample to elicit, databases of typical speakers to improve the precision of interpretation. We have assembled databases of more than 7, 000 language samples from children 3 – 18 years of age in conversation, narrative, expository, and persuasive sampling contexts. Because we do not have complete sets of language samples for all ages across all possible speaking conditions, we are left with the challenge of finding the best sampling context to optimize language use and exhibit the language difficulty, with optimum opportunity to interpret the results. Ideally we want to select an elicitation context that fits the speaker's spoken language abilities and reveals the language difficulty, with a SALT database to quantify the results.

Selecting the Optimum Language Sample

The optimum language sample for an individual will meet as many of the following objectives as possible.

1. Provide maximum information about the speaker's language
   - Vocabulary, syntax, semantics, and discourse
   - Structure and organization
   - Fluency, efficiency, and accuracy
2. Motivate the speaker to do their best talking
   - Age appropriate
   - Attentive listener or conversational partner
3. Identify speakers' spoken language strengths and weaknesses within:

   - Community
   - School
   - Workplace
   - Family
4. For school-aged children, clearly demonstrate the student's difficulties with functional language regarding:
   - Classroom curriculum
   - State-wide spoken language standards
   - Social language use
5. Optimize opportunity to interpret results
   - Follow the relevant elicitation protocol
   - Adhere to SALT transcription conventions
   - Where possible, compare performance to typical speakers (SALT databases)

These objectives will help guide you in choosing the sampling condition that best captures the spoken language issue(s) in question.

Sampling Contexts or Genres

A clear understanding of the different types of sampling contexts is inherent to a valid and effective language sample, and is central to implementing the objectives listed in the previous section. Research has demonstrated that each of the speaking contexts places different demands on the speaker and produces somewhat different results. For example, conversational samples help document discourse skills, while narrative, expository, and persuasion samples work well to illustrate organizational skills. The reference databases in SALT consist of samples from the following sampling contexts:

- <u>Conversation in play</u>

  Conversation, where adults speak to children about ongoing events, is the basic platform for learning language. Children begin to respond with gestures or verbalizations, such as ba-ba, da-da, ma-ma, that are received with delight and interpreted to mean whatever is relevant. As understandable words appear and word combinations signal the emergence of grammar, language learning accelerates with rapid gains in every aspect of verbal communication. Samples of conversation can be recorded as soon as children can be understood and throughout the life span.

  Young children are most comfortable conversing while playing and are likely to talk more with familiar partners than strangers, e.g., parents versus newly encountered adults. Although most young children tend to talk more in play situations, this should be confirmed for each child. The play context can be adjusted to meet individual preferences, individual interests, gender, culture, and experience. Consider that some children may prefer novel versus familiar toys. Discussion with parents may be helpful in selecting the optimum talking contexts and partners. Parents are usually the most familiar conversational partners, and often can elicit the most talk. Professional examiners can direct the language sample by pointing out situations to talk about and asking questions of increasing complexity; yes/no, what, where, why, or when, for example. Play samples are most productive up to about age four or five, after which the child will usually talk to an adult about a topic without physical interaction with objects. This is a somewhat variable ability in typical children. Remember, the goal is to record the best language use possible. When the play session is completed, confirm with the parents as to the validity of the sample.

Play-based language samples are particularly useful when evaluating the communication skills of late talkers, individuals with developmental disabilities, those on the autism spectrum, and those with neurological disorders. Consider that recording language samples in play offers the opportunity to evaluate communication in the individual's most productive medium, demonstrating his or her optimum language use.

Play is the natural context for language learning and the most comfortable method of interaction with toddlers when evaluating language. A good sample of play is child initiated. Samples of interactive play not only give an authentic picture of current levels of language production, they can also reveal non-verbal behaviors that go along with communicative development. Where non-verbal behaviors are important to analyze, samples of play should be videotaped in order to assess both verbal and non-verbal communication skills.

Samples of children producing utterances of two words or less can probably be transcribed by an observer as the child is talking. With utterances longer than two words, a recording of the speech is necessary to insure an accurate record of language use. Keep in mind that children talk more as they get older. The length of the sample will need to be sufficient to allow opportunity to display their best spoken language skills.

- Conversation with adult partner

  Conversational samples uniquely document the use of oral language to exchange information at a spontaneous level. Conversations are governed by the rules of discourse and, as such, they offer insight into the social aspect of language use. From a conversation we can assess the speaker's ability to orchestrate turn taking, topic initiation and maintenance, and ability to repair breakdowns in communication. In a conversation, speakers must follow certain conventions. For example, they must listen attentively, limit interruptions, say only what needs to be said, and say what is true. These conventions are learned by talking. Speakers get better at conversing as they get older and have more experiences initiating topics, staying on topic, responding to questions, providing more utterances per turn, and using more diverse vocabulary and longer utterances.

  Conversation, with both familiar and unfamiliar partners, allows for careful description of the social use of language. Eliciting conversational samples places more responsibility on the examiner than any other context. Examiners need to monitor their language to engage the speaker in conversation while having the least influence on the speaker. To do this, examiners should ask open-ended questions rather than yes/no questions, and should allow the target speaker to introduce new topics. Eliciting a conversational sample is like talking with your grandmother to find out what life was like when she was growing up; you get to listen a lot and say encouraging things to express your interest. Hopefully she will do most of the talking – which is the point of the conversation.

  Conversational samples are particularly useful in documenting language abilities of children and adults diagnosed with autism spectrum disorder and the related diagnosis of social communication disorder. These samples provide access to the social aspects of communication, such as listening, initiating and responding on topic, adding new information, responding to requests for clarification, answering questions, and allowing the partner to speak.

- Narration - story tell or retell

  We engage in narrative language when we tell someone about an event attended, a book, a T.V. episode, or a movie. Narrative samples, in general, require less interaction from the examiner as the focus is on the target speaker to tell or retell a story. The examiner introduces the task, helping the speaker identify a story to tell or reviewing a specific story to retell. After that, it is up to speaker to proceed with as little coaching as possible. Narratives require remembering

sequences of actions or events that must be told in order to form a coherent text. Narratives emerge between three and four years of age. However, our research reveals that narrative ability is not consistent until after age four. Our work also documents that children produce longer and more complex utterances in narration than in conversation.

Where conversations are utterance based, narratives are text based, formed by many utterances produced in a logical order to convey the information. Narratives fall into two groups for language sample analysis purposes, 1) narratives where the speaker knows the content but the examiner may not, and, 2) narratives where both the speaker and the examiner know the content. Event narratives entail relating an event experienced directly. Telling a story from memory, relating a movie or an episode of a TV show, making up a story, or retelling a story just heard are also types of oral narratives. There are excellent reasons to consider each type of narrative, determining the optimum language sample to collect. If you let the speaker choose the story, you may foster individual motivation to tell the best story. If you choose the story, you can interpret the content and vocabulary in detail.

- Narration – personal narratives

  Personal narratives are descriptions of past events experienced by the speaker and are one of the most frequently and earliest developing types of narration in children (Peterson & McCabe, 1983). The ability to tell personal narratives is considered important for socio-emotional wellbeing and academic performance. Our previous research has shown that children produce more complex language in personal narratives than conversation (see Westerveld et al., 2004)

  Personal narratives can be elicited using scripted prompts or photos and asking the child to share his or her experience about a specific event. By combining children's responses to a range of photos, it is often possible to collect at least 50 utterances, providing you with enough utterances for detailed linguistic analysis.

- Narration - expository

  When we impart information, such as how to do something or how to play a game, we are engaging in exposition, also called procedural narration. Expository skills are acquired later in childhood through adolescence, although our research has shown that children as young as six can produce expository language samples (Westerveld & Moran, 2011; 2012). Research documents exposition produces more complex syntax than story retelling or conversation (Nippold, 2010). Exposition in spoken and written language is part of every state's instructional standards from middle elementary through high school. This suggests that expository language samples are an excellent choice for late elementary, middle, and high school students, as well as adults. The most common expository task used in oral language research is the telling of how to play a favorite game. This can be an individual sport, a team sport, or a board game. Our research on exposition corroborates other studies documenting that speakers produce more complex language in exposition than in conversation or story narratives (Malone, et al., 2008; Malone, et al., 2010; Westerveld & Vidler, 2016). Our research also documents that game types are equivalent in eliciting valid expository language samples.

- Narration - persuasion

  Persuasion can be defined as "the use of argumentation to convince another person to perform an act or accept the point of view desired by the persuader" (Nippold, 2007). It figures prominently in academic standards, such as the Common Core State Standards, that cut across modes of communication: speaking, listening, reading, and writing (National Governors Association, 2010). The ability to persuade is required across the secondary curriculum. Acquiring persuasive skills is critical to success in college and career, and to full participation in social and civic life.

> Persuasion challenges students to take into account their audience's perspective and to use complex language to express complex ideas. Our preliminary research indicates that this sampling context produces shorter samples than the expository task, but facilitates the production of more complex language.

In general, consider eliciting conversational samples for children less than 4 – 5 years of age because narrative skills are just emerging at about four years. We have found that narrative samples, particularly story retell, exposition, and persuasion expand the information we can glean from the language sample as they are more challenging than conversation and are central to language arts curricula in schools. The SALT narrative databases allow measures of vocabulary, syntax, rate, fluency, and textual content and structure relative to age or grade-matched peers reported in standard deviation units. Narrative samples require less examiner vigilance than conversational samples, increasing examiner confidence in the reliability of the sample.

Sample Length

How long does a language sample need to be to ensure a valid reflection of oral language performance? This question has been asked repeatedly over the years. The answer is, as you might expect, it depends. We have spent a great deal of effort addressing this issue as it reflects on all other aspects of the LSA process. Shorter samples are faster to elicit and transcribe. *But will they include the important features of language under scrutiny?* Our original target sample size of 100 utterances, which turned out to produce consistent results across children of the same ages, could be recorded in 10-12 minutes and transcribed in 60 – 90 minutes. Subsequent research determined that smaller samples produced similar results in a much shorter time frame. Conversational samples of 5 minutes in duration resulted in approximately 50 utterances, cutting transcription time in half. We also learned that children talk more as they get older so it takes longer to elicit a sample of 50 utterances from a three-year-old than a 5-year-old. In fact, there is a linear relationship between age and amount of talking per unit time. Children having difficulty with spoken language usually take longer to produce a reliable language sample.

For more information on the impact of sample size on outcome measures, read the article *Language Sampling: Does the Length of the Transcript Matter?* by Heilmann, Nockerts, and Miller (2010).

Fictional narratives should include the entire story, regardless of how long or short, because we want to measure the overall narrative structure for completeness as well as document word, morpheme, and utterance measures. This means that narrative sample analyses are based on the entire task so the amount of talking is an important measure. Using the entire story allows you to document the overall structure of the narrative because you are including all of the utterances used. Analyses of vocabulary use and syntactic complexity can then be interpreted within the context of the whole story.

SALT Reference Databases

Participants included in the SALT databases vary in age, gender, socioeconomic status, and geographic location. Different elicitation protocols were used to collect the samples, and each sample included in a database was elicited following the corresponding protocol. The participants in each database were all typically developing and reflected the range of SES and school ability in their communities, with no history of special education. Each database was the product of one or more research studies confirming stability of performance within ages and grades, and documenting changes associated with advancing age across a range of measurements. Selecting a sample type using these sampling protocols allows you to create an age or grade-matched set of peers to document strengths and weaknesses. You can also elicit more than one sample type to make sure language production is representative of a variety of speaking conditions found in daily use.

SALT Reference Database	Samples	Ages	Grades	Location	Appendix
New Zealand/Australia Databases Conversation Story Retell (*Ana Gets Lost*) Story Retell (the Bus Story) Personal Narrative Expository	 350 349 127 355 107	 4;5–8;4 4;0–8;9 5;3–8;9 4;5–8;4 6;1–8;4		New Zealand & Australia	A B C D
AU-USA Persuasion	179	12;10–18;9		Australia & Wisconsin	E
Play	69	2;8–5;8	P,K	Wisconsin	F
Conversation	584	2;9–13;3	P,K,1,2,3,5,7	Wisconsin & California	G
Narrative SSS (Student Selects Story)	330	5;2–13;3	K,1,2,3,5,7	Wisconsin	H
Narrative Story Retell *Frog, Where Are You?* (FWAY) *Pookins Gets Her Way* (PGHW) *A Porcupine Named Fluffy* (APNF) *Doctor De Soto* (DDS)	 145 101 53 201	 4;4–7;5 7;0–8;11 7;11–9;11 9;3–12;8	 P,K,1 2 3 4,5,6	Wisconsin & California	I
Expository	354	10;7–18:9	5–7, 9–12	Wisconsin	J
ENNI (*story generation from pictures*)	377	3;11–10;0		Canada	K
Test of Narrative Language TNL-2 TNL	 778 500	 4;0-14;11 5;0–11;11	 P,K,1-8 ---	4 US Regions	L

Figure 2-1

Figure 2-1 lists the reference databases included with SALT software. Language samples you collect, following SALT's protocols, may be compared to age or grade-matched peers selected from these databases. For each database, the number of samples, the age range, grade range (*if available*), and the geographic locations are listed.

- <u>The New Zealand/Australia databases</u>

  The original New Zealand databases were the result of collaboration with Gail Gillon and Marleen Westerveld. They were interested in creating a national database of oral language samples which would document language development for New Zealand children and allow these data to be used to document disordered language performance. A practice-based research project was undertaken with volunteer speech-language pathologists from around the country. Each recorded 5 - 7 samples from typical children of specific ages. The result was a database of several hundred children 4 - 8 years of age producing conversations, story retells, personal narratives, and expositions. Several published research papers have resulted from this work (Westerveld, Gillon, & Miller, 2004; Westerveld, Gillon, & Moran, 2008; Westerveld and Gillon, 2010a, 2010b), the most recent one comparing the New Zealand and American data sets (Westerveld & Heilmann, 2012). The results revealed remarkable similarities across the two countries. The most significant difference occurred with the five year olds who, in New Zealand, seem to be slightly more advanced than their American counterparts. It is suggested that this difference may be due to when they enter school. Children in New Zealand enter school on their fifth birthday rather than waiting for the start of the next school year as is done in the U.S. This

research collaboration led to the creation of the first national database of New Zealand language development.

Marleen Westerveld expanded the databases by collecting samples from students in Queensland, Australia following the same protocol as was used when collecting the New Zealand samples. A discussion on the creation of these databases is provided in Chapter 7. See Appendices A - D for a copy of the protocols that were used to elicit the language samples.

- AU-USA Persuasion Database

  The persuasion protocol requires the student to present a persuasive argument for a change in their school, workplace, or community. The argument is to be directed at the student's principal, supervisor, or government official. The student can choose an issue of personal interest or select from a list of suggested issues. The student is given a few minutes to complete a planning sheet which contains six topics (Issue Id and Desired Change, Supporting Reasons, Counter Arguments, Response to Counter Arguments, Compromises, and Conclusion). Next to each point is a brief description of what is covered within that topic and space for making notes. The student is then asked to present his or her persuasive argument. The persuasion task reflects a skill essential for success across the secondary curriculum and for success as a friend, family member, employee, and citizen. Oral persuasion is under-represented in standardized speech-language assessment tools and is a linguistically challenging task that we believe is sensitive to language impairment (see also Heilmann, Malone, & Westerveld, 2020).

  The Persuasion reference database consists of 179 samples from typically developing adolescents fluent in English. Students were drawn from high schools across the state of Queensland, Australia and from public schools in two geographic areas of Wisconsin: Milwaukee area school districts and Madison Metropolitan School District. There are students from a variety of economic backgrounds and ability levels. See Appendix E.

  At the time of this writing, we are collaborating with clinicians from the San Diego Unified School District to elicit additional persuasive samples.

- Play database

  Language samples from young children, ages 2;8 to 5;8, were collected in a play format allowing the child to talk about ongoing events and refer to past and future events as they were able. Like other conversational samples, the examiner was required to follow the child's lead, expand utterances, comment on ongoing actions and events, and ask open-ended questions to encourage talking when necessary. See Appendix F.

- Conversation database

  The SALT Conversation database was one of our earliest databases, driven by the wealth of developmental data from research studies on language development. This SALT database uses a protocol prescribing face-to-face talk with an examiner on general topics of home, school, or holidays for children 2;9 to 13;3 years of age. Conversation requires examiners to introduce topics, then encourage speakers to expand on their own experiences, responding to open-ended questions and requests for clarification. See Appendix G.

- Narrative SSS (Student Selects Story) database

  The SSS narrative protocol was developed to provide speakers with the most motivation to tell their best story. The protocol allows the speaker to select a story, movie, or TV program to retell

with minimal prompts from the examiner. The advantage of this genre is the speaker's familiarity with the story, which optimizes motivation to tell as complete a story as possible. The disadvantage is that the content of the story and specific vocabulary may not be known by the examiner, which may limit interpretation of vocabulary use and story structure.

This protocol was the earliest narrative protocol examined in our research. It was developed as part of a project focused on comparing conversational and narrative language from school-aged children. Children younger than 4 - 5 years had difficulty with this task, which allowed us to identify the baseline for documenting narrative language. For children older than 4 - 5 years, this protocol worked very well. The Narrative SSS protocol is a more linguistically challenging task than conversation. See Appendix H.

- Narrative Story Retell database

The next narrative protocol examined in our research was story retelling where children narrated a story just told to them. This protocol allowed us to develop methods to analyze narrative structure and specific content because the story was known or familiar to both the examiner and the speaker being assessed. This protocol required us to select specific stories that would be age appropriate and motivating for speakers of both genders, and be as culture-free as possible. We began by using the story *Frog, Where are You?* (Mayer, 1969) which had been used in language development research for decades with children 4 - 10 years of age. Different stories had to be identified for children beyond first grade, as research, and our experience, indicated that children did not use more complex language after about age eight. We used different stories for the 2nd, 3rd, and 4th - 6th grades (*see Figure 2-1 for the story titles*). These stories increased in complexity while providing age-appropriate interest. Our research on children's story retells indicates that children retell increasingly complex stories with advancing grades. Their stories are longer with more complex syntax, larger vocabularies, and more complete story structures.

The databases can be used to compare age or grade-level expectations. Using the same stories allows you to compare what the child included in their retell as well as what they left out. Specific vocabulary for each story can also be compared. Our research has shown story retells produced short consistent samples that were easily transcribed. The examiner introduces the task, reviews the story while sharing the pictures, then asks the speaker to tell the story. This context places minimal demand on the examiner, and results in stories that are short, focused, and consistent over age and grade. See Appendix I.

- Expository database

The expository protocol involves describing how to play a favorite game or sport. This can be an individual or team sport, a board or yard game. Our initial research project involved 7th and 9th graders and we found that, no matter which type of game was described, the language produced was similar in amount and complexity (Malone, et al., 2008). This finding is very helpful when helping a student select a familiar game to talk about and compare to the database samples.

The Expository database was recently expanded and now contains language samples from 5th - 7th, and 9th - 12th grade students. Research on language development in adolescents and the experience of clinicians providing services for middle and high school students motivated the creation and subsequent expansion of this database. Research on exposition documents that students produce more complex language in exposition than in conversation or narration, making it a more challenging sampling context (Malone, et al. 2008; Nippold, 2010). Expository sampling using SALT requires the examiner to introduce the task and help select the game or

sport to talk about. The examiner then monitors the speaker, who makes notes using a matrix of topics that should be covered when providing a complete rendition of the game or sport. The speaker's notes are used to guide the speaker through the task. This task is linguistically challenging and research is still exploring the limits of its use for children and adults (Miller, Andriacchi, & Nockerts, 2016). See Appendix J.

- The ENNI database

  The Edmonton Narrative Norms Instrument (ENNI) was developed by Phyllis Schneider who was interested in providing normative data for typical children in Edmonton, Canada (Schneider, Dubé, & Hayward, 2005). The Province provided grant funds for the project. Stories were written and children aged 4 - 10 retold them using a specific protocol. The major outcome of this work was the consistency of their oral narrative performance within age groups and the consistent progress across the entire age range. This work confirms our findings that oral language samples do provide a consistent and powerful index of language skills over time and across genres. The ENNI project, along with the stories and elicitation protocols, can be found at www.rehabmed.ualberta.ca/spa/enni/. See Appendix K.

- TNL Narrative Samples
  The narratives in the TNL2 Narrative Samples database came from Ron Gillam's normative testing of the TNL-2: Test of Narrative Language - Second Edition (Gillam & Pearson, 2017). The narratives in the TNL Narrative Samples database came from Ron Gillam's normative testing of the original Test of Narrative Language (Gillam & Pearson, 2004).

  Dr. Gillam was interested in adding his transcribed narratives to SALT to allow users to examine the narratives elicited from the test in more detail. These databases can provide users with the opportunity to examine word, utterance, and narrative structure using objective measures. See Appendix L.

Eliciting Samples for Comparison with the SALT Reference Databases

The SALT databases provide the opportunity to compare an individual language sample to age or grade-matched peers. In order for the comparison to be valid, however, language samples must be elicited following the same protocol as was used to collect the database samples. Conversations must be all conversation without narratives intruding. Similarly, narratives must be all narratives without conversation intruding. Comparison of narratives requires following the specific protocol used in eliciting the narratives in the comparison database. Narratives where the student selects the story (SSS narratives) can validly be compared to any story the speaker selects following the SSS protocol. Story retell narratives, where the speaker retells the same story they've just heard or followed, should only be compared to other story retells of the same story. And expository and persuasive narratives, where the student explains how to play a favorite game or sport, must be compared to their respective database samples in order to get valid results. In each case the protocol will result in samples that are comparable, with reliable outcomes, as long as they were collected under the same conditions and transcribed using SALT's transcription conventions.

From a developmental perspective, our research documents that the language produced by these different sampling contexts provides speakers with increasing challenges. From conversation to narration to exposition to persuasion, speakers produce more complex language, longer sentences, and more different words, as well as more errors, repetitions, and revisions. As students progress through the curriculum, conversational skills become less important, with the exception of some students on the autism spectrum. Narrative and expository skills underlie much of the literacy curriculum, particularly written language.

What if There Isn't a Comparable Database?

Even without a reference database to use for comparison, a good language sample can provide a wealth of information about a person's expressive language. The SALT *Standard Measures Report* groups together some of the most informative language measures to give an overall summary of the speakers' language performance. This report provides data on transcript length, syntax/morphology, semantics, discourse, intelligibility, mazes and abandoned utterances, verbal facility and rate, and omissions and errors. See Chapter 9 for an example case study.

Two samples from the same speaker may be linked for a Time1/Time2, Pre/Post, Language1/Language2, or Protocol1/Protocol2 comparison. This information can be extraordinarily useful for diagnostic purposes as well as for tracking response to intervention.

SALT can also be used to analyze written samples or to count the frequency of communicative behaviors such as dysfluencies or atypical verbal and non-verbal communicative behaviors.

Suggestions for Eliciting the Best Language Sample

Speakers are more likely to converse if they believe listeners are really interested in what they have to say. If they doubt a listener's sincerity, younger speakers may simply refuse to cooperate. Older speakers may cooperate but may provide only minimal responses that do not reflect their language ability. The speaker who has difficulties is often reticent and requires an environment of trust to achieve optimal communication. *How can the examiner create this environment and gather the most representative sample of the speaker's expressive language skills?*

The first few minutes of the language sample interaction are critical. If the examiner fails to establish a comfortable rapport with the speaker, the resulting language sample may be strained and lack the necessary spontaneity to function as a valid index of the speaker's expressive language performance. Taking a few minutes to visit before moving on to the sampling protocol is helpful. Westerveld and Gillon suggest the use of a 5 minute warm-up task (e.g., using the book "*Where's Wally*?"), before starting the conversational context. The goal is to elicit a sample which is representative of the communicative behaviors in question. The following are suggestions to help achieve this goal:

- Be friendly and enthusiastic. Give the speaker your undivided attention, showing interest with smiles, vocal inflection, and eye contact.
- Be patient. Allow the speaker space and time to perform and don't be afraid of pauses. Use a relaxed rate of speech as a fast rate can cause communicative pressure.
- Get the most language by using open-ended prompts and following the speaker's lead. If the protocol allows, ask for clarification. This indicates interest and is informative to the assessment.
- If the protocol allows for questions, avoid yes/no and specific "wh" questions, such as what-are questions, as they tend to elicit one-word responses. Ask age-appropriate questions and avoid asking questions when the speaker knows you already have the answer. Don't ask more than one question at a time.

These suggestions are relevant for all speakers regardless of their cultural, economic, or language background, or their cognitive, physical, or speech and language differences. The goal is to provide the speaker the maximum opportunity to communicate to the best of his or her ability. There is no substitute for experience in talking with speakers of various ages and ability levels. But even the most experienced examiner must guard against behavior that might inhibit the speaker's performance.

What constitutes a valid language sample?

1. The examiner follows the elicitation protocol.
2. The elicitation protocol challenges the speaker's production abilities.
3. The speaker produces a sample that is representative of his or her language.
4. At least 80% of the sample is intelligible (*find a quiet area and use a quality recording device*).

What materials are needed to elicit the samples?

1. An audio recorder. Digital is preferred. An external microphone is usually not necessary with a digital recorder.
2. A quiet area, preferably with a table and two chairs.
3. Any books, pictures, audios, or other materials required for the specific elicitation protocol.

Summary

Keep in mind that the people you are trying to evaluate may not have a successful history talking spontaneously. The SALT elicitation protocols have been very effective in eliciting language under a variety of conditions. Eliciting samples still requires your clinical skill to encourage optimum productive language from individuals who may be poor communicators. The language sample process allows you to take several different samples without affecting the outcome of each. So if the first sample does not work out, try again. The databases will allow you to bring precision to your interpretation of the results. Be clear about your clinical objectives as they are central to collecting a sample relevant to meeting your goals. Keep in mind that the better the sample you record, the better the analysis results will reflect the speaker's language skills. The next step in the process is to render the sample into a form that SALT can analyze. That requires converting the acoustic recording to text, in other words, transcription.

CHAPTER

3

Transcribing Language Samples

Jon F. Miller
Karen Andriacchi
Ann Nockerts

Why Transcribe?

Transcribing spoken language into orthographic text has a long history. It has been used to preserve meeting outcomes with "Minutes", to record legal proceedings for trial transcripts and depositions, to provide access to oral language for the Deaf community with closed captioning on television, and, for many years, stenographers had to "take a letter". These few examples serve to point out that transcribing spoken language captures what was said at various events and provides access to that language at a later time. Today, there are software applications which convert speech to text. With little or no training, these applications can produce fairly accurate text. *So can we use them for our language samples?* The answer, unfortunately, is "not at this time". Certainly speech recognition keeps improving, but it still requires intelligible speech which follows standard grammar rules. Our speakers are not so considerate. We could have the speech recognition software create a first draft of the text that we could then edit. Or we could speak the sample into the computer while listening to the recording. We have tried these approaches and find that they actually take more time to edit and review for reliability than simply transcribing the original oral sample. SALT requires a transcript which follows specific transcription rules. These rules specify words, morphemes, and utterances. Exact transcription ensures accurate counts for the measures SALT calculates. For now, transcription using software such as SALT, with live listeners and typists, is the best and most accurate option for populations seen in the field of speech-language pathology.

Transcription is often thought of as an activity that is difficult and time consuming. In truth, once the coding conventions are learned, transcription is not difficult and the process provides a wide scope of insight into oral language skills, showing both strengths and weaknesses. You might consider it to be detailed listening. We have created a transcription format that ensures accuracy (Heilmann, et al., 2008) and provides for many levels of detail. At the basic level, you can code words, morphemes, and utterances and the software will provide measures like mean length of utterance, number of different words, and total words. Marking pauses and transcript duration produce measures of speaking rate and can pinpoint frequency, duration, and location of pauses. Add marking for repetitions, revisions, and filled pauses, and get an analysis of their frequency as well as a breakdown of repetitions and revisions as partial words, whole words, and phrases. These measures allow you to say something about whether verbal fluency problems are at the word level, as in word retrieval, or at the phrase level having more to do with syntactic formulation. The next deeper level of linguistic analysis allows for coding of words or utterances for specific features. An example we have incorporated into our analysis set, the Subordination Index, is a fast measure of clause density associated with complex sentence use. This measure requires coding for each utterance in the sample using the SALT coding routines (see Appendix O). The SALT transcription process is designed to provide the most information for the least transcription effort. Utterances need to be identified with appropriate ending punctuation, and words are defined by spaces on each side. Everything else

is optional. The more you mark or code, however, the deeper and more thorough the subsequent analysis will be.

Overview of SALT Transcription

The record of spoken language created with a SALT transcript allows for a variety of immediate analyses and offers the opportunity for additional analysis in the future. Transcription may seem like a daunting task when just beginning, but working through the transcription process has incalculable rewards as the first step for problem solving an individual's oral language skills. Practice leads to proficiency.

The basic transcription protocol in SALT (see Appendix O) specifies conventions to identify utterances, words, morphemes, pauses, unintelligibility, omissions, and errors used to calculate specific language measures. Our first goal was *time efficiency*, keeping coding to a minimum for basic level analysis. Subsequent coding, if desired, would be guided by the results of the initial analyses across all language levels.

It was also important to create a readable transcript that could be easily followed and understood by family and other professionals. Transcripts can be shared with colleagues to increase accuracy in diagnosis and intervention. This process is particularly important for complex problems. Clinicians have reported sharing transcripts with diagnostic team members, parents, teachers, and administrators to clarify oral language concerns and to support other diagnostic results. Transcripts, along with the audio/video files, can be stored as part of clinical records to facilitate sharing of information.

SALT provides you with helpful tools. A specialized editor facilitates every step of the transcription process, from setting up descriptive information about the speaker and context to a transcript error routine that identifies format errors and guides correction. SALT has built-in help at every level. When transcribing, specific transcription coding features can be easily accessed, producing a list of all transcription features, their definitions, and examples for use. This is particularly useful for infrequently used conventions. Once a transcript is completed, a variety of analyses can easily be calculated. This transcription format ensures that all analyses are calculated accurately. The uniformity of the process overcomes the major weakness cited for completing LSA by hand, *consistency*. With SALT, all transcription is completed using the same method, regardless of the type of sample or age of the speaker.

Transcription Requirements

The SALT software and some method for audio/video playback are required for transcription. Digital recordings greatly improve the overall sound quality of a language sample which, in turn, improves the ability to accurately and more efficiently transcribe what was spoken. Digital recordings also allow for easy and fast manipulation of the audio or video file, e.g., moving forward and back, or repeating segments of language. File transfer and copying is fast and simple with digital recordings. There are a number of options for controlling the playback of digital files for transcription. For those who plan on transcribing frequently, we have found foot pedal controls (*hands free*) reduce transcription time and improve the overall accuracy of the transcript. There are also a number of software programs available for controlling the playback of digital files which are often free downloads or come installed on your computer. The SALT web site has recommendations for digital recorders and play back hardware and software.

You do not need to be a speech pathologist to transcribe a language sample. Transcribing spoken language into the SALT editor requires the ability to type, fluency in the language recorded, knowledge of the elicitation protocol, and familiarity with SALT transcription conventions. With

experience, you develop the ability to rapidly and accurately code samples using the SALT transcription conventions. A number of school districts have set up transcription stations staffed by speech pathology aides or individuals with clerical experience. These transcribers produce transcripts that can be used to create the basic reports leaving more technical coding, when necessary, to individual SLPs.

How long does it take to transcribe a language sample? The transcription tools available with SALT greatly speed up the transcription process (see also Pezold, Imgrund, & Storkel, 2020). In our review on frog story retells, transcription time took an average of 40 minutes. This included specialized coding for clausal density and story structure. These audio files were 3 – 6 minutes in length and averaged about 60 utterances. Longer samples take more time of course. Conversational samples generally take longer because topics can vary so much. Story retells have the advantage of providing the same expectations, characters, vocabulary, and story line for the transcriber. Experience also makes a difference. Just as in typing or keyboarding, practice makes perfect.

The Underpinnings of Transcription

The first transcription decisions to be made are *what is a word?* and *what is an utterance?* This sounds simple enough, but consistency is required.

What is a word?

The SALT transcript format defines a word as a set of characters bound by spaces. In SALT, *fsqwú* is a word, though not recognizable in English. We transcribe what is said using standard orthography. This means that we transcribe the words used but not the pronunciation used by the speaker. Articulation errors are not typed in a SALT transcript. Word transcription is driven by using the same spelling for words heard regardless of articulation. For example, a speaker who reduces /r/ clusters might say “tuck” for “truck”. Contextually, the transcriber would know the speaker intended to say “truck” and thus would type the word “truck” to get accurate vocabulary measures. Similarly, pronunciation differences due to regional dialects are not typed in a SALT transcript. As an example, the speaker drops the “g” and says “waitin” for “waiting”. This would be transcribed as “waiting”. Note that clinicians interested in tracking articulation errors and dialectal variations could mark the instances using word codes (see the “Customized Coding” section later in this chapter).

The reason for using the intended word rather than the pronounced word is consistency. Standard spelling conventions are needed to avoid increasing the number of different words used within and across transcripts. Six different spellings of the same word would be counted as six different words in the program. Uniform spelling is essential to obtaining accurate counts of the number of different words used in a sample. “Ahhhh I see”, and “Ah I see”, although spoken with different intonation, should be spelled consistently, e.g., “Ah”.

What is an utterance?

A number of rules to define utterances have been used in the research literature. Utterances can be segmented using Phonological Units (P-units) which are based on speakers’ pauses and intonation in the speech sample. Communication units (C-units) are the most commonly used method of segmenting (Loban, 1976). They are defined as a main clause with all its dependent clauses. Minimal Terminable Units (T-units) are a variation of C-unit rules, originally defined to segment written language (Hunt, 1965).

We use C-unit segmentation because we found that the more syntax-based rules of the C-unit provided greater consistency (see Appendix N). This was particularly true as we increased the age of the children we studied. Despite using consistent rules that have been time-tested through research, children and adults still say things that are puzzling to segment. These surprises have led to the creation of the “utterance of the week” in our lab which has led to many spirited discussions on how

to segment or code properly. Typically, 95% of the transcription process is straight forward with 5% of the decisions requiring more thought or creativity.

SALT is focused on word, morpheme, utterance, and discourse features of the language, and transcription decisions define the measures calculated for each language feature. Language production, rather than speech production, is the focus. As you learn the transcription coding rules, you will begin to appreciate that each decision for a specific feature has an impact on how other features are defined for analysis. Learning to transcribe will help you understand the interrelationship among the features of our language.

Anatomy of a Transcript

Figure 3-1 shows an excerpt from a SALT transcript. The lines at the beginning of the transcript make up the transcript header. Header information is entered into a dialogue box presented when you create a new transcript in SALT. The information you enter in the header dialogue box is inserted at the beginning of the new transcript. The speaker label line, which begins with a dollar sign, identifies the speakers in the transcript. The identification lines begin with a plus sign and contain identification information such as the target speaker's gender and current age. The initial timing line begins with a hyphen. The example given here is one possibility of what the header information may look like at the beginning of a transcript. Your header will vary depending on what information you choose to fill in.

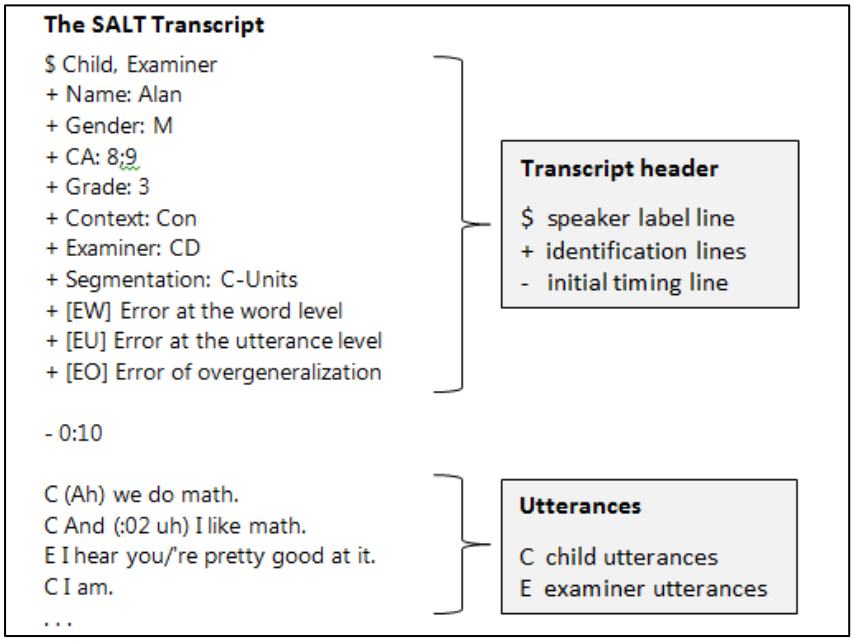


Figure 3-1

Once the header information is specified, you are ready to type what was spoken during the language sample. Each utterance must begin with a speaker identification letter. These letters should correspond to the first letter of the speaker label as specified in the $ speaker label line. For example, if your speaker label line is $ Child, Examiner, each child utterance will begin with C and each examiner utterance will begin with E, as shown in the example above. Each utterance is segmented according to the rules chosen for the sample. For the most thorough and accurate analysis results each utterance should be marked and coded following the basic SALT transcription conventions (see Appendix M).

Customized Coding

SALT allows you to devise your own codes to analyze any feature of the language sample that you are interested in. These codes can be inserted anywhere within a word or at the end of specific words or utterances, depending upon the features of interest. One example of custom coding includes marking responses to questions as appropriate [AR], inappropriate [IR], or no response [NR]. The transcript might look like the following:

E Do you have any plan/s for the weekend?
C No **[AR]**.
E Did you know there/'s a track meet here on Saturday **[NR]**?
: 0:05
E Do you know anyone on the track team?
C I don't like track **[IR]**.

Codes could be created to mark suprasegmental features if important to the diagnostic, e.g., [PR] for pitch rise and [FI] for falling intonation. These codes can then be pulled up in the analyses for further investigation of frequency or patterns of use. Coding schemes for articulation errors and dialectal variations can be created, or existing schemes can be implemented. With bilingual or multilingual speakers we often see code switching. Code switches can be marked at the word and/or utterance level with a code, e.g., [CS], to be further reviewed or counted. When transcribing from video samples, non-verbal communication behaviors such as points, nods, or shrugs can be marked. Unique coding is also useful for tracking progress made in therapy with specifically coded repeat samples. An example might include work on increasing specific referencing with pronoun use. Pronouns with unclear referents in the sample can be marked with a code during transcription and later pulled up in the analysis. There are endless possibilities for unique coding schemes since the coding is so flexible.

When creating new codes or when using less frequently used codes in SALT, it is helpful to insert plus lines at the beginning of the transcript to define the codes for the reader. See Figure 3-2.

```
$ Child, Examiner
+ Gender: F
+ CA: 6;8
+ Context: Con
+ [EW] = word-level error
+ [EU] = utterance-level error
+ [CS] = code switching
```

Figure 3-2

See Chapter 8 for detailed suggestions for transcribing written samples and coding samples for fluency.

Transcription Reliability

At the end of the day, can you learn the basic transcription codes and use them reliably to create an orthographic record of oral language? We addressed this question in a research project to document transcription accuracy and reliability (Heilmann, et.al. 2008). This project looked at English and Spanish narrative samples elicited from bilingual children retelling the story *Frog, Where Are You?* by Mercer Meyer (1969). All samples were digitally recorded and later transcribed by a trained master's-level student majoring in speech-language pathology. On average, it took the transcribers 30 minutes to transcribe each sample.

Transcript protocol accuracy was analyzed by having a proficient transcriber review transcripts for adherence to the SALT coding conventions; checking for accuracy in utterance segmentation, words within the main body of the utterance, words in mazes, and maze placement. Percent agreement was high across the board (90% - 100%) suggesting the transcribers consistently adhered to the transcription procedure. *Transcription consensus* was analyzed to identify differences in transcripts completed by a single transcriber against the "gold standard" transcript; checking for accuracy in words and morphemes, utterance segmentation, maze placement, pauses, and utterance type. Transcribers were very reliable in transcribing samples with percent agreement of 90% - 99%, with the exception of marking pauses (60% - 70%). *Test-retest reliability* was also calculated for samples collected within a two-week period. Results revealed significant correlation values from r=.69 to r=.79 noting a very high level of agreement that is statistically the same. These data, however, indicate some variability across transcripts. To determine the impact of this variability, SALT analyses were calculated for each transcript. Statistical analysis found that both transcripts (test-retest) provided the same values across measures of syntax (mean length of utterance in words), semantics (number of different word roots), and total productivity (number of total words and words per minute). While some variability is inevitable when making decisions during transcription, these analyses document that the impact on the measures of language performance is negligible.

This work demonstrates that language samples can provide consistent data for documenting language performance across individuals and within the same client over time. You can have confidence that using SALT transcription codes will result in reliable transcripts of oral language use. This work also dispels the myth that language samples are too variable to provide robust clinical data. On the contrary, your transcription of individual samples will provide you with the tools to document your practice.

Transcribing in Other Languages: Challenges and Rewards

Our bilingual Spanish/English research project (Miller, et al., 2006) presented us with a major challenge; how to make consistent transcription decisions for Spanish that would allow comparison with English transcripts. In order to compare an individual's Spanish language skills with their English language skills we needed to be sure we were counting the same elements; words, morphemes, and utterances. Aquiles Iglesias and Raúl Rojas, who at the time were at Temple University, collaborated with us to design the Spanish transcription format for SALT. It took the better part of a year to work out how to code specific features of Spanish which are inherently different than English, such as verb inflections and bound versus unbound clitics. Once the transcription rules were defined, the final product, which included reference databases for comparison in both English and Spanish, proved to be such a valuable tool that we built it into the SALT software. This has been well received and frequently used by both researchers and clinicians.

Through collaboration with Elin Thordardottir at McGill University (Thordardottir, 2005) and Elizabeth Kay-Rainingbird at Dalhousie University, SALT now supports French transcription and reporting. Funda Acarlar, a colleague at Ankara University in Turkey, used SALT to transcribe samples in Turkish to produce its own database for comparison in the language, in essence creating local norms which resulted in a customized version of SALT (Acarlar & Johnston, 2006).

There has been interest in using SALT with other languages as well. The challenge is always to make consistent transcription decisions within the language. Words and utterances must be clearly defined. The end product, however, will offer the benefit being able to analyze functional language produced in real-life settings.

Summary

Suffice it to say that transcription is the core of LSA. If done with care and consistency you will have a valuable snapshot of spoken language to evaluate. Understand that there will be a few puzzling features of almost every transcript. To accurately capture the speaker's language, think about what was said and how it was intended. Work toward typing and coding precisely what was communicated while appreciating the diversity of human communication within and across age (see Appendix M).

CHAPTER

4

Analyzing Language Samples

Jon F. Miller
Karen Andriacchi
Ann Nockerts

Analyzing the sample is where we begin to see the tremendous power that computers bring to the task. SALT can be used to create a series of reports of word, morpheme, discourse, rate, fluency, and error measures. To make this happen it is important to understand the overall structure of the program and learn the specifics of the menu choices available. This chapter focuses on the organization of the SALT measures, explaining why they are included in the software, what you can learn from each score, and where to go to further evaluate a specific problem. The software calculates a wide variety of measures which are accessed from the menus. In this discussion, the focus is on two of these menus: Analyze and Database.

When analyzing language samples, it is important to create an approach that examines each transcript systematically, making sure that all levels of language performance are evaluated. The transcript includes utterances from one or more speakers, representing features of the sample such as unintelligible segments, repetitions, revisions, pauses, overlapping speech, abandoned utterances, and words or bound morphemes omitted in obligatory context. This transcribed sample is the basis for all measures.

Review the Transcript

It's easy to get excited at this point and plunge into the detailed analyses of the transcript. It is important to remember, however, that the results of the analyses need to be placed in context to create an overall description of oral language performance. Prior to analyzing the transcript, it is strongly suggested you follow these steps:

1. Re-read the transcript while listening to the recording. This will help you to consider the reliability of the recording as a valid index of the targeted speaker's oral language.

2. Make changes to the transcript where necessary. If transcription was done by someone other than yourself, there may be unintelligible segments that you, as a familiar listener, can understand. Or, it is possible that the transcriber upheld the speaker to a higher or lower standard of proper syntax than you desire for the speaker's age or the sample context. You should be aware of coding decisions made by the transcriber and make changes to ensure the transcript is authentic to the speaker's intent.

3. Look back on the issues raised in the referral by teachers, parents/family, by you, or by a fellow team member. *Does the transcript provide a sample of oral language which reflects the reasons for referral?*

Analysis Menu Options

Analysis of the language in the transcript is completed using two main menu options in SALT: Analyze and Database. They are introduced here but are discussed, in greater detail, later in this chapter.

The Analyze menu produces reports which summarize information from the current SALT transcript *independent of the reference databases*. These reports provide information for two speakers in the sample, as defined by the $ speaker line at the beginning of the transcript.
The *Database* menu produces reports which compare language measures from an individual's transcript to age or grade-matched samples selected from one of the SALT reference databases.

SALT Reference Databases

Language sample analysis has long been held as a valid indicator of expressive language performance in children. Several factors, however, have limited its general use including a lack of standardized procedures for eliciting language samples, validated measurement categories, normative data, and relevant interpretation strategies. Over the past several years, each of these issues has been addressed through research projects. Analyses of data obtained from these projects have led to the development of standardized language sampling procedures, language sample norms, and interpretation strategies that can be used in the evaluation process for determining the existence of a handicapping condition in expressive language. These data also have direct implications for determining special education program intervention strategies and in monitoring student progress. The language sample norms obtained from these research projects have been stored in the SALT reference databases (see Chapter 2).

Underlying Constructs

Let us take a look at three important underlying constructs that are the backbone of the SALT analysis process. There are default settings for each of these constructs which can be changed to suit your needs using the *Setup* menu.

- **Analysis Set (C&I Verbal Utts)**

  The *analysis set* in SALT is a subset of the total utterances which is used for many of the calculations. Although you may change the analysis set, the default analysis set includes those utterances which are complete (not abandoned or interrupted), intelligible (do not contain any unintelligible segments), and verbal (excludes utterances that do not contain at least one verbalized word, e.g., gestures). To illustrate the importance of the analysis set, consider the calculation of mean length of utterance (MLU). To avoid negatively influencing the outcome, the only utterances included in the calculation of MLU are those in the analysis set, i.e., those utterances which are complete, intelligible, and verbal (C&I Verbal Utts). Contrast this with the measure of percent intelligibility which is calculated on all of the utterances in the sample.

  Many of the reports selected from the Analyze menu provide the same language measures calculated from both the analysis set utterances and from total utterances. Other reports selected from the Analyze menu give you the option of specifying the set of utterances to use for the calculations. Reports selected from the Database menu, on the other hand, decide for you the measures which are based on analysis set utterances and those which are based on total utterances.

  As stated earlier, the analysis set can be changed to meet your needs. As an example, consider that, when eliciting conversational samples, examiners are often forced to ask questions to encourage talking. Responding to yes/no questions, however, often results in one-word

responses. Because of this, early research on language development calculated MLU from "spontaneous" C&I verbal utterances, eliminating responses to questions. Using the *Setup menu: Analysis Set* option, you can change the current analysis set so that it excludes responses to questions. Subsequent analyses would then be based on the new analysis set. If the speaker's MLU is significantly longer when responses to questions are excluded, we can assume that responses to questions limited verbal output.

- **Word Base**

  The *word base* defines which words you want included in the analyses. By default, the word base includes all words except those coded as ((parenthetical remarks)). You have the option of including parenthetical remarks as well as excluding, or only including, words that have specific [codes] attached to them. Words excluded from the current word base are not included in any analyses except the count of all words which is used to calculate speaking rate. In all other respects, they are treated as though they were commented out.

  An example of the utility of the word base option might include a transcript which contains signed words. The signed words would have been coded in the transcript to flag them for analysis, e.g., typing the code [SIGNED] at the end of each signed word. Using the *Setup menu: Word Base* option you may choose to exclude, or to only include, the signed words.

- **Transcript Cut**

  The *transcript cut* setting determines which section of the transcript to include in the analyses. All analyses are based on those utterances within the current transcript cut. The default transcript cut is the entire transcript (*nothing cut*), but it may be changed to restrict the analysis to a specific section of the transcript. The transcript cut is determined by the location of the utterances within the transcript (*contrast this with the current analysis set, which is determined by the contents of the utterances*). The *Setup menu: Transcript cut* option is used to change the current transcript cut. You specify the transcript cut in terms of a starting point (*beginning of transcript, specified utterance, timing line or code*) and either an ending point (*end of transcript, specified utterance, timing line or code*) or until the transcript contains a specified number of utterances, words, or elapsed time.

  The transcript cut could be used, for example, to limit the analysis to the first 50 utterances or to the first 200 words. Suppose your transcript contains a series of conversational topics. You could set the transcript cut to include only those utterances pertaining to a specific topic. Similarly, if your transcript contains a series of stories, you could set the transcript cut to include a single story.

Each of these constructs has a default setting that will more often than not be used for running measures in SALT. It is, however, important to understand that you have the option to change them and how those changes might affect the outcome of your analyses.

Running the Measures - The Analyze Menu

The Analyze menu provides the opportunity to generate measures for each speaker in the transcript. A few of the options are discussed here. Others are covered later with specific clinical case examples (see Chapter 8).

The *Standard Measures Report* (SMR) is the first analysis option in the Analyze menu. The SMR calculates summary measures across sample length, intelligibility, macro analysis (if coded), syntax/morphology, semantics, discourse, verbal facility, and errors. The measures included in this report come from the research literature on language production, e.g., MLU, NDW, mazes (false

starts, repetitions, revisions, and filled pauses), and from the requests of SLPs who were interested in measures of speaking rate, pauses, intelligibility, and certain features of discourse. This report is designed to provide a profile of strengths and weaknesses in individual speakers.

Follow-up analyses are available in the Analyze menu to examine particular issues. If mean length of utterance (MLU) is low, for example, you may want to generate a summary of the words and bound morphemes found in the transcript (*Syntax/Morphology Summary*) and the distribution of utterances by the number of words and morphemes they contain (*Utterance Distribution Tables*). If the number of different words (NDW) is low, you may want to look at the follow-up summary (*Semantics Summary*), an alphabetical list of all the different words in the transcript and their frequency (*Word Root Tables*), a list of common words and their frequency (*Standard Words Lists*), a list of bound morphemes with their word roots (*Bound Morpheme Tables*), and lists of words categorized by parts of speech (*Grammatical Categories*[1]). Generate a *Verbal Facility Summary* when mazes (filled pauses, repetitions, and/or revisions) or pauses are high. The *Standard Utterance Lists* option pulls up utterances containing specific features, e.g., responses to questions, abandoned utterances, and utterances containing omissions. The organization mirrors clinical decision making by presenting a look at strengths and weaknesses and then offering further analysis options to explore each area in more detail (see Appendix T).

The *Performance Report* helps you incorporate the language sample analysis findings into diagnostic reports and Individual Education Plans. The data generated from the various reports within the Analyze menu is used to create a cohesive narrative about the speaker's expressive language performance without the database comparison. This is the only report in the Analyze menu which can be edited in the report window. You may want to add clinical impressions or observations, or modify some of phrasing to fit your preferences. The report can also be saved in RTF format which can be opened using Microsoft® Word, or copied and pasted into electronic record-keeping programs.

The Analyze menu lists outcomes for each speaker in the transcript. The reports have particular utility when eliciting samples for which there is no database for comparison such as adult speakers or the hearing impaired. Perhaps you used an elicitation protocol different than those used for the SALT databases, or perhaps you simply want to look at change over time comparing transcripts from the same speaker at different intervals. Even without a reference database to use for comparison, a good language sample can provide a wealth of information about a person's expressive language.

Running the Measures - The Database Menu

The Database menu is used to compare a speaker's performance to age or grade-matched peers to generate comparison data. The databases allow you to answer the question, *is this speaker's performance across measures typical?*
There are multiple analysis options available in the Database menu.

Selecting the Database Samples for Comparison

In order to utilize the analysis options in the Database menu, you must first select a database comparison set. There are three steps to the process:

```
$ Child, Examiner
+ Name: Timmy
+ Gender: M
+ CA: 5;8
+ Grade: K
+ Context: Nar
+ Subgroup: FWAY
```

Figure 4-1

STEP 1: Select database (Figure 4-2)

Select the appropriate SALT database for comparison. The plus lines at the beginning of the SALT transcript (Figure 4-1) direct the software to pre-select the appropriate database. In the example we are using, the

[1] The grammatical category algorithm, dictionary, and software code have been generously provided by Ron Channell, Ph.D., Brigham Young University.

Narrative Story Retell database was chosen with subgroup/story FWAY (*Frog, Where Are You*?, Mayer, 1969). This database selection step typically requires only that you agree with the selection made by the software. The selection can, of course, be changed.

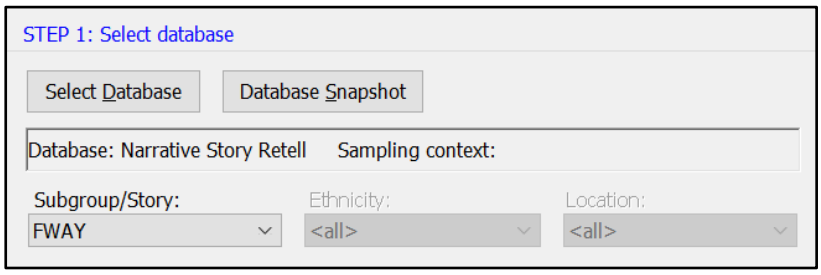


Figure 4-2

STEP 2: Select age, grade, and/or gender criteria (Figure 4-3)

Choose criteria for matching samples. The options are to match your sample to samples in the database by age, grade, and/or gender. An age match is the most common criteria used for comparison and is usually the default selection.

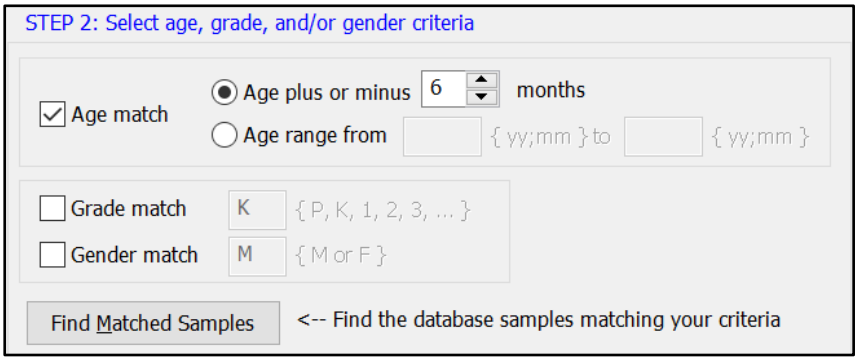


Figure 4-3

STEP 3: Select method used to equate samples by length (Figure 4-4)

Select a method to equate your sample and the database samples by length in terms of words, utterances, or elapsed time. Some language measures vary significantly, depending on the length of a sample. Consider, for example, the number of different words (NDW) and the number of errors. The longer the sample, the greater the opportunity to use a wider variety of words and to make more errors. If the target speaker's sample was far longer than the samples in the database, his or her opportunity to use different words and to make errors was greater. Reversely, a target speaker who produced a very short sample had less time, thus opportunity, to produce different words and to make errors. Equating samples by length offers a more fair comparison of the target speaker's performance to the performance of the speakers in the database samples; apples to apples.

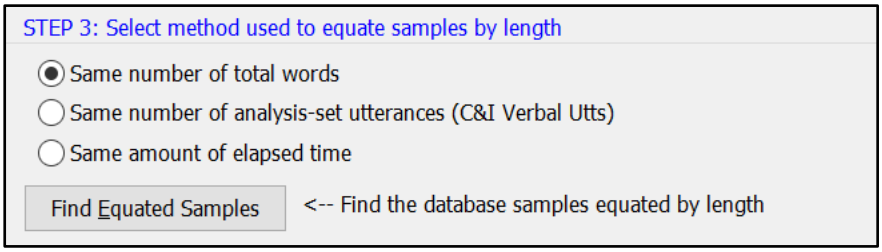


Figure 4-4

Once the comparison set criteria have been selected, all of the analysis options in the Database menu become available.

Database Standard Measures Report

The *Standard Measures Report* (Figure 4-5), selected from the Database menu, contains the same measures as the same selected from the Analyze menu. The database report provides an overall summary of how the target speaker compares to a selected peer group in standard deviation units. The *Standard Measures Report* is the backbone of SALT analysis, providing general measures of language performance essential for identifying strengths and deficits at all levels of language use. The individual sections in this report are discussed in detail below.

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)

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	6.46 *	-1.26	7.62	5.17	9.77	0.93
% Utterances With Verbs	87.5% *	-1.64	95.23	80.00	100.00	4.72
Mean Verbs per Utterance	1.04 *	-1.40	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 4-5

The heading at the beginning of the *Standard Measures Report* gives information about the target speaker and the database comparison sets that were selected. In this example, Timmy, age 5;8, produced a story retell sample using FWAY (*Frog, Where Are You*?, Mayer, 1969). Samples were selected from the *Narrative Story Retell* database (STEP 1: Figure 4-2). The comparison sets chosen included, first, 69 samples matched by age (STEP 2: Figure 4-3), and next, 66 of the 69 samples in the database that were cut to 139 Number of Total Words (STEP 3: Figure 4-4). Note that 3 of the 69 samples were excluded because they contained less than 139 NTW. When you select the *Standard Measures Report*, you are asked to select which of these sets you want to use for comparison. For this example, Timmy's sample is compared to the 69 samples matched by age using the entire transcript.

Let's look at the numbers.

As you scan the *Standard Measures Report* (Figure 4-5), notice that it is divided into domain-specific sections. The first column lists the measures. Following the measures column are the scores for the target speaker reported as raw scores and in standard deviation units relative to the database mean. Note that values which are highlighted and followed by one asterisk are used to denote scores that are at least 1 standard deviation (SD) from the database mean. Values followed by two asterisks are 2 or more SDs from the database mean. The SD interval, which affects how measures are asterisked, can be changed from the default setting of 1 SD to any value, e.g., 1.5, 1.75, to accommodate diagnostic criteria. Careful consideration of the plus and minus standard deviation values relative to each score is necessary to make the correct interpretation of performance. For example, scores of negative 2 SDs for mazes is considered to be a strength while negative 2 SDs for MLU indicates a significant problem. Think about the direction the speaker's performance must deviate to be considered a problem.

The final four columns in the report include database values of mean, range of scores (min and max), and SD. There is an optional fifth column, the %SD. The percent standard deviation is an index of the variability of each score for the dataset. The higher the %SD value, the greater the variability of the scores in the comparison set. If desired, use the Setup menu in SALT to toggle the %SD display.

Refer to Appendix U for a good explanation of standard deviation.

Transcript Length: Measures of transcript length provide data on the length of the transcript in terms of utterances, words, and elapsed time. Sample length should always be kept in mind when interpreting language measures. Some language measures, e.g., NTW, NDW, number of errors and omissions, vary depending on the length of a sample.

Intelligibility: The speech intelligibility measures provide an index of how many unintelligible segments there are in the transcript. This is important when evaluating the language performance in speakers who have articulation issues. Speakers with intelligibility scores less than 80% may generate language measures that are influenced by their ability to produce understandable utterances. Utterances may be shorter and word selection may be reduced to fewer syllables. Also, keep in mind that this measure is not speech intelligibility per se. This score also reflects the quality of the recording (hopefully improved with digital equipment), the skill of the transcriber, the number of unique proper names, and limiting listening to three passes of a segment during transcription. The intelligibility scores reflect understanding of the recording which may be different than face-to-face speech recognition.

Macro Analysis: Scoring procedures were developed to assess the structure and content of narrative, expository, and persuasion samples (see Appendices P-S). When a transcript is scored following these procedures, the composite score is included in this section of the report. In this example, the Narrative Scoring Scheme (NSS) was applied to the sample. All the samples in the selected database (*Narrative Story Retell*) were scored for NSS so comparison scores are provided.

Syntax/Morphology: Measures of syntax and morphology include MLU in words and morphemes which are highly correlated with age from 3 – 13 years (Leadholm & Miller, 1992). MLU is one of the measures central to the identification of language disorder (Paul, 2007; Rice**,** et al., 2010). "% Utterances with Verbs" and "Mean Verbs per Utterance" are included for English samples. Verbs are identified using a large dictionary of English words and a set of grammatical rules (Channell & Johnson, 1999). The SI composite score is included with samples coded for subordination index (see Appendix O).

Semantics: Number of Total Words (NTW) is the total count of all words. Number of Different Words (NDW) is a direct index of vocabulary diversity. It is derived from the production of unique free

morphemes (the part of the word that precedes the /). For example, *play*, *play/ed*, and *play/ing* would be treated as one word root (*play*) occurring three times. Only words located in the main body (excludes mazes) of the utterance are counted to calculate these measures. The Moving-Average NDW estimates NDW using a moving window. Initially, a window length is selected, e.g., 100 words (Moving-Average NTW), and the NDW for words 1–100 is calculated. Then the NDW is calculated for words 2–101, then 3–102, and so on to the end of the sample. For the final score, the individual NDWs are averaged. Unlike the traditional calculation of NDW, the Moving Average NDW is independent of sample length (Covington & McFall, 2010). If desired, the window length can be changed using the Setup menu in SALT.

Discourse: Discourse measures are available for conversational or play samples where mean turn length in utterances and words, percent responses to questions and intonation prompts, percent utterances with overlapping speech, and percent utterances which interrupted another speaker inform you about responsiveness to a conversational partner. These measures are an excellent first step in identifying speakers who fail to attend to partner speech.

Verbal Facility: Verbal facility is described by providing a measure of speaking rate (in words per minute), pause time as a percent of total time (if silent pauses and elapsed time were marked in the sample), percentage of the number of total words that were in mazes (Maze Words as % of Total Words), and the percent of utterances which were abandoned. The words per minute score significantly correlates with age and is considered by bilingual researchers to be an index of language facility (Miller, et al., 2006). The more fluent you are in a language, the higher your words per minute score. A high number of pauses within the speaker's utterances might be indicative of language processing, word retrieval, or fluency problems. Pauses between utterances may indicate processing or formulation difficulties. "Maze" is the term used for false starts, repetitions, revisions, and filled pauses. Increased maze use has been linked to word retrieval and utterance formulation problems. The maze words to total words ratio captures the overall impact of mazes on the whole sample. Silent pauses, both within and between utterances, affect overall verbal facility and rate. Abandoned utterances can be thought of as severe mazes where the speaker does not complete the utterance. These utterances can impact overall fluency of oral productions.

Errors: Errors are captured during transcription. "% Utterances with Errors" calculates the percent of utterances which contain at least one instance of either an omission or an error code. Omission codes are used to mark missing words or bound morphemes that have obligatory contexts signaling required use. Error codes at the word or utterance level are used to note inappropriate word choice or syntactic form. These codes are meant to signal errors that may need further review.

Report Footnotes (Fig 4-5):

- At least 1 SD (** 2 SD) from the database mean
  Identifies the current standard deviation interval (1 SD by default) used to flag measures. One asterisk denotes scores that are at least 1 SD interval from the database mean. Two asterisks denote scores that are 2 or more SD intervals from the database mean.
- Italicized measures
  When the report is based on the entire transcript, measures which count occurrences are italicized to alert you that these measures can be significantly affected by the different sample lengths.
- Calculations based on C&I Verbal Utts
  Identifies the measures which are calculated using just the utterances in the current analysis set (C&I Verbal Utts by default). The other measures are calculated using total utterances.
- Database selection criteria
  Lists the criteria used when selecting database samples for comparison.

Database Performance Report

The *Performance Report* (Figure 4-6) helps you incorporate the language sample analysis findings into diagnostic reports and Individual Education Plans. The data generated from various reports are used to create a cohesive narrative about the speaker's expressive language performance, noting both strengths and challenges.

Performance Report
Timmy FWAY
Age: 5;8, Grade: K

Language Sample Analysis with SALT Software

Elicitation Task and Database Overview
Timmy completed a narrative story retell of 'Frog, Where Are You?' (Mayer, 1969). He listened to the story and then retold the story using his own words. Measures of sample length, intelligibility, narrative structure, syntax/morphology, semantics, verbal facility, and errors were calculated from his language sample and compared with samples from 69 speakers completing the same task. These speakers were within 6 months of Timmy'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, Timmy's sample was compared with a subset of 66 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
Timmy's sample contained a total of 26 utterances using 154 words produced in 1 minute and 54 seconds, resulting in a shorter sample than his database peers completing the same task. His number of utterances, words, and time were 1.35 SD lower, 1.72 SD lower, and 1.71 SD lower, respectively, than the database mean.

Macro Analysis
The Narrative Scoring Scheme was used to assess the structure and content of Timmy's narrative. The following categories were included: introduction, character development, mental states, referencing, conflict resolution, cohesion, and conclusion. Timmy's composite score of 13 out of a possible 35 points was 1.83 SD below the database mean of 18.83. He demonstrated particular difficulty with the categories of introduction, character development, mental states, conflict resolution, and cohesion.

Syntax/Morphology
Timmy's mean length of utterance (MLU) in words was 5.79, which was 1.32 SD below the database mean of 6.88. Most frequently, he used 3-word, 6-word, and 7-word utterances. His MLU in morphemes was 6.46, which was 1.26 SD below the database mean of 7.62. 87.5% of Timmy's utterances contained verbs with an average of 1.04 verbs per utterance. These values were both lower than the database mean by 1.64 SD and 1.40 SD, respectively. Timmy's sample was scored for subordination index (SI), which measures the average number of clauses per utterance. In general, higher SI scores indicate increased use of complex syntax. Timmy yielded an SI score of 1.05, which was within normal limits. His most complex utterance contained 2 clauses. For example:

C And then he said, "Don't come back to my home ever again" {E laughs}.

Semantics
Timmy used 62 different words (NDW) within an analysis set of 139 total words (NTW). This compares with database means of 90 different words within 240 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. Timmy produced a moving-average NDW of 49, which was within the normal limits, indicating typical vocabulary diversity.

...

Figure 4-6

This is the only database report which can be edited in the report window.
The report can also be saved in RTF format which can be opened using Microsoft® Word, or copied and pasted into electronic record-keeping programs. You may want to add clinical impressions or observations, or modify some of phrasing to fit your preferences. Any transcription changes or alterations to the comparison set that are made to fit the needs of your speaker may be worth noting in the report (e.g., changing the grade match or expanding the database age match).

Database Quick Look Report

The *Quick Look* report (Figure 4-7) includes a list of language measures providing a quick view of how the target speaker compares to the selected database transcripts. Each language measure is indicated as one of the following: strength, within normal limits (WNL), or weakness.

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)		
QUICK LOOK Compared to 69 Samples Matched by Age			
LANGUAGE MEASURE	**Strength**	**WNL**	**Weakness**
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 (5;2 - 6;2)			

Figure 4-7

Examples - Selecting Samples from the SALT Reference Databases

There are more than 7,000 samples in the SALT databases across speaking genres. As mentioned, the software helps you to identify the correct database from which you will select the transcripts for comparison. The first time you select a report from the Database menu, you are prompted to choose the specific database matching your sample type, the age or grade-match criteria, and the basis for comparison by length. This is best illustrated with examples.

Example 1: Blake 8;4 PGHW[2]

Blake is 8 years and 4 months old. In this example, he is retelling the story *Pookins Gets Her Way* (Lester, 1987). To select a report from the Database menu, you are prompted to select the database comparison set. Based on the +Context and +Subgroup information lines at the beginning of Blake's transcript (Figure 4-8), the Narrative Story Retell database (see Appendix I) is pre-selected. This database contains samples from participants retelling several different stories. Only those participants retelling the same story, *Pookins Gets Her Way* (PGHW), are considered.

```
$ Child, Examiner
+ Name: Blake
+ Gender: M
+ CA: 8;4
+ Ethnicity: Caucasian
+ Grade: 2
+ Context: Nar
+ Subgroup: PGHW
```

Figure 4-8

[2] *Blake 8;4 PGHW* is one of the sample transcripts included with the software.

The rule of thumb we have developed over the years is to aim for at least 20 participants for comparison to reduce the variability as much as possible. The more participants you have in the comparison set, the better it represents language performance of typical speakers of the same age or grade, speaking under the same conditions.

Age, grade, and gender criteria are then specified to further refine the comparison set. For Blake's sample, the age criterion is pre-set to +/- 6 months, i.e., all database participants in the age range 7;10 – 8;10. The grade and gender criteria are not specified using the default settings. They can be selected if desired. In this example, 74 participants matched the age range specified (Figure 4-9).

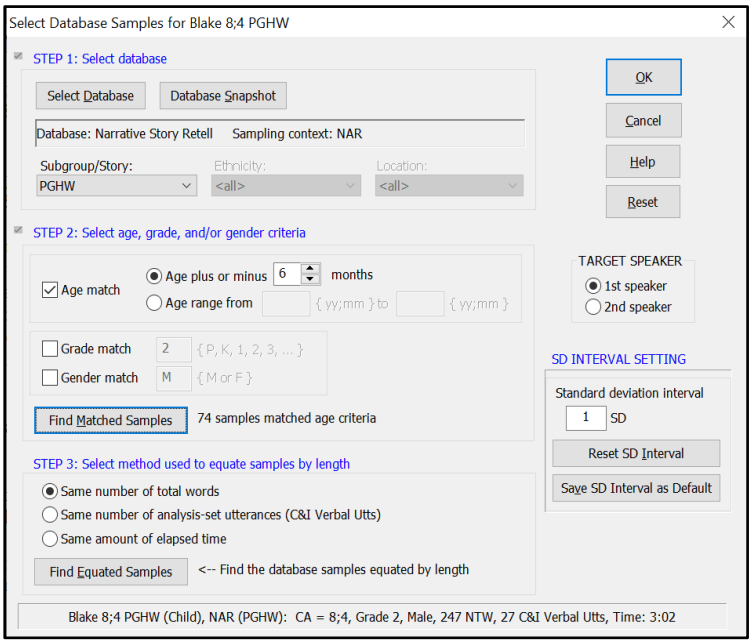


Figure 4-9

The next step in selecting database samples for comparison is to find a set of samples that are equated by length. When comparing an individual's sample with selected database samples, it is important to understand what portion of the database transcripts are included in the comparison. The default setting is to compare the target sample to samples in the database with the same number of total words (NTW). Other options include a comparison using the same number of analysis set utterances or the same amount of elapsed time. In this example, we use NTW to equate the length of the samples. After making this selection, you are presented with the best comparison set options varying in number of participants and number of words (Figure 4-10).

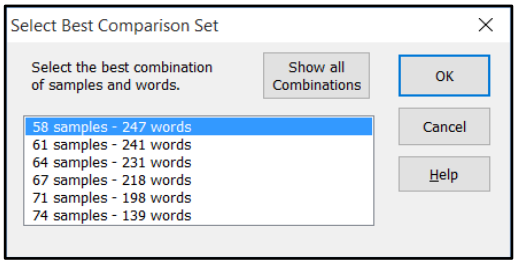


Figure 4-10

In this example, 58 of the 74 participants contained at least 247 NTW (same NTW as found in Blake's sample). You want to maximize the number of participants with the most language. Often the choice is obvious. In this example, six options are provided, ranging from 58 samples with transcripts containing at least 247 words, to 74 samples with transcripts containing at least 139 words. The 58 samples provide the longest transcripts (247 words versus 139 words), hence the most language to be included in the comparison set. The 74 samples maximize the database participants but minimize the sample length. Since 58 samples are sufficient, this option was selected. SALT then calculated the database values with the selected database participants and generated the reports.

Example 2: Timothy 6;1 Con[3]

Timothy is 6 years and 1 month old. In this example, a conversational sample was elicited between Timothy and a speech pathologist. Based on the +Context information line at the beginning of the transcript (Figure 4-11), the Conversation database (see Appendix G) is pre-selected.

```
$ Child, Examiner
+ Name: Timothy
+ Gender: M
+ CA: 6;1
+ Grade: K
+ Context: Con
```

Figure 4-11

The age criterion is pre-set to +/- 6 months. The database has 147 samples for comparison in that age range. The same number of total words was chosen to equate this sample to the database samples by length. Using the same number of words in the both Timothy's sample and the database samples ensures that measures, such as number of different words, number of pauses, and errors are not influenced by sample length. If your target speaker's MLU is low and you compare samples based on the same number of utterances (rather than words), the typical speakers in the comparison set will likely have longer utterances and hence more different words because they produced more words per utterance. Basing the comparison on the same length in words eliminates this confound. 146 of the 147 samples had at least as many words as Timothy's sample (53 NTW).

At this point you could consider narrowing the age range of the analysis set, reducing it from 12 months (+/- 6 months) to perhaps 8 months (+/- 4 months) which provides 104 participants with transcripts containing at least 53 words. Narrowing the age range even further to 6 months still results in a group of 77 participants with 53 words. By reducing the age range of the comparison set, we improve the match between the individual speaker and the comparison group of typical speakers. This reduces the variability inherent in larger age ranges. You might also consider matching the database participants by grade and/or gender. Some databases are large enough to allow you to adjust the selection criteria and still have sufficient participants to create a valid comparison set. Some do not allow for this adjustment because the number of participants was limited at inception.

What we have done in selecting a comparison set is to create a customized set of transcripts that best match the target language sample. In this example, there are two comparison sets. The first includes all samples which match the age criteria selected and calculations are based on the entire transcript. In the second, and length-matched, comparison set, the comparison is based on 53 words (Timothy's NTW). The matching database samples are all cut at 53 words, i.e., transcript processing stops when the 53rd word is reached in each of those samples. The SALT program produces the unique set of measures for each comparison set providing the best possible measures of typical performance. Each of these comparison sets constitutes a table of normative values like that found in any standardized test. Instead of one look-up table, SALT creates unlimited look-up tables tailored for each target transcript.

Examples - Following up on the Standard Measures Report

A variety of analyses have been created to provide more insight into the strengths and deficits identified on the *Database menu: Standard Measures Report*. The remaining examples in this chapter are used for illustration.

Example 3: Steven 15;3 Expo transcript[4]

Steven is 15 years and 3 months old. In this example, an expository sample was elicited. Figure 4-12 shows the Verbal Facility section of the *Standard Measures Report*, generated from comparing Steven's sample to age-matched peers selected from the Expository database (see Appendix J). The

[3] *Timothy 6;1 Con* is one of the sample transcripts included with the software.
[4] *Stephen 15;3 Expo* is one of the sample transcripts included with the software.

results show significant weakness in the area of verbal facility with reduced speaking rate (words/minute), and increased pause time, maze words, and abandoned utterances.

STANDARD MEASURES REPORT Compared to 76 Samples Matched by Age						
LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
VERBAL FACILITY						
Words per Minute	82.04 **	-2.73	148.98	77.31	208.07	24.57
Pause Time As % of Total Time	11.6% **	3.31	2.02	0.00	17.31	2.91
Maze Words As % of Total Words	18.3% **	2.14	8.74	1.97	23.57	4.48
% Abandoned Utterances	11.1% **	5.29	1.22	0.00	8.00	1.87

Figure 4-12

VERBAL FACILITY SUMMARY Compared to 72 Samples Equated By Same Number of Total Words						
LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
RATE SUMMARY						
Elapsed Time (4:35)	4.58 **	5.77	2.21	1.43	3.50	0.41
Words per Minute	82.04 **	-3.07	151.78	89.42	208.60	22.70
Utterances per Minute	5.89 **	-2.48	11.36	6.87	16.05	2.21
PAUSE SUMMARY						
Pause Time As % of Total Time	11.6% **	2.93	1.09	0.00	28.93	3.60
Pauses Within Utterances						
No. of pauses	4 **	7.55	0.25	0	2	0.50
Total pause time (seconds)	9 **	3.69	0.82	0	16	2.22
Average pause time (seconds)	2.25	-0.33	3.41	2.00	16.00	3.47
Pauses Between Utterances						
No. of pauses	7 **	10.38	0.18	0	4	0.66
Total pause time (seconds)	23 **	5.87	0.79	0	30	3.79
Average pause time (seconds)	3.29	-0.19	3.82	2.00	10.00	2.83

Figure 4-13

The *Database menu: Verbal Facility Summary* provides additional data on rate, pauses, mazes, and abandoned utterances. The Pause Summary section of this report provides a breakdown of within and between-utterance pauses as well as the total pause time in the sample (Figure 4-13). Within-utterance pauses accounted for 9 seconds of elapsed time while between-utterance pauses accounted for 23 seconds. That's a total of 32 seconds of silent pauses out of an expository sample that took 4 minutes and 35 seconds to complete.

VERBAL FACILITY SUMMARY Compared to 72 Samples Equated By Same Number of Total Words							
LANGUAGE MEASURE		Child		DATABASE			
		Score	+/-SD	Mean	Min	Max	SD
MAZE SUMMARY							
Total Maze Words		66 *	1.89	29.71	4	99	19.22
Maze Words As % of Total Words		18.3% *	1.86	8.88	1.34	25.19	5.09
Total Number of Mazes		28 *	1.22	16.61	4	40	9.37
Average Words per Maze		2.36	0.85	1.81	1.00	4.57	0.65
Average Mazes per Utterance		1.17 *	1.20	0.70	0.16	1.82	0.39
Utterances With Mazes		17 *	1.07	11.64	4	26	5.02
Utts With Mazes As % of Total Verbal Utts		70.8% *	1.11	48.91	16.00	89.47	19.72
Total Maze Components		36 *	1.30	19.83	4	54	12.46
Revisions	Part Word	3 **	2.84	0.53	0	4	0.87
	Word	4	0.97	2.15	0	10	1.90
	Phrase	7 *	1.11	3.64	0	18	3.02
Repetitions	Part Word	1	0.11	0.72	0	20	2.43
	Word	1	0.13	0.81	0	9	1.51
	Phrase	3 *	1.94	0.54	0	8	1.27
Filled Pauses	Single Word	17	0.65	11.19	0	36	8.93
	Multiple Words	0	-0.43	0.25	0	3	0.58
Maze Components As % of Total Components		10.9% *	1.32	6.18	1.34	15.52	3.59
ABANDONED UTTERANCES							
% Abandoned Utterances		11.1% **	5.09	1.04	0.00	8.00	1.98
Number of Abandoned Utterances		3 **	5.07	0.28	0	2	0.54

Figure 4-14

The *Standard Measures Report* (Figure 4-12) also revealed 18.3% of Steven's total words were in mazes. This is 1.86 standard deviations higher than the database mean. Based on these values, this area appears to be a relative weakness for Steven and indicates a more in-depth look at the contents

of the mazes. The Maze Summary section of the *Verbal Facility Summary* report provides the break-down of the maze contents (Figure 4-14). Using this report, we learn that there were a significant number of phrase-level revisions and repetitions when comparing to samples in the database. This can be indicative of utterance formulation problems.

Over eighteen percent of Steven's words were in mazes. This has a considerable impact on his oral communication. In addition, he produced repetitions and revisions at the phrase level. Reviewing the utterances with repetitions and revisions may provide additional insight. To do this, use the *Analyze menu: Standard Utterance Lists* option (Figure 4-15). Looking at the mazes in context will help identify where they appear in each utterance. *Do they seem to indicate utterance formulation problems, word retrieval issues, or some of each?* SALT provides you with the data to make these decisions which will guide you in developing an intervention plan.

STANDARD UTTERANCE LISTS
Total Utterances
1st Speaker

Utterances With Mazes - Filled Pauses & Repetitions

11	C (Um) the object in tennis is (to score) to score eleven point/s to win the game.
14	C And whoever win/3s (:02 mo* um) four out of the seven game/s win/3s.
15	C (The prep*) the preparation/s for tennis is[EW:are] you need the following equipment, tennis ball/s, and racket/s.
17	C And what player/s do to get ready is warm up (volley*) volleying the ball back and forth between the court/s.
18	C And *the playing area for tennis is (um) a tennis court.
20	C (How the contest) how the contest begin/3s is (um :02) one of the two opponent/s decide/*3s who get/3s to serve during the game.
21	C And to serve the score start/3s out (um) >
26	C (The um) the rule/s for singles tennis is[EW:are] (um) >
28	C The major rule/s are (um) penalty/s for foul/s (if it/'s) if you serve (if) to your opponent (is) if it is not *in the diagonal front box.
31	C (A way one way to score in tennis is um is the ten*) the scoring go/3s love, fifteen, thirty, forty, and then game.
32	C (Um how the contest) how long the contest last/3s is depending *on how (um) good you are.
34	C (Um) tiebreaking procedure/s are (um) you have to win the game by at least two point/s.
37	C (Um) some strategic move/s in tennis are to (um :02 really smash the ball when it come/3s like) smash the ball into the (on*) other opponent/z court.
40	C (Um :03) yes.
41	C (Um) in tennis, if you serve, *and it happen/3s to hit the net (um) you redo that serve, but only in a serve.
44	C (Um when) how you win in tennis is (um af*) if you/'re at forty point/s and you score another point then you would win the game.

Figure 4-15

STANDARD UTTERANCE LISTS
Total Utterances
1st Speaker

Abandoned Utterances

21	C And to serve the score start/3s out (um) >
22	; :02
23	C To serve (you s*) you go behind the baseline and serve.
24	C And the course of play is >
25	; :03
26	C (The um) the rule/s for singles tennis is[EW:are] (um) >
26	C (The um) the rule/s for singles tennis is[EW:are] (um) >
27	; :02
28	C The major rule/s are (um) penalty/s for foul/s (if it/'s) if you serve (if) to your opponent (is) if it is not *in the diagonal front box.

Figure 4-16

Steven abandoned 3 utterances which was significantly more than his age-matched peers. Use the *Analyze menu: Standard Utterance Lists* option to show the abandoned utterances in context with 2 following entries (Figure 4-16). Notice that each abandoned utterance is followed by a silent pause.

Using the *Analyze menu: Standard Utterance Lists* option, you can pull out a whole range of utterances from each speaker, e.g., utterances with omissions, errors, or pauses. Utterances can be displayed individually or with preceding and/or following utterances. They can also be viewed in the context of the entire sample.

Example 4: Jeremy 3;3 Play transcript[5]

Jeremy is 3 years and 3 months old. A play-based sample was elicited and compared to age-matched peers selected from the Play database (see Appendix F). The Syntax/Morphology variables in the *Standard Measures Report*, generated by comparing Jeremy's performance to database samples equated by same Number Total Words (NTW), show that Jeremy's MLU in morphemes was 2.63 standard deviations below the database mean (Figure 4-17). His verb usage is also significantly low with only 25% of his utterances containing verbs, compared with 55% of his age-matched peers.

STANDARD MEASURES REPORT
Compared to 30 Samples Equated By Same Number of Total Words

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
SYNTAX/MORPHOLOGY						
MLU in Words	1.62 **	-2.59	3.16	2.37	5.05	0.59
MLU in Morphemes	1.71 **	-2.63	3.44	2.51	5.55	0.66
% Utterances With Verbs	25.4% **	-2.12	55.14	30.00	86.36	14.02
Mean Verbs per Utterance	0.25 **	-2.01	0.66	0.38	1.14	0.20

Figure 4-17

The *Database menu: Syntax/Morphology Summary* can be generated to focus on bound morpheme usage (Figure 4-18). The measures in this report are based on 102 total words (NTW). Jeremy used 6 bound morphemes which was 1.15 SD below his age-matched peers who averaged just over 9 bound morphemes. He used one contracted "is", one 3rd person singular morpheme, and 4 plurals. He did not use any regular past tense */ed* or */ing* or possessives.

SYNTAX/MORPHOLOGY SUMMARY
Calculations Based on C&I Verbal Utts
Compared to 30 Samples Equated By Same Number of Total Words

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
Number Total Words	102	0.00	102.00	102	102	0.00
Number of Bound Morphemes	6 *	-1.15	9.20	4	17	2.77
/'LL	0	-0.36	0.30	0	4	0.84
/'M	0	-0.82	0.93	0	4	1.14
/'RE	0	-0.36	0.17	0	2	0.46
/'S	1	-0.76	2.67	0	8	2.20
/'T	0	-0.60	0.43	0	3	0.73
/'US	0	-0.39	0.13	0	1	0.35
/3S	1	0.74	0.40	0	3	0.81
/D'D	0	-0.18	0.03	0	1	0.18
/ED	0	-0.68	0.47	0	2	0.68
/ING	0	-0.83	1.00	0	4	1.20
/N'T	0	-0.55	0.37	0	2	0.67
/S	4 *	1.21	2.17	0	6	1.51
/Z	0	-0.31	0.13	0	2	0.43
Number of Omitted Words	4	0.68	2.43	0	8	2.30
Number of Omitted Bound Morphemes	1	0.07	0.90	0	6	1.37

Figure 4-18

The *Database menu: Utterance Distribution Tables* (Figure 4-19) allows you to further evaluate the low MLU score. The number of utterances at each utterance length in both words and morphemes can be found in these distribution tables. Jeremy does not have any utterances longer than 5 words where 7 - 9 word lengths are expected. If a speech motor problem were evident, we might see utterances severely restricted in length with utterances only at 2 - 3 words. It is important to review these tables when there are low MLU scores. The longer utterances produced may give insight into the next level of syntax to be mastered.

[5] *Jeremy 3;3 Play* is one of the sample transcripts that comes with the software.

UTTERANCE DISTRIBUTION TABLES
Calculations Based on C&I Verbal Utts
Compared to 30 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	38	16	6	1	2	0	0	0	0	0	0	0	0	0	0	63
Db Mean	0	12	4	5	4	4	2	1	1	0	0	0	0	0	0	0	33

Utterance Length in Morphemes

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	0	35	18	5	3	2	0	0	0	0	0	0	0	0	0	0	63
Db Mean	0	12	3	4	4	4	3	2	1	1	0	0	0	0	0	0	34

Figure 4-19

The Semantics variables in the *Standard Measures Report* show that his number of different words (NDW) was more than three standard deviations below the database mean (Figure 4-20). Low NDW is an indicator of limited vocabulary.

STANDARD MEASURES REPORT
Compared to 30 Samples Equated By Same Number of Total Words

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
SEMANTICS						
Number Total Words (NTW)	102	0.00	102.00	102	102	0.00
Number Different Words (NDW)	37 **	-3.34	55.13	40	63	5.43
Moving-Average NTW	100	0.00	100.00	100	100	0.00
Moving-Average NDW	37 **	-3.21	54.37	40	62	5.42

Figure 4-20

The *Database menu: Semantics Summary* can be generated to further evaluate these measures. In the Standard Word Lists section of this report (Figure 4-21), we see that Jeremy produced more question words than his peers but used only two different question words. No negatives (where almost 4 are expected), one conjunction, no core modals, and significantly limited personal pronouns.

SEMANTICS SUMMARY
Calculations Based on C&I Verbal Utts
Compared to 30 Samples Equated By Same Number of Total Words

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
Standard Word Lists						
Question Words						
Total	7 **	2.29	2.60	0	6	1.92
Type	2	0.55	1.47	0	3	0.97
Negatives						
Total	0 *	-1.24	3.83	0	15	3.10
Type	0 *	-1.46	2.17	0	7	1.49
Conjunctions						
Total	1	-0.77	3.10	0	10	2.73
Type	1	-0.51	1.63	0	5	1.25
Core Modals						
Total	0 *	-1.17	1.90	0	6	1.63
Type	0 *	-1.55	1.10	0	3	0.71
Personal Pronouns						
Total	4 **	-2.36	15.47	8	27	4.85
Type	3 *	-1.30	4.73	1	7	1.34

Figure 4-21

The *Database menu*: *Grammatical Categories* examines specific vocabulary use in more detail by sorting the words Jeremy used into 23 grammatical categories (Figure 4-22). Each word in the analysis set (C&I Verbal Utts) is identified as belonging to one of these categories. This is done using a large dictionary of English words and a set of grammatical rules (Channell & Johnson, 1999).

GRAMMATICAL CATEGORIES Calculations Based on C&I Verbal Utts Compared to 30 Samples Equated By Same Number of Total Words						
LANGUAGE MEASURE	Child		DATABASE			
Category	Score	+/-SD	Mean	Min	Max	SD
Initiators	0	-0.33	0.10	0	1	0.31
Determiners	8	-0.83	11.27	4	19	3.95
Adjectives	0 *	-1.22	3.67	0	13	3.00
Nouns	19	0.01	18.97	5	30	4.87
Personal Pronouns	4 *	-1.96	14.33	6	26	5.26
Other Pronouns	12 *	1.74	7.17	3	13	2.78
Auxiliary Modals	0 *	-1.17	1.90	0	6	1.63
Auxiliary Operators	0 *	-1.52	3.60	0	9	2.37
Verbs	12 *	-1.07	17.27	11	30	4.91
Copula Forms	4	-0.10	4.30	0	10	2.89
Verb Particles	2	0.04	1.93	0	8	1.89
Adverbs	12 **	2.42	4.80	1	12	2.98
Intensifiers	5 **	5.41	0.70	0	2	0.79
Prepositions	2 *	-1.51	5.60	1	12	2.39
Existential	1 *	1.45	0.20	0	2	0.55
Question Words	7 **	2.47	2.43	0	6	1.85
Coordinators	0 *	-1.15	2.10	0	5	1.83
Subordinators	0	-0.87	1.07	0	4	1.23
Infinitives	0	-0.95	1.00	0	4	1.05
Possessives	0	-0.31	0.13	0	2	0.43
Negation Words	0 *	-1.33	2.07	0	6	1.55
Lets Words	0	-0.39	0.13	0	1	0.35
Interjections	20 **	3.74	7.93	3	14	3.23

Figure 4-22

To list the vocabulary words spoken within the language sample from a specific grammatical category, use the *Analyze menu: Grammatical Category Lists* option and select categories of interest. It may be beneficial to look at words produced from categories highlighted as areas of relative weakness when compared to the database samples. In Jeremy's case there were a number of grammatical forms more than one standard deviation from the database mean Jeremy's use of interjections may be of interest when reviewing the context of the transcript. It may be informative to ponder why these forms were so prevalent in his language sample as there were 20 productions compared to the average of just under 8 in the database comparison set (Figure 4-23).

GRAMMATICAL CATEGORY LISTS C&I Verbal Utts		
Interjections		
	Child	Examiner
HEY	0	1
HUH	0	3
MHM	1	0
OH	5	7
YEAH	7	1
YEP	7	0
Total Frequency	20	12

Figure 4-23

These interjections are either the word "oh" or forms of "yes". Figure 4-24 shows a segment of Jeremy's sample with the interjections highlighted.

E Here/'s the seal.
C Yep.
E You saw pop bottle/s huh?
C Yep.
E Those are pretty cute.
: :02
C Coke up.
E Hey look who I have.
C Yep.
C Two of them?
E Two of them.
C Oh.
E Two monkey/s.
C Oh.

Figure 4-24

Notice that they are all 1-word utterances, contributing to Jeremy's low MLU.

Example 5: Timothy 6;1 Con

This final illustration uses the same transcript as Example 2 where a conversational sample was elicited between Timothy (age 6;1) and a speech-language clinician. Timothy's sample was compared to 147 age-matched peers selected from the Conversation database. The discourse section of the *Database menu: Standard Measures Report* revealed less than expected responses to questions at 42.9%. The *Database menu: Discourse Summary* can be selected to follow up this score (Figure 4-25). This table reveals that the examiner asked 7 questions of which 3 were answered = 42.9%. An answer is defined by a child utterance immediately following an examiner question. You will need to read the questions to determine if they were correct responses in terms of syntax and semantics. The length of Timothy's speaking turns was within the typical range when compared to his age-matched peers.

Timothy 6;1 Con

TRANSCRIPT INFORMATION	DATABASE INFORMATION
Speaker: Timothy (Child)	Database: Conversation
Sample Date:	147 Samples Matched By Age
Current Age: 6;1	146 Samples Cut at 53 Number Total Words
Context: Conversation	Context: Conversation

DISCOURSE SUMMARY
Calculations Based on Total Utterances
Compared to 146 Samples Equated By Same Number of Total Words

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
TURN LENGTH SUMMARY						
Mean Turn Length (utterances)	1.14	-0.69	1.66	1.00	7.00	0.75
Median Turn Length (utterances)	1.00	-0.39	1.32	1.00	7.00	0.82
Mean Turn Length (words)	3.24	-0.89	8.99	1.94	58.00	6.47
Median Turn Length (words)	2.00	-0.77	7.21	1.00	58.00	6.78
RESPONSES TO QUESTIONS & INTONATION PROMPTS						
% Responses to Questions	42.9% *	-1.50	75.72	0.00	100.00	21.94
Other Speaker Questions	7	-0.12	7.88	0	59	7.55
Responses to Questions	3	-0.60	5.64	0	29	4.42
Y/N Responses to Questions	0	-0.90	1.42	0	7	1.57
% Responses to Intonation Prompts	---		93.33	0.00	100.00	25.82
Other Speaker Intonation Prompts	0	-0.32	0.12	0	2	0.39
Responses to Intonation Prompts	---		1.13	0	2	0.52
OTHER MEASURES						
% Utts With Overlapping Speech	0.0%	-0.83	8.34	0.00	63.64	10.06
Utts. With Overlapping Speech	0	-0.80	1.16	0	8	1.44
% Utts Interrupted Other Speaker	0.0%	-0.83	8.34	0.00	63.64	10.06
Interrupted Other Speaker	0	-0.35	0.13	0	2	0.38
% Words Mentioned First	51.5%	-0.51	55.72	36.51	78.95	8.40
Words Mentioned First	35	-0.11	35.64	23	50	5.67

** At least 1 SD (** 2 SD) from the database mean*
Database selection criteria: Age +/- 6 months (5;7 - 6;7)

Figure 4-25

The *Analyze menu: Standard Utterance Lists* option can be used to display the examiner's questions in the context of the entries which follow each question (Figure 4-26). In this example, the examiner's questions are displayed with the following two entries. The examiner's second and last three questions were not answered. It is informative to look at the questions to see what types of questions were asked and to see whether or not the examiner provided sufficient time for the child to respond.

STANDARD UTTERANCE LISTS
Total Utterances
2nd Speaker

Questions

28	E WHAT ELSE?
29	C A X.
30	C SOMEONE BROUGHT THE CAKE.
70	E A CHOO_CHOO_TRAIN?
71	E OH THAT SOUND/3S FUN.
72	; :10
101	E A REAL LIVE TRAIN?
102	C FIVE.
103	E FIVE WHAT HON?
103	E FIVE WHAT HON?
104	C FIFTEEN.
105	E FIFTEEN.
108	E GO BACKWARDS?
109	; :06
110	E SOUND/3S FUN.
123	E AND GRANDMA AND GRANDPA TOO?
124	E I BET THEY LIVE UP.
125	C MHM.
130	E HAVE YOU EVER BEEN BACKWARD IN A TRAIN?
131	E AND I DID/N'T UNDERSTAND THE FIFTEEN.
132	C FIFTEEN TRAIN/*S.

Figure 4-26

Chronological Age versus Cognitive Age

You can use the databases to create an age-matched comparison set based on the cognitive age of the target speaker. This is useful, for example, when you are working with children with developmental disabilities. Comparing to typical peers based on this method provides you with reference scores based on cognitive abilities. Creating a second comparison set based on chronological age provides you with contrasting scores to help describe the speaker's communication ability comparing cognitive ability with current age expectations.

Arguments about which scores qualify for services are still debated in the literature, and vary across states and school districts. With this contrast so easily accessible, you will be able to document performance to address criteria using chronological age versus cognitive age as the reference point.

Analyzing Samples without using the Reference Databases

There may be times when you do not require the databases, or the appropriate database is not available for the target speaker's age or for the sampling condition you prefer to use. You may be working with older adults, or a speaker who has a native language other than English, or a speaker who uses alternative/ augmentative communication. You may prefer to assess language use in the home, in a supervised work setting, or while participating in a classroom activity. Perhaps you have designed your own elicitation protocol to capture specific language use.

The reports in the Analyze menu provide scores for all language levels and elicitation contexts. Without a database for comparison, you can use clinical judgment or find other sources of information to interpret language ability. Books on language development will refresh your information about expectations through the developmental period. Paul, Norbury, and Gosse (2018) provides an invaluable resource on developmental expectations extracted from the literature through adolescence. Also, SALT contains a variety of graphs generated from the SALT reference databases which show patterns across speaking contexts, ages, and grades for a variety of language measures. They are included as PDFs, accessible from *Help menu: Normative Graphs*.

Examining the relationship between communication partners in conversation does not require a database, only comparison scores for each language measure. The *Analyze menu: Discourse Summary* provides you with the amount of talking for each participant. You can quickly see who is asking questions, who is answering, how much each speaker holds the floor, the number of utterances containing overlapping speech, and the number of interruptions. Communication partners may diverge from following the same topic. Examining each speaking turn relative to the preceding turn of the partner allows you to interpret if the speaker stayed on topic. This may be an important index for children and adults on the autism spectrum or who have sustained brain injury.

There may be other aspects of the language sample you want to evaluate such as specific vocabulary or pronoun use. The *Analyze menu: Word Root Tables* provides an alphabetical list of the words used in the sample. The *Analyze menu: Grammatical Categories* option breaks down the speaker's English vocabulary into twenty-three categories based on parts of speech. The *Analyze menu: Standard Word Lists* provides eight different pronoun lists, including personal pronouns and possessive pronouns. Suppose you want to flag those pronouns where the reference was not clearly established. The *Edit menu: Insert Code* option can be used to help code any aspect of the transcript you are concerned about. You can create a code list and save it for future use across time or individuals. Once your transcript is coded, the *Analyze menu: Code Summary*, *Analyze menu: Word Code Tables*, and *Analyze menu: Utterance Code Tables* provide summary reports of your codes.

SALT provides an important tool to facilitate the side-by-side comparison of two transcripts. Link your transcripts using *Link menu: Link Transcripts* and then select reports from the Analyze and Database menus to compare the target speaker from each transcript. The *Link* option can be used to compare transcripts recorded at different times to chart progress. Samples taken at time-one and time-two can be compared directly to document changes across language levels. This is particularly important when working with individuals with brain injury where documenting change is crucial for continuing therapy. Also, because of the wide range of measures available, unexpected changes can be documented. You can also use the *Link* option to make comparisons across languages, e.g., English and French. Language samples for each language can be compared, allowing a precise index of the speaker's fluency in each language. The Link menu is also helpful in comparing performance across linguistic contexts such as conversation vs. narration. A speaker on the autism spectrum, for example, may perform differently in a conversational context than a more text-based context such as a narrative story retell.

Summary

In this chapter we reviewed the major concepts for using SALT to analyze language transcripts. Chief among them are the analysis set, which determines the utterances to be included for each measure, and the comparison set for selecting database participants. Awareness of the analysis set and the comparison set will facilitate accurate interpretation of the results provided for each measure. The reference databases are unique to SALT and provide comparison data on typical peers. SALT is an assessment tool with vast capabilities. The more time you spend with it the more it will reveal about oral language performance.

CHAPTER

5

Interpreting Language Samples

Jon F. Miller
Karen Andriacchi
Ann Nockerts

This chapter focuses on using SALT to build a thorough description of language use. SALT provides a range of measures which describes oral language performance and creates a profile of strengths and weaknesses. Understanding the measures is key to interpreting the outcome of the SALT analysis. It is important to be clear what is being measured and how that measurement relates to oral language performance. This is the most difficult, but most interesting, part of the language sample analysis (LSA) process.

The major outcome of the LSA process is a description of language use in functional speaking contexts. LSA, along with other potential measures and clinical judgment, can be used to identify language disorder or delay.

Describing Language Use via SALT Measurement Outcomes

The *Standard Measures Report* (SMR) provides an overview of performance across measures of all language levels. When examining a *Database menu: Standard Measures Report*, consider plus or minus one standard deviation (SD) as significant in terms of identifying areas that need further examination. This criterion allows you to quickly form an impression of strengths and weaknesses, or the "profile" of language production exhibited in the sample. The measures in the SALT *Standard Measures Report* are organized into language domains that have been identified by research and/or by clinicians as central to a thorough examination of language production, and frequently relate to academic performance. The measures cover transcript length, intelligibility, syntax/morphology, semantics, discourse, verbal facility, and errors. The report provides the target speaker's raw score and standard deviation for each measure as well as the database mean, range, and SD. Each of the measures is considered to be a general score, sensitive to disordered performance identified by parents, teachers, and SLPs. This range of measures is necessary as there are a number of different types of oral language deficits. In other words, not all language disordered children show the same profile of scores across the SMR. The array of measures allows us to identify strengths as well as weaknesses in oral language, an essential ingredient in developing intervention plans.

Refer to Appendix U for a good explanation of standard deviation.

Profiles of Performance

We don't expect all children with language difficulty to communicate alike, nor do we expect them to exhibit the same linguistic profiles within and across age. We know that disorders of language production take several different forms and, further, that these forms seem to be stable over time. Our own research documented this by identifying a number of different problem areas in children receiving speech-language services in the schools (Leadholm & Miller, 1992).

The rest of this section discusses how deficit areas converge to create profiles of performance.

General language difficulties

The most common profile reveals language difficulties (i.e. performance significantly below age-expectations) across the domains of syntax, morphology, and semantics with low verbal productivity and low speaking rate. For an in-depth discussion on the use of terminology (language delay, language disorder, developmental language disorder, please refer to the CATALISE papers; Bishop et al., 2016; 2017). Indications of general language difficulties on the SMR are noted by a low mean length of utterance (MLU). Additionally, low number of different words (NDW), and/or low number of total words (NTW) are frequently noted. Often speaking rate is low, i.e., low words per minute (WPM). Multiple errors at the word and utterance level can be evident. And, for younger children, we see frequent omissions of bound morphemes and auxiliary verbs. Further examination of the low MLU reveals a reliance on simple syntax. These children may just be reticent talkers, producing shorter samples with sparse vocabularies and elemental syntax. In these cases, SLPs need to refocus on overall language proficiency. Not talking very much may be a function of family style (Hart & Risley, 1999), cultural background (Crago, Annahatak, & Ningiuruvik, 1993), or lack of language proficiency. Careful review of family status and performance across speaking situations can help sort this out. Ultimately, the primary intervention target may be to increase talking by providing varied opportunities to use language. Please refer to the section identifying language disorder for further information.

Word retrieval and utterance formulation

Speakers having trouble finding the right word or completing utterances with intended semantic content and appropriate syntax frequently repeat and revise. We refer to these repetitions and revisions as mazes, after Walter Loban whose seminal work coined the term (Loban, 1976). The SMR contains the measure *percent maze words to total words*; which indexes the impact of mazes on the entire sample. When this measure is high, it is important to look further at the number and types of mazes in both the *Database menu: Verbal Facility Summary* and *Analyze menu: Verbal Facility Summary.* Here you will find important essential information breaking down the contents of mazes, the distribution of mazes, (percent of the 1-morpheme, 2-morpheme ... 15+ morpheme utterances which contain mazes), the number of mazes (some utterances may have more than one maze), the total number of maze words, and the average number of words per maze. All of these measures provide information which, together, form a picture of the extent and nature of the speaker's difficulty. Where samples are short, percent maze words to total words is the best measure, as the other measures are confounded by frequency. To distinguish between a word-level and an utterance-level problem we need to examine the sample in more detail. Repetition and revision of words and part-words point to word retrieval issues. Repetitions and revisions of phrases are indicative of utterance formulation problems. The number of abandoned utterances may also be indicative of either of these problems and is significant in that the speaker did not resolve the word or utterance conflict. Consider abandoned utterances to be failed utterances which should be reviewed in detail to determine if a pattern exists. *Are these partial utterances similar relative to form and/or content?*

We have documented cases where speakers produced three and four mazes per utterance. When examining these utterances in detail, it was evident that they were attempting to string three or more propositions together in a single utterance, but didn't have the necessary command of complex syntax to accomplish the task. This is an example of how LSA can provide detailed evidence of the language deficit with a clear direction for organizing an intervention plan.

Pauses can also be indicative of word retrieval or utterance formulation problems. Our clinical experience suggests that either mazes or pauses are used when having difficulty finding the right word or formulating an acceptable utterance. Seldom are both pauses and mazes used by the same speaker. The *Analyze menu: Verbal Facility Summary* provides several telling pause measures such as

pauses within utterances and pauses between utterances. The total time for all pauses in each category is provided as well. The total time measure allows a fast check on the impact of pausing on the overall sample. Pauses within utterances may be associated with word-level problems. An analysis of where pauses occur in the utterance will help confirm this interpretation. Pauses which occur before main verbs, subject or object nouns, or adjectives are indications of word selection issues. You can also confirm this by asking individuals older than seven or eight who have the capacity to reflect on their own language use. Pauses between utterances may be related to utterance-level problems. Some individuals pause both within and between utterances. More assessment should be done to confirm the nature of difficulty. Pauses can be a significant deficit. As an example, a middle school student was disciplined for not responding to a school administrator, judged to be insolent, and sent home. The school SLP intervened with a language sample showing a pattern of significant pausing; more than five minutes total pause time in a 15-minute sample. This is perhaps an extreme case, but it illustrates how oral language deficits can be misinterpreted within the school and community.

Narrative organization

Documenting this type of problem requires collecting a narrative sample where the examiner knows the content expected. Examples include a story retell or an exposition of a game or sport familiar to the SLP. Narrative organization problems are usually evident when listening to the sample. The scope and sequence of the narrative may be confused, characters may be left out, conflicts or resolutions might be missing. The SMR provides only a few helpful measures. Frequently, high numbers of pauses both within and between utterances are evident and there may also be high maze values. Non-specific referencing, which may also occur, can be flagged by inserting word codes within the transcript. These codes can then be counted and the words and utterances containing them pulled up for analysis. Differentiating word retrieval or utterance formulation problems from narrative organization deficits will require additional measures such as the Narrative Scoring Scheme (see Appendix P), the Expository Scoring Scheme (see Appendix Q), the Persuasion Scoring Scheme (see Appendix R), or the Oral Narrative Quality (see Appendix S). These applications will be reviewed in the next chapter which entails following up the SMR with more detailed measures to confirm language production difficulties. Basically, listening to the sample will provide clinical evidence of whether the problem is at the word, utterance, or overall text level. Further analyses are necessary to document these clinical impressions.

Discourse deficits

Discourse or pragmatic deficits can take many forms. The SMR provides several measures to assist with discourse analysis. Discourse requires an interaction between two speakers, in other words a conversational sample. SALT calculates the percent of responses to questions and the average speaking turn measured in words. It also quantifies overlapping speech and interruptions. Research shows that length of speaking turn increases with age as does the number of responses to examiner questions. Responses to questions provide a direct index of attending to the speaking partner. A closer look at questions within the language sample is recommended. This should include reviewing the examiner questions and the responses to determine the types of questions that were posed and their relative level of difficulty, e.g., yes/no versus “WH” (what, where, when, why, or how). Additionally, this analysis should include a review of the type of utterance that followed the examiner question, e.g., another question, an appropriate response, an inappropriate response. SALT bases the calculation of responses to questions on who spoke following the question, the examiner or target speaker. If the target speaker spoke and is credited with a response, the content and form of the responses should be examined to determine if the syntax and semantic content are accurate. Failing to answer questions appropriately, or at all, may also be associated with delayed language development. A significant amount of overlapping speech and/or interruptions may be an indication of poor discourse skills. Examine the transcript to look for patterns.

Fast speaking rate with low semantic content

Individuals who speak very fast do not necessarily have a language problem. Our esteemed colleague Liz Bates spoke very fast but with extraordinarily clear and precise language form and content. In relatively infrequent cases, a fast rate appears to be an adaptation to not being able to organize thoughts into utterances or texts. This is most evident in conversational samples where the speaker is sharing information or responding to requests. Rate accelerates and content is circumlocuted. The speaker talks around the target adding relatively little new information, often without giving the conversational partner opportunity to speak. Also, the speaker may lack specific referencing using pronouns in the place of specific referencing nouns. So WPM is very high, turn length is high, and MLU is high, though not always related to complex sentence use. The contrast between a conversational sample and a narrative sample may reveal the pattern only appears in conversation, or possibly across all genres. Clinical experience suggests that these cases, while rare, are very resistant to intervention. Perhaps we do not yet understand the basis for these problems. Perhaps written language samples would be informative about these semantic issues.

Identifying Language Disorder

Speech-Language Pathologists are the experts in determining if a language disorder is present. When oral language issues are in question, we know best practice includes language sample analysis. An essential component of the LSA process requires a definition and clear understanding of what is a language disorder. Once in place you can relate that knowledge to the oral language measures calculated by SALT. The American Speech-Language-Hearing Association (ASHA) has defined language disorder as "impairment in comprehension and/or use of a spoken, written, and/or other symbol system. The disorder may involve the 1) form of language (phonologic, morphologic, and syntactic systems), 2) the content of language (semantic system), and/or 3) the function of language in communication (pragmatic system), in any combination." (1993, p. 40 as cited in Paul, 2007). Paul (2007) explains language disorder in her own words as follows: "Children can be described as having language disorders if they have a significant deficit in learning to talk, understand, or use any aspect of language appropriately, relative to both environmental and norm referenced expectations for children of similar developmental level" (p. 4). Both definitions of language disorder agree there must be impairment in receptive or expressive language. However, Paul's definition includes the terms "significant", "environmental expectations", and "norm referenced" which provide the diagnostician more thoroughly defined criteria from which to align their assessment. Significant environmental deficit judgments are made relative to communication success at home, school, and community. Norm referenced deficits refer to performance on standardized or norm referenced tests. Paul advocates the position that deficits be identified by testing to define age-level expectations and by assessing the ability to use language for communication in the activities of daily living. This is particularly important for us to keep in mind as we consider the outcomes of LSA. LSA is the gold standard for documenting everyday communication, which is a critical part of defining language disorders (Paul, 2007). *But does SALT's LSA process qualify as a standardized test or a norm-referenced procedure?*

Standardization

To document "impairment", as required by the definition of language disorder, best practice includes documenting performance relative to age-matched peers, usually using a standardized test. There are several concepts that make up the standardization process. The first part of "standardization" is doing the same thing with everyone, following a consistent testing protocol. From its onset, SALT has worked toward standardizing the process of language sampling. First, we've developed detailed protocols for eliciting conversational and several types of narrative samples. See Appendices A-L for detailed protocols for each sample type, including guides to examiner behavior, scripts for encouraging reticent individuals, books for story retelling, and expository and persuasion note-taking matrices. Second, language samples are transcribed using a very specific and consistent set of rules to identify words, morphemes, utterances, and errors. Detailed transcription rules

ensure the accuracy of each analysis. Uniformity in collecting and transcribing samples has produced consistent analysis results, both within and across speakers (Heilmann, et al., 2010a). SALT does meet the first condition necessary for "standardization" with standardized administration and transcription protocols.

The next condition of standardization to review is the creation of an index of typical performance by administering the "test" to a large group of individuals. This process generates a normative sample or comparison group that can be used to document performance relative to age-matched peers. The composition of the normative sample usually includes stratification of, 1) typical development, including high, average, and low performers, 2) geographical distribution, to satisfy perceived "Lake Woebegone" bias ("where all the children are above average" - Garrison Keillor), and, 3) socioeconomic and ethnic diversity. The SALT databases were created following the premise of stratification. The databases provide access to the performance of typical speakers under the same standardized speaking conditions. The SALT databases have some limitations relative to geographical distribution and ethnic diversity. Where we have tested geographical differences, we have found no significant differences between children in Wisconsin and San Diego. Some differences do exist between American and New Zealand children at five years but not six or seven (Westerveld, Gillon, & Miller, 2004). It has been suggested that the difference at five years is because children in New Zealand begin formal schooling on their 5th birthday, typically earlier than their American counterparts (Westerveld & Heilmann, 2010). Research on ethnic diversity has not shown differences in language development for the core features of English. SLPs are responsible for recognizing dialect differences that are not consistent with Standard American English (SAE). Many features of African American English (AAE), for example, could be inappropriately considered as errors from an SAE perspective. The over inclusion of AAE speakers into special education has prompted a great deal of research which sites AAE as the major source of erroneous identification. SLPs are responsible for identifying dialectal features when transcribing, analyzing, and interpreting language samples.

Next we take up how these data can be used to interpret relative ranking of individual speakers. SALT uses standard deviation scores for each measure to document the relative ranking of individual speakers. This approach optimizes the descriptive value of the measures, sacrificing the "standard score" approach associated with standardized tests typically thought of as a scaled score, i.e., a standard deviation of 15 where 85 – 115 is considered typical performance. Creating scaled scores requires "smoothing" the data to create the same scaled scores for each measure or composite score. SALT, rather, relies on the standard deviation scores calculated for each comparison set that corresponds to the age and speaking conditions of the target speaker. Smoothing normative data allows test builders to interpolate missing data, e.g., data on 5 and 7-year-olds used to predict that of 6-year-old children. Creating standard scores makes interpreting the results more straightforward for users since all scores have the same statistical properties, such as mean and standard deviation. The measures included in SALT have come from the developmental literature or the clinical experience of SLPs working with language disorder. Measures like mean length of utterance, number of different words, and words per minute correlate highly with age and have very small standard deviations. Other clinically significant behaviors like mazes, pauses, and errors are not evenly distributed and have larger standard deviations. The SALT project has opted to keep these more descriptive measures that would certainly be discarded if creating a "standardized test" with smoothed standard scores for each measure. Creating standard scores assumes that each measure functions the same way across children over time. Some of the SALT measures that SLPs find useful in describing language production do not function the same way across speakers, but each captures an important aspect of oral language performance. As examples, consider pausing and mazing. Some speakers pause frequently to gain time to find the right word or to formulate the rest of an utterance while others do not. Similarly, some speakers produce frequent mazes, repeating and revising part words, words, and phrases. Both of these behaviors provide valuable clinical insight, but neither would appear in a standardized test because they do not correlate with age. The

measures that are included in standardized tests are those that are significantly correlated with age and are sensitive to the identification of language disorder. Careful analysis of the standardized tests for language reveals that a great deal of work needs to be done to create measures that can identify language disorder beyond 70%. SALT identifies children with language disorder 76% of the time (sensitivity) and identifies children with typical language 82% of the time (specificity). These values were calculated from the measures in SALT's *Standard Measures Report* from 263 typical children and 231 children aged 3 – 13 receiving services in the Madison Metropolitan School District using -1 SD compared to the Conversation database (Miller & Klee, 1995). This means that SALT can identify disordered children at rates equal or better than most standardized language tests on the market today. But it can do more by describing specific language strengths and weaknesses. This profile of performance provides the information necessary to develop intervention plans to strengthen oral language skills essential for meeting everyday communication requirements.

The following is an email exchange on "standardization" between two SLPs who use SALT for LSA and a professor who conducts research on LSA. It addresses the issue of using LSA to qualify students for services.

> Original question from Mary-Beth Rolland: SLP from Madison, Wisconsin:
>
> Could I get some input from you all? The administration has been saying that we cannot use SALT to qualify students for speech and language because it is not a formal test measure. It is not standardized. You can use it to corroborate formal measures like the CELF (Semel, Wiig, & Secord, 2003). Can you speak to "formal", "standardized" and why LSA is a better measure of a child's actual performance than a test like the CELF? I have had this discussion so many times I need new info from the 'experts'.
>
> From Tom Malone: SLP from Brown Deer, Wisconsin:
>
> I have always viewed language sampling, including SALT, as one of the informal measures needed to meet state eligibility criteria for language impairment (Wisconsin Administrative Code, 2011). Although SALT does give you norm referenced measures, it does not give you the sort of composite scores that formal (i.e., standardized) tests, like the CELF, can provide. The requirement to use composite scores (either receptive, expressive, or total) in reporting standardized norm referenced test results is spelled out in a technical assistance guide published by the Wisconsin Department of Public Instruction (Freiberg, Wicklund, & Squier, 2003) to help implement the then-new SL criteria. With SALT you get a wide variety of measures on which a student can be compared to his/her peers, but no single measure (at least not yet) that tells you whether the student is language impaired. And that, I believe, puts SALT firmly in the informal measures camp.
>
> I will defer to Jon (*referring to Jon Miller*) & John (*referring to John Heilmann*) on whether the SALT databases have the other necessary properties of a standardized test, such as normal distribution. The criteria do, however, give you an out for qualifying a student using SALT instead of formal tests. In those cases in which formal testing is "not appropriate or feasible," such as when such tests are not culturally appropriate for that student, informal measures can be substituted.
>
> I might also mention that in selling SALT to administrators over the years I have gotten some traction in arguing that SALT can often make a compelling

case for dismissing secondary students, who typically have been receiving SL services for a decade or more. That's because SALT, much better than formal testing, can address the issue of whether a student 'has a functional and effective communication system' which, according to the technical assistance guide (p. 29), is a major factor in considering dismissal.

From John Heilmann: Assistant Professor, University of Wisconsin – Milwaukee:

This is a great discussion. I'll add my two cents. Before doing so, I just want to say that this is my opinion and that these issues are not clear cut (obviously).

The word "standardized" can be used many different ways. Typically, when we say standardized test, we think of the CELF or TOLD (Hammill & Newcomer, 1988). However, I think it's more appropriate to apply the word "standardized" to the test administration procedures. In Ch. 3 of Haynes and Pindzola (2011), they state: "Standardization may imply only that the procedures for test administration are standard, not that norms are provided with the instrument." So, in that sense, LSA could be considered standardized, assuming the clinicians are adhering to the protocols used in the databases. There could be some debate here, as not every child is completing the same items. But, if the children are completing the same protocol and the protocol is pretty structured, e.g., narrative retell, expository discourse task, I feel comfortable saying that it is using standardized procedures. Some (including me) would call that a standardized assessment. Some evidence for this are the differences observed when using different protocols. There are many examples in the literature. For example, I presented a poster with Marleen Westerveld showing that there were significant and clinically meaningful differences in children's retells based on the presence or absence of pictures.

The next term to think about is "norm referenced." Basically, that means that you compare it to a normative sample. On the surface, it's pretty clear that you can compare SALT to a sample of age/grade-matched children. Most of the SALT databases are drawn from the Madison area, which some could argue is not representative of the broader population. In your particular case, I think it strengthens your argument, as you are essentially using local norms (recommended by many). But, we have put together some data showing that geography alone doesn't really affect the measures. You can see that in the 2010 paper you referred to. In the poster with Marleen (that I mentioned above), we provide even stronger evidence. We showed that the differences due to presence or absence of pictures were much greater than the difference due to geography (WI vs. New Zealand).

The final issue is "standard scores." This is where LSA using SALT differs from traditional "standardized/norm referenced" tests. Tests that generate standard scores, e.g., CELF, TOLD, normalize their norm referenced data to generate standard scores. That is, they smooth out the differences across ages to predict performance of individual children. This is done to increase the consistency of the data and smooth out the variations across the norming sample. SALT simply finds a group of matched children, generates

normative data for that particular group (means, SD), and lets you know how your child performs in comparison. Another difference is that you can get a composite standard score, while, with SALT, you have to rely on each of the specific measures.

So, I don't know if that answers your question any further. I guess I would be interested in knowing why your administrators are concerned about the use of SALT. Are they concerned about, a) over identifying children, b) under identifying children, or c) reducing costs of transcription? If it's identification accuracy, you can cite the 2010 "using databases" paper (Heilmann, Miller, & Nockerts, 2010b). In that paper we also cite the other two main articles that have shown that LSA can identify children with LI (Aram, Morris, & Hall, 1993; Dunn, et al., 1996). There are other papers out there that have cautioned against the use of LSA. But, there are also plenty of papers that show the ineffectiveness of standardized tests, e.g., Dollaghan & Campbell (1998); Plante & Vance (1994). Also, you would be amazed at the questionable properties of standardized tests when looking at their very own test manuals. That is, many don't do a great job identifying children with LI (i.e., not great sensitivity and specificity) and they often "stack the deck" for their results, e.g., comparing performance on the CELF to the TOLD; they're basically the same test, so they should perform similarly on both.

This doesn't even mention the general admirable properties of the task [LSA] - functional communication, potentially less format bias for cultural and linguistic minorities, gets descriptive information, etc. Let me know what you think. Like I said, these are my opinions. I may have a bias given that this is my line of research. But, there are others out there who share similar views.

From Tom Malone:

It may be that Mary-Beth's administrators, like me, have focused on the legal aspect of eligibility. Like it or not, we are stuck with state criteria that require both formal and informal measures, but never really defines what those are or how they differ. Based on the emphasis on composite scores that I cited from the technical assistance guide (which doesn't really have the force of law, but it's all we've got), it seems probable that "formal" was meant to refer to traditional standardized tests. What John is saying, I think, that the research is showing that there really isn't such a bright-line distinction between these two types of testing.

Now, I think you know that I'm no big fan of standardized tests. A major point of our ASHA case study was to show that SALT was way superior to standardized testing in reflecting teacher concerns over our subject's language skills (Malone, et al., 2010). But over the years I've had administrators that really want to see those standardized scores when making eligibility decisions at an IEP meeting. And over the years I've become fairly resourceful at coming up with the test scores I need when I want to qualify a student, even if the student's SALT results are actually the bigger influence in my decision making. I admit it's not the cleanest approach, putting me in mind of these lines:

Between the idea
And the reality
Between the motion
And the act
Falls the shadow

-T.S. Eliot, *The Hollow Men*[6]

From John Heilmann:

I think that's a fair summary. Part of this is probably a cultural issue - standardized tests are ingrained in special education. Part of this is a psychometric issue. In many situations, you may find that norm referenced tests are more stable, particularly when looking at a composite score. There isn't a composite SALT score, per say. Laura Justice developed an index of narrative microstructure, which may be a good way to go (Justice, et al., 2006). However, recall that Aram's work showed that MLU is a good general measure (superior to standardized test results when identifying children with LI). So, I still think the jury is out. And we have to acknowledge the limitations of standardized tests for making high stakes decisions (when used alone).

This is the end of their email conversation which highlights some of the issues involved in using LSA to diagnose language disorder and qualify individuals for services in the schools. These issues remain with us, but the SALT project has advanced our confidence in using LSA to evaluate language use in the everyday speaking situations necessary to advance through the language arts and literacy school curriculum. Standardizing the process of collecting, transcribing, and analyzing samples provides confidence in using LSA as a valid and reliable assessment tool. SALT, with its databases of typical speakers to use for comparison, advances language sample analysis to norm referenced status and provides a window into how a range of language measures creates profiles of performance. These profiles confirm clinician, teacher, and parent judgments of communication difficulties and provide face validity for LSA.

A similar project that confirms the stability of LSA when the process is standardized is the Edmonton Narrative Norms Instrument (Schneider, Dubé, & Hayward, 2005). The ENNI is aimed at developing norms for narrative story retells for children ages 4 – 9 years. While the procedures and stories were different from those used when collecting the SALT story retell samples, the results were similar in terms of consistency of performance, reliability, validity, and advancing language skills with age. This project serves as a replication of our research over the years, advancing the use of LSA as a valid and reliable index of oral language performance. Another powerful validation of the consistency of language sample analysis comes directly from the New Zealand/Australia database. Results from several research projects showed there are very few differences between database samples collected in the United States and those collected in New Zealand or Australia (see Chapter 7 for details).

What constitutes a “significant” deficit?

Possibly the most accepted proof of “significance” is to supply a score from an assessment. The first step in the LSA interpretation process is to review what constitutes a score outside the typical range. The definition of language disorder uses the phrase “significant deficit” but does not define the target value. Presumably the word “significant” is used in the definition to denote a level of performance below that of typical speakers of the same age. It is usually stated in standard scores or

[6] This poem was first published as now known on November 23, 1925, in Eliot's *Poems: 1909-1925*.

standard deviation (SD) units. The specific level noting "significance" is not an agreed upon number. A significant deficit or delay ranges from -0.5 SD to -1.5 SD in the research literature, to -1 SD to -2SD in state standards across the country. The value in Wisconsin, -1.75 SD, may likely be a political decision as there is no evidence relating this number with oral language difficulty having an impact on school performance. These values are important as they determine what percentage of children can qualify for services. A review of the normal curve offers some insight into specifying the percentage of the population falling at or below standard deviation units from -1 SD, -1.5 SD, -1.75 SD to -2 SD. 68% of the population will fall between plus and minus 1 SD, 82% between +/-1.5 SD, 89% between +/- 1.75 SD, and 95% between +/- 2 SD. If we look at the minus end of the curve, 9% of the population fall below -1.5 SD, 5.5% below -1.75 SD, and 2.75% below -2 SD. These standard deviation criteria define the percentage of children who can qualify for services using standardized tests if the population of children with language disorder is distributed along the normal curve. These values define "significant" deficit relative to typical children. *Refer to Appendix U for a good explanation of standard deviation.*

We began the chapter with the definition of language disorder that had two parts, documenting language performance relative to age-matched peers, and difficulty with oral language at home, school, and community. We have seen that LSA can provide norm-referenced data across a range of measures that are relevant for describing disordered language performance in natural speaking situations; conversation, narrative, expository, and persuasive language. SALT's version of LSA is norm referenced, indexing performance relative to age or grade status. SALT does not aspire to become a standardized test but it does aspire to a standardized language sampling process; it can both define typical performance across age and speaking conditions and describe, in detail, the specific language features that characterize individual disordered performance.

Conclusion

SALT Analysis provides evidence for several different profiles of language disorder: language delay, word retrieval problems, utterance formulation deficits, discourse problems, and fast speaking rate with low semantic content. We examine each of these problem types further in the next chapter where we investigate the more detailed measures necessary to illuminate each specific profile. So far we have focused on the clusters of measures on the SMR that constitute a distinct profile of performance. Further analysis of each type will reveal that there can be overlap among these profiles requiring all of our clinical skills and experience to unravel.

CHAPTER

6

Beyond the Standard Measures

Jon F. Miller
Karen Andriacchi
Ann Nockerts

Introduction

The central focus of this chapter is the analysis of language samples using a database comparison set. We also branch into analyses that do not require a set of samples for comparison. These measures are valuable to the assessment process through the *Analyze menu: Standard Measures Report* which contains the same language measures as the *Database menu: Standard Measures Report* but is generated without a comparison dataset. The same general principles, discussed in this chapter, apply to both reports. For every language measure in the *Standard Measures Report* there are follow-up measures in SALT that can support your questions and aid in your clinical interpretation.

The *Standard Measures Report* provides general measures of performance across areas of language that have been identified as significant for functional communication as well as academic performance. The task at hand is to figure out how the strengths and weaknesses highlighted from language sample analysis (LSA) form a complete picture of oral language performance. The true power in the diagnostic process comes when the strength of the SALT application is combined with clinical knowledge. SALT allows for a highly detailed and thorough analysis of language production, but the diagnostician must know how to interpret the measures and where to look further.

Our approach to interpreting LSA measures, outlined here, has evolved over the past 20 years working with SLPs, and from our own research and clinical experiences.

Step 1
Once the sample has been transcribed, generate the *Database menu: Standard Measures Report* (SMR) with the appropriate database comparison group. Notice the areas which are flagged as being at least one standard deviation above or below the database mean. Interpreting the values correctly is very important. Negative values, or those below the database mean, can indicate a problem for values like MLU or NDW. But positive values, higher than the database mean, can also document problems. Pauses and mazes are examples where positive values can indicate oral language issues which may need further investigation. Don't make the mistake of considering all areas that are above or below the database mean to be a problem. Think about that aspect of language and what impact it has for the speaker. It would be irresponsible to enroll a student, for example, who has negative values for mazes, as that student is actually more fluent than the average speaker his or her same age.

Look for clusters of measures which point toward a specific profile of language production problem. The profiles are meant to be descriptive of the oral language performance. They are not independent and, in many cases, may be overlapping. Their utility is in providing direction for how we spend our follow-up time to create a complete description of oral language performance, and to

create a plan for intervention. Don't be surprised if you find unique performance deficits. We are constantly finding utterances that are distinct, as well as overlapping profiles not seen before. Focus on the speaker and his or her distinctive communication problems, and allow the SALT measures to document these oral language deficits.

Step 2
After running the SMR, listen to the sample again while reading the transcript. This tunes you back in to the speaker's overall oral language style. It also gives an opportunity to review how well the SALT measures captured the language difficulties you might have heard in the sample. The SMR does not capture every aspect of language difficulty. So be prepared to be creative in documenting issues beyond this report such as problems with narrative organization or non-specific referencing. It is possible to create customized code lists to mark any word or utterance of interest. SALT provides useful utilities to facilitate this hand-coding process, making it easy and efficient. We discuss these options in more detail later in the chapter.

Step 3
Generate the *Database menu: Quick Look* to make sure you didn't misinterpret the results or overlook something obvious. This report provides a visual display of strengths and weaknesses. For example, if the value for mazes is more than 1 standard deviation interval below the database mean, then mazes are marked as a strength. If the value is more than 1 standard deviation interval above the database mean, then mazes are marked as a weakness. Otherwise mazes are marked as "within normal limits".

Step 4
Evaluate problem areas in more detail. Measures in the SMR that are above or below one standard deviation from the database mean should be evaluated in more detail for several reasons. First, we need to confirm that each of these measures represents a real problem. Second, it is important to look at the utterances and words on which these measures are based, e.g., abandoned utterances, utterances with mazes, and words with omitted bound morphemes. Third, multiple measures should be reviewed together to determine if they constitute a profile of language disorder. SALT often provides more detailed and specific analyses that are available as summaries, e.g., *Database menu: Verbal Facility Summary*, or as lists, e.g., *Analyze menu: Omissions and Error Codes*. Exploring these additional analyses provides details about areas of difficulty and resolves questions about the impact of the SMR measures. The SMR results direct the next steps to help understand the language difficulties presented. To work efficiently, further analyses are only run when justified by measures in the SMR. If mazes are produced in high numbers, for example, then we want to determine if they consist of filled pauses, or part-words, words, or phrases in repetition or revision. SALT produces such a table but it is only of interest if maze totals are significantly high. In this way, the SMR identifies areas requiring further exploration.

Step 5
Generate the *Database menu: Performance Report* for a customized written report, identifying areas where your client's sample differs significantly from his/her peers. The results are provided as text which can be edited, and copied and pasted into diagnostic reports.

Follow-up Analyses Organized by Profile Type

The discussion of follow-up analyses (Step 4) has been organized by the profile types mentioned in the previous chapter. This allows for discussion of each of the standard SALT measures, the more detailed measures, and recommendations for hand-coded procedures where warranted.

GENERAL LANGUAGE DELAY DIFFICULTIES

The primary indicator for is low mean length of utterance (MLU). This is often in conjunction with low number of different words (NDW), low words per minute (WPM), high number of errors, and/or high number of omissions. We often see minimal, if any, complex syntax use. Each of these areas may need to be examined in further detail to determine if it is an accurate reflection of performance, and to support initial findings.

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	3	1	7	2	3	5	0	0	0	1	0	2	0	0	0	24
DB Mean	0	0	1	2	4	6	5	5	4	2	2	1	1	1	0	1	35

Figure 6-1

MLU: We want to make sure MLU shows a range of sentence lengths with the mean reflecting an average. Question a low MLU. *Could it be limited by speech production issues or a lack of respiratory support? Or is it truly language based?* Look at the *Database menu: Utterance Distribution Tables* (or the *Analyze menu: Utterance Distribution Tables* if you are not comparing to database samples). The utterance distribution table (Figure 6-1) shows the number of utterances spoken for each utterance length. This example shows a speaker's language sample which contained only a few utterances that were longer than six words in length, notably less than the database mean values for that age speaker.

This same distribution can also be investigated at the morpheme level. We hope to find a range of utterance lengths around the mean, some longer and some shorter than the mean value. It is instructive to examine the database values relative to the target sample to identify the number of longer utterances produced. These utterances may likely be the syntactic forms the speaker is just learning. Analyzing the syntax of these utterances provides useful insight into the speaker's language development progress. A reasonable distribution of utterance lengths clustering around the mean, e.g., lengths from 1 – 7 with an MLU of 3.2, validates the MLU value. It is also good practice to check on the examiner's language for conversational samples (see the *Analyze menu: Syntax/Morphology Summary* and *Analyze menu: Semantics Summary*). Examiner language (MLU and NDW) should be equal to, or less complex than, the target speaker.

SEMANTICS SUMMARY
Calculations Based on C&I Verbal Utts
Compared to 40 Samples Equated By Same Number of Total Words

LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
Standard Word Lists						
Question Words						
Total	0	-0.85	0.57	0	2	0.68
Type	0	-0.90	0.50	0	2	0.55
Negatives						
Total	3	-0.91	5.05	1	11	2.25
Type	2	-0.78	2.95	1	5	1.22
Conjunctions						
Total	19 *	-1.93	37.90	21	62	9.80
Type	4 *	-1.74	6.13	4	8	1.22
Core Modals						
Total	2 *	-1.67	7.50	2	18	3.29
Type	2 *	-1.03	2.97	1	5	0.95
Personal Pronouns						
Total	50	0.22	48.03	27	68	8.80
Type	7	-0.08	7.10	3	9	1.26

Figure 6-2

NDW and Vocabulary: Begin examining vocabulary use with the *Database menu: Semantics Summary* (or the *Analyze menu: Semantics Summary* if you are not comparing to database samples). The Standard Word Lists section of this summary (Figure 6-2) provides frequency data for five word lists: question words (for conversational samples), negatives, conjunctions (the first complex

sentence type), core modals, and personal pronouns. The type and total frequency for each list is provided.

Conversational samples offer the opportunity to examine question word use. Negative utterances have a specific form, so the frequency of these words provides evidence of use. Conjunctions provide insight into initial complex sentence use. The types and tokens provide evidence for the variety of conjoining words used. Modals are another unique form used increasingly as development advances. Personal pronouns give some insight into referencing. Pronoun use follows a specific reference with appropriate subject and object, gender, and number choice. You can find the words used in the sample by accessing the *Analyze menu: Standard Word Lists*. This option lets you explore other vocabulary lists as well.

GRAMMATICAL CATEGORIES
Calculations Based on C&I Verbal Utts
Compared to 40 Samples Equated By Same Number of Total Words

LANGUAGE MEASURE	Child		DATABASE			
Category	Score	+/-SD	Mean	Min	Max	SD
Initiators	2	0.61	1.17	0	5	1.36
Determiners	42	0.81	37.25	26	50	5.84
Adjectives	11	0.46	9.13	2	19	4.09
Nouns	74	0.88	66.13	48	85	8.98
Personal Pronouns	43	0.04	42.63	19	66	9.04
Other Pronouns	3	-0.13	3.25	0	7	1.96
Auxiliary Modals	2 *	-1.69	7.63	2	18	3.33
Auxiliary Operators	5	-0.03	5.07	0	11	2.66
Verbs	52 *	-1.23	58.88	45	71	5.59
Copula Forms	5	-0.33	5.70	3	11	2.11
Verb Particles	2	0.59	1.38	0	4	1.05
Adverbs	24	0.41	21.73	10	33	5.61
Intensifiers	2	-0.32	2.42	0	5	1.32
Prepositions	22	0.49	20.00	12	33	4.12
Existential	0	-0.41	0.15	0	1	0.36
Question Words	2 **	2.04	0.65	0	2	0.66
Coordinators	13 *	-1.65	24.05	15	37	6.71
Subordinators	3 *	-1.31	6.30	2	13	2.52
Infinitives	5	-0.95	6.88	3	11	1.96
Possessives	0	-0.55	0.50	0	4	0.91
Negation Words	2 *	-1.31	4.78	1	10	2.12
Lets Words	0	-0.16	0.03	0	1	0.16
Interjections	1	0.36	0.70	0	3	0.82

Figure 6-3

Another useful list is the *Database menu: Grammatical Categories* (or the *Analyze menu: Grammatical Categories* if you are not comparing to database samples). This report (Figure 6-3) organizes all the words used in the sample into the categories listed in this table. This is done using a large dictionary and a set of grammatical rules (Channell & Johnson, 1999). The *Analyze menu: Grammatical Category Lists* option shows the words in each category.

The *Analyze menu: Word Root Tables* produces an alphabetized list of all the words used in the sample (Figure 6-4). This can be invaluable for exploring the vocabulary used in story retell narrative and expository samples where the context is familiar to the examiner and certain vocabulary use may be obligatory.

WORD ROOT TABLE
C&I Verbal Utts

	Child	Examiner		Child	Examiner
*BRANCHES	1	0	IN	2	0
*WERE	1	0	LEAP	1	0
A	5	0	LIKE	1	0
AGAIN	1	0	LOOK	4	0
AND	15	0	MY	1	0
AT	1	0	NIGHT	1	0
BACK	1	0	OF	2	0
BARK	1	0	ON	2	0
BE	1	0	ONE	3	0
BEE	2	0	OUT	1	0
BOY	2	1	OVER	2	0
BRANCH	1	0	QUIET	1	0

Figure 6-4

Omissions and errors: Frequently, in younger children, omissions and errors are centered around bound morphemes. The frequency and type of bound morphemes used in the sample are listed in the *Analyze menu: Bound Morpheme Tables*. The *Analyze menu: Omissions and Error Codes* summary (Figure 6-5) provides a list of all omitted words and bound morphemes as well as all the words and utterances coded as errors. The utterances containing the omissions and errors are also included in this summary. It is useful to examine these utterances to look for patterns.

OMISSIONS AND ERROR CODES
Total Utterances
1st Speaker

	CHILD	
	Total	**Expanded**
Omitted Words	3	
*THE		1
*TO		1
*WERE		1
62 C (Um we went) we *were just drive/ing *the car.		
109 C And they were try/ing *to chase the other dog away and run all around the whole world {E laughs}.		
Omitted Bound Morphemes	1	
CHASE/*ED		1
82 C My mommy chase/*ed them all around {C laughs}.		
Word-level Error Codes	5	
BES[EW:BEING]		1
CANNOT[EW:COULD_NOT]		1
FELLED|FALL[EO:FELL]		1
FIND[EW:FOUND]		1
SAWED|SEE[EO:SAW]		1
43 C But we cannot[EW:could_not] find them.		
65 C And :02 they are always bes[EW:being] mean to me.		
117 C And she (a*) felled|fall[EO:fell] in the thing.		
120 C And the lady sawed|see[EO:saw] her.		
122 C (And) and they find[EW:found] Savanna when they came home.		
Utterance-level Error Codes	2	
[EU]		2
73 C (And :02 and) and I have never want the dog/s (r*) runed away again [EU].		
103 C And another times when he was so crazy all the times [EU].		

Figure 6-5

Subordination Index: We tend to think about "delayed language" only with children under 5 years of age. However, our clinical experience and research have shown that these delayed patterns persist through childhood. An important analysis often supporting the diagnosis of delayed development is the Subordination Index (SI), a hand-coded analysis of clausal density (see Appendix O). SALT has

utilities for simple insertion of an SI code at the end of each utterance (see *Edit menu: Insert SI Codes*). The *Database menu: Subordination Index* (or the *Analyze menu: Subordination Index* if you are not comparing to database samples) summarize the results (Figure 6-6). A low SI score indicates the use of simple syntax, or lack of complex sentence formulation, which is often characteristic of speakers with language delay.

SUBORDINATION INDEX							
LANGUAGE MEASURE	Child		DATABASE				
	Score	+/-SD	Mean	Min	Max	SD	%SD
[SI-0]	0	-0.53	0.25	0	2	0.47	189%
[SI-1]	21 *	-1.21	29.46	12	47	7.00	24%
[SI-2]	1 *	-1.00	3.22	0	9	2.22	69%
[SI-3]	0	-0.43	0.16	0	1	0.37	231%
SI Score	1.05	-0.76	1.10	0.96	1.27	0.07	6%
* At least 1 SD (** 2 SD) from the database mean							

Figure 6-6

WORD RETRIEVAL AND UTTERANCE FORMULATION

Word retrieval and utterance formulation problems must be differentiated from one another by examining the speaker's mazes and pauses if scores for these behaviors prove to be higher than normal. The *Database menu: Verbal Fluency Summary* (or the *Analyze menu: Verbal Fluency Summary* if you are not comparing to database samples) provides detailed measures of rate, pause, mazes, and abandoned utterances.

Rate and Pauses: The Rate and Pause sections of the *Verbal Fluency Summary* (Figure 6-7) provide information on speaking rate (words and utterances per minute) and detailed measures of pauses found within and between utterances. In our experience, pauses within utterances are associated with word retrieval problems and pauses between utterances are linked to utterance formulation issues. Frequent pauses may be another indication of word retrieval or utterance formulation problems. Some individuals use repetition, revision, or filled pauses to find the right word or utterance form. Others just pause silently until the solution emerges. Only a few do both. The length of the silent pauses is an indication of the difficulty listeners will have in following the message. A pause of only 1 - 2 seconds signals an opportunity for speaking turn change. This discourse rule leaves listeners hanging when long pauses occur within the speaker's turn. You can get a list of all the utterances containing pauses in the *Analyze menu: Standard Utterance Lists* option.

VERBAL FACILITY SUMMARY Compared to 40 Samples Equated By Same Number of Total Words						
LANGUAGE MEASURE	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
RATE SUMMARY						
Elapsed Time (5:32)	5.53 *	1.48	3.98	2.45	6.42	1.05
Words per Minute	86.57	-0.43	95.50	58.91	144.08	20.81
Utterances per Minute	8.31	-0.96	10.41	6.23	15.92	2.18
PAUSE SUMMARY						
Pause Time As % of Total Time	16.0%	0.30	13.17	0.00	34.20	9.47
Pauses Within Utterances						
No. of pauses	8 *	1.83	2.30	0	13	3.12
Total pause time (seconds)	30 **	2.10	7.18	0	50	10.87
Average pause time (seconds)	3.75	0.79	2.99	2.00	5.00	0.97
Pauses Between Utterances						
No. of pauses	9	0.20	7.88	0	22	5.67
Total pause time (seconds)	23	-0.22	28.23	0	94	24.08
Average pause time (seconds)	2.56	-0.78	3.26	2.00	6.20	0.91

Figure 6-7

Mazes and Abandoned Utterances: High numbers of mazes revealed on the *Standard Measures Report* is the primary indicator that we are dealing with a word retrieval or utterance formulation

issue. The Maze section of the *Verbal Fluency Summary* provides a breakdown of the total number of mazes that are revisions, repetitions, and filled pauses (Figure 6-8). The maze revisions and repetitions are further broken down into their components (part-word, word, and phrase) and filled pauses are broken down into single word, e.g., “um”, and multiple words, e.g., “um um um”. Speakers with word-level problems have a preponderance of part-word and word repetitions and revisions. Speakers with utterance-level issues have more phrase-level repetitions and revisions. The results can be mixed, requiring further exploration. The Abandoned Utterances section provides a count of the abandoned utterances. It should be noted that frequent abandoned utterances point to utterance-level issues. You may consider an abandoned utterance to be a failed maze in the sense that the speaker was not able to resolve the maze and gave up. Use the *Analyze menu: Standard Utterance Lists* to examine each abandoned utterance carefully to determine similarity of form and content used.

VERBAL FACILITY SUMMARY
Compared to 40 Samples Equated By Same Number of Total Words

LANGUAGE MEASURE		Child		DATABASE			
		Score	+/-SD	Mean	Min	Max	SD
MAZE SUMMARY							
Total Maze Words		106 **	3.20	42.90	8	96	19.70
Maze Words As % of Total Words		25.4% **	2.79	11.86	2.51	23.59	4.85
Total Number of Mazes		37 *	1.87	20.85	5	44	8.62
Average Words per Maze		2.86 *	1.62	2.05	1.00	3.07	0.50
Average Mazes per Utterance		0.93 *	1.49	0.56	0.17	1.23	0.25
Utterances With Mazes		25 *	1.96	15.55	5	26	4.81
Utts With Mazes As % of Total Verbal Utts		62.5% *	1.69	41.43	17.24	70.00	12.49
Total Maze Components		69 **	3.92	24.90	8	58	11.25
Revisions	Part Word	2	-0.08	2.15	0	8	1.82
	Word	7 **	2.68	2.33	0	8	1.75
	Phrase	12 *	1.52	6.63	0	17	3.53
Repetitions	Part Word	7 **	2.26	2.40	0	9	2.04
	Word	26 **	5.41	4.20	0	20	4.03
	Phrase	8 **	2.31	2.33	0	9	2.45
Filled Pauses	Single Word	7	0.43	4.63	0	24	5.48
	Multiple Words	0	-0.29	0.25	0	5	0.87
Maze Components As % of Total Components		18.2% **	3.59	7.31	2.51	15.72	3.02
ABANDONED UTTERANCES							
% Abandoned Utterances		0.0%	-0.51	1.48	0.00	15.71	2.88
Number of Abandoned Utterances		0	-0.40	0.73	0	11	1.81

Figure 6-8

The *Database menu: Maze Distribution Tables* report (or the *Analyze menu: Maze Distribution Tables* if you are not comparing to database samples) provides additional maze data (Figure 6-9). The first table, % of Utterances with Mazes by Utterance Length in Morphemes, provides you with the percentage of utterances with mazes at each length (1, 2, 3, 4, etc.) in morphemes. This is informative as you expect more mazes to appear with longer utterances. Note which utterance lengths have fewer mazes than expected and which have more. Additional tables provide you with the distribution of mazes by maze length and by utterance length. Finally, you can examine the distribution of utterances by the number of mazes they contain which gives a clear index of how many utterances had one maze, two mazes, and so on. These tables provide you with insight into maze length relative to utterances attempted and how much material is in mazes relative to the total sample. Mazes are disruptive to listeners, making it difficult to follow the utterance and the message. Speakers with word retrieval problems tend to repeat or revise before subject or object nouns, and adjectives. They also repeat or revise before verbs, which is tricky, as the problem may be syntax based rather than a problem with word retrieval.

MAZE DISTRIBUTION TABLES
Calculations Based on C&I Verbal Utts
Compared to 40 Samples Equated By Same Number of Total Words

% of Utterances With Mazes By Utterance Length in Morphemes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	---	---	0%	33%	33%	20%	83%	50%	100%	100%	100%	---	75%	0%	100%	63%
Db Mean	20%	24%	23%	22%	28%	30%	30%	39%	41%	52%	54%	30%	58%	52%	65%	39%

Number of Mazes By Utterance Length in Morphemes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	---	---	0	1	1	1	8	2	3	3	3	---	6	0	9	37
Db Mean	0	0	0	0	1	2	2	2	2	2	1	1	1	1	6	21

Number of Mazes By Maze Length in Morphemes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Child	14	10	0	3	4	2	3	0	1	0	0	0	0	0	0	37
Db Mean	11	4	2	1	1	1	0	0	0	0	0	0	0	0	0	20

Figure 6-9

Utterance formulation problems can be linked to specific syntactic forms like complex sentences. When you see a high percentage of mazes in longer utterances as well as more than one maze per utterance, review the sample for complex sentence use. Note the number of propositions attempted and the syntactic forms used by the speaker. If syntax is limited to simple sentence forms and more than one proposition is attempted per utterance, then teaching complex syntax is your target. You can test this conclusion by working on producing one proposition at a time and reviewing the maze frequency. If this is the correct conclusion, then mazes will be significantly reduced. If not, work through the mazes from a word-level perspective.

To measure complex syntax, you might look at the use of subordination by applying the Subordination Index (SI, see Appendix O). The SI has been coded in most of the database samples and is available for comparison with an individual sample.

Whether the issue is frequent pauses or frequent mazes, you should review vocabulary diversity. Review the number of different words (NDW) produced in the sample as well as the moving-average NDW. If these measures are below 1 SD, then re-read the sample to identify circumlocutions and examine pronoun use. Pronoun use can also be examined in the *Database menu: Semantics Summary* which provides personal pronoun use compared to peers. The *Analyze menu: Standard Word Lists* option gives you frequencies of pronoun use for several types of pronouns.

Finally, in the pursuit to diagnose utterance formulation versus word retrieval difficulties, if you began with a conversational sample you should collect an additional narrative sample. Narrative samples put more pressure on the speaker to produce specific content which is usually familiar to the examiner. Select the type of narrative relative to age or ability level; story retell for younger individuals and expository or persuasion samples for those who are older. The narrative should elicit more examples of complex syntax from the speaker if he or she is capable. It also provides an opportunity to examine specific word use.

NARRATIVE ORGANIZATION

Problems with narrative organization are often the only issues arising from the language sample. You should collect a narrative sample, of course, but the *Standard Measures Report* may not show any specific deficits. When you listen to the sample and re-read the transcript, however, it is clear that the speaker doesn't fluidly tell the story. Characters may not be introduced, plots may be ignored, conflicts and/or resolutions may be omitted or included at odd times, and so on. These speakers typically have difficulty with written language as well as with oral reports in school. Their language at the word and utterance level is usually fine, but be aware of possible issues with complex syntax. This is a profile that is often identified initially by teachers and SLPs when listening to oral language or reviewing written language assignments. The crux of the problem in production is taking the listener through the introduction, characters, conflicts, resolutions, character mental states, and conclusion in an orderly manner.

Oral Narrative Quality: The Oral Narrative Quality (ONQ) is an assessment tool developed to create a more objective narrative structure scoring system for the *Ana Gets Lost* (AGL) story retells included in the New Zealand/Australia Story Retell Reference Database (see Appendix B). The ONQ is scored for each of eight categories. The *Edit menu: Insert Template → Oral Narrative Quality* utility is used to insert the scoring template at the end of the transcript. Once the scores have been assigned, the results can be summarized with the *Analyze menu: Oral Narrative Quality* and *Database menu: Oral Narrative Quality* (Figure 6-10).

ORAL NARRATIVE QUALITY
Compared to 110 Samples Matched by Age

ONQ Category	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
Introduction	1	-0.80	2.33	1	5	1.65
Theme	3	-0.40	3.64	1	5	1.58
Main Character	3	-0.48	3.73	1	5	1.50
Supporting Characters	1 *	-1.33	2.69	1	5	1.28
Conflict	1	-0.99	2.58	1	5	1.60
Coherence	1	-0.83	2.25	1	5	1.50
Resolution	3	-0.60	3.78	1	5	1.30
Conclusion	3	-0.14	3.16	1	5	1.15
Oral Narrative Quality	16 *	-1.22	24.16	12	40	6.68

Figure 6-10

Narrative Scoring Scheme: We adapted a scoring procedure to document narrative organization. The Narrative Scoring Scheme (NSS) is based on the work of Stein and Glenn, 1979; 1982 (see Appendix P). The NSS involves assigning scores for each of seven categories and then typing the scores into the transcript on plus lines inserted at the end of the transcript. SALT has utilities for inserting the scoring template (*Edit menu: Insert Template → Narrative Scoring Scheme*) and reports for summarizing the results (*Analyze menu: Narrative Scoring Scheme* and *Database menu: Narrative Scoring Scheme* (Figure 6-11)). The NSS measure was developed for our bilingual research project and was one of the best predictors of reading achievement in both Spanish and English (Miller, et al., 2006).

NARRATIVE SCORING SCHEME
Compared to 82 Samples Matched by Age

NSS Category	Child		DATABASE			
	Score	+/-SD	Mean	Min	Max	SD
Introduction	4	0.12	3.90	1	5	0.83
Character Development	3	-0.02	3.02	1	5	0.99
Mental States	1 **	-2.10	2.66	1	5	0.79
Referencing	2 *	-1.98	3.32	2	5	0.66
Conflict Resolution	3	-0.49	3.39	1	5	0.80
Cohesion	2 *	-1.75	3.26	1	5	0.72
Conclusion	4	0.59	3.34	1	5	1.11
NSS Composite Score	19	-0.94	22.89	12	32	4.13

Figure 6-11

Expository Scoring Scheme: The Expository Scoring Scheme (ESS), based on the NSS measure, was developed to document narrative organization and content for expository samples (see Appendix Q). The ESS is scored for ten different features. Use the *Edit menu: Insert Template → Expository Scoring Scheme* utility to insert the scoring template at the end of the transcript. Then assign the scores and summarize the results with the *Analyze menu: Expository Scoring Scheme* and *Database menu: Expository Scoring Scheme* reports (Figure 6-12).

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

Figure 6-12

Persuasion Scoring Scheme: The Persuasion Scoring Scheme (PSS) was also based on the NSS measure as well as the ESS. This scoring scheme was developed to document narrative organization and content for persuasion samples (see Appendix R). The PSS is scored for seven different features. The *Edit menu: Insert Template → Persuasion Scoring Scheme* utility is used to insert the scoring template at the end of the transcript. Once the scores have been assigned, the results can be summarized with the *Analyze menu: Persuasion Scoring Scheme* and *Database menu: Persuasion Scoring Scheme* (Figure 6-12) reports.

PERSUASION SCORING SCHEME Compared to 45 Samples Matched by Age						
PSS Category	**Child**		**DATABASE**			
	Score	**+/-SD**	**Mean**	**Min**	**Max**	**SD**
Issue Identification	3 *	-1.12	4.02	1	5	0.92
Supporting Reasons	3 *	-1.28	4.09	2	5	0.85
Other Point of View	2	-0.98	3.27	1	5	1.29
Compromises	4	0.93	2.89	1	5	1.19
Conclusion	3	0.17	2.76	0	5	1.45
Cohesion	3 *	-1.10	3.80	3	5	0.73
Effectiveness	2 *	-1.79	3.56	1	5	0.87
PSS Composite Score	20 *	-1.01	24.38	14	32	4.34

Figure 6-12

DISCOURSE DEFICITS

Discourse deficits are best identified from conversational samples where there are multiple speaker turns. There are several measures pertaining to discourse included on the SMR which SALT calculates automatically. These include Percent Responses to Questions, Mean Turn Length (in words), Utterances with Overlapping Speech, and Interrupted Other Speaker. Percent Responses to Questions provides an index of number of examiner questions followed by an utterance, or response, from the target speaker. The utterances need to be reviewed to make sure that the target speaker's utterance was, in fact, a response to the question. For speakers with discourse problems we often see inappropriate responses or no response when a question is asked. When the percentage is low, examiner questions and target speaker responses should be looked at clinically. SALT provides an easy way to construct the list of questions using the *Analyze menu: Standard Utterance Lists* option. Select the 2nd speaker's (*examiner's*) utterances ending with a question mark and display them in context with several following entries - usually 2 or 3 will catch the response if it's available. You will then be presented with a list you can analyze for form and content. *Did the examiner allow sufficient opportunity for the response? Was the question answered appropriately? Was the right syntax used?* In Figure 6-14, the target speaker answered all three questions. But in two of the three responses the speaker produced one or more abandoned utterances. Perhaps the facts were not available to the speaker. Otherwise, we have evidence of word retrieval or utterance formulation problems.

STANDARD UTTERANCE LISTS Total Utterances 2nd Speaker	
Questions	
9	E Do you ever eat Mexican food?
10	C (Um) no not that>
11	C Well I ate taco/s (one) one time.
23	E Which one do you like best?
24	C I like burrito/s.
25	C They have a little pizazz in them.
26	E What do they put in it to make it pizazzy?
27	C (Um) green pepper/s and pepper/s (um)>
28	C I/'ve never>

Figure 6-14

If the discourse measures in the *Standard Measures Report* are questionable then generate the *Database menu: Discourse Summary* (Figure 6-15) (or *Analyze menu: Discourse Summary* if the database comparison set is not available) to produce a summary of the number of examiner questions asked, the number answered, the number of yes/no responses, and the percentage of questions answered. Other indicators of whether or not the speaker is following discourse rules include the number of utterances with overlapping speech and the number of times the target speaker interrupted the other speaker. The *Turn Length Summary* section provides several measures of the speaker's turn taking. A turn is the number of speaker utterances or words while they hold the floor. As speakers become more language proficient their turn length increases. Turn length is also an indication of whether or not the speaker is following discourse rules, allowing the speaking partner turns for sharing information. The turn length distribution tables enable you to review turns by number of words and number of utterances. Look for a distribution of turn lengths, not just short responses or long responses. It is important to re-read and listen to the transcript focusing on how well the speaker follows discourse rules. We are concerned with individuals who are un-responsive to the speaking partner, or who seem to have their own topic of conversation, never attending to the partner's speech at all.

DISCOURSE SUMMARY Calculations Based on Total Utterances Compared to 146 Samples Equated By Same Number of Total Words						
LANGUAGE MEASURE	**Child**		**DATABASE**			
	Score	**+/-SD**	**Mean**	**Min**	**Max**	**SD**
TURN LENGTH SUMMARY						
Mean Turn Length (utterances)	1.14	-0.69	1.66	1.00	7.00	0.75
Median Turn Length (utterances)	1.00	-0.39	1.32	1.00	7.00	0.82
Mean Turn Length (words)	3.24	-0.89	8.99	1.94	58.00	6.47
Median Turn Length (words)	2.00	-0.77	7.21	1.00	58.00	6.78
RESPONSES TO QUESTIONS & INTONATION PROMPTS						
% Responses to Questions	37.5% *	-1.74	75.72	0.00	100.00	21.94
Other Speaker Questions	8	0.02	7.88	0	59	7.55
Responses to Questions	3	-0.60	5.64	0	29	4.42
Y/N Responses to Questions	0	-0.90	1.42	0	7	1.57
% Responses to Intonation Prompts	---		93.33	0.00	100.00	25.82
Other Speaker Intonation Prompts	0	-0.32	0.12	0	2	0.39
Responses to Intonation Prompts	---		1.13	0	2	0.52
OTHER MEASURES						
% Utts With Overlapping Speech	0.0%	-0.83	8.34	0.00	63.64	10.06
Utts. With Overlapping Speech	0	-0.80	1.16	0	8	1.44
% Utts Interrupted Other Speaker	0.0%	-0.83	8.34	0.00	63.64	10.06
Interrupted Other Speaker	0	-0.35	0.13	0	2	0.38
% Words Mentioned First	51.5%	-0.51	55.72	36.51	78.95	8.40
Words Mentioned First	35	-0.11	35.64	23	50	5.67

Figure 6-15

A follow-up measure to the turn length analysis is to code topic maintenance and change. This can be done by creating customized codes, e.g., [Topic_Initiate] and [Topic_Continue], and inserting the appropriate code at the end of each utterance (Figure 6-16). Check that "continuations" don't just dwell on detail but provide new information on the general topic, as in a typical fluid conversation.

E Do you have any brother/s or sister/s [Topic_Initiate]?
C I got[EW:have] three brother/s [Topic_Continue].
C But they don't live with us [Topic_Continue].
C They live with Grandma_Dale [Topic_Continue].
E Oh, ok [Topic_Continue].
C Grandma_Dale has got two dog/s [Topic_Initiate].
E She has two dog/s [Topic_Continue]?
C Yeah [Topic_Continue].

Figure 6-16

Use *Explore menu: List - Word and Code List* (Figure 6-17) to summarize the codes. The summary will tell you who initiated the topics in the conversation and who maintained them over the course of time. This will document responsiveness to the speaking partner from a content perspective.

Explore Words and Codes
Total Utterances

	Child	Examiner
[Topic_Initiate]	10	18
[Topic_Continue]	25	12
Total Frequency	35	30

Figure 6-17

FAST SPEAKING RATE

There are individuals who speak very fast yet have difficulty making specific references. This is often associated with reduced semantic content. Their speaking rate (WPM) is higher than their peers by more than one SD and their sample is longer. Their NDW is usually within one SD from the mean, but MLU is often higher. Calculating the Subordination Index (SI, see Appendix O) often reveals appropriate syntax. A careful reading of the transcript reveals that the speakers hold the floor at all costs (*very long turn lengths*) and continue to speak until the content to be conveyed has been produced. This may be an adaptation to a word retrieval or utterance formulation problem where the problem focus seems to be the content. Evidence for this comes from the frequent circumlocutions within speaking turns. Fortunately, these are not frequent cases as they seem very resistant to therapies. This suggests that we have not identified the basic problem. The follow-up analyses should focus on reading and coding the transcript for content errors and circumlocutions that suggest a word or utterance-level problem.

Coding More Detail of Specific Clinical Problems

SALT allows you to create customized codes to mark individual words and utterances for any feature that may be of special interest. Once coded, the program counts each code and lists the words or utterances containing them. This was illustrated previously with the example of topic initiation and continuation. Measures of specific features like Developmental Sentence Scoring (Lee & Canter, 1971) can also be coded and summarized. Lexical or syntactic forms targeted in therapy can be coded in spontaneous samples to document carry-over into everyday language use. This is perhaps the most powerful, yet under-used, feature of SALT. Although it requires you to hand code each feature, SALT has utilities to facilitate the task (see *Edit menu: Insert Code*). The *Explore menu: List - Word and Code List* can be used to identify and list utterances containing specific words,

morphemes, phrases, and codes. If you are working on a set of vocabulary, for example, create a list of the words of interest. SALT will count the number of times each word occurs in the transcript and pull up the utterances containing them. If you are interested in discourse, you might code the examiner questions for their form, e.g., Y/N, what, where, why, to determine the types of questions the speaker is able to answer and those that cause difficulty. If you want to mark phonological problems, for example, create codes and SALT will count them and show you where they occurred. You can easily look for patterns of occurrence from this analysis.

Linking Transcripts for Side-by-Side Comparison

The Link menu in SALT allows you to select any two transcripts for comparison. Once selected, you can generate reports for side-by-side comparisons (Figure 6-18). This facilitates, 1) monitoring change over time to document therapy progress or to observe for generalization, 2) comparing performance in different speaking contexts, 3) assessing proficiency across languages, 4) documenting RtI with naturalistic language use data, and 5) providing the necessary data to discontinue services.

Tyson 6;0 Con Time1 & Tyson 6;2 Con Time2

	TIME1 Current Age: 6;0 Context: Conversation Database: Conversation 153/128 Database samples		TIME2 Current Age: 6;2 Context: Conversation Database: Conversation 139/114 Database samples	
STANDARD MEASURES REPORT Compared to 128/114 Samples Equated By Same Number of Total Words				
LANGUAGE MEASURE	**Time1**		**Time2**	
	Score	**+/-SD**	**Score**	**+/-SD**
Current Age	(6;0) 6.00	0.19	(6;2) 6.17	0.25
TRANSCRIPT LENGTH				
Total Utterances	88 **	4.43	73 **	2.95
C&I Verbal Utts	73 **	3.58	61 **	2.29
All Words Including Mazes	267 *	1.21	258	0.76
Elapsed Time (minutes)	(5:03) 5.05 *	1.75	(4:34) 4.57 *	1.19
INTELLIGIBILITY				
% Intelligible Utterances	85.1% **	-2.89	85.9% **	-2.94
% Intelligible Words	94.6% **	-5.09	96.1%	-0.27
SYNTAX/MORPHOLOGY				
MLU in Words	2.84 **	-2.16	3.39 *	-1.69
MLU in Morphemes	3.18 **	-2.13	3.74 *	-1.70
% Utterances With Verbs	46.6% *	-1.84	50.8% *	-1.50
Mean Verbs per Utterance	0.55 *	-1.97	0.67 *	-1.47
SEMANTICS				
Number Total Words (NTW)	207	0.00	207	0.00
Number Different Words (NDW)	113 *	1.59	102	0.28
Moving-Average NTW	100	0.00	100	0.00
Moving-Average NDW	66 *	1.64	59	0.00
DISCOURSE				
Mean Turn Length (utterances)	1.22 *	-1.04	1.40	-0.61
Mean Turn Length (words)	3.36 *	-1.40	4.56	-0.94
% Responses to Questions	78.3%	0.01	76.1%	-0.10
% Responses to Intonation Prompts	---		100%	0.32
% Utts With Overlapping Speech	22.7% *	1.92	21.9% *	1.67
% Utts Interrupted Other Speaker	5.7% *	1.83	4.1% *	1.17
VERBAL FACILITY				
Words per Minute	52.87 *	-1.03	56.50	-0.82
Pause Time As % of Total Time	2.3%	-0.75	2.2%	-0.70
Maze Words As % of Total Words	11.2%	-0.01	11.9%	0.14
% Abandoned Utterances	4.5%	0.67	0.0% *	-1.05
ERRORS				
% Utterances With Errors	5.7%	-0.51	2.7%	-0.93
Number of Omissions	3 *	1.24	1	-0.18
Number of Error Codes	2	-0.42	1	-0.80

** At least 1 SD (** 2 SD) from the database mean*
Time2: moving-average ttr based on a subset of 0 database samples
Calculations based on C&I Verbal Utts: Syntax/Morphology and Semantics sections, Maze Words As % of Total Words
Time1: Database selection criteria: Age +/- 6 months (5;6 - 6;6)
Time2: Database selection criteria: Age +/- 6 months (5;8 - 6;8)

Figure 6-18

Comparing transcripts is an important part of the clinical process. Evaluating time-1/time-2 language samples for growth or change can effectively show whether or not therapy targets have generalized to functional speaking tasks, not simply to drill and practice scenarios. Comparisons across speaking contexts can be invaluable to a diagnostic. For example, narratives may present more of a linguistic challenge than conversations for a particular speaker. Collecting samples in both contexts provides the opportunity for direct comparison of the SMR results using the linking tool. Bilingual speakers present a unique challenge because, in order to evaluate their total language proficiency, it is important to collect comparable samples in each language. Collecting samples in more than one language from the same speaker provides the opportunity to compare performance across languages. This helps us to distinguish speakers who are language disordered from those who need more English (or second language) instruction (see Heilmann & Westerveld, 2013). RtI can be documented using the linking function. It facilitates the comparison of the speaker's performance at various points throughout the intervention phase of the process. SALT analysis of language samples provides thorough and detailed analysis of "real talk", generating functional data to make the case for dismissing a student from caseload. Language sample analysis is the only assessment that can prove the speaker does or does not have a "functional and effective communication system" which is often a requirement for dismissal.

Summary

SALT offers many ways to characterize oral language deficits. Your task is to make use of the tools to better describe oral language. SALT saves you time in analysis and provides clear direction on where to focus further diagnostic effort. At the end of the day, trust your clinical judgment as to the general problems the speaker exhibits. Then use SALT to document those areas to bring together a compelling case for enrolling for services, outlining an intervention plan, or dismissing from therapy.

CHAPTER

7

Assessing Children's Language Using the New Zealand/Australia Reference Databases

Marleen Westerveld
Gail Gillon

This chapter focuses on the creation, validation, and use of the New Zealand (NZ) and Australian (AU) reference databases. Although all of the principles and guidelines regarding LSA provided in Chapters 1 through 6 apply when using these databases, we discuss some features that are specific to the NZAU databases, including the Profile of Oral Narrative Ability (PONA). This chapter also summarizes existing research into comparing language samples across databases/geographic locations.

Development of the NZ databases

We were interested in creating a national database of oral language samples that would document language development for NZ children between the ages of 4;5 and 7;6 to assist in identifying disordered language performance. As an initial step, the Westerveld and Gillon language sampling protocol was developed. Our aim was to create a protocol that would a) be appropriate for 4;5 to 7;6-year-old children, b) take less than 30 min to administer, and c) elicit spoken language in a range of contexts that are relevant to the New Zealand (Early Childhood) Curriculum. Background information on the development and piloting of the protocol that was used to elicit these samples is reported in detail in Westerveld and Gillon (1999/2000; 2001). The protocol incorporates optimal sampling conditions and elicitation techniques based on an extensive review of the literature. This resulted in a protocol that elicits language across three contexts:

1. *Conversation*. An interview format is used, in which the child is engaged in approximately 10 minutes of conversation with the examiner (see Appendix A). The aim is to elicit at least 50 utterances.
2. *Story retelling*. The child listens twice to an audio-recording of a novel story (*Ana Gets Lost*; Swan, 1992). Following the first exposure, eight comprehension questions are asked, yielding an oral narrative comprehension score (ONC). After the second exposure the child is asked to retell the story (see Appendix B).
3. *Personal narratives*. The examiner relates brief scripted personal experiences related to 11 photo prompts and asks the child if "anything like that has ever happened to him/her" (see Appendix C).

Eliciting both types of narratives adhered to the NZ English Curriculum at the time (Ministry of Education, 1994), which stated that 1) students should converse and talk about events and personal experiences, and 2) students should be able to interpret character, story, and setting through the use of spoken language and non-verbal techniques. Although the revised NZ English Curriculum (speaking, writing, and presenting; Ministry of Education, 2007) is worded differently, the principles remain the same. It emphasizes the importance of "constructing a range of texts […] through deliberate choice of content, language, and text form", of "conveying and sustaining personal voice",

and of "achieving a sense of coherence when constructing texts" (see fold-out charts of the NZ Curriculum).

A practice-based research project was undertaken with volunteer speech-language pathologists from around the country. Each recorded 5 - 7 samples from typically developing children in conversation, personal narrative, and story retelling conditions. The result was a database of transcripts produced by several hundred children ages 4;5 – 7;6 from around the country.

Validation studies

Research into the development and validity of the database across the elicitation contexts of conversation, personal narratives, and story retelling showed 1) sensitivity to age on measures of MLU, number of different words (NDW), and grammatical accuracy; and 2) significant effects for elicitation contexts in all age groups on measures of syntax and verbal productivity (Westerveld et al., 2004). These results indicated, as expected, that children's spoken language performance improves with age, regardless of elicitation context. Furthermore, and consistent with previous research, narrative samples contained longer sentences, higher semantic diversity, and lower grammatical accuracy compared to conversational samples.

A second set of story retelling data, using the *Ana Gets Lost* task (Swan, 1992; see Appendix B) was collected in November 2009 from 76 children aged 4;0 to 4;11. These children attended seven different kindergartens in Christchurch, New Zealand, and were from a range of socio-economic and ethnic backgrounds (Westerveld, Gillon, & Boyd, 2012). The transcripts have been included in the NZAU Story Retell database to create norms for children aged 4;0 – 7;6. Two studies have investigated the clinical utility of this story retelling task (Westerveld & Gillon, 2010a; Westerveld et al., 2012). More specifically we wanted to determine if a Profile of Oral Narrative Ability (PONA) could be created based on children's performance on the oral narrative comprehension and production measures derived from the story retelling task. Oral narrative ability was captured using measures of comprehension (ONC), quality (ONQ), syntax (MLUm), grammatical accuracy (GA), semantic diversity (NDW), and verbal productivity (number of utterances used to retell the story). In summary, the following results were found:

- The story retelling task was effective in eliciting spoken language samples in more than 85% of children, aged between 4;0 and 7;6.
- Normal distributions were found on measures of ONC, ONQ, and MLUm for the 4-year-old children.
- Ceiling effects were found on the GA measure for all age groups.
- Acceptable moderate concurrent and predictive correlations were found between measures derived from the story retelling task and two norm-referenced measures of language ability (PPVT-4; Dunn & Dunn, 2007; and *Understanding Spoken Paragraphs*; CELF-4; Semel, Wiig, & Secord, 2006).

Based on these results we concluded that the PONA was a useful addition to the speech-language pathologist's assessment battery for children suspected of or presenting with language impairment.

Since that time, the PONA has been used successfully in studies with bilingual (Samoan-English) preschool children (Westerveld, 2014), preschool-children with autism spectrum disorder (Westerveld & Roberts, 2017), and children from disadvantaged backgrounds attending their first year of school in Queensland, Australia (Lennox, Westerveld, & Trembath, 2018), and children from Indigenous backgrounds in Australia (Pearce & Flanigan, 2019).

Expository database

The New Zealand Expository database (see Appendix D) was created in 2009 (see Westerveld & Moran, 2011). Expository discourse may be considered an advanced form of discourse that children are exposed to at school from a relatively early age. Examples include procedural descriptions (e.g., of simple science experiments) or explanations of the rules of a game. A total of 65 six- and seven-year-old participants were recruited from three primary schools located in suburban Auckland, New Zealand. Expository language generation samples were elicited using the favorite game or sport (FGS) task, developed by Nippold, Hesketh, Duthie, and Mansfield (2005). Our aims were to determine if young school-age children are able to successfully produce expository discourse and to obtain normative data for clinical practice. It was found that the task was successful in eliciting expository samples in most of the children. As expected, there was considerable individual variation, with approximately 9% of the children producing less than six utterances. Results also revealed normal distributions for some of the measures (MLU, % maze words, and words per minute [WPM]), indicating that these measures may be particularly helpful in identifying disordered performance in young school-age children. Taken together, the study provided evidence of the clinical usefulness of this database.

The Australian databases

In response to a lack of existing Australian normative data, a practice-based research project was undertaken in 2012 in collaboration with the Department of Education and Training, Queensland, Australia. Practising speech pathologists assisted in collecting spoken language samples from 127 children attending the first three years of schooling in Queensland, Australia. Children were aged between 5;6 and 8;6 and attended Prep (year one of schooling), Year 1, or Year 2. For more detailed information about the recruitment procedures and the participants please see Westerveld and Vidler (2015). The result was a database containing conversational, story retelling, personal narratives, and expository samples.

When collecting the language samples, several research questions guided our data collection methods. As reported in Westerveld and Vidler (2015; 2016), we wanted to 1) describe the level of performance across the language tasks of young school-age children in Australia, 2) examine whether syntactic performance was sensitive to discourse context (conversation, personal narratives, and exposition), and 3 how young Australian primary school-age children perform on the Bus Story (Renfrew, 1995). Results from our study clearly revealed a developmental trend of increasing linguistic proficiency (across syntax, semantics, and verbal productivity) with increasing age. Consistent with previous research, the expository task yielded the most complex language samples. Results also showed that using the published *Bus Story* norms will potentially result in over-identification of language impairment, emphasizing the importance of collecting local norms, especially for an assessment task that was standardized over 20 years ago.

Geographical comparisons

Comparisons of New Zealand and American data sets have revealed some interesting findings (Nippold, Moran, Mansfield, & Gillon, 2005; Westerveld et al., 2004; Westerveld & Heilmann, 2010). In general, the results revealed remarkable similarities across the two countries, regardless of the elicitation context, on measures of MLU and semantic diversity (NDW). The only significant difference on these two language measures occurred with the six-year-olds who, in New Zealand, demonstrated more advanced language skills (MLU and NDW) than their American counterparts in a conversation context (Westerveld et al., 2004). It is suggested that this difference may be due to when the children typically start their formal education. Children in New Zealand enter school on their fifth birthday rather than waiting for the start of the next school year as is customary in the US.

Westerveld and Heilmann (2012) compared the story retelling samples of 6- and 7-year-old children from NZ and the US. All children retold the story *Frog Where Are You?* (Mayer, 1969), using the elicitation protocol from the Narrative Story Retell database (Appendix I). Findings showed that the only language measures that were sensitive to geographic location were mazing behavior (% maze words) and speaking rate (WPM). There were no differences between the groups on measures of MLU, NDW, and narrative quality (NSS, Appendix P). These results clearly suggest that clinicians can use overseas story retelling databases when analyzing performance of their young school-age clients with language impairment, as long as English is their first and only language.

More recently, the research team compared persuasive samples produced by Australian high-school students to those produced by students in the US, using the persuasive protocol described in Appendix E (Heilmann, Malone, Andriacchi, & Westerveld, 2015; Heilmann, Malone, & Westerveld, 2020). When controlling for age differences, we found that students from the US produced longer samples. However, no significant differences were found on measures of MLU, NDW (controlled for sample length), mazing behavior, errors, or persuasive quality (PSS, Appendix R). Based on these results it was decided to combine the samples and create the AU_USA Persuasion Database (Appendix E).

Westerveld and Vidler (2016) compared the language samples of Australian and New Zealand children. Although significant differences in performance were found as a function of geographic location, effect sizes were small, indicating that the differences in performance were small, clinically speaking. We therefore decided to combine the New Zealand and Australian databases when integrating them into SALT. This gives the user the option to choose a subset (i.e. AU or NZ) when comparing a language sample from a client to the database.

Summary

The New Zealand and Australian databases of language samples that have been integrated into SALT provide clinicians with easy access to normative data on spoken language skills that are crucial for accessing the Early Childhood / Primary School curriculum. Clinicians are urged to record and transcribe their language samples they routinely collect from their clients (see Westerveld & Claessen, 2014), and compare them to the corresponding database to enhance their understanding of a client's strengths and weaknesses in language performance compared to same-age peers from Australia and/or New Zealand. This detailed analysis of spoken language performance will not only promote effective goal setting, it will also enable detailed progress monitoring following intervention.

CHAPTER

8

Additional Applications of SALT

Joyelle DiVall-Rayan
Jon F. Miller
Karen Andriacchi
Ann Nockerts

Introduction

While we traditionally think of SALT Software as an assessment tool to evaluate and analyze oral language skills, there are other non-traditional applications for which SALT can be useful as well. Due to the flexibility of the software and ability to customize codes, SALT can be used for almost any language production task. In this chapter we highlight two alternative uses of SALT; to assess expressive language in written form, and to assess disfluent motor speech production.

Using Salt to Assess Written Language

In our technology-driven society, brevity seems to be appreciated when we are texting or typing out 140-character tweets. However, strong written language skills are still a vital part of the language arts curriculum starting in kindergarten and extending through 12th grade. Students are expected to write opinion pieces, informative/explanatory texts, narratives, and research texts. The Common Core State Standards suggest that, starting in second grade, students should, "Use knowledge of language and its conventions when writing, speaking, reading, or listening" (CCSS:L.2.3). Students in second grade are required to, "Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words to connect opinion and reason, and provide a concluding statement or section" (CCSS: W.2.1). By their senior year, students are required to "Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences" (CCSS: W.11-12.3). Based on the standards, developing proficient writing skills is no small feat. SALT can be used to analyze written language samples to provide an abundance of information about developing written language skills.

Nickola Nelson, of Western Michigan University, says the following about the usefulness of using SALT software when analyzing written language samples (personal communication, August 7, 2015).

> *We have used SALT extensively in our research and clinical work on written language with school-age children and adolescents. (See Nelson, 2014a, 2014b, for information about this work and about a story probe technique for gathering baseline samples for a classroom-based writing lab approach.) SALT is beautifully suited to conducting some forms of analysis that are difficult to manage by hand, such as counting the number of words and more particularly, the number of different words. Both of these can be helpful repeated measures for written language samples gathered under similar conditions. SALT facilitates the process of coding (you can make up your own as well as using standard SALT conventions) and counting of codes. SALT features allow you to count the child's use of specific conjunctions and pronouns, which can be quite useful as well,*

in establishing baseline levels and marking progress. When transcribing written language samples, it is important to follow the special rules for transcribing spelling errors in order to make accurate word counts. When dividing utterances into C-units (also called T-units within written language samples) it is best to treat them as if they were oral language samples (i.e., ignoring student punctuation). By transcribing each C-unit as a separate utterance, you can use SALT's calculation of Mean Length of C-unit to compare your student's samples across time or writing contexts. Not to be missed are the advantages of working on language samples that do not have to be transcribed from an audio recording and the delights of experiencing how children and adolescents express their ideas in writing.

How the text was generated should also be considered when assessing written language. *Was it hand written? Or was it created by a word processing program or a speech-to-text software application such as Dragon Dictate?* The question must be considered, *does the text generation method contribute to the end result?* Hand writing can be difficult to decipher making it challenging to identify words and word boundaries. Certainly, spelling can be a challenge, particularly when consistent forms are not used. Broadening definitions of words to accommodate "invented" spelling will require using a "rich interpretation" strategy where credit is given if the word form is consistent but not correctly spelled.

SALT can be used to assess written samples and to track progress on features of written language performance from writing conventions such as capitalization, punctuation, and spelling to use of specific vocabulary such as linking words. Written samples can be coded to capture any feature of writing an evaluator is interested in tracking. By applying SALT's standard transcription conventions and codes to the written sample, analysis will also yield measures of linguistic performance such as MLU, NDW, and more. The types and extent of coding, as is always the case in SALT, is left to the discretion of the user. By marking more features within the sample, more information can be yielded from the analysis.

Procedure

The procedure developed to analyze written language in SALT requires typing the written language into the SALT editor using SALT transcription conventions and then applying the suggested written language coding scheme to the sample. Once the sample is entered and coded, SALT can generate reports from the Analyze menu with information on specific vocabulary, length of sentences, errors, e.g., coded spelling errors, or punctuation errors, and grammar. There are no comparison databases with the SALT program for comparing written samples. However, samples can be compared time 1/time 2 to track progress in writing skills. The following coding scheme is recommended to capture written language performance.

Written Sample Coding Scheme

Misspellings [S] Mark misspellings for analysis of vocabulary, language and spelling skills.	[S]- spelling error Misspelling|correct spelling[S] Example: *Forg*|*frog*[S] [S] [EW:__] spelling and word form error Example: *Baite*|*bite*[S][EW:bit] Spelling error and omitted bound morpheme Example: *Lok*|*look/*ed*[S] Spelling error with correct morpheme Example: *Cyring*|*cry/ing*[S] Spelling and overgeneralization error Example: *Teled*|*tell*[S][EO:told] Non-grapheme symbol (unidentifiable) Example: *frXg*|*frog*[S] Code switch with (Spanish) misspellings Example: *The abehas*|*abeja/s*[S] *chase/ed the boy* [CS].
Upper/lower case errors [IC] Incorrect use of upper case or lower case letters [IC]	Obligatory capitalization, e.g., proper pronouns or beginning of utterances Wrote: *the frog was gone.* Transcribed: *the*[IC] *frog was gone*. Use of capital letters in middle of word. Wrote: *He rAn home*. Transcribed: *He rAn*[IC] *home.*
Letter reversals	Type correct grapheme assuming they are developmentally appropriate. Create custom code to analyze this feature, if desired.

Punctuation [PN] Mark missing, incorrect, and/or extraneous punctuation. Do not insert commas and quotations even if obligatory.	[PN] – punctuation error Missing end of utterance punctuation Insert code at end of utterance followed by appropriate punctuation. Wrote: *The frog jumped* Transcribed: *The frog jump/ed [PN].* Incorrect punctuation Type the writer's punctuation in the code followed by correct punctuation outside of bracket. Wrote: *Where are they.* Transcribed: *Where are they [PN.]?* Extraneous punctuation mark Insert the [PN] code, including punctuation produced, at location of extra punctuation. Wrote: *He said. to go away.* Transcribed: *He said [PN.] to go away.*
Word Punctuation [WPN]	[WPN]- word punctuation error Missing word-level punctuation Wrote: *The girls coat was red.* Transcribed: *The girl*[WPN']*s*|*girl/z coat was red*.
Numbers	Type numbers as they were written. Example: *8 or eight*
Sound effects	Type as they were written
Extra Space [XSP]	Extra space within written word. Wrote: *honey moon* Transcribed: *honey*[XSP]*moon*
Space Required [SPR]	Space required within written word. Wrote: *theyare* Transcribed: *they* [SPR] *are*

Case Study: Using SALT for written language sample analysis

The following is an example of a written narrative collected from a first grade student writing about the wordless picture book, *One Frog Too Many* (Mayer & Mayer, 1975).

Written Sample

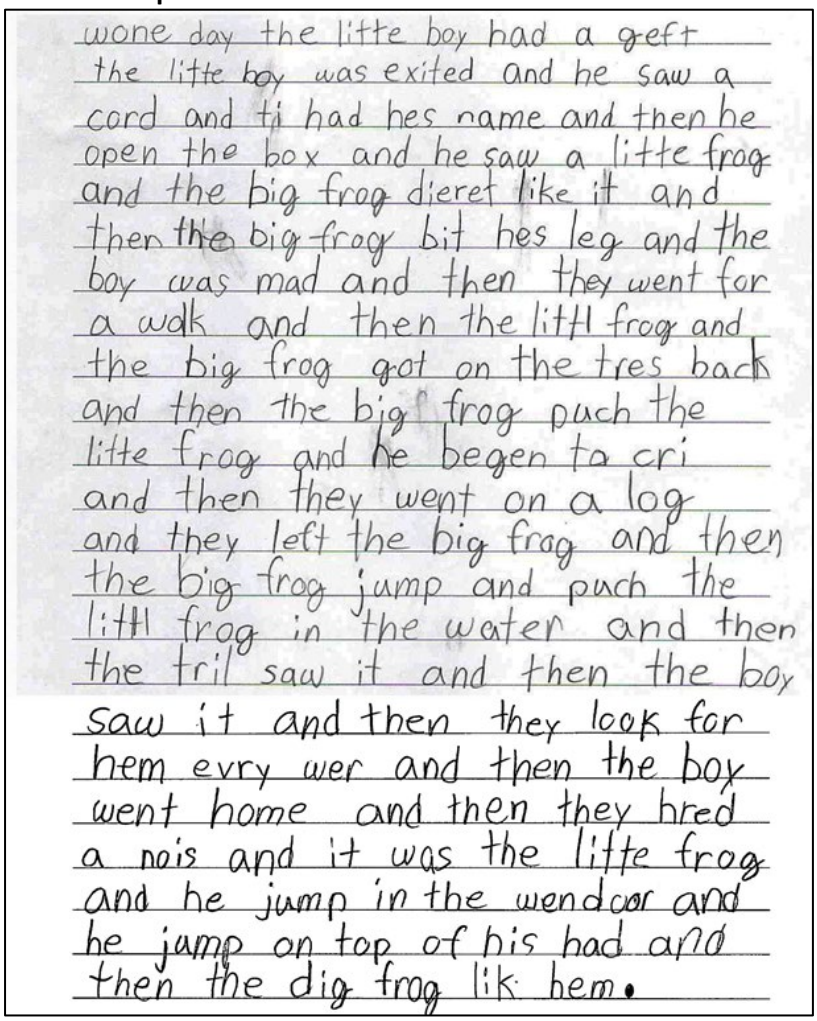

wone day the litte boy had a geft
the litte boy was exited and he saw a
card and ti had hes name and then he
open the box and he saw a litte frog
and the big frog dieret like it and
then the big frog bit hes leg and the
boy was mad and then they went for
a wdk and then the litfl frog and
the big frog got on the tres back
and then the big frog puch the
litte frog and he begen to cri
and then they went on a log
and they left the big frog and then
the big frog jump and puch the
litfl frog in the water and then
the tril saw it and then the boy
saw it and then they look for
hem evry wer and then the boy
went home and then they hred
a nois and it was the litte frog
and he jump in the wendcor and
he jump on top of his had and
then the dig frog lik hem.

Figure 8-1

SALT Transcript

```
$ Child
+ Grade: 1
+ Context: WNar
+ Subgroup: OFTM
= case was not coded as it was not of interest to the examiner

C wone|one[S] day the litte|little[S] boy had a geft|gift[S] [PN].
C the litte|little[S] boy was exited|excited[S] [PN].
C and he saw a card [PN].
C and ti|it[S] had hes|his[S] name [PN].
C and then he open/*ed the box [PN].
C and he saw a litte|little[S] frog [PN].
C and the big frog dieret|did/n't[S] like it [PN].
C and then the big frog bit hes|his[S] leg [PN].
C and the boy was mad [PN].
C and then they went for a walk [PN].
C and then the littl|little[S] frog and the big frog got on the tres|tree/z[S][WPN']
back[EW:branch] [PN].
C and then the big frog puch|push/*ed[S] the litte|little[S] frog [PN].
C and he begen|began[S] to cri|cry[S] [PN].
C and then they went on a log [PN].
C and they left the big frog [PN].
C and then the big frog jump/*ed and puch|push/*ed[S] the littl|little[s] frog in the
water [PN].
C and then the tril|turtle[S] saw it [PN].
C and then the boy saw it [PN].
C and then they look/*ed for hem|him[S] evry[XSP]wer|everywhere[S]  [PN].
C and then the boy went home [PN].
C and then they hred|heard[S] a nois|noise[S] [PN].
C and it was the litte|little[S] frog [PN].
C and he jump/*ed in the wendoor|window[S] [PN].
C and he jump/*ed on top of his had|head[S] [PN].
C and then the big frog lik|like/*ed[S] hem|him[S].
```

Figure 8-2

The written narrative (Figure 8-1) shows that the student's handwriting is legible. Other features to note are the lack of capitalization and ending punctuation. The transcript (Figure 8-2) shows the missing end punctuation marked with the [PN] code. The lack of capitalization could have been coded using the [IC] code but was instead just indicated with a comment at the beginning of the transcript. Also note the production of multiple spelling errors. The student is using emerging sequencing as noted by her use of "and then" to begin most sentences.

STANDARD MEASURES REPORT		
	Child	***
TRANSCRIPT LENGTH		
Total Utterances	25	0
Analysis Set (C&I Verbal Utts)	25	0
All Words Including Mazes	175	0
Elapsed Time	---	
INTELLIGIBILITY		
% Intelligible Utterances	100%	---
% Intelligible Words	100%	---
SYNTAX/MORPHOLOGY		
MLU in Words	7.00	---
MLU in Morphemes	7.08	---
% Utterances With Verbs	76.0%	---
Mean Verbs per Utterance	0.76	---
SEMANTICS		
Number Total Words (NTW)	175	0
Number Different Words (NDW)	55	0
Moving-Average NTW	100	---
Moving-Average NDW	38	---
VERBAL FACILITY		
Words/Minute	---	---
Pause Time As % of Total Time	---	
Maze Words As % of Total Words	0.0%	---
% Abandoned Utterances	0.0%	---
ERRORS		
% Utterances With Errors	32.0%	---
Number of Omissions	8	0
Number of Error Codes	1	0

Figure 8-3

The Analyze menu contains a number of reports which can be used to analyze this sample. The *Standard Measures Report* (Figure 8-3) provides a summary of the sample. The student wrote 25 utterances (sentences) using, on average, seven words per sentence. The intelligibility measure indicates that all words were legible. A total of 175 words were written with 55 of those being different words. Note that the student had errors in 32% of her sentences. There were eight omissions (words and/or bound morphemes) and one word or utterance marked as an error. The next step is to analyze the codes to further explore the written sample.

CODE SUMMARY

WORD CODES

	Child				***			
	Main Body		Mazes		Main Body		Mazes	
	Anal Set	Total Utts	Anal Set	Total Utts	Anal Set	Total Utts	Anal Set	Total Utts
[EW:BRANCH]	1	1	0	0	0	0	0	0
[S]	28	28	0	0	0	0	0	0
[WPN']	1	1	0	0	0	0	0	0
[XSP]	1	1	0	0	0	0	0	0

UTTERANCE CODES

	Child				***			
	Main Body		Mazes		Main Body		Mazes	
	Anal Set	Total Utts	Anal Set	Total Utts	Anal Set	Total Utts	Anal Set	Total Utts
[PN]	24	24	0	0	0	0	0	0

Figure 8-4

The *Code Summary* (Figure 8-4) reveals that the student wrote one erroneous word, made 28 spelling errors, wrote one word without word-level punctuation, and wrote one word with an extra space within the word. Note there were 24 utterance codes [PN] where the student did not use punctuation. Recall from the sample that there were 25 total sentences and ending punctuation was only used on the last sentence.

In addition to the frequency and location of the written errors in a language sample, it may be valuable to look at the lexicon produced in the writing. The *Grammatical Categories* report (Figure 8-5) lists the parts of speech and the number of times each part of speech occurred in the sample. As reported, the student used mostly nouns (57) and determiners (28), e.g., *a*, *the*, *his*. Note that the student produced 25 coordinators, which seems high.

GRAMMATICAL CATEGORIES		
	Child	***
TOTAL UTTERANCES		
Initiators	0	0
Determiners	28	0
Adjectives	8	0
Nouns	57	0
Personal Pronouns	15	0
Other Pronouns	0	0
Auxiliary Modals	0	0
Auxiliary Operators	0	0
Verbs	16	0
Copula Forms	3	0
Verb Particles	0	0
Adverbs	14	0
Intensifiers	0	0
Prepositions	9	0
Existential	0	0
Question Words	0	0
Coordinators	25	0
Subordinators	0	0
Infinitives	0	0
Possessives	1	0
Negation Words	1	0
Lets Words	0	0
Interjections	0	0

Figure 8-5

The *Grammatical Categories List* (Figure 8-6) produces lists of the specific words identified in any of the grammatical categories. After selecting coordinators, the report details which coordinators were used. In this sample there were 25 uses of the word *and*. Although there was a high frequency of coordinators, the student actually only used this one coordinating form.

GRAMMATICAL CATEGORY LISTS Total Utterances		
Coordinators		
	Child	***
AND	25	0
Total Frequency	25	0

Figure 8-6

WORD CODE TABLE Table Expanded by Words and Codes Total Utterances - Main body 1st Speaker				
	Child			***
	Total	Expanded		Total
[EW:BRANCH]	1			0
BACK[EW:BRANCH]		1		
[S]	28			0
BEGEN|BEGAN[S]		1		
CRI|CRY[S]		1		
DIERET|DID/N'T[S]		1		
EVRY[XSP]WER|EVERYWHERE[S]		1		
EXITED|EXCITED[S]		1		
GEFT|GIFT[S]		1		
HAD|HEAD[S]		1		
HEM|HIM[S]		2		
HES|HIS[S]		2		
HRED|HEARD[S]		1		
LIK|LIKE/*ED[S]		1		
LITTE|LITTLE[S]		5		
LITTL|LITTLE[S]		2		
NOIS|NOISE[S]		1		
PUCH|PUSH/*ED[S]		2		
TI|IT[S]		1		
TRE[WPN']S|TREE/Z[S]		1		
TRIL|TURTLE[S]		1		
WENDOOR|WINDOW[S]		1		
WONE|ONE[S]		1		
[WPN']	1			0
TRE[WPN']S|TREE/Z[S]		1		
[XSP]	1			0
EVRY[XSP]WER|EVERYWHERE[S]		1		

Figure 8-7

The *Word Code Table* (Figure 8-7) lists each word code expanded to show the words that were coded. The clinician can then analyze these words for patterns in errors. The [S] code marked spelling errors. Spelling information can be shared with other professionals on the education team and, if needed, interventions can be implemented. In the student's language sample, she consistently misspelled *little* and substituted "e" for "i" in *gift*, *him*, *his*, and *window*.

Case Study Summary

In the written narrative sample we ascertained that the student had very legible writing. She met the core standard, "Write narrative in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal even order, and provide some sense of closure" (CCSS W.1.3). The analyses revealed that the student did not begin sentences with upper case letters nor did she use ending punctuation. Temporal words produced in the narrative lacked variety as she only used *and then* to sequence her narrative. Finally, it might be beneficial to monitor the student's progress on spelling comparing to subsequent samples to see if the number of spelling errors decreases. For children with severely impacted spelling skills, computer software for apps may offer support for spelling through spell-checking, word prediction, or speech-to-text capabilities.

Other Considerations for Written Language

It may be informative to explore various modalities for written language for students with and without language disorders. When pulling together an initial work-up of strengths and weaknesses, the production method must be taken into consideration in order to get an accurate assessment. Comparing performance of written language across hand written, word processed, or speech-to-text

productions may help to discern how the production method helps or hinders text creation. It is also the case that software may mask difficulties where word choices and spelling help is automatic. It may be sufficient to help students work out the best technology-based supports possible to enhance their written language production.

Using SALT to Assess Fluency

The coding scheme described in this section was specifically designed to mark speech disfluencies. The coding can be applied to an existing transcript, previously coded for oral language production, or a speech sample can be elicited for the sole purpose of assessing fluency. These fluency codes are flexible in nature. They can be general, just marking the occurrence of a disfluency, or further defined to add more detail. The *Analysis menu: Fluency Codes and Behaviors* report provides detailed information on the number and types of disfluent productions within the connected speech sample. This fluency report is useful, not only for initial evaluations, but additionally to track therapy progress or changes in fluency behaviors over time and/or contexts.

Differentiating typical disfluencies from stuttering is imperative to a fluency assessment in order to determine whether there is a need for intervention. The American Speech Language Hearing Association (ASHA) provides the information below, which demonstrates how a language sample might help differentiate what are language vs. fluency production difficulties.

> *Fluency Disorders/Language Difficulties*
> Children with language difficulties at the sentence, narrative, or conversational discourse level may exhibit increased speech disfluencies, particularly interjections, revisions, and phrase repetitions. However, their disfluencies are not likely to involve prolongations, blocks, physical tension, or secondary behaviors that are more typical for children who stutter (Boscolo, Bernstein Ratner, & Rescorla, 2002).
>
> Word-finding issues can create increased non-stutter like disfluencies that are similar to those observed in cluttering; specific standardized tests can be used to rule out word-finding difficulties. Assessing organization of discourse also can help rule out verbal organization issues that might be mistaken for cluttering (van Zaalen-Op't Hof, Wijnen, & De Jonckere, 2009).

Coleman (2013) states that typical speech disfluencies are made up of multisyllabic whole-word and phrase repetitions, interjections, and revisions. Conversely, stuttering contains sound or syllable repetitions, prolongations, and/or blocks. Other differential behaviors seen in speakers who stutter may include physical tension and/or concomitant behaviors such as eye blinks, facial grimacing, and changes in pitch or loudness. Negative reaction or frustration may be noted. Avoidance behaviors such as reduced verbal output may also be present. These behaviors are not seen in speakers with typical disfluencies.
A family history of stuttering may be also an important differential.

Understanding the difference between typical disfluencies and stuttering helps clinicians make decisions about the coding scheme(s) they may want to apply during the transcription step of speech sampling. *Will the sample be analyzed only for fluency, or are there features of oral language that will add to the assessment outcomes?*

Fluency treatment programs focus on increasing fluent speech production and effective communication. A desired outcome is to help the speaker participate more fully in social, educational, civic, and/or professional activities. The achievement of optimal communication in naturalistic, everyday communication contexts, such as in conversation or narration, make speech sampling a preferred practice for fluency evaluation since it can assess everyday use of oral language as well as speech production in these contexts.

As mentioned previously, SALT's fluency coding scheme can be applied to any transcript from any sample of spoken language. A clinician may collect a typical conversational or narrative sample. Or a sample from a specific speaking context such as a telephone conversation, ordering at a restaurant, a debate, or a mock interview may best capture the speaker's difficulties with fluent speech production. It may be prudent to assess fluency in multiple linguistic contexts to determine the impact of each context on oral fluency. For example, a conversation, which taps into discourse and pragmatics, may yield different results than a narrative sample, where discourse is not interposed. Or, a conversational sample could be compared in analysis to a sample of oral reading where the opportunity to use alternate vocabulary is not present. The analysis results can be compared side-by-side using SALT's linking feature.

Recommended codes to mark disfluent speech production

SALT contains a default list of fluency codes which may be edited to suit your purposes. They include:

[FL] used to mark any unspecified type of disfluency
[FLR] used to mark repetitions
[FLP] used to mark prolongations
[FLB] used to mark silent blocks

Coding Unspecified Types of Disfluencies - [FL]

The insertion of the [FL] code can be used to highlight any type of disfluent production and will be tallied in analysis to provide the frequency of occurrence.

- [FL] used to mark disfluent *utterances*. Insert the code [FL] at the end of any utterance containing one or more disfluencies. The fluency report will count and display the coded utterances.
- [FL] used to mark disfluent *words*. Insert the [FL] code at the end of each disfluent word. When the [FL] code is attached to a word, with no space between the word and the code, the code indicates the presence of some type of disfluent behavior associated with that word. The fluency report will count and display the coded words with the option of also including the utterances.

Applying the code [FL] at the word or utterance level provides only the number of words or number of utterances in the sample that contained disfluencies. Using further defined codes will generate more specific results in analysis.

Coding the Type of Disfluency – [FLR], [FLP], [FLB]

The default set of codes for SALT's fluency analysis were developed to mark repetitions, prolongations, and silent blocks. These speech disfluencies occur at the sound, syllable, or whole-word level and are marked in the transcript using word codes, i.e., codes the disfluent words.

The *Edit menu: Insert Code* option brings up the dialogue box "Code Lists Used to Facilitate Inserting Codes in Transcript" (Figure 8-8).
The "Fluency Codes" option, available at the bottom left of the dialogue box, brings up the list of default fluency codes. The code list can be changed, or customized, and saved for future use if desired.

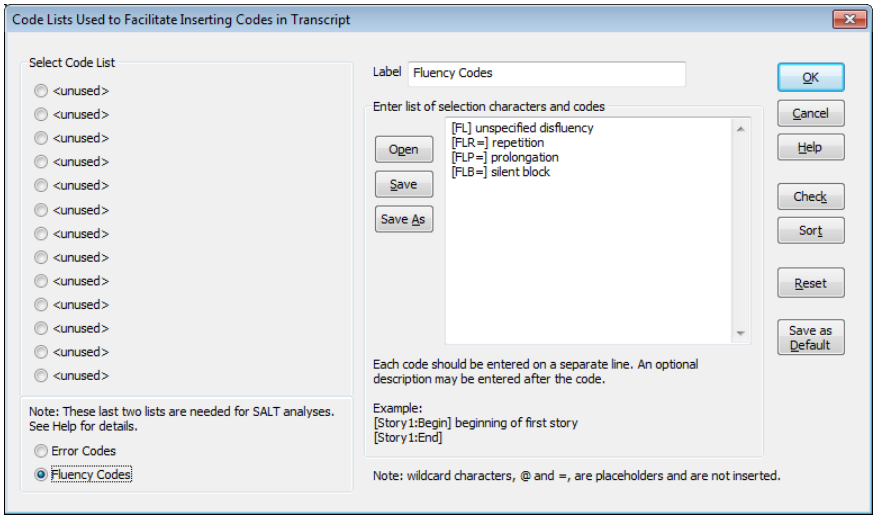


Figure 8-8

This code list can be used to facilitate coding. Once selected, the "Select code to be inserted" dialogue box is displayed (Figure 8-9).

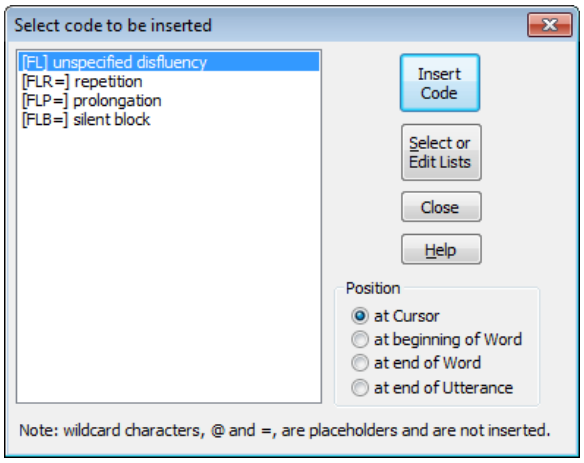


Figure 8-9

You are provided with options for the position of the fluency codes. The codes can be inserted at the point of the cursor in the transcript, at the beginning of a word, at the end of a word, or at the end of an utterance.

Basic Coding

Basic coding involves inserting one or more codes at the end of each disfluent word within the SALT transcript. This coding option is a fast method of tallying the number and types of disfluencies produced in the language sample.

Examples:

C *My**[FLR]** mom was really angry*.	Repeated some or all of the word
C *She like/3s banana/s**[FLP]**.*	Prolonged some part of the word
C *She is funny**[FLB]**.*	Silent block at the beginning or in middle of the word
C The boy woke**[FLR][FLP]** up.	Sound or whole word repetition followed by prolongation.

This *basic* level, inserting codes at the end of each word, does not distinguish the position of the disfluency within the word in analysis. Nor does this level of coding indicate the number of repetitions produced or the length of a prolongation or block.

The fluency report, using the *basic* level of coding, will count the total number of [FLR], [FLP], and [FLB] codes (and/or customized codes) that were inserted in the sample. Selecting the *Analyze menu: Fluency Codes and Behaviors* report (Figure 8-10), you specify the speaker, utterance base, and whether counts are given for disfluencies within and outside mazes. You have the option of displaying the coded words, or you can expand the report to additionally display the utterances containing the codes.

Should a more detailed description be of interest, these codes can be positioned and/or expanded to provide further information as described in the following sections.

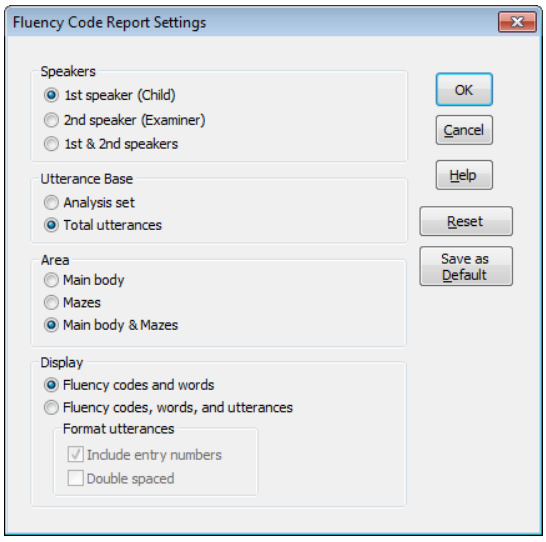


Figure 8-10

Indicating Position within the Word

Inserting fluency codes at the position of the disfluency provides additional documentation. The fluency report will count the codes and display the specific words with their positional codes.

- **Repetitions**: insert the code immediately before the repeated sound or syllable. If the entire word is repeated, insert the code at the end of the word. For example,

  *C She like/3s **[FLR]**banana/s.* Repeated the initial sound /b/ or syllable /ba/
  *C She like/3s ba**[FLR]**nana/s.* Repeated the medial sound /n/ or syllable /na/
  *C She is funny**[FLR]**.* Repeated the whole word

  Distinguishing between repeated sounds and syllables

  Notice, in the first two examples, that it may not be evident whether the positional code is marking a sound or a syllable. If you wish to distinguish between sounds and syllables for repetitions, expand the fluency codes by adding "Snd" for sound and "Syl" for syllable, i.e., [FLRSnd], [FLRSyl]. For example,

  *C She like/3s ba**[FLRSnd]**nana/s.* Repeated the sound /n/
  *C She like/3s ba**[FLRSyl]**nana/s.* Repeated the syllable /na/

- **Prolongations**: insert the code immediately before the prolonged sound or syllable. For example,

  *C She is **[FLP]**funny.* Prolonged the initial sound /f/
  *C She like/3s ba**[FLP]**nana/s.* Prolonged the sound /n/
  *C She like/3s ban**[FLP]**ana/s.* Prolonged the sound /a/

*C She like/3s banana/**[FLP]**s.* Prolonged the final sound /s/

- **Silent blocks**: insert the code at the position of the block. For example,

*C She is **[FLB]**funny.* Silent block at beginning of sound/word
*C She is fun**[FLB]**ny.* Silent block in middle of the word, between the syllables

Adding Number of Repetitions

When coding repetitions, you may want to indicate the number of repetitions. To do this, expand the repetition code by adding a colon followed by a number representing the number of extra repetitions. For example,

*C The **[FLR:4]**boy is chase/ing the dog.* Repeated the initial sound /b/ four extra times
*C The boy**[FLR:2]** is chase/ing the dog.* Repeated the word "boy" two extra times
*C She like/3s ba**[FLR:4]**nana/s.* Repeated the sound /n/ or the second syllable /na/ four extra times

Note, in this last example, that you could differentiate between sounds and syllables by adding "Snd" for sound and "Syl" for syllable, i.e., [FLRSnd:4], [FLRSyl:4].

Adding Length of Prolongations and Blocks

When coding prolongations and silent blocks, you may want to indicate their duration. Note that the duration may be measured in a variety of ways, e.g., seconds, milliseconds, numeric scale. The duration doesn't have to be numeric. You may want to use a scale such as L=long, M=medium, and S=short. If you choose to include duration, just be consistent in how you measure it within and across your data sets. In the examples which follow, duration of prolongation is measured in number of seconds.

*C There are **[FLP:04]**many people.* Initial sound/syllable was prolonged for 4 seconds
*C The kangar**[FLP:05]**oo was funny.* Final sound was prolonged for 5 seconds
*C He like/3s **[FLB:03]**banana/s.* 3-second silent block at beginning of word

Coding Concomitant Behaviors

Concomitant behaviors are secondary, or accessory, behaviors that can accompany disfluency in speech production. They vary from person to person. These characteristics are best rated at the time of elicitation, directly after, or from a video recording of the speech-language sample. Rather than code concomitant behaviors in the transcript at the point(s) where they occur, these behaviors are marked using plus lines inserted at the end of the transcript. The suggested coding is divided into the following five categories:

- **Vocal quality** such as pitch rise, vocal tic, change in volume (louder/softer), change in rate (faster/slower)
- **Grimace (*facial*)** such as jaw jerk, tongue protrusion, lip press, squinting, tremor of lips or face
- **Eye movement** such as avert eye gaze, close eyes, blink eyes
- **Distracting sound** such as fast or shallow breathing, sigh, whistle, blow (*air*), click, laugh, clear throat
- **Movement of extremities** such as arm movement, hand movement, hands around face, finger movement, shrug shoulders, clap, nod, shake, jerk

Select *Edit menu: Insert Fluency Template* to insert the following plus lines used to rate these five concomitant behavior categories:

+ Vocal Quality:
+ Grimace:

+ Eye Movement:
+ Distracting Sound:
+ Movement of Extremities:

Each category is rated on a 0-3 scale as follows:

0 = does not occur
1 = LOW frequency of occurrence
2 = MEDIUM frequency of occurrence
3 = HIGH frequency of occurrence

Example of using SALT to code disfluencies

Figure 8-11 contains an excerpt from a SALT transcript showing the *basic* level of coding for disfluency as well as the rating of concomitant behaviors. The child in this sample is retelling the story *Frog, Where Are You?* (Mayer, 1969). The [FLR], [FLP], and [FLB] codes were inserted at the end of words. , indicating type of disfluency but not position within the word, number of repetitions, or length of prolongations and blocks. The concomitant, or secondary, behaviors were assessed on a scale of 0-3 and the rating values inserted on plus lines at the end of the transcript.

The *Analyze menu: Fluency Codes and Behaviors* report (Figure 8-12) produces a list of the disfluent words. The child repeated words 16 times and prolonged words 18 times. No silent blocks were coded. At the bottom of the report are the severity rating scores applied to concomitant behaviors.

```
$ Child
+ Context: Nar
+ Subgroup: FWAY
+ [FLR]: repetition
+ [FLP]: prolongation
+ [FLB]: silent block
+ [EW:] error at the word level

C Once there[FLR] was a boy  that[FLR][EW:who] had a frog.
C He like/ed it very much[FLP].
C And the dog did[FLR] too.
C (Um) one night when the[FLP] boy and the dog were sleep/ing the[FLP] frog crept out : 02 of the (um)
container.
C Then (w*) right when[FLP] the boy and dog woke[FLR][FLP] up, (he was) he was miss/ing.
C He look/ed everywhere (from hi*) from his boot/s (to hi* his) to inside the bowl[EW:jar].
C And then[FLR] he call/ed out his name from[FLP] the window[FLP].
C Then his dog jump/ed out the[FLP] window[FLP].
C Still the container (was[FLR] in his) was on his head.
C And the[FLR] boy got up with his boot/s and got him.
C He went[FLP] look/ing for him.
C They[FLR] went into the woods[FLR][FLP].
; :02
C He found[FLP] a hole.
C And the dog found[FLP] a[FLR] beehive.
C And then a[FLR] gopher came[FLR] out of the hole.
C (And the[FLP]) and the[FLP] bee/s start/ed chasing[FLR] the dog[FLR].
C Then the gopher was[FLP] stare/ing at the[FLR] boy while[FLP] he was climb/ing up the tree[FLR] branch and
look/ing[FLP] through a hole.
.........
= Concomitant Behaviors
+ Vocal Quality: 0
+ Grimace: 0
+ Eye Movement: 3
+ Distracting Sound: 0
+ Movement of Extremities: 2
```

Figure 8-11

Fluency sample for book
Analysis Set: C&I Verbal Utts

FLUENCY CODES
Total Utterances - Main body & Mazes
1st Speaker

	Child	
	Total	**Expanded**
Word-level Fluency Codes		
[FLR=]	16	
A[FLR]		2
CAME[FLR]		1
CHASING[FLR]		1
DID[FLR]		1
DOG[FLR]		1
THAT[FLR][EW:WHO]		1
THE[FLR]		2
THEN[FLR]		1
THERE[FLR]		1
THEY[FLR]		1
TREE[FLR]		1
WAS[FLR]		1
WOKE[FLR][FLP]		1
WOODS[FLR][FLP]		1
[FLP=]	18	
FOUND[FLP]		2
FROM[FLP]		1
LOOK/ING[FLP]		1
MUCH[FLP]		1
THE[FLP]		5
WAS[FLP]		1
WENT[FLP]		1
WHEN[FLP]		1
WHILE[FLP]		1
WINDOW[FLP]		2
WOKE[FLR][FLP]		1
WOODS[FLR][FLP]		1
Utterance-level Fluency Codes		
CONCOMITANT BEHAVIORS		
Vocal Quality	0	
Grimace	0	
Eye Movement	3	
Distracting Sound	0	
Movement of Extremities	2	

Figure 8-12

Benefits of Coding Disfluencies

There are numerous benefits of coding disfluencies in samples of everyday communication. The analyses are taken from the very behavior we are addressing, frequent social or text-based communication contexts. Taken together, verbal fluency and language analyses provide a powerful tool to document speech and language performance individually and how they interact for the target speaker. These tools provide the information necessary to pinpoint specific deficits which can guide the clinician in developing and implementing effective intervention programs.

Other Applications of SALT

Over the years, SALT Services has provided consultation and transcription services for projects covering a wide array of assessment aims. These projects have shed light on just how flexible and valuable coding language samples is to the processes of diagnostics, measuring gains or changes in performance, and discovering outcomes that may not have been expected. Below are just a few of these projects.

- Building local norms
  - SALT has been used by researchers and school districts to build reference databases of local norms from samples they collected.
- Language from AAC devices
  - Alzheimer's and Primary Progressive Aphasia: Speakers used spoken language augmented with low tech AAC (communication boards). Both spoken language and use of AAC were captured in transcription, providing data to assess the speaker's combined productive language.
  - The output of AAC devices was transcribed to assess the speaker's vocabulary and discourse.
  - AAC and the conversational partner: The output of the AAC devices was transcribed along with the spoken responses of the conversation partners to assess the quantity and quality of partner responses to generated speech.
- Language from LENA™ recordings (LENA™ Research Foundation, 2015)
  - A number of projects have been undertaken to evaluate the quality of the language spoken in the home or classroom setting in addition to the quantity of spoken language that LENA recordings provide.
- Language of speakers with hearing impairment
  - Language samples of children with hearing loss were analyzed to track the amount of code switching between spoken and signed language.
  - Language samples were collected over time to track the spoken performance of children with cochlear implants.
- Classroom intervention projects
  - Teacher language was recorded and transcribed to assess pre and post instruction when teaching language/reading.
  - Classroom language was analyzed to assess student performance pre and post direct vocabulary instruction and post shared story intervention.
- Legal studies research
  - The Netflix 2015 documentary "Making A Murderer" raised questions about the possibility that the defendants were victims of law enforcement malfeasance. The language of a juvenile defendant and two of the investigating detectives was transcribed and analyzed using SALT.
- Adult assessment of pragmatics
  - Mock job interviews of college students were custom coded for specific pragmatic features.
  - Pre and post intervention was assessed for increased use of positive words and phrases.
- Interviews
  - Research interviews were transcribed and coded to quantify responses to specific questions.
  - Interview task: transcripts were coded for various pragmatic skills of adolescent children with Autism Spectrum Disorder (ASD)
- Customer support calls
  - Support calls from a large business were recorded, transcribed, and analyzed to track the types of calls and the quality of the responses.
- Gorilla sign language
  - SALT was used to track the vocabulary of a sign-language speaking gorilla.

SALT's flexible transcription and coding options make it a great tool for analyzing any type of language sample for multiple purposes.

Please visit the SALT website for a full list of books, chapters, articles, and presentations with emphasis on the use of language sample analysis.
(https://www.saltsoftware.com/resources/publications

CHAPTER

9

Pulling it all Together: Examples from our Case Study Files

Marleen Westerveld
Anne van Bysterveldt
Joyelle DiVall-Rayan
Jon F. Miller

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.

[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

<u>Database Menu: Standard Measures Report</u> (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.

<u>Analyze Menu: Word Code Tables</u> (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 instance of a verb tense error.

Daniel Nar AGL
Analysis Set: C&I Verbal Utts

WORD CODE TABLE
Table Expanded By Words And Codes
C&I Verbal Utts - Main Body
1st Speaker

	Child			Examiner
	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		

Figure 9-2

Daniel Nar AGL

TRANSCRIPT INFORMATION	DATABASE INFORMATION
Speaker: Daniel (Child)	Database: NZ-AU Story Retell
Sample Date:	110 Samples Matched By Age
Current Age: 5;10	97 Samples Cut at 45 Number Total Words
Context: Narration (AGL)	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	DATABASE INFORMATION
Speaker: Daniel (Child)	Database: NZ-AU Personal Narrative
Sample Date:	129 Samples Matched By Age
Current Age: 5;10	119 Samples Cut at 178 Number Total Words
Context: Narration (NZPN)	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)

[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.

[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)

<u>Database Menu: Quick Look</u> (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.

QUICK LOOK Compared to 82 Samples Matched by Age			
LANGUAGE MEASURE	**Strength**	**WNL**	**Weakness**
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)

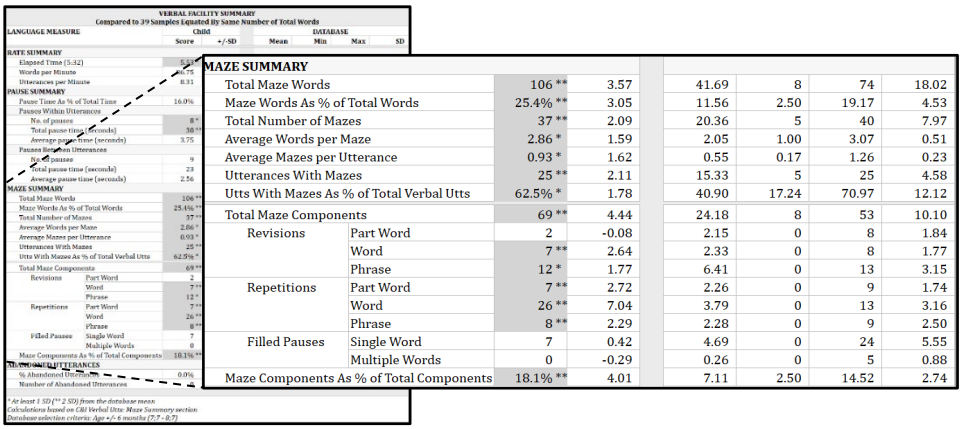
The Subordination Index (SI) is a relatively fast way to document the use of complex syntax (see Appendix O). This is an important measure from Carter's sample to confirm the SLP's observation of infrequent use of complex syntax and the frequent mazes which may be associated with utterance formulation 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.

SUBORDINATION INDEX Calculations Based on C&I Verbal Utts Compared to 39 Samples Equated By Same Number of Total Words						
LANGUAGE MEASURE	**Child**		**DATABASE**			
	Score	**+/-SD**	**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
** 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)

[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	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)

Database Menu: Subordination Index (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)

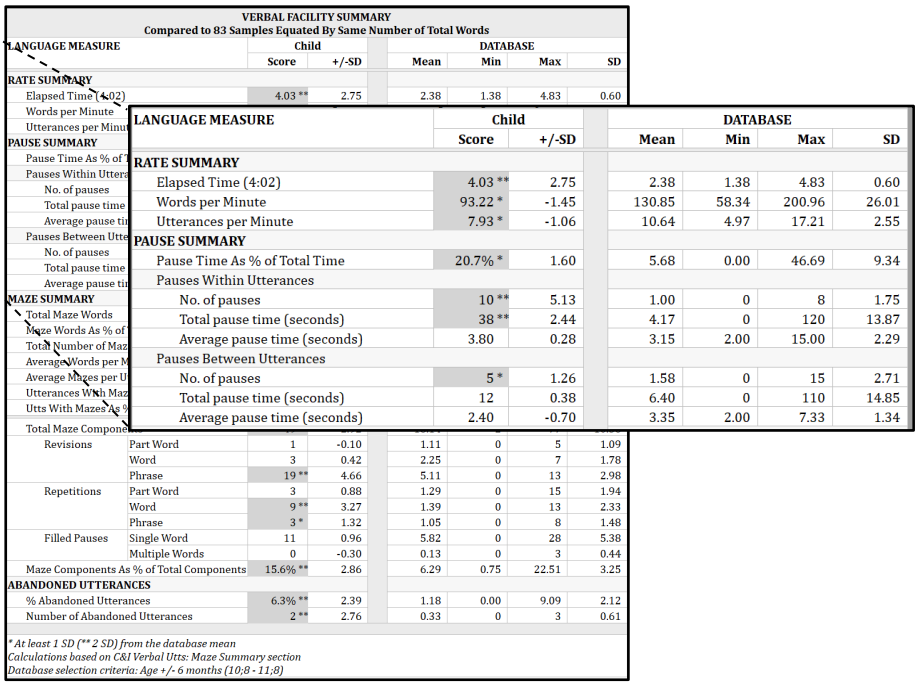
Figure 9-26 (*SI* based on the first 265 words)

Database Menu: Verbal Facility Summary

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.



VERBAL FACILITY SUMMARY
Compared to 83 Samples Equated By Same Number of Total Words

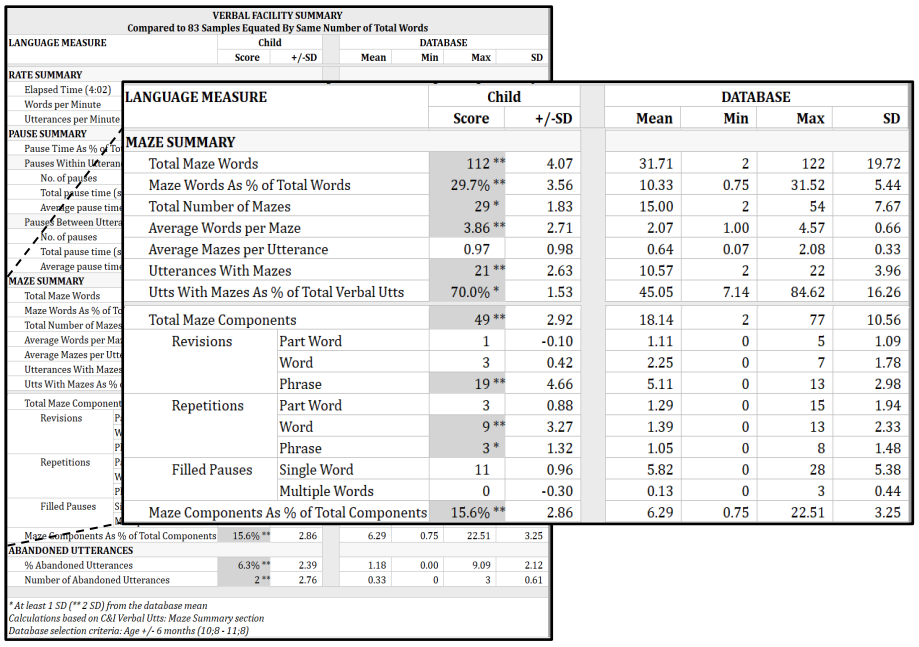
LANGUAGE MEASURE		Child		DATABASE			
		Score	+/-SD	Mean	Min	Max	SD
RATE SUMMARY							
Elapsed Time (4:02)		4.03 **	2.75	2.38	1.38	4.83	0.60
Words per Minute		93.22 *	-1.45	130.85	58.34	200.96	26.01
Utterances per Minute		7.93 *	-1.06	10.64	4.97	17.21	2.55
PAUSE SUMMARY							
Pause Time As % of Total 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
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
ABANDONED UTTERANCES							
% Abandoned Utterances		6.3% **	2.39	1.18	0.00	9.09	2.12
Number of Abandoned Utterances		2 **	2.76	0.33	0	3	0.61

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

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.



VERBAL FACILITY SUMMARY
Compared to 83 Samples Equated By Same Number of Total Words

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

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

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

Analyze Menu: Abandoned Utterances (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.

[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	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)

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

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

[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

<u>Analyze Menu: Standard Measures Report</u> (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
	Word	7	7		1	1
	Phrase	11	11		0	0
Repetitions	Part Word	2	4		0	0
	Word	1	1		0	0
	Phrase	3	3		0	0
Filled Pauses	Single Word	23	24		0	0
	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

<u>Explore Menu: Utterances Coded as [SI-3]</u> (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

Case Study 7: SAM
Response to Intervention

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.

[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

Database Menu: Standard Measures Report (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 Score	Pre RtI +/-SD	Post RtI Score	Post RtI +/-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

AFTERWORD

So what's next?

Go out and collect a language sample, transcribe it, generate the analyses, and interpret the results. This book provided the fundamentals, focusing on the importance of using LSA to assess productive language. It covered the various elicitation contexts, emphasized the importance of accurate transcription, and described the reference databases available for comparison. A lot of attention was given to understanding the analysis options and interpreting the results. Little time, however, was spent on "how to"; how to elicit and record a language sample, how to play it back during the transcription phase, how to type it into the SALT editor, how to learn the transcription conventions, and how to generate the analyses.

So where can you go for help?

You have several options, depending on your style of learning. *Do you like to jump right in, only seeking help when you get stuck? Or do you prefer to complete all available training so you know as much as possible before starting?* No matter what your style, it's important for you to know about the resources available to you.

- Appendices in the back of this book. Find detailed descriptions of all the SALT reference databases including the protocols used for elicitation in Appendices A-L. Appendix M contains a convenient summary of the transcription conventions and Appendix N details the rules for segmenting utterances into C-units. Guidelines for applying the Subordination Index (SI), Narrative Scoring Scheme (NSS), Expository Scoring Scheme (ESS), Persuasion Scoring Scheme (PSS), and Oral Narrative Quality (ONQ) are provided in Appendices P-S. Appendix T provides a guide to the SALT variables. Appendix U provides an explanation of standard deviation and how it relates to language measures.

- SALT web site (www.saltsoftware.com). Select "Training" for a variety of courses covering all the components of LSA using SALT. These courses are available for free. Listen to lectures, watch elicitation videos, learn and practice the transcription conventions, watch videos demonstrating how to use the software, and view case studies. Earn ASHA professional development hours while you learn. The material on the Web site is continually being improved and expanded so visit often. Also under "Training" you'll find a link to SALT's YouTube videos where you'll find quick tips on all things LSA and SALT as well as more comprehensive video lectures.

- Help built into the SALT software. The context help, accessed by pressing the F1 function key, is particularly useful because the help it provides is specific to where you are in the software. If you are typing your sample into the SALT editor window, F1 brings up a list of all the transcription conventions with detailed explanations and examples. If you are viewing a report, F1 describes the variables included in that report. In addition, every dialogue box contains a help button and the Help menu lets you search for topics using keywords.

- Normative Graphs. Accessed from the SALT Help menu, these graphs, derived from the SALT reference databases, show age and grade values for a variety of language measures. They are available in PDF format.

- Resources. Accessed from the SALT Help menu, these documents are in PDF format and provide detailed descriptions of the transcription conventions, including those for Spanish, French, and written samples. There are scoring guides, and a series of directed exercises to guide you through the mechanics of using the software.

So what are you waiting for?

One option is to go and record a language sample from anyone, child or adult, using one of the sampling protocols discussed in Chapter 2 and detailed in the appendices. Then open the SALT editor and begin transcribing the sample. This approach is for those who prefer to learn on the fly, by transcribing a sample. And this approach may work well because of the context help offered by the software. If you are typing an utterance containing a revision, for example, just press F1 and read about marking mazes. Soon you will remember that mazes are enclosed in parentheses. As you work through the transcript, you will master the frequently occurring conventions and know where to find help for the others.

An alternative learning method offers more support for learning the basics of the software. Go to the SALT web site and watch one or two elicitation videos. Read about digital recorders. Familiarize yourself with the elicitation protocols and go out and record a language sample. Then go back to the SALT web site and work through the courses on transcription conventions. At the completion, you will be a trained transcriber. Or you may prefer to do the first two or three transcription lessons to learn the basics. Then transcribe your sample, accessing the context help built into the software and returning to the web site as needed. Refer to the *Help menu → Resources* for directed exercises on using SALT to correct errors you may have made during transcription and to generate the reports. These lessons are designed to take you through all of the SALT features in a step-by-step format.

These learning options are available to help you get the most out of SALT so you can incorporate language sample analysis into your practice as efficiently as possible.

GUIDE TO THE APPENDICES

SALT Reference Databases of English-fluent Speakers

Database	Context (Subgroup)	Age Range	YOS	# Samples	Location	SI, NSS, ESS, PSS, D, ONQ	Appendix
NZ-AU Conversation	Con	4;5 – 7;7 5;5 – 8;4	-- 1,2,3	248 102	New Zealand Australia		**A**
NZ-AU Story Retell	Nar (AGL) Nar (AGL) Nar (BUS)	4;0 – 7;7 5;5 – 7;7 5;3 – 8;9	-- 1,2 1,2,3	264 85 127	New Zealand Australia Australia	ONQ	**B**
NZ-AU Personal Narrative	Nar (NZPN)	4;5 – 7;7 5;5 – 8;4	-- 1,2,3	228 127	New Zealand Australia	D	**C**
NZ-AU Expository	Expo	6;1 – 7;11 7;4 – 8;4	-- 3	65 42	New Zealand Australia		**D**
AU-USA Persuasion	Pers	12;10 – 18;4 14;8 – 18;9	---- 9-12	66 113	Australia WI	SI, PSS	**E**
Play	Con (Play)	2;8 – 5;8	P, K	69	WI	SI	**F**
Conversation	Con	2;9 – 13;3	P, K, 1, 2, 3, 5, 7	584	WI & CA	SI	**G**
Narrative NSS	Nar (NSS)	5;2 – 13;3	K, 1, 2, 3, 5, 7	330	WI	SI	**H**
Narrative Story Retell	Nar (FWAY) Nar (PGHW) Nar (APNF) Nar (DDS)	4;4 – 7;5 7;0 – 8;11 7;11 – 9;11 9;3 – 12;8	P, K, 1 2 3 4, 5, 6	145 101 53 201	WI & CA	SI, NSS	**I**
Expository	Expo	10;7 – 15;9	5, 6, 7, 9	242	WI	SI, ESS	**J**
ENNI	Nar (ENNI)	3;11 – 10;0		377	Canada		**K**
TNL2 & TNL Narrative Samples Databases	Nar (TNL2) Nar (TNL)	4;0 – 14;11 5;0 – 11;11		778 500	USA		**L**

Summary Guides

Topic	Appendix
Summary of SALT Transcription Conventions	**M**
C-Unit Segmentation Rules	**N**
Subordination Index (SI)	**O**
Narrative Scoring Scheme (NSS)	**P**
Expository Scoring Scheme (ESS)	**Q**
Persuasion Scoring Scheme (PSS)	**R**
Oral Narrative Quality (ONQ)	**S**
Guide to the SALT Variables	**T**
Understanding SALT Measures: Standard Deviation	**U**

APPENDIX

A

NZ-AU Conversation Database

Database	Context (Subgroup)	Age Range	# Samples	Location
NZ-AU Conversation	Con	NZ: 4;5 - 7;7 AU: 5;5 - 8;4	NZ: 248 AU: 102	New Zealand Australia

New Zealand Participants

This database contains language samples collected from New Zealand children aged 4;5 - 7;7. The language samples were collected from the participants in a conversational context. The children were randomly selected from schools in Auckland, Hamilton, Christchurch (major urban areas in New Zealand) as well as secondary urban areas surrounding Christchurch. Approximately 80% of the participants were from the Auckland/Hamilton region to reflect New Zealand's population density in these areas. Children with diagnosed disabilities were excluded from the sample. The schools reflected a range of socio-economic areas and English was the first language of all children included in the database. There was an even gender distribution. The ethnicity of the group comprised of the following: New Zealand European: 62%, Maori: 22%, Pasifika 5%, Asian 3%, and Other 8%.

The Group Special Education speech-language therapists involved in the project were trained by one of the researchers on the assessment procedures and language sampling protocol. Each child was seen individually in the child's school setting and was administered a New Zealand speech and language screening test and reading or letter knowledge test to gain information regarding the child's general language development. Any child who performed very poorly on the receptive language screening task (i.e., could not follow basic instructions) was excluded from the database. Children's language samples were also excluded from the database for reasons such as poor taping quality and not engaging in the task (i.e., not willing to talk). Only samples that contained over 45 complete and intelligible utterances were included.

This database was created with two options. A language sample taken from a child can be compared against this population distribution as a whole or against a database including Maori children only.

Australian Participants

Children, aged 5;5 - 8;4, were randomly selected from the first three years of primary school, grade 0 (Prep or Foundation Year), grade 1, and grade 2, across Queensland (regional: 55; City: 72), representing the full range of socio-economic areas (1 – 10).

Ethics approval for this project was granted by the University Human Ethics Committee (PES/31/12/HREC). Approval was also granted by the Department of Education and Training, Queensland Government (550/27/1258). Of the schools who agreed to participate, teachers were asked to identify children who 1) attended Foundation Year (known as Prep; YOS1), Year 1 (YOS2), or Year 2; YOS 3); 2) spoke English as their first language; 3) were progressing normally at school; and 4)

had no history of speech and/or language impairments. Consent forms were sent home to these children via the teachers. From the children for whom consent to participate was obtained, participants were randomly selected, making sure there was an equal distribution of girls and boys, and an equal number of participants across the three grades. Conversational language samples were elicited from 102 children, from grade 0 (n = 37), grade 1 (n = 32), and grade 2 (n = 33). There was an even gender distribution. These children were from the following ethnic backgrounds, as indicated by their parents on the project consent forms:

Australian (85.5%)
Aboriginal and Torres Strait Islander (3.9%)
Pacific Island (.8%)
Other (3.1%)
Non-specified (6.3%)

A total of 21 speech pathologists assisted with the data collection. These therapists received a manual, observed a demonstration video, and attended a one-hour teleconference. Each child was seen individually in the child's school setting and was administered a range of oral language tasks. Children's language samples were excluded from the database if they contained less than 40 complete and intelligible utterances. For this reason 24 transcripts were discarded (see Westerveld & Vidler, 2015). As reported in Westerveld and Vidler, samples of less than 5 minutes' duration were 1.8 times more likely to contain fewer than 50 utterances.

Elicitation Protocol

Materials

- quiet location, free of distractions, with a table and two chairs
- the child is asked to bring an object from the classroom/home to talk about
- stopwatch or other timing device

Preparation

If this is the first time you meet the child, it is recommended you use a warm-up activity (for 2-5 mins). For example, show the child the book "*Where's Wally?"* (Handford, 1987) and tell the child "*I brought a book to show you*". Point to pictures in the book and comment on some funny aspects, with the sole purpose of putting the child at ease.

Directions

The protocol was adapted from interview procedures described by Evans and Craig (1992). The conversation protocol aims to elicit 50 complete and intelligible utterances from the child in 10 minutes of conversation. In the New Zealand database more than 90% of the children assessed produced at least 50 clear and intelligible utterances in 10 minutes of conversation. The use of a stopwatch or other timing device is recommended.

The examiner first encourages the child to talk about the object he/she has brought. The child is then asked to talk about his or her family, school, and after-school activities. To establish and maintain a productive communicative interaction, please follow the recommendations as provided in Chapter 2 (suggestions for eliciting the best language sample). These include listening and following the child's lead, maintaining the child's pace, using open-ended prompts, avoiding leading questions, and adding new information when appropriate. You may want to respond to the child with rewording the child's comments or by stating "*that's interesting, tell me some more about that.*"

Start with the first question and introduce the remaining questions when appropriate.

- *"What did you bring to show me?"* **Object** _____ "Can you tell me about it?"
- "Tell me about the sorts of things you do in the classroom".
- *"What* do you like to do when *you're not in school?"*
- *"Do* you have any brothers or sisters?"

Transcription Notes

The utterances were segmented into communication units (C-units). A C-unit includes an independent clause with its modifiers (Loban, 1976). Yes/no responses or elliptical responses are also considered C-units. The following error codes were inserted in the transcripts: [EW:word] to mark word-level errors and [EU] to mark utterance-level errors. All transcripts were timed and pauses of two or more seconds in length were marked.

The New Zealand databases are a result of the collaboration between Gail Gillon and Marleen Westerveld from the Department of Communication Disorders, University of Canterbury and Jon Miller and Ann Nockerts from SALT Software, LLC. Speech-language therapists from Group Special Education in Auckland, Hamilton, Christchurch and Canterbury districts in New Zealand were involved in the collection of the language samples. The New Zealand Ministry of Education allowed the participation of Special Education speech-language therapists in the project. Financial assistance for the project was provided by the University of Canterbury, The Don Bevan Travel Scholarship, and the New Zealand Speech-Language Therapists' Association.

The Australian databases are the result of a collaboration between Dr. Marleen Westerveld from Griffith University, and Kath Vidler from the Department of Education, Training, and Employment. Speech pathologists employed by the Department of Education, Training, and Employment across the State of Queensland were involved in the collection of the language samples. Financial assistance for the project was provided through a Griffith University Emerging Researcher Grant and by SALT Software LLC.

APPENDIX

B

NZ-AU Story Retell Database

Database	Context (Subgroup)	Age Range	# Samples	Location
NZ-AU Story Retell	Nar (AGL)	4;0 – 7;7	264	New Zealand
	Nar (AGL)	5;5 – 7;7	85	Australia
	Nar (BUS)	5;3 – 8;9	127	Australia

New Zealand Participants

This database contains spoken language samples collected from New Zealand children aged 4;0 - 7;7. The language samples were collected from the participants in a story retelling context using a storybook format and vocabulary that is familiar to children in New Zealand.

The initial data were collected in 2000/2001 from 4;6 to 7;7 year-old children who had been randomly selected from kindergartens and schools in Auckland, Hamilton, Christchurch (major urban areas in New Zealand) as well as secondary urban areas surrounding Christchurch. Approximately 80% of the participants were from the Auckland/Hamilton region to reflect New Zealand's population density in these areas. Children with diagnosed disabilities were excluded from the sample. The schools reflected a range of socio-economic areas and English was the first language of all children included in the database. There was an even gender distribution. The ethnicity of the group comprised of the following: New Zealand European: 62%, Maori: 22%, Pasifika 5%, Asian 3%, and Other 8%.

A second set of data was collected in November 2009 from 76 children aged 4;0 to 4;11. All children attended their local kindergarten in Christchurch, New Zealand. The kindergartens reflected a range of socio-economic areas and English was the first language of all children. There were 58% girls and 42% boys. Ethnic make-up of the group was as follows: NZ European 89%, Maori 8%, Pasifika 1.5%, and Other 1.5%.

The therapists and educators involved in the project were trained by one of the researchers on the assessment procedures and language sampling protocol. Each child was seen individually in the child's pre/school setting. Children's language samples were excluded from the database for reasons such as poor taping quality, not engaging in the task (i.e., unwilling to retell the story), or not being able to retell the story without using the pictures in the book as visual prompts.

This database was created with two options. A language sample taken from a child can be compared against this population distribution as a whole or against a database including Maori children only.

Australian Participants

Two sets of samples were collected in Australia in 2012. The first set was based on the story "Ana Gets Lost". These samples were collected from 85 children (ages 5;5 to 7;7) attending the first two years of primary school: Grade 0 (Prep or Foundation) and Grade 1 across Queensland, representing

the full range of socio-economic areas (1 – 10). There were 44 (52%) girls and 41 (49%) boys. All children spoke English as their first language and were progressing normally at school as indicated by their teachers. Ethnic make-up of the group was as follows: Australian 80%, Aboriginal and Torres Strait Islander 4.7%, European 3.5%, Unspecified 10.6%, Other 1.2%.

The second set of samples collected in Australia was based on the Bus story (Renfrew, 1995). This database contains language samples collected from Australian children attending the first three years of primary school: Grade 0 (Prep or Foundation Year), Grade 1, and Grade 2 across Queensland (regional: 55; City: 72), representing the full range of socio-economic areas (1 – 10). The language samples were collected from the participants in a narrative context, using the story retelling task "The Bus Story" (Renfrew, 1995).

Ethics approval for this project was granted by the University Human Ethics Committee (PES/31/12/HREC). Approval was also granted by the Department of Education and Training, Queensland Government (550/27/1258). Of the schools who agreed to participate, teachers were asked to identify children who 1) were in their first three years of primary schooling; 2) spoke English as their first language; 3) were progressing normally at school; and 4) had no history of speech and/or language impairments. Consent forms were sent home to these children via the teachers. From the children for whom consent to participate was obtained, participants were randomly selected, making sure there was an equal distribution of girls and boys, and an equal number of participants across the three grades. A total of 127 children participated in this study, from Grade 0 (n = 44), Grade 1 (41), and Grade 2 (n = 42). These children were from the following ethnic backgrounds, as indicated by their parents on the project consent forms: Australian (85.5%), Aboriginal and Torres Strait Islander (3.9%), Pacific Island (.8%), Other (3.1%), and Non-specified (6.3%).

Elicitation Procedures – Subgroup AGL

The child was asked to listen twice to an English audio-recording of the story *Ana gets Lost* ("Ko au na galo"; Swan, E., 1992), while looking at pictures in the story book. The story script is included at the end of this appendix. The story is about a Pacific Islands girl who gets lost in the city while looking for her mum and dad. It is a 10-page 'reader' (of the type typically used in New Zealand Year 1 and 2 classrooms) with coloured pictures and Tokelauan text. The story was selected for several reasons: The story has not been published in English, which minimised the chances of children being familiar with the book. Presenting text in an unknown language also prevented the children from reading the text while they heard the story and thus removed any reading advantage. Having a text written in another language also provided a convincing reason for listening carefully to the tape recording of the English version of the text. Further, children from different cultures living in New Zealand were expected to be familiar with the story content and vocabulary translation, such as 'policeman', 'beach', and 'dairy'. The original translation of "Ko au na galo" was adapted to add a little further length and complexity to the story. For a copy of the protocol and to access the elicitation materials, please visit www.marleenwesterveld.com

Directions

1. Introduce the task: "*I brought a book to show you. I have it on my computer. We can't read this story as it is written in another language, but I have the story on tape, in English. Let's listen to the story. I will ask you some questions about the story afterwards*".
2. Immediately after the first exposure to the story, the child is asked eight comprehension questions. The responses to the questions should be recorded and scored. If the child's answer is unclear, ask for clarification/elaboration, e.g., "*Why?"* or "*Can you tell me a bit more?".* To reduce the influence of story comprehension on the child's retelling performance, provide the

child with the correct answer before proceeding to the next question if the child does not respond or if the answer is clearly incorrect. Specific scoring guidelines (including correct answers and allowable prompts) can be found at the end of this appendix.

Questions	Correct?	NR ?	Child's answer
Who is the story about?			
Why did Ana have to stay at home?			
Why did Ana get bored?			
Where did Ana go to find her parents?			
Why did Ana get scared?			
Who found Ana?			
What did the policeman do?			
Why were Ana's parents happy to see her?			
TOTAL CORRECT	/8		

Note: NR = No Response

3. Introduce a different activity (of approx.. 10 min duration). For example the personal narrative section can be administered.
4. Listen to the story a second time: *"Let's listen to the story a second time. Afterwards we will put a new tape in the recorder and then I would like you to tell the story, so that other children can listen to it later".*
5. *"OK, now it's your turn to tell the story. Let's start at the beginning".*

   If the child does not start telling the story spontaneously, the following prompts can be used:
   - *"What was the story about?"*
   - *"What happened in the beginning?"*
   - *"Just use your own words".*
   - *"Just tell me what you remember".*

   The following prompts are used to encourage the child to continue telling the story:
   - *"And then?"*
   - *"Anything else you can remember?"*
   - Repeat the child's utterance*, followed by "and then?"*
6. If the child is unsuccessful at retelling the story and/or uses less than 5 consecutive utterances spontaneously, you may ask the child to tell the story while looking at the pictures. Please note that this transcript cannot be compared to the NZ Story Retell database, as the presence of pictures will affect children's language output.

Ana Gets Lost - Story Script

One Saturday morning, Ana's mum and dad went fishing on the beach. Ana had been sick all week, so she had to stay at home with her big brother, Tom. She asked Tom if he wanted to play with her. "No thanks", he said, "I want to read a Sports Magazine."

Ana got bored. So when Tom fell asleep, she decided to go looking for her mum and dad. She quietly opened the front door and went outside.
Ana walked towards the beach, but she got lost. She kept walking until it got dark. Ana got very scared and she started to cry. She stopped outside a dairy.
She was still crying and didn't know what to do. Then Ana felt a pat on her shoulder. She looked around and saw a policeman. Hello, he said, are you Ana? Yes, said Ana, giving him a big smile.
The policeman took Ana home in the police car. Mum and Dad were very happy to see Ana. They thanked the policeman for finding Ana, and bringing her home safely. The policeman told Ana not to get lost again. Then he smiled and drove away.

Elicitation Procedures – Subgroup BUS

The Bus Story (Renfrew, 1995) was administered using the standard elicitation guidelines as reported in the manual. In this task, the examiner reads the story, while the child follows along with the pictures in a wordless book (four pages containing three pictures each). After listening to the story, the child is asked “Now you tell me the story. Once upon a time, there was a ...?” (p. 5). Following the administration guidelines, only minimal or indirect prompts should be given, when needed. For example “and then?” or “so...?”.

The model story contains: 15 utterances (UTT), MLU: 12.4, number of different words (NDW): 102, and clausal density (CD; total number of clauses divided by the number of utterances): 1.6**.** Refer to Westerveld and Vidler (2015) for more information.

Transcription Notes – Bus and AGL

The utterances were segmented into communication units (C-units). A C-unit includes an independent clause with its modifiers (Loban, 1976). All transcripts were timed and pauses, within and between utterances, of two or more seconds in length, were marked. Age and gender information is included for all participants.

All New Zealand samples contained the following plus lines:
+ Context: Nar
+ Subgroup: AGL
+ Ethnicity: Maori (only included for Maori subset)

All Australian samples contained the following plus lines:
+ Context: Nar
+ Subgroup: AGL or BUS

Transcription Notes – Subgroup Bus

All BUS story retelling samples were hand-coded for Information (+ info) and Grammar (+A5LS), as outlined in the manual (Renfrew, 1995). In summary:

Bus Story Information score: Points were awarded when the child included the right information (e.g. the bus ran away ; they made funny faces at each other), using the correct referent (e.g., bus , man ,

train) so there was no ambiguity (i.e. when there is a change of actor , such as the train, bus, man). In addition, the information needed to be mentioned in the right order.

Bus Story (sentence) Length score: A5LS: the average number of words in the fi ve longest sentences (excluding and, then, and well)

Transcription Notes – Subgroup AGL

The following types of utterances were excluded from analysis by inserting an equal (=) sign in front of the utterance:

- official title (‘Ana gets lost),
- comments unrelated to the story (e.g., child comments on someone entering the room),
- official ending (e.g., ‘The end’).

Coding Notes

- [EO:word] to mark overgeneralization errors
- [EP:word] to mark pronoun errors
- [EW:word] to mark other word-level errors
- [EU] to mark utterance-level errors.

Database Location and Ethnicity Selection Options

This database was created with two location options (New Zealand and Australia) and one ethnicity option (Maori). A language sample taken from a child can be compared against this population distribution as a whole or against a subset selected by location and/or including Maori (New Zealand) children only.

Story Quality Rubric - Oral Narrative Quality (ONQ)

To evaluate the child’s ability to apply story structure knowledge when retelling the Ana gets Lost story, the story retellings in the database were scored on a story quality rubric. The rubric was adapted from Jones and Lodholz (1999) and assessed inclusion of six text structure elements, as well as a measure of holistic coherence. It also investigated whether the child included the theme of the story. Theme is defined as ‘‘the overall coherent topic of the text and its essential points’’ (Westby, 2005, p. 162). See Appendix S for full details.

Oral Narrative Comprehension (ONC)

The answers should be scored following the guidelines below. Once you have scored the child’s performance add the child’s score to the transcript using a + line, e.g.,

+ ONC: 1

Indicates the child answered one question correctly.

Guidelines for administering and scoring the comprehension questions for the AGL task				
No	**Questions**	**Allowed Prompt**	**Correct**	**Incorrect**
1	Who is the story about?	If child says: a little girl, ask: "what's her name?"	Ana	
2	Why did Ana have to stay at home?	If child says: her mum and dad went fishing, ask: "why couldn't she come?"	Because she is sick	Too dangerous / too young. Wasn't allowed. So she didn't get lost.
3	Why did Ana get bored?		nothing to do, brother wouldn't play with her, no one to play with	Had to stay home. Because she wanted to play. Boring inside. Brother was reading a comic. Brother fell asleep.
4	Where did Ana go to find her parents?	Where did her parents go?	beach	dairy
5	Why did Ana get scared?		it was getting dark/night time, she got lost, she couldn't find them, she was all alone.	She was scared at night.
6	Who found Ana?		Police/ policeman / Cop	
7	What did the policeman do?	What else did he do? If child says: "told her not to get lost again".	bring/took her home	
8	Why were Ana's parents happy to see her?	Ask for clarification if necessary	Because they thought they had lost her, because she (had) got lost/ because they might have never seen her again, because she was safe, because they didn't know where she was.	Because the policeman found her. Because she was back / back home again. She came back.

Acknowledgements

The New Zealand databases are a result of the collaboration with Gail Gillon from the Department of Communication Disorders, University of Canterbury and Marleen Westerveld from Griffith University. Speech-language therapists from Group Special Education in Auckland, Hamilton, Christchurch, and Canterbury districts in New Zealand were involved in the collection of the language samples. The New Zealand Ministry of Education allowed the participation of Special Education speech-language therapists in the project. Financial assistance for the project was provided by the University of Canterbury, The Don Bevan Travel Scholarship, and the New Zealand Speech Language Therapists' Association.

The Australian databases are the result of the collaboration between Dr. Marleen Westerveld from Griffith University, and Kath Vidler from the Department of Education, Training, and Employment. Speech pathologists employed by the Department of Education, Training, and Employment across the State of Queensland were involved in the collection of the language samples. Financial assistance for the project was provided through a Griffith University Emerging Researcher Grant and by SALT Software LLC.

APPENDIX

C

NZ-AU Personal Narrative Database

Database	Context (Subgroup)	Age Range	# Samples	Location
NZ-AU Personal Narrative	Nar (NZPN)	NZ: 4;5 - 7;7 AU: 5;5 - 8;4	NZ: 228 AU: 127	New Zealand Australia

Participants

This database contains spoken language samples collected from New Zealand children aged 4;5 – 7;7. The New Zealand data were collected in 2000/2001. The language samples were collected from the participants in a personal narrative context (relating a personal experience). The children were randomly selected from schools in Auckland, Hamilton, Christchurch (major urban areas in New Zealand) as well as secondary urban areas surrounding Christchurch. Approximately 80% of the participants were from the Auckland/Hamilton region to reflect New Zealand's population density in these areas. Children with diagnosed disabilities were excluded from the sample. The schools reflected a range of socio-economic areas and English was the first language of all children included in the database. There was an even gender distribution. The ethnicity of the group comprised of the following: New Zealand European: 62%, Maori: 22%, Pasifika 5%, Asian 3%, and Other 8%.

The Group Special Education speech-language therapists involved in the project were trained by one of the researchers on the assessment procedures and language sampling protocol. Each child was seen individually in the child's school setting and was administered a New Zealand speech and language screening test and reading or letter knowledge test to gain information regarding the child's general language development. Any child who performed very poorly on the receptive language-screening task (i.e., could not follow basic instructions) was excluded from the database. Children's language samples were also excluded from the database for reasons such as poor taping quality and not engaging in the task (i.e., not willing to talk).

This database was created with two options. A language sample taken from a child can be compared against this population distribution as a whole or against a database including Maori children only.

Australian Participants

The Australian data were collected in 2012 from 127 children (aged 5;5 to 8;4) attending the first three years of primary school: Grade 0 (Prep or Foundation, n = 44), Grade 1 (n = 41), or Grade 2 (n = 42) across Queensland (regional: 55, city: 72), representing the full range of socio-economic areas (1 – 10). There were 64 (50.4%) girls and 63 boys (49.6%). Of the schools who agreed to participate, teachers were asked to identify children who 1) spoke English as their first language; 2) were progressing normally at school; and 3) had no history of speech and/or language impairments. Consent forms were sent home to these children via the teachers. From the children for whom consent to participate was obtained, participants were randomly selected, making sure there was an equal distribution of girls and boys. Children were from Australian (85.2%), Aboriginal and Torres

Strait Islander (4.0%), Pacific Island (0.8%), Other (3.2%), or Non-specified (6.4%) ethnic backgrounds, as indicated by their parents on the project consent forms.

The speech-language pathologists involved in the project were trained by one of the researchers on the assessment procedures and language sampling protocol. Each child was seen individually in the child's school setting. Children's language samples were also excluded from the database for reasons such as poor recording quality and not engaging in the task (i.e., not giving any personal narratives).

Elicitation Protocol

The personal narrative protocol was adapted from a conversational technique developed by Peterson and McCabe (1983), called the *Conversational Map*. In adapting this technique, the examiner relates a brief personal experience related to a photo prompt in order to encourage the child to share one of his or her personal experiences. A pocketsize photo album with a series of carefully selected photos is used for the stimulus items. Each photo is presented individually in separate sleeves of the photo album. For the Australian students, some of the photos and prompts were updated to ensure the materials were relevant to the Australian context.

The task is introduced as follows: "*I brought some photos to show you*". The examiner then provides a short prompting narrative with each photo (see protocol below), followed by the question: *"Did anything like that ever happen to you?"* If the child responds "*no*", the examiner turns the page of the photo album to the next photo. If the child responds "*yes*", a follow-up question is asked *"Can you tell me about it?"* Or "*What happened last time you ..* (went to the doctor, went to the Movies etc)?. The aim is to elicit at least 3 personal narratives and 50 C&I utterances.

To encourage the child to continue a personal narrative, the examiner can respond to the child's narrative by:

- Repeating the exact words of the children when they pause
- Using relatively neutral sub-prompts, such as "*uh-huh*"
- Saying "*tell me more*"
- Asking "*and then what happened?*"

It is very important that the examiner does NOT evaluate the child's narrative. Examples of evaluation include comments such as "*That must have been scary*", or "*Did it hurt?*" This gives the children the opportunity to demonstrate what they can do on their own, especially if you want to analyze the quality of the children's personal narratives (see McCabe & Rollins, 2004).

Prompts used for the Personal Narrative Task	
No	**Prompts**
1	Oh look who's this? (Ronald McDonald). I went to a birthday party at McDonald's last year. Have you ever been to McDonald's?
2	We went to the beach in the holidays. These children dug a big hole in the sand and waited for the sea to fill it up. Have you been to the beach? What happened last time you went to the beach?
3	This little girl had to go to the Doctor, because she had a bad cough. Have you ever been to the Doctor's?
4	These friends are watching somebody arriving on a big plane. Have you ever been on a plane? If child says "*no*", ask: Have you ever been out to the airport to watch the planes?
5	Oh look, this girl fell off the bars and hurt her knee. She had to go to the sick-bay and they put a plaster on. Have you ever broken anything? If child says "n*o*", ask: Did you ever hurt yourself in the playground?
6	These children went on a school-trip. NZ: They all went on a bus to Motat (a museum with lots of old cars). Have you ever been on a school-trip? AU: They all went on the bus to the Zoo.
7	Can you see the bee on the flower? I got stung by a bee once. On my big toe! Did a bee ever sting you?
8	Look, this is Santa. He visited my daughter's school in a fire engine. Has Santa ever been to your school? If child says "*no*", ask: Have you ever seen Santa anywhere?
9	The dental nurse visited my daughter's school last year. All the children had to go for a check-up. Have you ever had a tooth-ache? If child says "*no*", ask: Have you ever been to the dental nurse?
10	Look, there's my daughter/niece/nephew ……He/ she was in a play at her school. They did the pied piper. All the children had to dress up and perform in the school hall. Have you ever been in a play? If child says "*no*", ask: Have you ever seen a play?
11	We went to the movies in the holidays. Have you ever been to the Movies? Which one did you go to? Ask: I haven't seen that one. Can you tell me about it?

Photos Used to Elicit Personal Narratives

You can download the photos and the prompts used to elicit the samples from the SALT Web site at www.saltsoftware.com/resources/ or visit www.marleenwesterveld.com.

Transcription Notes

The utterances were segmented into communication units (C-units). A C-unit includes an independent clause with its modifiers (Loban, 1976). All transcripts were timed and pauses, within and between utterances, of two or more seconds in length, were marked. Age and gender information is included for all participants.

The prompts were transcribed from (and including) the examiner's question that leads to a "yes" response from the child. E.g., with the first prompt (McDonald's), only transcribe the underlined italicized utterances:

Oh look who's this? I went to a birthday party at McDonald's last year. *Have you ever been to McDonald's?* Child responds Yes or {Nods}. *What happened last time you went to McDonald's?*

For example:

```
+ McDonalds
E have you ever been to McDonald's?
C yes.
E What happened last time you went to McDonald's?
C…
```

Only successful narratives were transcribed. If the child responded "*no*" or "*can't remember*", this was indicated as follows:

+ Beach
= child can't remember the last time they went to the beach.

The following plus lines were inserted as part of the header information:

+ Context: Nar
+ Subgroup: NZPN
+ Ethnicity: Maori (only included for Maori subset)

Database Comparison Options

This database was created with two location options (New Zealand and Australia) and one ethnicity option (Maori). A language sample taken from a child can be compared against this population distribution as a whole or against a subset selected by location and/or including Maori (New Zealand) children only.

Acknowledgements

The New Zealand databases are a result of the collaboration between Gail Gillon and Marleen Westerveld from the Department of Communication Disorders, University of Canterbury and Jon Miller and Ann Nockerts from SALT Software LLC. Speech-language therapists from Group Special Education in Auckland, Hamilton, Christchurch and Canterbury districts in New Zealand were involved in the collection of the language samples. The New Zealand Ministry of Education allowed the participation of Special Education speech-language therapists in the project. Financial assistance for the project was provided by the University of Canterbury, The Don Bevan Travel Scholarship, and the New Zealand Speech Language Therapists' Association.

The Australian databases are the result of a collaboration between Dr. Marleen Westerveld from Griffith University and Kath Vidler from the Department of Education, Training, and Employment. Speech pathologists employed by the Department of Education, Training, and Employment across the State of Queensland were involved in the collection of the language samples. Financial assistance for the project was provided through a Griffith University Emerging Researcher Grant and by SALT Software LLC.

APPENDIX

D

NZ-AU Expository Database

Database	Context (Subgroup)	Age Range	# Samples	Location
NZ-AU Expository	Expo	6;1 - 7;11 7;4 - 8;4	65 42	New Zealand Australia

New Zealand Participants

This database contains spoken language samples collected from New Zealand children (in 2008) aged 6;1 – 7;11. A total of 65 six- and seven-year-old participants were recruited from three primary schools located in suburban Auckland, New Zealand (NZ). The schools were awarded mid socio-economic status based on the Ministry of Education ranking system. These children had no known history of hearing disorder, neurological disorder, or speech-language therapy, spoke English as their first language, and were progressing normally at school. The group consisted of 37 girls and 28 boys from NZ European (74%), Maori (14%), Pasifika (8%), and Other (4%) ethnic backgrounds (Westerveld & Moran, 2011).

Australian Participants

A second set of data was collected in 2013 from 42 children aged 7;5 to 8;4 who attended Year 2 (year of schooling 3) of their local primary school in Queensland, Australia. Ethics approval for this project was granted by the University Human Ethics Committee (PES/31/12/HREC). Approval was also granted by the Department of Education and Training, Queensland Government (550/27/1258). The schools reflected the full range of socio-economic areas. Of the schools who agreed to participate, teachers were asked to identify children who 1) spoke English as their first language; 2) were progressing normally at school; and 3) had no history of speech and/ or language impairments. Consent forms were sent home to these children via the teachers, and from the children for whom consent to participate was obtained, participants were randomly selected, making sure there was an equal distribution of girls and boys. The group consisted of 19 girls and 23 boys, from Australian (90.5%), Aboriginal and Torres Strait Islander (2.4 %), or Non-specified (7.1%) ethnic backgrounds. See Westerveld and Vidler (2016) for further details.

This database was created with two options. A language sample taken from a child can be compared against this population distribution as a whole or against a database including NZ or AU children only.

Elicitation Procedures

Expository language generation samples are elicited using the Favorite Game or Sport (FGS) task, developed by Nippold et al. (2005). In this task, the examiner carefully follows a script. First, the child is asked what his or her favorite game or sport is and why. The examiner then asks the child to explain the game or sport, using the pragmatically felicitous prompt "*I am not too familiar with the game of [..*]". Finally, the child is asked what a player should do to win a game of [..]. The child should be allowed as much time as necessary to finish the explanation. The examiner needs to make sure to

show interest in the child's explanation and only use neutral responses as needed to encourage the child to continue.

Favorite Game or Sport (FGS) Task Protocol (Nippold et al., 2005)

To elicit the sample, the examiner reads out the following script:

I am hoping to learn what people of different ages know about certain topics.

1. *What is your favorite game or sport?*
2. *Why is [e.g., chess, soccer, etc] your favorite game/sport?*
3. *I'm not too familiar with the game of (chess), so I would like you to tell me all about it. For example, tell me what the goals are, and how many people may play a game. Also, tell me about the rules the players need to follow. Tell me everything you can think of about the game of (chess) so that someone who has never played it before will know how to play.*
4. *Now I would like you to tell me what a player should do in order to win the game of (chess). In other words, what are some key strategies that every good player should know?*

Following each prompt, the interviewer pauses, displays interest in the response, and allows the child as much time as necessary to complete the response. If the child fails to address a question or requests for the question to be repeated, the interviewer is allowed to ask the question again.

Transcription Notes

The utterances were segmented into communication units (C-units). A C-unit includes an independent clause with its modifiers (Loban, 1976). Utterances that did not contain a subject and a predicate were coded as fragments, i.e., [FRG] code inserted at the end of these utterances, so they could be easily excluded from analysis. The transcripts begin with the student's first utterance which pertains to the child's answer to the question what his or her favorite game or sport is. All transcripts were timed and pauses, within and between utterances, of two or more seconds in length, were marked.

Coding Notes

The following error codes were inserted in the transcripts: [EP] to mark pronoun errors, [EO] to mark overgeneralization errors, [ES] to mark semantic errors, [EW] to mark other word-level errors, and [EU] to mark utterance-level errors. [FRG] marks utterance fragments, and [NGA] marks utterances that are 'not grammatically accurate'. All Australian samples were also coded for dependent clauses [D].

Dependent Clause coding

The following three types of dependent clauses were identified and coded:

Adverbial clauses [AVC] begin with a subordinating conjunction. Examples include:

- *And if they get the highest number [AVC] when the game's finished [AVC], they win [IC].*
- *And then once you've done that [AVC] (uhm) we pull out the blue mats and the (o* other k*) white mat [IC].*
- *And if you remember that [AVC] and you don't get hit [AVC] you win the game [IC].*

Relative clauses [RC] describe a noun and generally immediately follow the noun they describe. Examples include:

- *But we (like) have to hit the person [IC] who's (um) doing that [RC].*
- *And he brings me to all the games [IC] that I can go to [RC].*

- *And you've got lines [IC] where you're allowed to go up to [RC].*

Nominal clauses name persons, places, things or ideas. These clauses often answer the question 'what'? Examples include:

- *And whoever grabs the ball (um) [NOM] they (um) get to start with the ball in centre [IC].*
- *And that's [IC] how they lose the game sometimes [Nom].*
- *And whoever finishes all their beads [NOM] wins [IC].*

Acknowledgements

This project was supported by a Massey University Research Fund awarded to Marleen Westerveld. All samples were collected by student clinicians under supervision, and were transcribed and coded by Massey University students. This project was funded in part by SALT Software, LLC.

The Australian database was the result of a collaboration between Dr. Marleen Westerveld from Griffith University and Kath Vidler from the Department of Education and Training. Speech pathologists employed by the Department of Education and Training across the State of Queensland were involved in the collection of the language samples. Financial assistance for the project was provided through a Griffith University Emerging Researcher Grant and by SALT Software LLC.

APPENDIX

E

AU-USA Persuasion Database

Database	Context	Age Range	Grade in School	# Samples	Location	Special Coding
AU-USA Persuasion	Pers	12;10 – 18;4 14;8 – 18;9	N/A 9-12	66 113	Australia WI	SI, PSS

Introduction

Persuasion can be defined as "the use of argumentation to convince another person to perform an act or accept the point of view desired by the persuader" (Nippold, 2007). Persuasion was chosen for the following reasons:

- It figures prominently in academic standards that cut across modes of communication: speaking, listening, reading, and writing (National Governors Association, 2010).
- Acquiring skill at persuasion is critical to success in college and career and to full participation in social and civic life.
- Persuasion challenges students to take into account their audience's perspective and to use complex language to express complex ideas.

Australian Participants

The Australian dataset contains persuasive samples from typically developing students whose primary language is English. The students attended public schools across the state of Queensland, Australia. Schools were situated in country and metropolitan areas and students were from a range of economic backgrounds. "Typically developing" was determined by normal progress in school and absence of special education services. Economic background was based on the school's postcode and Socio-Economic Indexes for Areas (SEIFA, 2011) data. Student ability level was determined by the students' most recent performance in English (~15% obtained a C and 15% an A). The race/ethnicity of the students, as identified on the student consent form was predominantly 'Australian". Age and gender are provided for all samples. Grade in school data is not available.

USA Participants

Samples were elicited from typically developing students whose primary language is English. The students were drawn from public schools in two geographic areas of Wisconsin: Milwaukee area school districts, and Madison Metropolitan School District. Students were from a variety of economic backgrounds and ability levels. "Typically developing" was determined by normal progress in school and absence of special education services. Economic background was based on eligibility in the free lunch program (25% qualified for free or reduced lunch). Ability level was determined by GPA scores and teacher reports (4% were low, 25% were average, and 71% were high). The race/ethnicity of the students was similar to that of the geographic area from which they were drawn (63% White, 17% African American, 8% Hispanic, 7% Asian, and 2% Hmong, and 3% unknown). Age, grade, and gender are provided for all samples.

Elicitation Protocol

Overview

The elicitation protocol is easy to administer and provides optimum opportunity for the student to produce a "good" persuasive argument. Following a script, the examiner asks the student to argue for a change in their school, workplace, or community. The argument is to be directed at the student's principal, boss, or government official. The student can choose an issue of personal interest or select from a list of suggested issues. The student is given a few minutes to complete a planning sheet which contains six topics (Issue Id and Desired Change, Supporting Reasons, Counter Arguments, Response to Counter Arguments, Compromises, and Conclusion). Next to each point is a brief description of what is covered within that topic and space for making notes. Following the planning phase, the student, speaking from his/her notes, is asked to persuade the examiner who stands in for the intended authority figure. The average length of the persuasion is approximately 4 minutes and contains around 33 complete and intelligible utterances.

SCRIPT

Today I want to find out how well you can persuade. That's when you talk people into changing their mind and doing something you want. I'm going to make a recording. If you want, you can listen to it when we're finished.

I would like you to pick a rule or situation you would like to see changed in your school, job, or community. Imagine that I am an adult who has the power to make the change that you want. Here are a few examples:
1. Pretend I'm the principal of your school and you want to persuade me to provide money for a special event;
OR
2. Pretend I'm your boss and you want to persuade me to change your hours or work schedule;
OR
3. Pretend I'm a government official and you want me to change the law so that taxes are raised or lowered for a specific purpose.

I expect you to talk for at least a few minutes, so be sure to pick an issue you know and care about. You can choose an issue from this list [hand list to student] or else pick one of your own.

Allow the student time to review the suggested issues before asking*: What issue have you picked?*

If the student has difficulty choosing an issue, offer assistance. Review the list together. If a proposed topic is not an arguable issue, e.g., strawberry ice cream is better than chocolate, encourage the student to pick a different issue. If a proposed issue is too narrow, encourage the student to modify it. For example, if the student wants to argue for a change to his or her individual grade in a particular class, suggest that the issue be broadened into an argument for a school-wide change to grading policy.

Once an appropriate issue has been selected, clarify the intended target of the persuasion, e.g., principal, boss, government official, by asking*, Who will you be trying to persuade?*

If there is a mismatch between the issue and the authority figure, help the student to resolve the problem. For example, if a student wishes to convince a boss to raise the minimum wage, help the student understand that this argument is best directed toward a government official.

Once a match has been established between issue and authority figure, proceed to the planning directions:

Talk to me as if I'm your [name the appropriate authority, e.g., principal, boss, senator] and tell me everything you can to persuade me. To do your best job, you'll first need to organize your thoughts. Here's a list of points you'll need to cover to make a complete argument [hand the student a copy of the planning sheet]**.** *Please take the next few minutes to plan by taking notes in these blank spaces* [point to the empty boxes in the column on the right]**.** *But don't waste time writing sentences. Just jot down some key words to remind you of what you want to say. If you don't want to take notes, you can use the reverse side to draw a diagram or make a graphic organizer. Do you have any questions? Go ahead and start planning.*

Skill at reading is not being assessed. Therefore, if the student appears to be having any difficulty understanding the planning sheet, read the text aloud to the student.

Allow enough time for the student to write something for each point on the planning sheet or to create a diagram or graphic organizer. Verify that the student has done some planning for each point. If not, prompt with*, Please do some planning for* [name(s) of omitted point(s)]**.**

When the student has finished planning, continue with: *When I turn on the recorder, you will be doing all the talking. I'm going to listen to what you have to say. Tell me everything you can think of. It's OK to look at your planning sheet to remind yourself of what you want to say. Feel free to add to what you've written. Remember: I expect you to talk for as long as you can.*

Turn on the recording device and have the student begin speaking. Do not engage the student in a debate. Instead, limit your encouragement to affirmations such as: *Uhhuh, mhm, I see, OK, ah, etc.*

If the student finishes speaking before several minutes has elapsed or has not discussed one or more points on the planning sheet, prompt with: *Is there anything else you can tell me?*

When the student has finished speaking, turn off the recorder. Review the recording for quality before releasing the student. If there's time, offer to let the student listen to the recording.

Transcription Notes

The language samples were segmented into Communication Units (C-units).

- [EO:word] marks overgeneralization errors
- [EW:word] marks other word-level errors
- [EW] marks extraneous words
- [EU] marks utterance-level errors

Subordination Index (SI) and Persuasion Scoring Scheme (PSS) Coding

SI and PSS coding was applied to all samples.

SI is a measure of syntactic complexity which produces a ratio of the total number of clauses (main and subordinate clauses) to the number of C-units. A clause, whether main or subordinate, is a statement containing both a subject and a predicate. Grammatically, a subject is a noun phrase and a predicate is a verb phrase. Main clauses can stand by themselves. Subordinate clauses depend on the main clause to make sense. They are embedded within an utterance as noun, adjective, pronominal, or adverbial clauses (see Appendix O).

The PSS assesses the structure and content of persuasive language, a critical language skill in secondary curriculum, using a scoring rubric consisting of the essential characteristics of a coherent persuasive argument. These characteristics include: 1) issue identification and desired change, 2) supporting reasons, 3) other point of view, 4) compromises, 5) conclusion, 6) cohesion, and 7) effectiveness. The first five characteristics roughly correspond to the topics from the student planning sheet (see Appendix R).

Each characteristic receives a scaled score 0-5 or NA (not applicable). The PSS scoring guide defines what is meant by Proficient/Advanced (score of 5), Satisfactory/Adequate (score of 3) and Minimal/Immature (score of 1). The scores in between, 2 and 4, are undefined, use judgment. Significant factual errors reduce the score for that topic. A score of 0 is given for student errors, e.g., not covering topic, not completing/refusing task, unintelligible productions, abandoned utterances. A score of NA (non-applicable) is given for mechanical/examiner/operator errors, e.g., interference from background noise, issues with recording (cut-offs, interruptions), examiner not following protocol, examiner asking overly specific or leading questions rather than open-ended questions or prompts.

A composite is scored by adding the total of the six characteristic scores. Maximum score = 30.

Analysis Notes

The SALT group transcribed the samples following the SALT format and performed a series of statistical analyses to describe the dataset for consistency, differences across samples from AU and USA, age-related and gender related changes, as well as topic related changes.

Acknowledgements

Australian Samples: The Australian samples were collected by speech-language pathologists employed by the Department of Education and Training, Queensland, Australia. The following clinicians assisted with the data collection: Alicia Terrey, Diane Chen, Donna Arulogan, Elizabeth Tweed, Emma Fraser, Jane Westphal, Kaitlin Scurr, Kristy Cooney, Bronte Brooke, Leanne Herbert, Lynda Miles, Melissa Gardiner, Robyn Kalkaus, Sarah Johnston, Bronte Brook.

USA Samples: We gratefully acknowledge and thank Thomas O. Malone, a retired speech-language pathologist formerly with the Brown Deer School District, for being the driving force behind this project. His influence is everywhere including, but not limited to, designing the protocol used, recruiting clinicians from Milwaukee-area school districts, and presenting the results of the project (Heilmann, Malone, Andriacchi, & Westerveld, 2015). We would also like to thank John Heilmann (United States) and Dr. Marleen Westerveld (Australia) for their work getting the research protocols in place and working with the school districts to obtain their approval and cooperation. We would like to thank the following clinicians and students who collected the Wisconsin persuasion samples:

- Brown Deer School District: Kari Anewenter
- Madison Metropolitan School District: Helen Chung, Alyson Eith, Sheryl Hall, Kelsey Beach Hausmann, Laura Johnson, Abby Mahoney Kabara, Chris Melgaard, Carrie Rhode, Mary-Beth Rolland, Liz Schoonveld, Helena White
- Nicolet School District: Karen Kingsbury
- Shorewood School District: Eva Gulotta, Katie Koepsell, and Inga Siler
- Wauwatosa School District: Amy Brantley, Peg Hamby, Christine Maranan, Kathy Meinecke, Molly Suberlak, Amanda Voigtlander
- West Allis-West Milwaukee School District: Sarah Bartosch, Erin Jodie
- UW-Milwaukee graduate students: Taylor Hansen, Maggie Long, Maricel Schulte

All samples were transcribed and coded by the staff at SALT Software, LLC. We wish to thank Karen Andriacchi, Carol Cailliet, and Joyelle Divall-Rayan for their lead on the project, and the transcription staff for their help with transcription and coding.

This project was funded by SALT Software, LLC.

Persuasion Topics List

Changing the time school starts in the morning
Allowing students to leave campus during the school day without special permission
Requiring students to do graded homework
Requiring students to take foreign language classes
Allowing teachers to socialize with students on social networks such as Facebook, Twitter, Snapchat, Instagram, etc.
Including grades in physical education classes in students' grade point average
Allowing students to listen to their music using headphones during free periods
Changing the access teenagers have to entertainment that is violent or sexually suggestive; entertainment includes movies, music, and video games
Requiring school uniforms or a dress code for students
Awarding cash or other incentives to students who earn good grades
Replacing traditional textbooks with notebook computers or digital materials
Requiring cities to provide free wireless Internet access in public spaces
Requiring people to get a license in order to become parents
Allowing alternatives to jail, such as counseling or public service, for convicted criminals
Requiring colleges to pay their student athletes a salary for playing
Requiring drug tests for professional athletes
Allowing employers to require drug tests as part of their hiring procedure
Requiring workers to pay for their own work uniforms or equipment
Raising the minimum wage
Changing the minimum age for voting, drinking, driving, or holding a job
Other: Topic of your choice

Persuasion Planning Sheet (*The actual form used can be downloaded from the SALT web site at* www.saltsoftware.com/resources/)

What to Talk about When Trying to Persuade Someone

Topic	What's Covered	Notes
Issue ID and Desired Change	What rule or situation do you want changed? What would you change it to?	
Supporting Reasons	What facts or values or evidence helps your side? Be sure to include how your change would help or benefit the listener or people the listener cares about.	
Counter Arguments – Other Point of View	What are some good reasons on the other side?	
Response to Counter Arguments	What can you say to knock down or weaken the reasons on the other side? What reasons on the other side can you can agree with, either in whole or in part?	
Compromises	If you can't get your way 100%, what deals would be acceptable so each side wins a little?	
Conclusion	Briefly sum up your position: What do you want? Why do you want it? What are the first steps needed to make the change happen?	

APPENDIX

F

Play Database

Database	Context (Subgroup)	Age Range	Grade in School	# Samples	Location	Special Coding
Play	Con (Play)	2;8 – 5;8	P, K	69	WI	SI

Participants

Typically developing children, ranging in age from 2;8 - 5;8, were drawn from preschools in Madison and kindergarten classrooms in the Madison Metropolitan School District. These children, whose primary language is English, came from a variety of economic backgrounds and ability levels. "Typically developing" was determined by normal progress in school and absence of special education services. Economic background was determined by eligibility for the free lunch program. Ability level was determined by teacher rating. Age, gender, and grade data is available for all children.

Elicitation Protocol

Materials
- audio or video recorder
- Play dough, small toys, blocks etc.
- quiet location free of distractions with a table and two chairs

Preparation
Check the recorder for loudness levels. Record the date, student's name or ID, birth date, age, and grade.

Directions
Playing with play dough or small toys: Follow the child's suggestions, request directions etc. Comment on the child's activity.

"*I've bought some play dough for us to play with today. I wonder what we could make together.*"
"*Let's make ---. What do we need to do to make it*?"
"*Here are two cows. What should we do with them*?"
"*What other animals go in the barn*?"

Transcription Notes

Utterances were segmented into C-units (see Appendix N). All transcripts were timed and pauses, within and between utterances, of two or more seconds in length, were marked.

Coding Notes
- [EO:word] marks overgeneralization error
- [EP:word] marks pronoun error
- [EW] marks an extraneous or unnecessary word in the utterance that, if omitted, would make the utterance syntactically correct, e.g., C And he shout/ed and[EW] to the frog.

- [EW:word] marks other word-level error
- [EU] marks utterance-level error (*also marks utterances with 3 or more errors*)
- [FP] marks filled pause words such as *like*, e.g., *You (like[FP]) get six card/s.*

Subordination Index (SI) Coding

SI coding was applied to all samples. SI is a measure of syntactic complexity which produces a ratio of the total number of clauses (main and subordinate clauses) to the number of C-units. A clause, whether it is main or subordinate, is a statement containing both a subject and a predicate. Grammatically, a subject is a noun phrase and a predicate is a verb phrase. Main clauses can stand by themselves. Subordinate clauses depend on the main clause to make sense. They are embedded within an utterance as noun, adjective, or adverbial clauses (see Appendix O).

Using SALT to Compare Samples to the Play Database

Use SALT's Database menu to compare your sample with age or grade-matched samples selected from the Play database. SALT looks at the "+ Context" and "+ Subgroup" plus lines in your transcript to determine which database to pre-select. To pre-select the Play database, include the following plus lines in your transcript:

+ Context: Con
+ Subgroup: Play

Although you can type these plus lines into your transcript, the easiest way is to select the correct sampling context (Con) and subgroup (Play) when first creating a new transcript (by completing the New Transcript Header information dialogue box).

Acknowledgements

These samples are the result of a long-term collaboration with clinicians working in the Madison Metropolitan School District. All samples were transcribed and coded by the University of Wisconsin students working in the Language Analysis Lab. This project was funded in part by SALT Software, LLC.

APPENDIX

G

Conversation Database

Database	Context (Subgroup)	Age Range	Grade in School	# Samples	Location	Special Coding
Conversation	Con	2;9 – 13;3	P, K, 1, 2, 3, 5, 7	584	WI & CA	SI

Participants

The Conversation database contains samples from typically developing English-fluent students located in Wisconsin and California. Age, gender, and grade data are available for all participants.

- *Wisconsin*: students, ranging in age from 2;9 -13;3, were drawn from preschools in Madison, the Madison Metropolitan Public School District, and rural areas in northern Wisconsin. The children were from a variety of economic backgrounds and ability levels. "Typically developing" was determined by normal progress in school and absence of special education services. Economic background was determined by eligibility for the free lunch program. Ability level was determined by teacher rating.

- *California*: students, ranging in age from 4;4 - 9;11, were drawn from two public school districts in San Diego County; San Diego City Schools and Cajon Valley School District. The students were described as typically developing and average performing in the classroom as determined by performance on standardized classroom assessments, teacher report, and absence of special education services. The participants reflected the county's demographics and were balanced by race, ethnicity, gender, and socioeconomic status. Socioeconomic status was determined by mother's highest level of education.

Elicitation Protocol

Materials
- audio or video recorder
- quiet location free of distractions with a table and two chairs

Preparation
Check the recorder for loudness levels. Record the date, student's name or ID, birth date, age, and grade.

Directions
Use one or more of the following conversational topics. Suggested questions and prompts are listed for each topic. Introduce at least one topic absent in time and space from the sampling condition, e.g. for holidays, "*What did you do?*" or "*What will you do?*".

1. Classroom activities
   "*Tell me about some of the things you've been doing in school lately*."
   Ask about specific classroom units.

2. Holidays
   "*Did you do anything special for Halloween (or appropriate holiday)*?"
   "*Tell me about that*."
   "*Are you going to do anything special for Christmas ((or appropriate holiday)*?"

3. Family activities, visits, locations, etc.
   "*Are you going to visit your grandma and grandpa*?"
   "*Where do they live*?" "*How do you get there*?" "*What do you do there*?"

4. Family pets
   "*Do you have any pets at home*?" "*Tell me about them*."
   "*What do you have to do to take care of them*?"
   "*Do they ever get in trouble*?"

Examiner's role during the retell

Be an attentive conversational partner. Use eye contact. Encourage the student to talk. Avoid asking a lot of yes/no questions. Keep it a conversation. Take turns talking. Avoid topics that may result in a narrative, e.g., "Oh, you saw a movie last weekend. Tell me about it."

Transcription Notes

Utterances were segmented into C-units (see Appendix N). The transcripts begin and end with the student's first and last utterance, respectively. All transcripts were timed and pauses, within and between utterances, of two or more seconds in length, were marked.

Coding Notes

- [EO:word] marks overgeneralization error
- [EP:word] marks pronoun error
- [EW] marks an extraneous or unnecessary word in the utterance that, if omitted, would make the utterance syntactically correct, e.g., C And he shout/ed and[EW] to the frog.
- [EW:word] marks other word-level error
- [EU] marks utterance-level error (*also marks utterances with 3 or more errors*)
- [FP] marks filled pause words such as *like*, e.g., *You (like[FP]) get six card/s.*

Subordination Index (SI) Coding

SI coding was applied to all samples. SI is a measure of syntactic complexity which produces a ratio of the total number of clauses (main and subordinate clauses) to the number of C-units. A clause, whether it is main or subordinate, is a statement containing both a subject and a predicate. Grammatically, a subject is a noun phrase and a predicate is a verb phrase. Main clauses can stand by themselves. Subordinate clauses depend on the main clause to make sense. They are embedded within an utterance as noun, adjective or adverbial clauses (see Appendix O).

Using SALT to Compare Samples to the Conversation Database

Use SALT's Database menu to compare your sample with age or grade-matched samples selected from the Conversation database. SALT looks at the "+ Context" plus line in your transcript to determine which database to pre-select. To pre-select the Conversation database, include the following plus lines in your transcript:

+ Context: Con

Although you can type these plus lines into your transcript, the easiest way is to select the correct sampling context (Con) when first creating a new transcript (by completing the New Transcript Header information dialogue box).

Acknowledgements

The *Wisconsin* samples are the result of a long-term collaboration with a group of speech-language pathologists working in the Madison Metropolitan School District (MMSD). We would like to express our appreciation to: Dee Boyd, Beth Daggett, Lynne Gabrielson, Laura Johnson, Mary Anne Jones, Marianne Kellman, Cathy Kennedy, Sue Knaack, Colleen Lodholtz, Kathleen Lyngaas, Karen Meissen, Chris Melgaard, Katherine Pierce, Laura Pinger, Lynn Preizler, Mary Beth Rolland, Lynda Lee Ruchti, Beth Swanson, Marianne Wood, Joan Zechman, and Rebecca Zutter-Brose for collecting the reference language samples and for sharing their clinical insights and experience in using SALT to evaluate the expressive language performance of school-age children. We would also like to acknowledge the MMSD SALT Leadership Committee for the help they provided with documenting guidelines for the elicitation and interpretation of language samples.

The *California* samples are the result of collaboration with two public school districts in San Diego County; San Diego City Schools and Cajon Valley Union Schools. We would like to thank Claudia Dunaway, from the San Diego City Schools, and Kelley Bates, from Cajon Valley, for their work on designing the protocol and organizing data collection. We would also like to thank the following San Diego City School SLPs: Cathy Lehr, Amy Maes, Roy Merrick, Peggy Schiavon, Dale Bushnell-Revell, Diana Mankowski, Jennifer Taps, Jean Janeke, Valerie Henderson, Mary Jane Zappia, Sharon Klahn, Linda Sunderland and the following Cajon Valley Union School SLPs: Marcelle Richardson, Victoria Wiley-Gire, Susan Carmody, Cathy Miller, Mary Baker, and Andrea Maher for collecting the language samples.

All samples were transcribed and coded by the University of Wisconsin students working in the Language Analysis Lab. This project was funded in part by SALT Software, LLC.

APPENDIX

H

Narrative SSS Database

Database	Context (Subgroup)	Age Range	Grade in School	# Samples	Location	Special Coding
Narrative SSS	Nar (SSS)	5;2 – 13;3	K, 1, 2, 3, 5, 7	330	WI	SI

Participants

The Narrative SSS (student selects story) database consists of narrative samples from typically developing students drawn from the Madison Metropolitan Public School District, and rural areas in northern Wisconsin. Students were from a variety of economic backgrounds and ability levels. "Typically developing" was determined by normal progress in school and absence of special education services. Economic background was determined by eligibility for the free lunch program. Ability level was determined by teacher rating. Age, gender, and grade data is available for all students.

Elicitation Protocol

Materials
- audio or video recorder
- quiet location free of distractions with a table and two chairs

Preparation
Check the recorder for loudness levels. Record your name, date, student's name or ID, birth date, age, and grade.

Directions
Use one of the following narrative tasks. Suggested questions and prompts are listed for each task.

2. Tell about a movie s/he saw.
   "*Do you go to the movies*?", "*Do you watch movies at home*?", "*Do you own any movies*?", "*What's your favorite movie*?", "*What's the last movie you saw*?"

3. Tell about a book s/he read.
   "*Have you read any good books lately*?", "*What's your favorite book*?", "*Have you read* (insert current books likely to be of interest)?"

4. Retell an episode from a TV program.
   "*What TV programs do you like to watch*?", "*Tell me about that one. I haven't seen it*.", "*What happened on the last one you watched*?", "*Do you ever watch* (insert current programs likely to be of interest)?"

5. With young children: Retell a familiar story such as *Goldilocks and the Three Bears*, *Little Red Riding Hood*, and *The Three Little Pigs*. Picture prompts should only be used after every attempt is made to elicit spontaneous speech. This is not a labeling activity.
   "*Do you know any stories*?", "*What is one of your favorite stories*?",
   "*Oh, I don't know that one very well. Will you tell it*?",
   "*Do you know Little Red Riding Hood*, etc.? *Oh, tell me about that one*."

Examiner Prompts

Using overly-specific questions or providing too much information compromises the process of capturing the speaker's true language and ability level. Avoid asking questions which lead to obvious and limited responses/answers. Use open-ended prompts. Open-ended prompts *do not* provide the speaker with answers or vocabulary. They *do* encourage the speaker to try or they let the speaker know that it's ok to move on if needed. Use open-ended prompts/questions as necessary.

- **Acceptable verbal prompts include:**

Tell me more.	Just do your best.
Tell me about that/it.	You're doing great.
I'd like to hear more about that/it.	Tell me what you can.
That sounds interesting.	Oh, that sounds interesting.
What else?	Mhm.
Keep going.	Uhhuh.

- **Acceptable nonverbal prompts include:**
  Smiles and eye contact.
  Nods of affirmation and agreement.

Transcription Notes

The language samples were segmented into C-units (see Appendix N). All transcripts were timed and pauses, within and between utterances, of two or more seconds in length, were marked.

Coding Notes

- [EO:word] marks overgeneralization error
- [EP:word] marks pronoun error
- [EW] marks an extraneous or unnecessary word in the utterance that, if omitted, would make the utterance syntactically correct, e.g., C And he shout/ed and[EW] to the frog.
- [EW:word] marks other word-level error
- [EU] marks utterance-level error (*also marks utterances with 3 or more errors*)
- [FP] marks filled pause words such as *like*, e.g., *You (like[FP]) get six card/s.*

Subordination Index (SI) Coding

SI coding was applied to all samples. SI is a measure of syntactic complexity which produces a ratio of the total number of clauses (main and subordinate clauses) to the number of C-units. A clause, whether it is main or subordinate, is a statement containing both a subject and a predicate. Grammatically, a subject is a noun phrase and a predicate is a verb phrase. Main clauses can stand by themselves. Subordinate clauses depend on the main clause to make sense. They are embedded within an utterance as noun, adjective or adverbial clauses (see Appendix O).

Using SALT to Compare Samples to the Narrative SSS Database

Use SALT's Database menu to compare your sample with age or grade-matched samples selected from the Narrative Student Selects Story database. SALT looks at the "+ Context" and "+ Subgroup" plus lines in your transcript to determine which database to pre-select. To pre-select the Narrative Student Selects Story database, include the following plus lines in your transcript:

+ Context: Nar
+ Subgroup: SSS

Although you can type these plus lines into your transcript, the easiest way is to select the correct sampling context (Nar) and subgroup (SSS) when first creating a new transcript (by completing the New Transcript Header information dialogue box).

Acknowledgements

The Narrative SSS database is the result of a long-term collaboration with a group of speech-language pathologists working in the Madison Metropolitan School District (MMSD). We would like to express our appreciation to: Dee Boyd, Beth Daggett, Lynne Gabrielson, Laura Johnson, Mary Anne Jones, Marianne Kellman, Cathy Kennedy, Sue Knaack, Colleen Lodholtz, Kathleen Lyngaas, Karen Meissen, Chris Melgaard, Katherine Pierce, Laura Pinger, Lynn Preizler, Mary Beth Rolland, Lynda Lee Ruchti, Beth Swanson, Marianne Wood, Joan Zechman, and Rebecca Zutter-Brose for collecting the reference language samples and for sharing their clinical insights and experience in using SALT to evaluate the expressive language performance of school age children. We would also like to thank the MMSD SALT Leadership Committee for the help they provided with documenting guidelines for the elicitation and interpretation of language samples. All samples were transcribed and coded by the University of Wisconsin students working in the Language Analysis Lab. This project was funded in part by SALT Software, LLC.

APPENDIX

I

Narrative Story Retell Database

Database	Context (Subgroup)	Age Range	Grade in School	# Samples	Location	Special Coding
Narrative Story Retell	Nar (FWAY) Nar (PGHW) Nar (APNF) Nar (DDS)	4;4 – 7;5 7;0 – 8;11 7;11 – 9;11 9;3 – 12;8	P, K, 1 2 3 4, 5, 6	145 101 53 201	WI & CA	SI, NSS

Participants

The Narrative Story Retell database contains samples from typically developing English-fluent students located in Wisconsin and California. Age, gender, and grade data are available for all participants.

- *Wisconsin* participants were drawn from the Madison Metropolitan Public School System and several Milwaukee area school districts (Brown Deer, Fox Point-Bayside, Shorewood, Waukesha, Wauwatosa, and West Allis-West Milwaukee). There are students from a variety of economic backgrounds and ability levels. "Typically developing" was determined by normal progress in school and absence of special education services. Economic background was based on eligibility in the free lunch program. Ability level was determined by teacher ratings.

- *California* participants were drawn from two public school districts in San Diego County; San Diego City Schools and Cajon Valley School District. The participants were described as typically developing and of average performance in the classroom as determined by performance on standardized classroom assessments, teacher report, and absence of special education services. The participants reflected the county's demographics and were balanced by race, ethnicity, gender, and socioeconomic status. Socioeconomic status was determined by mother's highest level of education.

Elicitation Protocol

1. **Preschool, Kindergarten, and 1st Grade**
   There are three options for eliciting the samples. Use whichever option you prefer as they all elicit similar narratives. The database samples were elicited using the 3rd option.

   - Materials
     - audio or video recorder
     - copy of the book *Frog, Where Are You?* (Mayer, 1969)
     - quiet location free of distractions with a table and two chairs

     Option 1:
     Use the FWAY script provided at the end of this appendix to tell the story to the child.

     Option 2:
     Play a recording of the FWAY story. You can record your own audio or download one from the SALT web site at https://www.saltsoftware.com/resources/elicaids/frogstories

Option 3:
Play the recording of *Frog, Where Are You?* which comes with The Strong Narrative Assessment Procedure (Strong, 1998). This audio uses a slightly different script.

- Preparation
  Check the recorder for loudness levels. Record your name, date, student's name or ID, birth date, age, and grade.

- Directions
  Seat the student next to you.

  Option 1:
  Say "*I would like to find out how you tell stories. First, I am going to tell you a story while we follow along in the book. When I have finished telling you the story, it will be your turn to tell the story using the same book***.**" Tell (try not to read) the story to the student, loosely following the script (provided on the last page). You do not need to memorize the story script. Just become familiar enough with it to tell a similar story.

  Options 2 and 3:
  Say "*I would like to find out how you tell stories. First, we are going to listen to the story while we follow along in the book. When we have finished listening to the story, it will be your turn to tell the story using the same book***.**" Play the audio. Turn each page while the student listens. Make sure the student is looking at the book.
  After telling the story or playing the audio, prepare the recorder to record the student's sample and say "*Now I would like you to use your own words to tell the story*."

  Turn the book to the first page with pictures and start recording. Say "*Do the best that you can. Now you tell me the story.*"

2. Grades 2nd, 3rd, 4th, 5th, and 6th

- Materials
  - audio or video recorder
  - quiet location free of distractions with a table and two chairs
  - 2 copies of the story book, one with the printed words covered
    - 2nd grade: *Pookins Gets Her Way* (Lester, 1987)
    - 3rd grade: *A Porcupine Named Fluffy* (Lester, 1986)
    - 4th, 5th, and 6th grade: *Doctor De Soto* (Steig, 1982)

- Preparation
  Check the recorder for loudness levels. Record your name, date, student's name or ID, birth date, age, and grade.

- Directions

  Use the book that does not have the text covered while reading the story. Seat the student next to you, show the book to the student, and say "*I am helping your teacher find out how you tell stories. First, I will read this story to you while you follow along. Then I'm going to ask you to tell the story using your own words.*"

  Read the story. Make sure the student is looking at the book.

  After reading the story, prepare the recorder to record the student's sample. Give the student the copy of the book which has the text covered and say "*Now I would like you to tell*

the story. Notice that the words are covered up. That's because I want you to use your own words to tell the story."

Turn to the first page with pictures and start recording. Say "*Do the best that you can. Now you tell me the story.*"

3. Examiner's role during the retell

During the retell, move slightly away from the student turning so that eye contact is easy. The student should be in charge of page turning during the retell, but provide assistance if the student has trouble turning pages, or starts skipping too many pages. Moving away from the student promotes language and minimizes pointing.

Do not give specific cues to the student during the task. You can point to the book to focus attention or say *"Tell me more.", "Keep going.", "You are doing a great job.", "And then…"* if the student stops talking before the story is finished. You may also use nonverbal cues such as head nodding and smiling to promote continued talking. If the student is unable to start the task, use the prompt *"One day…."* Using overly-specific questions or providing too much information to the student compromises the process of capturing the student's true language and ability level. Open-ended prompts *do not* provide the student with answers or vocabulary. But they *do* encourage the student to try or they let the student know it is ok to move on if needed. Avoid asking the "wh" questions, who?, what?, when?, where? as these often lead to obvious and limited responses/answers.

4. Optional Comprehension Questions

Following the student's retell, you have the option of evaluating his/her understanding of the story by asking a series of comprehension questions. For details, refer to the SALT web site at https://www.saltsoftware.com/resources/elicaids. Please note that the SALT Narrative Story Retell database samples were not scored for comprehension.

Database Subgroups

When selecting language samples from this database, by default, the comparison is restricted to samples from the specific story listed in the transcript header. You can specify one of the following subgroups:

FWAY = *Frog, Where Are You?*
PGHW = *Pookins Gets Her Way*
APNF = *A Porcupine Named Fluffy*
DDS = *Doctor De Soto*

Transcription Notes

Utterances were segmented into C-units (see Appendix N). The transcripts begin and end with the student's first and last utterance, respectively. All transcripts were timed and pauses, within and between utterances, of two or more seconds in length, were marked.

Coding Notes

- [EO:word] marks overgeneralization error
- [EP:word] marks pronoun error
- [EW] marks an extraneous or unnecessary word in the utterance that, if omitted, would make the utterance syntactically correct, e.g., C And he shout/ed and[EW] to the frog.
- [EW:word] marks other word-level error
- [EU] marks utterance-level error (*also marks utterances with 3 or more errors*)

- [FP] marks filled pause words such as *like*, e.g., *You (like[FP]) get six card/s.*

Subordination Index (SI) and Narrative Scoring Scheme (NSS) Coding

SI is a measure of syntactic complexity which produces a ratio of the total number of clauses (main and subordinate clauses) to the number of C-units. A clause, whether it is main or subordinate, is a statement containing both a subject and a predicate. Grammatically, a subject is a noun phrase and a predicate is a verb phrase. Main clauses can stand by themselves. Subordinate clauses depend on the main clause to make sense. They are embedded within an utterance as noun, adjective or adverbial clauses (see Appendix O).

NSS is an assessment tool developed to create a more objective narrative structure scoring system. It is based upon early work on story grammar analysis by Stein and Glenn, 1979, 1982. This scoring procedure combines many of the abstract categories of Story Grammar, adding features of cohesion, connecting events, rationale for characters' behavior, and referencing. Each of the scoring categories has specific explicit examples to establish scoring criteria, reducing the abstractness of the story grammar categories (see Appendix P).

Using SALT to Compare Samples to the Narrative Story Retell Database

Use SALT's Database menu to compare your sample with age or grade-matched samples selected from the Narrative Story Retell database. SALT looks at the "+ Context" and "+ Subgroup" plus lines in your transcript to determine which database to pre-select. To pre-select the Narrative Story Retell database, include the following plus lines in your transcript, where the Context is "Nar" and the Subgroup is the abbreviation specific to each story retell (see database subgroups):

+ Context: Nar
+ Subgroup: FWAY (or PGHW, or APNF, or DDS)

Although you can type these plus lines into your transcript, the easiest way is to select the correct sampling context (Nar) and subgroup corresponding to the specific story (FWAY/PGHW/APNF/DDS) when first creating a new transcript using the New Transcript Header information dialogue box.

Acknowledgements

The Wisconsin samples are the result of collaboration with the Madison Metropolitan School District (MMSD) and several Milwaukee area school districts. We would like to acknowledge and thank the MMSD SALT Leadership Committee for sharing their clinical insights and experience, and for their help with selecting the story books and recruiting clinicians for data collection. The California samples are the result of collaboration with two public school districts in San Diego County; San Diego City Schools and Cajon Valley Union Schools. We would like to thank Claudia Dunaway, from the San Diego City Schools, and Kelley Bates, from Cajon Valley, for their work on designing the protocol and organizing data collection.

We would like to thank the following clinicians who collected the samples:

- Brown Deer School District: Thomas O. Malone
- Cajon Valley Union School: Mary Baker, Kelley Bates, Susan Carmody, Andrea Maher, Cathy Miller, Marcelle Richardson, Victoria Wiley-Gire
- Madison Metropolitan School District: Vicki Ashenbrenner, Dee Boyd, Kelly Chasco, Connie Daering, Beth Daggett, Lynne Gabrielson, Maureen Gonter, Tanya Jensen, Laura Johnson, Mary Anne Jones, Marianne Kellman, Cathy Kennedy, Ann Kleckner, Sue Knaack, Colleen Lodholtz, Kathleen Lyngaas, Karen Meissen, Chris Melgaard, Jane Morgan, Nicole Olson, Andrea O'Neill, Katherine Pierce, Laura Pinger, Lynn Preizler, Carolyn Putnam, Mary-Beth Rolland, Lynda Lee

Ruchti, Beth Swanson, Jennifer Van Winkle, Emily Wolf, Meg Wollner, Marianne Wood, Joan Zechman, Rebecca Zutter-Brose

- San Diego City Schools: Dale Bushnell-Revell, Claudia Dunaway, Valerie Henderson, Jean Janeke, Sharon Klahn, Cathy Lehr, Amy Maes, Diana Mankowski, Roy Merrick, Peggy Schiavon, Linda Sunderland, Jennifer Taps, Mary Jane Zappia
- Shorewood School District: Terry Hrycyna, Katie Koepsell
- Waukesha School District: Patricia Engebose Hovel, Susan Moennig, Lisa Haughney, Colleen Raupp, Christine Herro, Maureen Waterstraat
- Wauwatosa School District: Beth Bliss, Amy Brantley, Betsy Goldberg, Peg Hamby, Karen Malecki, Angela Quinn
- West Allis-West Milwaukee School District: Sarah Bartosch, Joy Behrend, Beth Beno, Ann-Guri E. Bishop, Lindsay Bliemeister, Pat Culbertson, Mary Fuchs, Nicole Gosser, Joyce King-McIver, Ellen Reitz, Jan Schmidt, Jill Vanderhoef, Michele Wolaver

All samples were transcribed and coded by the University of Wisconsin students working in the Language Analysis Lab. This project was funded in part by SALT Software, LLC.

Resources

- Story Script for *Frog, Where Are You?* - found on the following page
- Elicitation materials includes books, laminated protocols and script, comprehension questions

Story Script for *Frog, Where Are You?* by Mercer Mayer, 1969.

Page	Script
1	There once was a boy who had a dog and a pet frog. He kept the frog in a large jar in his bedroom.
2	One night while he and his dog were sleeping, the frog climbed out of the jar. He jumped out of an open window.
3	When the boy and the dog woke up the next morning, they saw that the jar was empty.
4	The boy looked everywhere for the frog. The dog looked for the frog too. When the dog tried to look in the jar, he got his head stuck.
5	The boy called out the open window, "Frog, where are you?" The dog leaned out the window with the jar still stuck on his head.
6	The jar was so heavy that the dog fell out of the window headfirst!
7	The boy picked up the dog to make sure he was ok. The dog wasn't hurt but the jar was smashed.
8 - 9	The boy and the dog looked outside for the frog. The boy called for the frog.
10	He called down a hole in the ground while the dog barked at some bees in a beehive.
11	A gopher popped out of the hole and bit the boy on right on his nose. Meanwhile, the dog was still bothering the bees, jumping up on the tree and barking at them.
12	The beehive fell down and all of the bees flew out. The bees were angry at the dog for ruining their home.
13	The boy wasn't paying any attention to the dog. He had noticed a large hole in a tree. So he climbed up the tree and called down the hole.
14	All of a sudden an owl swooped out of the hole and knocked the boy to the ground.
15	The dog ran past the boy as fast as he could because the bees were chasing him.
16	The owl chased the boy all the way to a large rock.
17	The boy climbed up on the rock and called again for his frog. He held onto some branches so he wouldn't fall.
18	But the branches weren't really branches! They were deer antlers. The deer picked up the boy on his head.
19	The deer started running with the boy still on his head. The dog ran along too. They were getting close to a cliff.
20-21	The deer stopped suddenly and the boy and the dog fell over the edge of the cliff.
22	There was a pond below the cliff. They landed with a splash right on top of one another.
23	They heard a familiar sound.
24	The boy told the dog to be very quiet.
25	They crept up and looked behind a big log.
26	There they found the boy's pet frog. He had a mother frog with him.
27	They had some baby frogs and one of them jumped towards the boy.
28-29	The baby frog liked the boy and wanted to be his new pet. The boy and the dog were happy to have a new pet frog to take home. As they walked away the boy waved and said "goodbye" to his old frog and his family.

APPENDIX

J

Expository Database

Database	Context (Subgroup)	Age Range	Grade in School	# Samples	Location	Special Coding
Expository	Expo	10;7 – 18;9	5 – 7, 9 - 12	354	WI	SI, ESS

Introduction

The expository database contains samples from middle and high school students, ages 10;7 through 18;9. Exposition was chosen for the following reasons:

- Exposition is central to curriculum in middle and high school
- Exposition is included as part of state standards for speaking and writing
- Challenges students to use language in context (authentic, naturalistic, real speaking and listening)
- Allows documentation of oral expository skills relative to peers

Participants

354 typically developing, English-fluent students, ranging in age from 10;7 through 18;9. The students were drawn from public schools in two geographic areas of Wisconsin: Milwaukee area school districts (Brown Deer, Fox Point-Bayside, Nicolet, Shorewood, Waukesha, Wauwatosa, and West Allis-West Milwaukee), and from the Madison Metropolitan School District. They were from a variety of economic backgrounds and ability levels. "Typically developing" was determined by normal progress in school and absence of special education services. Economic background was based on eligibility in the free lunch program (25% qualified for free or reduced lunch). Ability level was determined by GPA scores and teacher reports (9% were low, 49% were average, and 42% were high). The race/ethnicity of the students was similar to that of the geographic area from which they were drawn (75% White, 13% African American, 7% Hispanic, 4% Asian, and 1% Hmong). Age, grade, and gender are provided for all samples.

Elicitation Protocol

<u>Overview</u>

The elicitation protocol is easy to administer and provides optimum opportunity for the student to produce a “good” expository. Following a script, the examiner asks the student to explain how to play a game or sport of the student's choosing. Discourage the student from talking about video games as they may be unfamiliar to the examiner and often result in limited content. The student is given a few minutes to complete a planning sheet which contains eight topics (Object, Preparations, Start, Course of play, Rules, Scoring, Duration, and Strategies). Listed next to each topic is a brief description of what's covered within that topic and space for making notes. Following the planning phase, the student is asked to explain the game or sport using his/her notes.

Using this protocol, expository samples tend to be between 5 – 6 minutes in length and have between 50 – 60 complete and intelligible utterances.

Script

I'm interested in finding out how well you do at giving explanations. I'm going to make a recording so I can remember what you say. If you want, you can listen to the recording when we're finished.

I want you to imagine that I am a student about your age. I'm visiting the United States from another country and I want to learn as much as I can about life in the U.S. You can help me by explaining how to play your favorite sport or game. You have lots of choices. For example, you could pick a sport, such as basketball or tennis. You could pick a board game, such as Monopoly or chess. Or you could pick a card game, such as Poker or Rummy. What sport or game do you want to pick?

The student offers an appropriate choice. If a choice is not offered or is inappropriate (such as a video game), reread the examples given above and/or add more examples to aid the student in making an appropriate choice. If the student is still having difficulty making a selection, suggest picking a game or sport recently played in the student's physical education class.

Assume that in my country we don't play [name of sport or game]. I'd like you to explain everything I would need to know to so I could learn to play. I'll expect you to talk for at least five minutes. To help you organize your thoughts, here's a list of topics I'd like you to talk about [hand the student a copy of the planning sheet found on the next page]. Please take the next few minutes to plan your explanation by taking notes in the blank spaces [indicate empty column on the right]. But don't waste time writing sentences. Just write some key words to remind you of what you want to say. You can talk about the topics in the order they are listed, or else you can number the topics any way you wish. If you don't want to take notes, you can use the backside of the list to draw a diagram or make a graphic organizer. Do you have any questions?

If student expresses difficulty with reading any portion of the checklist, read the unclear portions aloud. If the student has difficulty understanding the vocabulary, give an example from a sport or game different from the one the student has chosen.

Go ahead and start planning.

Allow enough time for student to write something for each topic on the checklist or to complete a diagram or graphic organizer. If the student stops writing or drawing before planning is finished, prompt with, "*Please do some planning for [topic name (s)].*"

I'm ready to turn on the recorder. You will be doing all the talking. I'm going to listen to what you have to say. Take as much time as you need to give a complete explanation. Remember: I expect you to talk for at least five minutes.

Turn on recording device and have the student begin speaking. After the student has finished speaking from his/her planning sheet, turn off recording device. If the student finishes speaking before five minutes has elapsed, prompt with, "*Is there anything else you can tell me*?". Review the recording for quality before releasing the student.

Examiner's role during the exposition

Be an attentive listener. Do not give specific cues to the student during the task. You can use nonverbal cues such as head nodding and smiling to promote continued talking. You can also use prompts such as "uhhuh" and "keep going" if the student stops talking before the task is completed. Asking questions or providing too much information to the student compromises the process of capturing the student's true language and ability level.

As stated in the protocol, if the student finishes talking before five minutes has elapsed, prompt with, "Is there anything else you can tell me?". If the student does not respond, the elicitation is over.

Transcription Notes

The language samples were segmented into C-units (see Appendix N). All transcripts were timed and pauses, within and between utterances, of two or more seconds in length, were marked.

Coding Notes

- [EO:word] marks overgeneralization error
- [EP:word] marks pronoun error
- [EW] marks an extraneous or unnecessary word in the utterance that, if omitted, would make the utterance syntactically correct, e.g., C And he shout/ed and[EW] to the frog.
- [EW:word] marks other word-level error
- [EU] marks utterance-level error (*also marks utterances with 3 or more errors*)
- [FP] marks filled pause words such as *like*, e.g., *You (like[FP]) get six card/s.*

Subordination Index (SI) and Expository Scoring Scheme (ESS) Coding

SI and ESS coding was applied to all samples.

SI is a measure of syntactic complexity which produces a ratio of the total number of clauses (main and subordinate clauses) to the number of C-units. A clause, whether it is main or subordinate, is a statement containing both a subject and a predicate. Grammatically, a subject is a noun phrase and a predicate is a verb phrase. Main clauses can stand by themselves. Subordinate clauses depend on the main clause to make sense. They are embedded within an utterance as noun, adjective or adverbial clauses (see Appendix O).

ESS assesses the content and structure of an expository language sample, similar to how the Narrative Scoring Scheme provides an overall measure of a student's skill in producing a narrative. The ESS is comprised of 10 characteristics for completing an expository language sample. The first 8 characteristics correspond to the topics listed on the planning sheet that is given to students (see Appendix Q).

Analysis Notes

The SALT group transcribed the samples following the SALT format and performed a series of statistical analyses to describe the dataset for consistency, differences among types of expository samples, age-related changes, and differences when compared to existing conversation and narrative samples. (Malone, et al., 2008). The following summarize the results of these analyses:

- Different expository contexts (team sport, individual sport, game) do not result in significantly different outcomes. Students describing how to play a team sport provided similar samples in terms of length, vocabulary, sentence complexity as students describing an individual sport or game. This finding is very useful in that it allows students to select the type of game they know best, optimizing their performance on this task.

- Measures of language production were significantly different for expository samples than conversational and narrative samples on measures of utterance length and complexity. Students produced significantly more complex sentences in the expository samples than conversation or narratives. This finding is similar to the findings of Nippold, et al. (2005; 2008).

Using SALT to Compare Samples to the Expository Database

Use SALT's Database menu to compare your sample with age or grade-matched samples selected from the Expository database. SALT looks at the "+ Context" plus line in your transcript to determine which database to pre-select. To pre-select the Expository database, include the following plus lines in your transcript:

+ Context: Expo

Although you can type these plus lines into your transcript, the easiest way is to select the correct sampling context (Expo) when first creating a new transcript (by completing the New Transcript Header information dialogue box).

Planning Sheet

The planning sheet is found at the end of this appendix. Following the planning sheet are two example planning sheets.

Acknowledgements

We gratefully acknowledge and thank Thomas O. Malone, a retired speech-language pathologist, formerly with the Brown Deer School District in Wisconsin, for being the driving force behind this project. His influence is everywhere including, but not limited to, a) recognizing the need for an expository database, b) designing the protocol used, c) recruiting clinicians from Milwaukee-area school districts, d) coding for types of subordination and applying the Expository Scoring Scheme, and e) presenting the results of the project (Malone, et al., 2008, Malone, et al., 2010).

We would like to thank the following clinicians who collected the expository samples:

- Brown Deer School District: Kari Anewenter, Thomas O. Malone, Katherine E. Smith
- Fox Point-Bayside School District: Jody Herbert
- Madison Metropolitan School District: Vicki Ashenbrenner, Kelly Chasco, Helen Chung, Ingrid Curcio, Alyson Eith, Sheryl Hall, Julie Hay-Chapman, Kelsey Beach Hausmann, Lynn Gabrielson, Maureen Gotner, Patty Hay-Chapman, Marie Hendrickson, Andrea Hermanson, Tanya Jensen, Laura Johnson, Abby Mahoney Kabara, Chris Melgaard, Jane Morgan, Andrea O'Neill, Nicole Olson, Nan Perschon, Carolyn Putnam, Carrie Rhode, Mary-Beth Rolland, Liz Schoonveld, Julie Scott-Moran, Jennifer Van Winkle, Helena White, Emily Wolf, Meg Wollner
- Nicolet School District: Karen Kingsbury
- Shorewood School District: Eva Gulotta, Terry Hrycyna, Katie Koepsell, Inga Siler
- Waukesha School District: Bill Downey, Linda Carver, Judy Ertel, Susan Fischer, Jeanne Gantenbein, Lisa Haughney, Christine Herro, Patricia Engebose Hovel, Susan Moennig, Colleen Raupp, Jennifer Theisen, Maureen Waterstraat
- Wauwatosa School District: Beth Bliss, Amy Brantley, Betsy Goldberg, Peg Hamby, Karen Malecki, Christine Maranan, Lynn Meehan, Kathy Meinecke, Angela Quinn, Molly Suberlak, Amanda Voigtlander
- West Allis-West Milwaukee School District: Sarah Bartosch, Joy Behrend, Beth Beno, Ann-Guri E. Bishop, Lindsay Bliemeister, Pat Culbertson, Mary Fuchs, Nicole Gosser, Erin Jodie, Joyce King-McIver, Ellen Reitz, Jan Schmidt, Jill Vanderhoef, Michele Wolaver.
- UW-Milwaukee graduate students: Taylor Hansen, Maggie Long, Maricel Schulte

Samples were transcribed and coded by the University of Wisconsin students working in the Language Analysis Lab and by the staff at SALT Software, LLC. This project was funded in part by SALT Software, LLC.

Resources

- Planning sheet - found at the end of this appendix
- Elicitation materials include laminated protocols, pad of planning sheets

Expository Planning Sheet (*The actual form used can be downloaded from the SALT web site at* www.saltsoftware.com/resources/databases.)

What to Talk About
When Explaining a Game or Sport

Topic	What's Covered	Notes
Object	What you have to do to win	
Preparations	Playing Area and Setup Equipment and Materials What players do to get ready	
Start	How the contest begins, including who goes first	
Course of Play	What happens during a team or player's turn, including any special plays, positions, or roles, both offensive and defensive	
Rules	Major rules, including penalties for violations	
Scoring	Different ways to score, including point values	
Duration	How long the contest lasts, including how it ends and tie breaking procedures	
Strategies	What smart players do to win, both offensively and defensively	

Please use the backside of this page for an optional diagram or graphic organizer, or for additional notes.

APPENDIX

K

ENNI Database

Database	Context (Subgroup)	Age Range	# Samples	Location
ENNI	Nar (ENNI)	3;11 – 10;0	377	Canada

Introduction

The Edmonton Narrative Norms Instrument (ENNI) is an assessment tool for collecting language information from children aged 4 to 9 through storytelling. Pictures that portray a story are presented to a child, who then tells the story to the examiner. Picture sets were drawn for the ENNI by a professional cartoonist; they range from a simple story with 2 characters to a complex story with 4 characters.

Participants

377 typically developing children, aged 3;11-10;0, living in Edmonton, Alberta, Canada and speaking English as a first language. Children were drawn from 34 preschools, daycares, and schools in the public and separate school boards. The range of economic and ethnic backgrounds reflects the diversity in the Edmonton area, as determined by a comparison with Statistics Canada data. Teachers were asked to refer two children in the upper level of achievement, two children from the middle level, and two children in the lower level (one boy and one girl at each level). In all cases, the children who were referred for the typical development sample were not to have speech or language difficulties or any other diagnostic label such as attention deficit disorder, learning disability, or autism. The children constitute the typically developing sample in the Edmonton Narrative Norms Instrument (ENNI), which also contains data from children with language impairment.

Elicitation Protocol

The task is story generation from pictures (not retell). Six original picture sets with animal characters are used to elicit stories, two each at three levels of complexity. The stories are controlled in pairs and systematically varied across levels for length, amount of story information, and number and gender of characters. The pictures for each story are placed in page protectors with each story in its own binder. When administering each story, the examiner first goes through all the pages so that the child can preview the story, after which the examiner turns the pages again as the child tells the story. The examiner turns the page when the child appears to be finished telling the story for a particular picture. The examiner holds the binder in such a way that he or she cannot see the pictures as the child tells the story, which means that the child needs to be explicit if the examiner is to understand the story; the child cannot legitimately use pointing in lieu of language when telling the story. The instructions emphasize that the examiner will not be able to see the pictures, so the child will have to tell a really good story in order for the examiner to understand it.

A training story is administered first consisting of a single episode 5-picture story. The purpose of the training story is to familiarize the child with the procedure and to allow the examiner to give more explicit prompts if the child has difficulty with the task. After the training story is administered, there are two story sets which may be given: Set A (Giraffe/Elephant) and Set B (Rabbit/Dog). You have the option of administering either or both sets. Both story sets were administered to all participants in the database.

When selecting language samples from the database, you have the option including both story sets or restricting the selection to a specific story set by specifying one of the following subgroups:

- Sets A & B = Set A and Set B stories
- Set A = Set A stories (Giraffe/Elephant)
- Set B = Set B stories (Rabbit/Dog)

Transcription Notes

Utterances were segmented into communication units, which consist either of an independent clause plus any dependent clauses or of a partial sentence. Utterances that were broken off by the speaker were counted as mazes. Timing is not indicated in the transcripts. Socioeconomic status, parental education and ethnic background are not indicated in the transcripts.

Coding Notes

The following codes were consistently used:

- [EW:word] marks word-level errors
- [EU] marks utterance-level errors

All picture sets and detailed administration and transcription instructions can be downloaded free of charge at www.rehabmed.ualberta.ca/spa/enni. The ENNI is copyrighted, including the pictures and all other materials. You are welcome to download, print, and use any of the materials for clinical, educational, or research purposes. None of the ENNI materials may be altered in any way or included in publications without permission from the authors.

Acknowledgements

Funding for this study was provided by the Children's Health Foundation of Northern Alberta. The ENNI was created by Phyllis Schneider, Rita Vis Dubé, and Denyse Hayward at the University of Alberta. The authors would like to thank Marilynn McAra, Livia Tamblin, and Linda Kaert for their assistance in data collection, and Jess Folk-Farber, Rhonda Kajner, Roxanne Lemire, Marlene May, Michelle Millson, Ignatius Nip, Michelle Trapp, and Kathy Wagner for their assistance with other aspects of the study.

APPENDIX

L

TNL2 & TNL Narrative Samples Databases

Database	Context (Subgroup)	Age Range	# Samples	Location
TNL2 Narrative Samples	Nar (TNL2)	4;0 – 14;11	778	USA
TNL Narrative Samples	Nar (TNL)	5;0 – 11;11	500	

Introduction

There are two TNL databases. The TNL2 Narrative Samples database contains narratives collected for the standardization of the TNL-2: Test of Narrative Language - Second Edition (Gillam, R., & Pearson, N., 2017). The TNL Narrative Samples database contains narratives collected for the standardization of the original Test of Narrative Language (Gillam, R., & Pearson, N., 2004).

1. TNL2 Narrative Samples database

Database	Context (Subgroup)	Age Range	# Samples	Location
TNL2 Narrative Samples	Nar (TNL2)	4;0 – 14;11	778	USA

The TNL2 Narrative Samples database contains narratives collected for the standardization of the TNL-2: Test of Narrative Language - Second Edition (Gillam, R., & Pearson, N., 2017).

Participants

The "TNL2 Narrative Samples" reference database consists of narrative samples from 778 children, ranging in age from 4;0 to 14;11, including 41 four-year olds, 59 five-year olds, 73 six-year olds, 103 seven-year-olds, 114 eight-year-olds, 122 nine-year-olds, 109 ten-year-olds, 81 eleven-year-olds, 29 twelve-year olds, 29 thirteen-year olds, and 18 fourteen-year olds. The children were in grades PK, K, 1 - 8. The normative sample is representative of the United States as a whole with an equal percentage of male and female participants. Children came from four US regions (Northeast, South, Midwest, and West). Their primary language was English. The race distribution of the children in the sample is 78% white, 14% black or African-American, 5% Asian/Pacific Islander, 2% two or more races, and <1% American Indian/Eskimo/Aleut. Hispanic status consisted of 22% yes and 78% no. Twelve percent of the sample had been identified with a disability. This is consistent with US Department of Education disability statistics. The exceptionality distribution of the sample was 5% Specific Learning Disability (including Developmental Language Disorder), 3% Intellectual Disability, 2% Attention Deficit Hyperactivity Disorder, 1% Physically Impaired, 1% Other Disability.

Elicitation Information

The elicitation format consists of children listening to an adult model of three types of stories, answering comprehension questions, and then producing a similar type of story. Examiners collected data on children's ability to tell stories in three formats: (1) a script-like story (2) a personal-like story (3) a fictional story. The examiner scripts and picture stimuli used to elicit the narratives are available in the TNL-2: Test of Narrative Language –Second Edition (Gillam & Pearson, 2017).

Task 1: McDonald's – Script-like Story (picture cue)
In the first narrative task, the examinee retells a McDonald's script about two children who go to McDonald's with their mother. The script-like story, told to the examinee prior to the production task, contains a number of events that children experience when they eat at a fast food restaurant. The examinee retells the story while looking at the single-picture cue.

Task 2: Late For School – Personal-like Story (five sequenced pictures)
In the second production task, examinees create a story that corresponds to a series of pictures about a boy who wakes up late for school.

Task 3: Aliens – Fictional Story (single picture)
In the third narrative production task, the examinee creates a story that corresponds to a picture of two children who see an alien family get out of a spaceship that lands in a park.

Transcription Notes

Language samples were transcribed according to SALT standard codes and conventions by undergraduate and graduate students in Communication Sciences and Disorders who completed SALT training on transcription and reached 90% or better agreement on three training transcripts. Utterances were segmented into C-units, which were defined as groups of words that could not be further divided without loss of their essential meaning (see Appendix N). After the audio file was transcribed by one research assistant, a second research assistant listened to the tape and marked disagreements with any of the original segmentation and/or coding decisions. All disagreements were resolved by a PhD level research coordinator who listened to the tape as she made a third pass through the transcripts.

All samples were timed, with separate timing markers inserted for each task. Gender, age, and grade information was included in the header. Parentheticals were marked with double parentheses, e.g., *The boy ((I don't know his name)) order/ed a sandwich*. Pauses of two or more seconds within and between utterances were marked.

Coding Notes
- [EO:word] marks overgeneralization error
- [EP:word] marks pronoun error
- [EW] marks an extraneous or unnecessary word in the utterance that, if omitted, would make the utterance syntactically correct, e.g., C And he shout/ed and[EW] to the frog.
- [EW:word] marks other word-level error
- [EU] marks utterance-level error (*also marks utterances with 3 or more errors*)
- [FP] marks filled pause words such as *like*, e.g., *You (like[FP]) get six card/s.*

Transcript Format:
Each transcript contains all three stories. The stories were separated by plus lines with the headers +[BeginMcDonalds], +[EndMcDonalds], +[BeginLateForSchool], +[EndLateForSchool], +[BeginAliens], +[EndAliens]. Timing lines show the elapsed time for each task in the transcript.

For example,

+ [BeginMcDonalds]
- 0:00
C The boy and the girl came home.
C And they want/ed to go eat.
E Ok.
C …….

C And that/'s all I know.
- 1:05
+ [EndMcDonalds]

+ [BeginLateForSchool]
- 2:20
C The boy woke up.
C And he was late for school.
C ……..
C The end.
- 4:15
+ [EndLateForSchool]

+ [BeginAliens]
- 4:55
C A boy and a girl were walk/ing in a park.
C They saw a big ship land.
E Mhm.
C …….
C And that/'s it.
- 7:10
+ [EndAliens]

Using SALT to Compare Samples to the "TNL2 Narrative Samples" Database

SALT looks at the "+ Context" and "+ Subgroup" plus lines in your transcript to determine which database to pre-select. To pre-select the "TNL2 Narrative Samples" database, include the following plus lines in your transcript:

+ Context: Nar
+ Subgroup: TNL2

Although you can type these plus lines into your transcript, the easiest way is to select the correct sampling context (Nar) and subgroup (TNL2) when first creating a new transcript (by completing the New Transcript Header information dialogue box).

When selecting language samples for comparison, you have the option including all three stories or restricting the selection to a specific task by specifying one of the following subgroup/story options:

- All 3 Stories - all three narrative tasks
- McDonalds - the first narrative task only (script retell)
- LateForSchool - the second narrative task only (five sequenced pictures)
- Aliens - the third narrative task only (single picture)

To compare your entire transcript (three narrative tasks) to entire transcripts in the database, use the default Subgroup/Story setting "All 3 Stories". To compare a specific task you would change the current transcript cut (Setup menu --> Transcript Cut) which determines the section of your transcript that you want included in the comparison. For example, to compare the section of your transcript which contains the narrative based only on McDonalds, you would change the transcript cut to begin with the line containing the code [BeginMcDonalds] and end with the line containing the code [EndMcDonalds]. Then you would compare this section of your transcript to the same task from the database by selecting the "McDonalds" subgroup/story.

Acknowledgements

The narratives in this database were collected for the standardization of the TNL-2: Test of Narrative Language (Second Edition), funded by Pro-Ed Inc. Sandra Gillam, PhD coordinated the transcription process. Megan Israelsen supervised the transcribers and checked the transcripts while she was a doctoral student at Utah State University in Logan. The transcribers were Haley Ashcroft, Alison Barlow, Tiegan Beck, Hannah Car, Kennedy Eggertsen, Cecily Froerer, Natalie Green, Sarai Holbrook, Natalie Johnson, Aubrey Passey, Madeline Peterson, Rebecca Polson, Amy Siler, Sierra Southwick, Ashlynn Thompson, Jenice Winterton, Daylene Weller, and Samantha Woodward. Gillam, R., & Pearson, N. (2017). *Test of Narrative Language* (Second Edition), Austin, TX: Pro-Ed Inc

2. TNL Narrative Samples database

Database	Context (Subgroup)	Age Range	# Samples	Location
TNL Narrative Samples	Nar (TNL)	5;0 – 11;11	500	USA

The TNL Narrative Samples database contains narratives collected for the standardization of the original Test of Narrative Language (Gillam, R., & Pearson, N., 2004).

Participants

This reference database consists of narrative samples from participants ranging in age from 5;0 to 11;11, including 50 five-year olds, 100 six-year olds, 100 seven-year-olds, 100 eight-year-olds, 50 nine-year-olds, 50 ten-year-olds, and 50 eleven-year-olds. There are an equal number of boys and girls at each age. Children came from four US regions (Northeast, South, Midwest, and West). Their primary language was English and they had not been identified with a disability and were not receiving any special education services. The race/ethnicity distribution of the children in the sample is 71% white (not Hispanic), 11% black or African-American, 10% Hispanic, and 8% other or not reported.

Elicitation Protocol

Examiners collected data on children's ability to tell stories in three formats: (1) a script retell (no picture cues), (2) a story about five sequenced pictures, and (3) a fictional narrative based on a single picture. The examiner scripts and picture stimuli that were used to elicit the narratives are available in the Test of Narrative Language (Gillam & Pearson, 2004).

Task 1: McDonald's - Script Retell (no picture cues)
In the first narrative format, the examiner reads aloud a story about two children who go to McDonald's with their mother. Because no picture cues are provided, the child must rely on auditory memory to answer literal and inferential comprehension questions about the story. After answering the story comprehension questions, the child is asked to retell the entire McDonald's story. The child's retelling was transcribed.

Task 2: Late For School - Five Sequenced Pictures
The examiner shows the child a sequence of five pictures that illustrate the critical events in a single episode story that the examiner tells. The story is about a child who creates a school project at home, falls, and breaks the project on the way to school, and then fixes the project when she gets to school. After reading the story to the child, the examiner asks the child to answer nine literal and inferential comprehension questions about the characters, events, and consequences in the story. The comprehension questions and answers were not transcribed. The examiner then shows the child a sequence of five new pictures that depict a sequence of events about a boy who is late for school. The child's oral story about the sequence of pictures was transcribed.

Task 3: Aliens - Single Picture
The examiner tells a multi-episode story that corresponds to a picture of two children who are looking at a treasure being guarded by a dragon. The examiner asks ten literal and inferential comprehension questions about the characters, events, problems, and consequences in the story. The comprehension questions and answers were not transcribed. The examiner then shows the child a picture of two children who witness a family of aliens walking out of a spaceship that has landed in a park. The child's oral story that corresponded to the picture of a fictional event was transcribed.

When selecting language samples from the database, you have the option including all three stories or restricting the selection to a specific story by specifying one of the following subgroups:

- All 3 Stories - all three narrative story tasks
- McDonalds - the first narrative task only (script retell)
- LateForSchool - the second narrative task only (five sequenced pictures)
- Aliens - the third narrative task only (single picture)

Transcription Notes

Language samples were transcribed according to SALT conventions by undergraduate and graduate students in Communication Sciences and Disorders who completed a course on transcription and reached 90% or better agreement on three training transcripts. Utterances were segmented into C-units, which were defined as groups of words that could not be further divided without loss of their essential meaning. After the tape was transcribed by one research assistant, a second research assistant listened to the tape and marked disagreements with any of the original segmentation and/or coding decisions. All disagreements were resolved by a PhD level research coordinator who listened to the tape as she made a third pass through the transcripts. Timing information was not coded. Gender, age, and ethnicity information is included in the header.

Coding Notes

- [EO:word] marks overgeneralization error
- [EP:word] marks pronoun error
- [EW] marks an extraneous or unnecessary word in the utterance that, if omitted, would make the utterance syntactically correct, e.g., C And he shout/ed and[EW] to the frog.
- [EW:word] marks other word-level error
- [EU] marks utterance-level error (*also marks utterances with 3 or more errors*)
- [FP] marks filled pause words such as *like*, e.g., *You (like[FP]) get six card/s.*

Using SALT to Compare Samples to the TNL Narrative Database

Use SALT's Database menu to compare your sample with age or grade-matched samples selected from the TNL Narrative database. SALT looks at the "+ Context" and "+ Subgroup" plus lines in your transcript to determine which database to pre-select. To pre-select the TNL Narrative database, include the following plus lines in your transcript:
+ Context: Nar
+ Subgroup: TNL

Although you can type these plus lines into your transcript, the easiest way is to select the correct sampling context (Nar) and subgroup (TNL) when first creating a new transcript (by completing the New Transcript Header information dialogue box).

Acknowledgements

The narratives in this database were collected for the standardization of the Test of Narrative Language, funded by Pro-Ed Inc. Denise Hayward, PhD, supervised the transcription process while

she was a post-doctoral fellow at the University of Texas at Austin. Allie Baron, Kara Bergemann, Samantha Castenuela, Jennifer Heard, Lisa Hendrix, Rebecca Garcia, Amy Grant, Tiffany Porter, Beth Schwab, and Davnee Wilson transcribed and checked the narratives. Gillam, R., & Pearson, N. (2004). Test of Narrative Language, Pro-Ed Inc.

APPENDIX

M

Summary of SALT Transcription Conventions

1. Transcript Format. Each entry begins with one of the following symbols. If an entry is longer than one line, continue it on the next line.

$ Identifies the speakers in the transcript; always the first line of the transcript.
Example: $ Child, Examiner

C Child/Client utterance. The actual character used depends on the $ speaker line.

E Examiner utterance. The actual character used depends on the $ speaker line.

+ Header information such as name, age, context, codes used in sample (e.g., + CA: 5;7). Also used for inserting test scores.

- Time marker. Example of two-minute marker: - 2:00

: Pause between utterances of different speakers.
Example of five-second pause: : :05 or :05

; Pause between utterances of same speaker.
Example of three-second pause: ; :03 or ;03

= Comment line. Information used for transcriber comments - not analyzed in any way.

2. End of Utterance Punctuation. Every utterance must end with one of these six punctuation symbols.

. Statement, comment. Do not use a period for abbreviations.

! Surprise, exclamation.

? Question.

~ Intonation prompt.
Example: E And then you have to~

^ Interrupted utterance. The speaker is interrupted and does not complete the thought/utterance.

> Abandoned utterance. The speaker does not complete the thought/utterance but has not been interrupted.

3. { } Comments within an utterance.
Example: C Lookit {C points to box}.
Nonverbal utterances with communicative intent are placed in braces. Example: C {nods}.

4. Unintelligible Segments. X is used to mark unintelligible sections of an utterance. Use X for an unintelligible word, XX for an unintelligible segment of unspecified length, and XXX for an unintelligible utterance.
Example 1: C They went X X park. Example 2: C He XX today. Example 3: C XXX.

5. Bound Morphemes. Words which contain a slash "/" indicate that the word is inflected or contracted in a regular manner. The root word is entered in its base spelling followed by a slash "/" and then the bound morpheme. *See the section at end of this appendix explaining the rationale behind marking bound morphemes.*

English and Spanish

/S Plural. Examples: kitten/s, baby/s, rana/s, flor/s.
Do not mark words that end in "s" but represent one entity (e.g., pants, binoculars).
Do not mark irregular forms (e.g., mice, geese, deer) or when the sound of the root changes (e.g., leaves, wolves).

English only

/Z Possessive inflection. Examples: dad/z, Mary/z
Do not mark any possessive pronouns (e.g., mine, his, hers, ours, yours, its, theirs).

/S/Z Plural and Possessive. Example: baby/s/z

/3S 3rd Person Singular verb form. Examples: go/3s, tell/3s, try/3s
Do not mark irregular forms (e.g., has, was) or when the sound of the root changes (e.g., do→does, say→says).

/ED Past tense. Examples: love/ed, die/ed
Do not mark irregular forms (e.g., did, grew, had, sank) or predicate adjectives (e.g., was tired, are bored, got fixed).
Transcription hint: regular past tense /ED verbs never follow a BE or GET verb.

/EN Past participle. Examples: take/en, eat/en, prove/en
Do not mark irregular forms (e.g., gotten, spoken, seen, been) or when the sound of the root changes (e.g., write→written).
Transcription hint: Regular form: present tense + EN as separate syllable. /EN verbs always follow HAVE, HAS, or HAD.

/ING Progressive verb form. Examples: go/ing, run/ing, bike/ing
Do not mark the gerund use of the verb form (e.g., went swimming, reading is fun).

/N'T, /'T Negative contractions. Examples: can/'t, does/n't
Do not mark irregular forms (e.g., won't) or when the sound of the root changes (e.g., do→don't).
/'LL, /'M, /'D, /'RE, /'S, /'VE Contracted → WILL, AM, WOULD, ARE, IS, HAVE
Examples: I/'ll, I/'m, I/'d, we/'re, he/'s, we/'ve
/H'S, /H'D, /D'S, /D'D, /'US Contracted → HAS, HAD, DOES, DID, US
Examples: He/h's been sick. We/h'd better go. What/d's he do for a living? Why/d'd the boy look there? Let/'us go.

6. Bound Pronominal Clitics (Spanish only). Pronominal clitics may be either bound or unbound. When bound, they are preceded by a plus sign. Examples: gritándo+le, déja+lo, dá+me+lo

7. Mazes. Filled pauses, false starts, repetitions, and reformulations.
( ) Surrounds the words/part-words that fall into these categories. Combine adjacent mazes. Example: C And (then um) then (h*) he left.

8. Omissions. Partial words, omitted words, omitted bound morphemes, and omitted pronominal clitics are denoted by an asterisk (*).
* Following one or more letters indicates that a word was started but left unfinished.
Example: C I (w* w*) want it.
* Preceding a word indicates that an obligatory word was omitted.
Example: C Give it *to me.
/* Following a slash the * is followed by the obligatory bound morpheme which was omitted. Example: C The car go/*3s fast.
+* Following a plus sign the * is followed by the obligatory Spanish pronominal clitic which was omitted. Example: C Él está gritándo+*le a la rana.

9. Overlapping Speech. When two speakers are speaking at the same time, the words which occur at the same time are surrounded by angle brackets < >.
Example: C Can I have that <one>?
E <Uhhuh>.
When one speaker interjects in the middle of another speaker's utterance, use empty angle brackets to indicate the position of the interjection.
Example: C I want you to do it < > for me.
E <Ok>.

10. Linked words. The underscore "_" is used to link multiple words so they are treated as a single word. Uses include:
Titles of movies and books.
Examples: Beauty_and_the_Beast, Frog_Where_Are_You
Proper names.
Examples: Mrs_Jones, Sr_Rojas
Words or phrases repeated multiple times.
Example: He ran ran_ran|ran as fast as he could.

11. Root identification. The vertical bar "|" is used to identify the root word.
Overgeneralization errors.
Example: C He goed|go[EO:went] to the park by himself.
Linked words repeated for emphasis.
Examples: C The boy ran very very_very|very fast.
C Dijeron rana rana_rana|rana dónde estás.
English only: Root form of irregular verbs.
Note that the root forms of irregular verbs are not identified in any of the SALT reference databases.
Example: C The bird flew|fly/ed away.

12. Sound Effects and Idiosyncratic Forms %. The percent sign is used to identify sound effects which are essential to the meaning or structure of the utterance. Non-essential sound effects are entered as comments. Strings of the same sound are linked together.
Example 1: C The dog went %woof_woof.
Example 2: C The dog barked {woof woof}.
The percent sign is also used to identify idiosyncratic forms. These are immature productions which are consistent in reference to an object, person, or situation.
Example 1: C See %vroom {car}.
Example 2: C My %coopa {cookie}.

13. Spelling Conventions.
- Abbreviations: Periods are not legal word characters. Abbreviated words should either be written out or left as an

abbreviation but without the period. Examples: Mr, Mister, Mrs, Dr, Sra, Señora

- Filled pause words: AH, EH, ER, HM, HMM, UH, UM, MM, and any word with the code [FP]
- Yes words: OK, AHA, MHM, UHHUH (*English & Spanish*)
  YEAH, YEP, YES (*English only*)
  SÍ (*Spanish only*)
- No words: NO, AHAH, MHMH, UHUH (*English & Spanish*)
  NAH, NOPE (*English only*)
- Hyphenated words follow standard spelling conventions. Examples: mother-in-law, pick-me-up, good-hearted, twenty-five
- Numbers (*examples*): twenty-one or 21; dieci-siete or 17 (*choose a format and be consistent*)
- Clock time: Do *not* use colons when typing clock time because it will be interpreted as a pause. Type out the words connected with an underscore character. Examples: eight_thirty, la_una_treinta
- Counting and "spelled" words use the underscore character to connect the numbers or letters.
  Examples: 1_2_3_4_5, C_A_T
- Shortened words: Either use the vertical bar to identify the word or use the full word. In the following example, the speaker said "cuz". No matter which format you use, the word root in this example is analyzed as "because".
  Example: C He was sad cuz|because they left.
  C He was sad because they left.
- English concatenatives:

BETCHA (*bet you*)	LOOKIT (*look at it*)	TRYNTA (*trying to*)
COULDA (*could have*)	MUSTA (*must have*)	USETA (*used to*)
GONNA (*going to*)	OUGHTA (*ought to*)	WANNA (*want to*)
GOTTA (*got to*)	OUTTA (*out of*)	WHATCHA (*what are you)*
HAFTA (*have to*)	SHOULDA (*should have*)	WOULDA (*would have*)
LIKETA (*like to*)	SPOSTA (*supposed to*)	

- Sounds with specific meanings:
  HMM, HUH (question or affirmation), IDK (intoned *I don't know*), UHOH (something is wrong), SHH or %SHH (be quiet), PSST, %PSST (to get someone's attention)
- Other English spellings:
  AIN'T, ALOT, ATTA, NOONE, OH, OOH, OOP, OOPS, OOPSY
- Reflexive vs Non-reflexive pronouns (Spanish only):
  The following pronouns can be used both reflexively and non-reflexively: ME, TE, SE, OS, NOS. Attach the code [X] when used reflexively.
  Examples: C El niño se[X] fue con el perro.
  C El perro me ayudó a conseguir la rana.

14. [ ] Codes. Codes are used to mark words or utterances. Codes are placed in brackets [ ] and cannot contain blank spaces. Codes used to mark words are inserted at the end of a word with no spaces between the code and the word. Codes used to mark utterances are inserted at the end of the utterance or at the position of the feature you wish to mark, separated by at least one space from adjacent word(s).

a) Codes used to mark errors in the reference database samples:

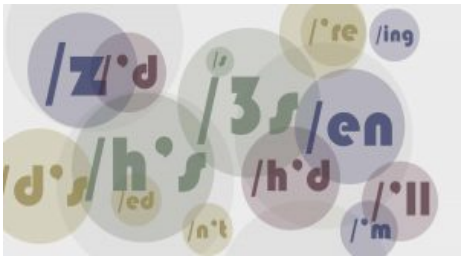
[EO:__] marks overgeneralization errors.	C He falled|fall[EO:fell].
[EP:__] marks pronoun errors.	C And them[EP:they] found the frog.
[EW] marks extraneous words.	C He were[EW:was] look/ing.
[EW:__] marks other word-level errors.	C And then the boy is a[EW] sleep/ing.
[EU] marks utterance-level errors.	C And they came to stop/ed [EU].
[FP] marks non-standard filled pause words.	C The dog (um like[FP]) fell down.

b) Other codes used in the Bilingual Spanish/English reference database samples:

[F] marks fragments due to utterance segmentation in modified communication units.	C The gopher look/ed out of the hole. C and bit the boy [F].
[CS] marks code-switched words.	C The dog fell from la[CS] ventana[CS].
[WO] marks utterances with non-standard word order.	C And then fell down the dog and the boy [WO].
[I] marks vocabulary provided by the examiner (imitated word).	C And the :05 <> owl[I] scare/ed him. E <Owl>.
[X] marks Spanish reflexive pronouns.	C El niño se[X] fue con el perro.

Why do we mark some bound morphemes and not others?

Originally posted as a SALT blog on December 11, 2018



The SALT reference databases use a very specific set of conventions for marking bound morphemes. Our protocols do not represent the only way to mark morphemes but if you want to compare your sample against our databases, it is important for you to use these same conventions.

If you aren't interested in the nuts and bolts, just skip down to the "Summary" section. It's the most condensed version of the SALT rules for marking bound morphemes that we can manage!

The SALT rules for marking bound morphemes may seem obscure at first. But there is method to our madness. This blog explains the rationale behind SALT's conventions for marking bound morphemes. It goes beyond, "because it's been this way for a long time and here are the rules to memorize". Or, a little more clinically, "because these are the developmental morphemes and here are the rules to memorize". Our hope in writing this blog is that by understanding the "why" behind the conventions, the rules will make more sense and, hopefully, it will be easier to implement them.

To a large extent, SALT's convention for marking bound morphemes is patterned after the conventions used by Roger Brown (1973) in the calculation of MLUm (mean length of utterance in morphemes) back in the early days of language sample analysis.

Inflectional morphemes versus Derivational morphemes

Many of the explanations and examples in this section are taken from the following websites:

- https://semanticsmorphology.weebly.com/inflectional-and-derivational-morphemes.html
- http://www.mathcs.duq.edu/~packer/Courses/Psy598/Ling-Morphology.pdf

Brown excluded derivational morphemes in the calculation of MLUm. To understand why, we first need to distinguish between the two types of bound morphemes – inflectional and derivational.

- **Inflectional morphemes** are used to show some aspects of the grammatical function of a word. *They are always suffixes and always result in the same part of speech.* We use inflectional morphemes to indicate if a word is singular or plural, whether it is a comparative or possessive form, and to mark tense. *Inflectional morphemes never change the grammatical category* (part of speech) of a word. For example, *shoe* and *shoes* are both nouns, *tall* and *taller* are both adjectives, and *look* and *looked* are both verbs. The inflectional morphemes simply produce different versions of the words.

  There are eight inflectional morphemes. They are shown in the following table:

Inflectional Morphemes		Added to	Example
-s, -es	plural	nouns	I have two black cat**s**.
-'s, -s'	possessive	nouns	My dog**'s** bark is very loud.
-er	comparative	adjectives	I have long**er** hair than you do.
-est	superlative	adjectives	He has the big**gest** pumpkin.
-s	3rd person singular	verbs	She run**s** fast.
-ed	past tense	verbs	He play**ed** basketball.
-en	past participle	verbs	She has eat**en** everything.
-ing	progressive tense	verbs	He is play**ing** basketball.

When children use inflectional morphemes, they are (generally) demonstrating their knowledge of the base word *as well as* their ability to encode the plural, possessive, or tense of that root word.

- **Derivational morphemes**, in contrast, are used to create new words or to make words of a different grammatical class (part of speech) from the root form. For example, by adding the derivational morpheme -er the verb *read* becomes the noun *reader*. The addition of -ize changes the adjective *normal* to the verb *normalize*. Similarly, we can derive the adjectives *helpful* and *helpless* by adding -ful and -less to the noun *help*.

  However, some derivational morphemes do not change the grammatical category of a word but they do significantly change the meaning of the word. For example, we can derive the nouns *neighborhood* and *kingdom* by adding the derivational suffixes -hood and -dom to the nouns *neighbor* and *king*. And derivational prefixes such as un- and re- generally do not change the category of the word to which they are attached. Thus, both *happy* and *unhappy* are adjectives, and both *fill* and *refill* are verbs. But each of these pairs of words, although clearly related, have very different meanings.

  Derivational morphemes may be either suffixes or prefixes and usually, but not always, result in a different grammatical category. The following table lists some of the common derivational morphemes:

Common Derivational Morphemes (Suffixes)	Added to	Results in	Examples
-ize	nouns adjectives	verbs verbs	rubber**ize** normal**ize**
-ful	nouns	adjectives	play**ful**, help**ful,** beauti**ful**
-ly	nouns adjectives	adjectives adverbs	man**ly**, friend**ly** proud**ly**
-sion	verbs	nouns	discus**sion**
-hood, -dom	nouns	<same>	neighbor**hood**, king**dom**
Derivational suffixes which overlap with inflectional suffixes (*though they serve a different purpose*)			
-er	verbs nouns/verbs	nouns nouns	read**er** grad**er**
-ed	verbs	adjectives	am tir**ed**, was bor**ed**
-en	verbs	adjectives	this spot is tak**en**
-ing	nouns/verbs nouns/verbs	nouns adjectives	bik**ing** is fun interest**ing** story

Common Derivational Morphemes (Prefixes)	Added to	Results in	Examples
un-, a- dis-, re- anti-	Adjectives verbs nouns	<same>	**un**happy, **a**typical **dis**like, **re**fill, **re**evaluate, **re**view **anti**-aircraft

According to Brown, young children generally do not learn a base word and then apply a derivational morpheme to encode extra information. Instead, they usually learn these as fully-formed, independent words with their own specific meaning. Although derivational morphemes can logically be split into a root word and a prefix or suffix, these smaller parts are not meaningful to the child speaker and so they should not be considered separate morphemes in this case.

Guo, et al. (2018) gives evidence for this, including:

- There is ample psycholinguistic evidence that base words and derived words (e.g., *beauty*, *beautiful*) are stored as separate lexical entries and should be given equal weight.
- Children may learn a derived word (e.g., *beautiful, interesting*) before the base word (e.g., *beauty, interest*). It seems unlikely that children would add the derivational morphemes to these base words to form the derived words. Side note: to test this, we looked at samples from 355 typically-developing children under the age of 7 taken from the SALT Play and Conversation databases. The derived word *beautiful* was used five times while its base form *beauty* was only used once. And *interesting* was used twice and there were no instances of its base form *interest*.

They consider that derivation is a word-formation process, not a grammatical encoding process. Therefore, derivation reflects a speaker's lexical skills, not grammatical skills.

So what are the rules behind the SALT conventions?

RULE 1: Do not mark derivational morphemes. **Do mark (most) inflectional morphemes.**

Why?
In short, we want to mark bound morphemes when they reflect the child speaker's understanding that the prefix/suffix has a meaning separate from the root word. When using derivational morphemes - learned as fully-formed, independent words - a child speaker is only utilizing a single meaning. In contrast, when using an inflectional morpheme, the child is utilizing two meanings: the root word and the encoded plural/possessive/tense meaning.

By not marking derivational morphemes, we do not give the speaker credit for bound morphemes which change the meaning of the word (e.g., happy → unhappy) or change its grammatical category (e.g., friend → friendly).

However, when the child speaker is likely to have understood the separate meanings of the bound morphemes, we do want to mark them. So we mark most inflectional morphemes. Most, but not all...

RULE 1a: Do not mark the comparative (inflectional) morphemes -er and -est.

Why not?
Although -er and -est are inflectional morphemes, Brown did not count them because they are not obligatory. According to Guo, et al (2018), this means that it is a stylistic choice whether to use comparative and superlative form rather than the uninflected adjective. For instance, when given a choice of several balls of varying sizes, a child may select the largest one and say, "*I have the big one*" unless prompted to make a comparison.

RULE 1b: Do not mark irregular forms.

Why not?
Irregular forms are counted as single morphemes because children (generally) learn them as separate forms, rather than inflections of their base forms.

The following table lists examples of irregular words:

Category	Examples of irregular words
plural	man → men, foot → feet, cactus → cacti, deer → deer
all possessive pronouns	I → mine, he → his, she → hers, we → ours, you → yours, it → its, they → theirs
3rd person singular	have → has, is → was
past tense	begin → began, break → broke, go → went, get → got
past participle (*regular form is present tense + EN as separate syllable*)	begin → begun, break → broken, go → gone, get → gotten, see → seen, be → been
negation	will → won't

Some words are irregular because the sound of the base form changes. These words follow the standard spelling for inflected or contracted words but change its sound. Some examples follow:

Category	Examples of changed sound
plural	leaf → leaves, wolf → wolves
3rd person singular	do → does, say → says
past participle	drive → driven, write → written
negation	do → don't

RULE 1c: Do not mark plurals for words which do not have a singular form.

Why not?
Children would not have learned the singular form in order to then apply the rule for plurals. Following are some examples:

Examples of Plurals Without a Singular Form			
belongings binoculars breeches clothes drawers	glasses (*spectacles*) goggles jitters knickers pajamas	pants panties remains riches shenanigans	shorts suds tights trousers tweezers

RULE 2: Do not mark concatenatives.

Why not?
Brown counted concatenatives as single morphemes because, like irregular forms, children may have stored them as holistic chunks. Following is a list of concatenatives:

Examples of Concatenatives (*meaning*)		
betcha (*bet you*)	lookit (*look at it*)	trynta (*trying to*)
coulda (*could have*)	musta (*must have*)	useta (*used to*)
gonna (*going to*)	oughta (*ought to*)	wanna (*want to*)
gotta (*got to*)	outta (*out of*)	whatcha (*what are you*)
hafta (*have to*)	shoulda (*should have*)	woulda (*would have*)
liketa (*like to*)	sposta (*supposed to*)	

RULE 3: Mark contracted words.

Why?
Contractions combine two words into one (e.g., *we are* → *we're*). The speaker is given credit for the same number of morphemes whether using two words or the one contracted word.

Contractions		Examples
-'t -n't	negation	I can**'t** leave yet. He does**n't** know better
-'s	is has does us	It**'s** time to go. He**'s** been sick. What**'s** he do for a living? Let**'s** go.
-'re	are	You**'re** late.
-'m	am	I**'m** ready to take the test.
-'ll	will	I**'ll** wait over here.
-'d	would had did	He**'d** do it. He**'d** better leave now. Why**'d** the boy look over there?
-'ve	have	We**'ve** a lot to do.

Summary

These rules can be summarized as:

- Only mark the following inflectional morphemes and contractions.

Inflectional Morphemes			Contractions	
/s	plural		/'t, /n't	negation
/z	possessive		/'s, /'re, /'m	is, are, am
/3s	3rd person singular		/'ll, /'d	will, would
/ed	past tense		/'ve, /h's, /h'd	have, has, had
/en	past participle		/d's, /d'd	does, did
/ing	progressive tense		/'us	us

- Do not mark irregular forms, concatenatives, or plurals which do not have a singular form.

Formatting Notes

- Use a slash (/) for bound morphemes which follow the free morpheme (suffixes) and use a backslash (\) for bound morphemes which precede the free morpheme (prefixes). There should be no spaces between the free morpheme and the bound morpheme(s).
- When the spelling of a free morpheme such as CRY changes with the addition of the bound morpheme, use the root spelling of the free morpheme (as if the bound morpheme is not there). Then, simply add the slash plus the bound morpheme (i.e. CRY/ED). If this is not done, the stem CRI will be treated as a different word from CRY and thereby inflate Type-token ratio (TTR) as well as Number of Different Words (NDW).

A Final Note

While we feel that Roger Brown's research published in 1973 has stood the test of time, we understand that it is not the only way to understand the use of morphemes or to calculate MLUm. If you have a language sample from which you want to compare the transcript with samples selected from the SALT reference databases, then these conventions are the most appropriate. However, these conventions may not be appropriate for all speakers or in all cases.

APPENDIX

N

C-Unit Segmentation Rules

The analysis of oral language samples requires recorded speech to be segmented or divided into units. There are a few different approaches to segmenting utterances, such as phonological units, T-units, and C-units. This document describes the rules for segmenting utterances into Communication Units (C-units), a rule-governed and consistent way to segment utterances.

Disclaimer: There is variation in the literature on how to segment utterances into C-units. All of the samples in the English SALT reference databases were segmented into C-units following the rules in this document. If you intend to compare your sample with samples selected from these databases, you should segment utterances following the same rules.

Definitions

- C-Unit
  The formal definition of a C-unit is "an independent clause with its modifiers". It includes one main clause with all subordinate clauses attached to it. It cannot be further divided without the disappearance of its essential meaning.

- Clause
  A clause, whether it is the main clause or a subordinate clause, is a statement containing both a subject and a predicate. Grammatically, a subject is a noun phrase and a predicate is a verb phrase.

Segmenting Utterances into C-Units

Main clauses can stand by themselves and can be segmented into one C-unit. Subordinate clauses DEPEND on the main clause to make sense. They cannot stand alone or be separated from the main clause. So a C-unit will either consist of a main clause or a main clause with its subordinating clause(s). The following examples are broken down into main and subordinate clauses. The main clause is bolded and the subordinate clauses are underlined.

The canary was perched on a branch <u>when the man approached him</u>.
Anastasia was angry with her mother <u>because she didn't get to buy a toy</u>. <u>When the boy looked in the jar</u> **he saw** <u>that the frog was missing</u>.

Notice the subordinate clauses cannot stand alone, or are incomplete, without the main clause. Thus, they are not separated (segmented further) from the main clause. Each of the above utterances consists of one C-unit and would be transcribed as:

C The canary was perched on a branch when the man approach/ed him.
C Anastasia was angry with her mother because she did/n't get to buy a toy.
C When the boy look/ed in the jar, he saw that the frog was missing.

Coordinating and Subordinating Conjunctions

When segmenting into C-units it is important to understand the different types of conjunctions which are used to link clauses. There are *coordinating* conjunctions and *subordinating* conjunctions.

- Coordinating Conjunctions

  The segmenting rule is simple when utterances contain coordinating conjunctions. These conjunctions link two main clauses which should be separated/segmented into two utterances (or two C-units) that can each stand alone. Common coordinating conjunctions include: and, but, so (but not "so that"), and then, then.

  Example 1:
  C The frog was sit/ing on a lily pad.
  C And then it jump/ed in.
  Example 2:
  C He had to catch the frog.
  C Or the waiter would make them leave.
  Example 3:
  C He climb/ed up on the branch/s.
  C But they were/n't branch/s.
  Example 4:
  C My aunt gave me money for my birthday.
  C So I use/ed it to buy some new jeans.

- Subordinating Conjunctions

  Subordinating conjunctions link a main clause and a subordinate clause. A C-unit includes the main clause with all subordinate clauses attached to it. The following are examples of subordinating conjunctions:
  Early Development: because, that, when, who
  Later Development: after, before, so (that), which, although, if, unless, while, as, how, until, as__as, like, where, since, although, who, before, how, while

  Example 1:
  C He went to the store because he was out of milk.
  Example 2:
  C When the boy saw it, the frog jump/ed.
  Example 3:
  C The man, who usually come/3s to my exercise class, was/n't there today.
  Example 4:
  C We can/'t find my cat who always run/3s away.

- "because" and "so"

  Always consider "because" as a subordinating conjunction. It will not start an utterance unless:
  A) It is preceded by the utterance of another speaker as in this example:
  C I like/ed the movie alot.
  E Why did you like it?
  C Because it was really funny.

  OR

  B) The subordinating clause is the first clause in the utterance as in this example:

C Because my mom was so mad, I did my homework first thing after school.

The word "so" can either be a coordinating conjunction or a subordinating conjunction. If its usage means "so that", it is a subordinating conjunction. Otherwise it is a coordinating conjunction.

Example 1 ("so" used as a coordinating conjunction):
C He had to go home.
C So we could/n't go to the game.

Example 2 ("so" used as a subordinating conjunction):
C He had to go home so his mom could take him to the dentist.

<u>Other rules for segmenting C-units</u>

- Sentence fragments

Sentence fragments are counted as separate C-units when the final intonation contour of the utterance indicates that a complete thought has been spoken. For example:
C The boy, the dog, and the frog, they were friend/s.
Versus
C The boy, the dog, and the frog. { fragment based on intonation }
C They were friend/s.

- Elliptical responses

Elliptical responses (sentence fragments) to questions or prompts from the examiner are counted as separate C-units. For example:
E What did you do next?
C Shop/ed.

- Yes/No responses or affirmations

If a question or intonation prompt is posed, segment the yes/no response from the subsequent utterance when succeeded by a complete utterance/C-unit. Examples:
E Is that the Spanish teacher?
C No.
C That/'s my science teacher.

E Do you want to read your book now?
C No.
C I don't.

E Do you have any pet/s?
C Yeah.
C I have a dog.

If a question or intonation prompt is posed, do *not* segment the yes/no response to stand alone when followed by an incomplete utterance/C-unit.
E Do you have any pet/s?
C Yeah, a dog.

If an utterance begins with an affirmation or starter, and does not follow a question or ~ prompt, do not segment the affirmation/starter from the subsequent words.
E I like dog/s.

C Yeah, I do too.
E That sound/3s interesting.
C Yeah, it was.
C It was really fun.
C Yeah, we had such a great time.

- Tags

Do not segment phrases such as “you know”, “I guess”, and “I mean” when they are used as tags. For example:

C He/’s gonna live with his dad, I guess.
C And then, you know, they were go/ing to this town.

- Questions as Tags

Do not segment questions when they are used as tags. For example:

C They got in trouble, right?
C He miss/ed the bus, did/n't he?

- Dialogue Complement/Complement

Dialogue quotes which are embedded in, or as part of, an utterance are counted as one C-unit as in this example:

C And the boy said, “That/’s my frog”.

Successive main clauses that occur in dialogue quotes are counted as separate C-units. For example:

C And he said, “I/’m ready”.
C “I want to go to the store now”.

Complement:

C She thought, “Sam was incorrect”.
C He realize/ed, nothing has changed.

- Grammatical errors

Ignore grammatical errors when segmenting utterances. For example,

C They is[EW:are] go/ing now. {child said, “They is going now.”}
C We *are go/ing too. {child said, “We going too.”}

- Pauses and intonation

Do not ignore pauses and intonation when segmenting utterances but, whenever reasonable, segment utterances based on grammar rules. When listening to speech, for example, there is sometimes a significant pause (with or without ending intonation) between a main clause and a subordinate clause. This inclines one to segment the utterance. With C-unit segmentation, however, the utterance would not be segmented as in this following example where the speaker paused for two seconds between the main clause and the subordinate clause:

C I like/ed the movie alot :02 because it was really funny.

In the following example, however, consider pause time and intonation:

C I like/ed the movie alot.
: :02
E Mhm.
C Because it was really funny.

If there is a significant pause and ending intonation (falling for statements, rising for questions) between the speaker's first utterance and the examiner's "Mhm", segment the utterances as show above. Otherwise, give the speaker credit for subordination and transcribe these "prompt sounds" as interjections as follows:

C I like/ed the movie alot :02 < > because it was really funny.
E <Mhm>.

References:

The rules for C-unit segmentation were summarized from Hughes, McGillivray, and Schmidek (1997), Loban (1976), Strong (1998), and Jon Miller's class notes from Communicative Disorders 640, Fall, 1999.

APPENDIX

O

Subordination Index

Introduction

This guide contains the scoring rules for the Subordination Index (SI), and directions for using SALT to enter SI codes into a transcript and to generate the SI reports.

SI definition: SI is a measure of syntactic complexity which produces a ratio of the total number of clauses to the total number of C-units (or modified C-units for samples of bilingual Spanish/English speakers). A clause, whether it is main or subordinate, is a statement containing both a subject and a predicate. Grammatically, a subject is a noun phrase and a predicate is a verb phrase. Main clauses can stand by themselves. Subordinate clauses depend on the main clause to make sense; they are embedded within an utterance as noun, adjective, or adverbial clauses. The SI analysis counts clauses.

This measure has been used in research studies since Walter Loban first created it to document complex sentence development (Loban, 1963). The attraction of this measure is the straight forward definitions of complex syntax with a scoring system that can be completed efficiently. It still requires hand coding in that these syntactic features cannot be identified accurately using lexical lists. An added feature is that it can be used with languages other than English. Our research on Spanish-English bilingual children used the SI to quantify complex syntax across the two languages. We found that a transcript can be coded in less than 10 minutes, with most time spent on the few unique utterances. Loban demonstrated that the SI captured advancing syntactic gains from kindergarten through grade 12.

SI codes: Language samples, which have been transcribed and segmented into C-units (or modified C-units), are coded at the end of each utterance using the codes [SI-0], [SI-1], [SI-2] which means subordination index – 0 clauses, 1 clause, 2 clauses within the utterance. The code, [SI-X], should be inserted at the end of utterances which are excluded from the SI analysis set (see Scoring Rules).

SI composite score: The SI composite score is calculated by dividing the total number of clauses by the total number of utterances.

SALT reference databases: The following SALT reference databases have been coded for SI: Play, Conversation, Narrative SSS, Narrative Story Retell, Expository, Persuasion, Bilingual Spanish/English Story Retell, Bilingual Spanish/English Unique Story, and Monolingual Spanish Story Retell. Samples you code may be compared to age or grade-matched samples selected from these databases.

Disclaimer: There is variation in the literature on how to count clauses, especially for some of the special cases. The SALT reference databases were coded for SI following the rules in this document. If you intend to compare your sample with samples selected from these databases, you should code your sample following the same rules.

Scoring Rules

1. Utterances that are incomplete, unintelligible, are nonverbal, or are marked with [EU] are excluded from the SI analysis set. Titles and <u>true</u> fragments, e.g., “The end”, “and the dog”, are

not C-units and are also excluded from the SI analysis set. These excluded utterances are coded for SI using [SI-X] and are not included in the SI composite score.

Examples of utterances not included in SI:

C Then he [SI-X]>
C He went XX yesterday [SI-X].

Examples of colloquialisms which are also not included in SI:

C You there frog [SI-X]?
C Frog, you in there [SI-X]?
C ¿Rana ahí [SI-X]?

These utterances are acceptable in conversation. Therefore, they are excluded from the SI analysis set so that the speaker is not penalized for not including a verb.

When an elliptical response to a question is not a clause, it is excluded from the SI analysis set. With elliptical responses, the missing term(s) are understood from the context. *"... they are answers to questions that lack only the repetition of the question elements to satisfy the criterion of independent predication"* (Loban, 1963).

Examples of elliptical response to a question:

E Why did you do that?
C Because [SI-X].
E ¿Por qué hiciste eso?
C Porque sí [SI-X].

When an ellipsis has clausal structure and the subject can implied, it is scored and included in SI.

Example of elliptical response with clausal structure:

E How do you win?
C Score the most point/s [SI-1]. –> The subject "you" was implied and scored for SI as though the subject was stated.

The following types of ellipses are given credit for verb use.

E You should turn in your assignment.
C I will [SI-1].

E Did your friend come to the party?
C He did [SI-1].

2. Ignore parenthetical remarks. Utterances which consist entirely of parenthetical remarks are excluded from the SI analysis set.

Examples:

C The girl ((I forgot her name)) got lost [SI-1].

C Then the ((what is that animal called)) <> ((oh yeah)) gopher bit him on the nose [SI-1].
E <Gopher>.

Example where the child does not repeat the subject supplied by the examiner:

C Then the ((what is that animal called)) <>bit him on the nose [SI-1].
E <Gopher>.

In this example, the child is given credit for the subject supplied by the examiner. Repeating the subject is optional in this context.

Examples of utterances consisting entirely of parenthetical remarks:

C ((I skip/ed a page)) [SI-X].

C (((Um) where was I)) [SI-X]?

3. Clauses with *omitted subjects are included in the SI analysis and receive a score of SI-0.

Example of omitted subject:

C *He got on the rock [SI-0].

Example of complex subordination with subject omission:

C And then *he grab/ed some branch/s so he would/n't fall [SI-1].

In this example the first clause receives SI-0 score due to subject omission in English.

Spanish note: Spanish is a pronoun-drop language (Bedore, 1999) and, as such, omission of nouns and personal pronouns is ubiquitous and grammatical. Therefore, these subjects are not considered to be omitted. Example: C Y luego agarró unas rama/s para que no se cayera [SI-2].

4. Clauses with missing subjects due to pronoun error are included in the SI analysis and receive a score of SI-0.

Examples:

C There[EW:they] see the frog/s [SI-0].

C Ahí[EW:ellos] ven a las rana/s [SI-0].

In these examples the pronoun is a demonstrative pronoun instead of a personal pronoun (i.e. she, you, his) and therefore the clause receives a zero score.

5. Commands with implied subjects are included in the SI analysis and scored as though the subject was stated.

Examples where the subject "you" is implied (not obligatory):

C Give it to me [SI-1].

C Look at this [SI-1].

6. Because of the pronoun-drop nature of Spanish, English and Spanish samples from bilingual speakers are segmented using modified C-units. Utterances containing successions of verbs without subjects are segmented and a fragment code, [F], is placed at the end of each utterance lacking a stated subject as a result of this segmentation. For these transcripts, subjects can be *implied* for fragments due to segmentation and receive SI scores.

Examples:

C He got on the rock [SI-1].

C and fell off the rock [F] [SI-1].

C Se subió a la piedra [SI-1].

C y cayó de la piedra [F] [SI-1].

Special case: If there is a fragment due to segmentation but the preceding utterance has an omitted subject, then you cannot imply the subject for the fragment.

C Then *he ran [SI-0].

C and look/ed [F] [SI-0].

Because Spanish is a pronoun-drop language, this special case does not apply to Spanish samples:

C Luego corrió [SI-1].

C y miró [F] [SI-1].

7. Clauses with *omitted copula (main verb) are included in the SI analysis and receive a score of SI-0.

Examples of omitted main verb/copula:
C (And the) and the frog *went through the big (ah) pond [SI-0].
C (y la) y la rana *nadó por el estanque (eh) grande [SI-0].

Examples of omitted verb in the second clause:
C And he start/ed say/ing, "Froggy, Froggy of[EW:are] you there" [SI-1]?
C Y empezó a decir, "¿Rana, Rana fuera[EW:estás] ahí [SI-1]?
In these examples the speaker did not state a verb in the second clause; thus that clause receives a score of zero.

8. Utterances containing omitted auxiliary verbs, bound morphemes, functor words, direct objects, and articles are included in the SI analysis (coded for SI). This includes verbs which are not conjugated correctly.

Examples of omitted auxiliary:
C He *is go/ing [SI-1].
C When they *were sleep/ing the frog got out [SI-2].
C Él *estaba yendo [SI-1].
C Cuando ellos *estaban durmiendo la rana se salió [SI-2].

Example of an omitted bound morpheme:
C The boy was fall/*ing off the rock [SI-1].

Example of an omitted article:
C He see/3s *an owl [SI-1].
C La rana se estaba cayendo de *la piedra [SI-1].

Examples of an omitted direct object:
C He was pour/ing coffee into the *cup [SI-1].
C Él estaba sirviendo café en la *taza [SI-1].

9. The subordinate clause within an utterance containing an omitted obligatory subordinating conjunction will not receive credit. Examples:
C There was a boy *who had a dog [SI-1].
C And the boy did/n't see *that the frog went out [SI-1].
C Había un niño *que tenía un perro [SI-1].
C Y el niño no vio *que la rana se salió [SI-1].

10. When an incorrect subordinating conjunction is used, the subordinate clause will not receive credit. Example:
C The deer was run/ing what[EW:so] he could throw the little boy in the water [SI-1].
If the word in error is a different subordinating conjunction, albeit the wrong one, the second clause may get credit. Use judgment. For example, bilingual (Spanish/English) children sometimes use the word "for" as a subordinating conjunction because the Spanish word "para," which means "for" in English, can be used as a subordinating conjunction in Spanish. In this case the subordinate clause should be given SI credit.
C The deer was run/ing for[EW:so] he could throw the little boy in the water [SI-2].

11. If a subordinating conjunction is not obligatory to the coherence of the utterance, the subordinate clause should still receive a score for SI. Examples:

C I know I want to go [SI-2].
C I think I hear something [SI-2].

The subordinating conjunction "that" can be implied in these utterances.

12. Dialogue is coded for SI. Consider the introducer, e.g., *he said*, as the main clause and what is in the quotes as the second clause. The direct quotation must have a subject and predicate in order to be considered a clause and get an SI count. Examples:

C And he *was say/ing, "Frog, where are you" [SI-2]?
C Y él *estaba diciendo, "¿Rana, dónde estás" [SI-2]?

C The boy said, "Shh" [SI-1].
C El niño dijo, "Shh" [SI-1].

Examples of commands in which the subject *you/tú* can be implied:

C The boy said, "Go away" [SI-2].
C El niño dijo, "Vete" [SI-2].

13. Semantics should be ignored when scoring SI. If the wrong content word is used by the speaker, but is grammatically acceptable, score SI accordingly. Examples:

C The boy ran[EW:fell] off the rock [SI-1].
C El niño se corrió[EW:cayó] de la piedra [SI-1].

14. Utterances with imitated words (coded with [I] in the examples) are included in the SI and are scored as though the imitated word originated from the speaker. Examples:

C The <> gopher[I] came out of the hole [SI-1].
E <Gopher>.

C El <> topo[I] salió del hoyo [SI-1].
E <topo>.

15. Counting Infinitives: there is variability in the literature on whether or not to count infinitives. Samples in the SALT databases do not count infinitives as clauses. Examples:

C The boy told the dog *to be quiet* [SI-1].
C The dog want/ed *to run away* [SI-1].
C El niño se fue *a comprar* un perro [SI-1].
C El perro se quería *escapar* [SI-1].

16. The utterances containing code switches will be reviewed for SI. If the majority of the utterance (at least 50%) is in the target language (English or Spanish), code for SI.

Examples of code switching and SI coding with English as the target language:

C The rana[CS] jump/ed off the boat [SI-1].
C El[CS] niño[CS] buscó[CS] en[CS] the hole [SI-X]. *only 2 of the 6 words are in English, so not coded for SI*

Examples of code switching and SI coding with Spanish as the target language:

C La frog[CS] saltó del bote [SI-1].
C The[CS] boy[CS] look/ed[CS] in[CS] el hoyo [SI-X]. *only 2 of the 6 words are in Spanish, so not coded for SI*

If the utterance has enough of the target language to score for SI but the speaker produces a partial verb in the non-target language then credit will be given for SI.

C The boy busc|buscar[CS] in the hole [SI-1]. *(target language: English)*

C El niño sear|search[CS] en el hoyo [SI-1]. *(target language: Spanish)*

Tricky Scoring Examples

The following table contains examples of utterances which may be tricky to score. Each utterance is given along with the rationale.

Transcript Quote	Rationale
And she get/3s all the toy/s she want/3s [SI-2]. When he was hold/ing an umbrella, he just knew he was/n't Fluffy [SI-3].	Implied subordinating conjunctions (Rule 11). Notice that in these examples the subordinating conjunction "that" can be implied.
Sit down and get to work [SI-1]. "Wait," said Dr_DeSoto [SI-2]! The boy said to the dog, "Be quiet" [SI-2].	Commands with implied "you" (Rule 5); in dialogue (Rule 12).
When it began to rain (he he um) he said, "My hat will shrink if the rain get/3s on it" [SI-4].	Notice in this relatively short utterance there are four clauses.
(Um) many player/s obviously would stretch before the game so that they would/n't (um like you know) cramp up as many people in athletics do [SI-3]. So it usually take/3s longer also because the clock stop/3s when the ball is run out of bounds [SI-3]. C And each creature also has its own special ability/s that can either destroy a creature when it come/3s in to play, or destroy a creature when it come/3s out of play, or let an opponent draw a card, or let you draw a card [SI-4].	Expository samples taken from older speakers often produce long utterances with complex subordination.
The higher your individual score, the more point/s get add/ed to your team/z score [SI-1].	The first clause does not contain a verb phrase.

Using SALT to enter SI scores

The *Edit menu: Insert SI Codes* utility may be used to insert the appropriate SI code at the end of each qualifying utterance in your transcript. Each utterance is highlighted and you are prompted to select the appropriate SI code from a list.

Analyzing the SI scores

The *Analyze menu: Subordination Index* report lists the count of each SI code along with the composite SI score.

Comparing your SI scores to the database samples

The *Database menu: Subordination Index* report lists the count of each SI code along with the composite SI score. Scores are listed for your transcript and for the selected database samples.

APPENDIX

P

Narrative Scoring Scheme

Introduction

The Narrative Scoring Scheme (NSS) is an assessment tool that provides an index of the student's ability to produce a structurally sound and coherent narrative. It was developed to create a more objective narrative structure scoring system and is based on an earlier version, Rubric for Completing a Story Grammar Analysis, developed by the Madison Metropolitan School District SALT working group, 1998, following the work of Stein and Glenn, 1979; 1982. This scoring procedure combines many of the abstract categories of Story Grammar, adding features of cohesion, connecting events, rationale for characters' behavior, and referencing. Each of the scoring categories has explicit examples to establish scoring criteria, reducing the abstractness of the story grammar categories. Heilmann, Miller, Nockerts, & Dunaway (2010) reviewed narrative scoring procedures used in research over the past 20 years detailing their sensitivity in capturing developing narrative skills. They concluded that "The NSS is an efficient and informative tool for documenting children's development of narrative macrostructure. The relationship between the NSS and microstructural measures demonstrates that it is a robust measure of children's overall oral narrative competence and a powerful tool for clinicians and researchers. The unique relationship between lexical diversity and the NSS confirmed that a special relationship exists between vocabulary and narrative organization skills in young school-age children."

The NSS scoring is done at the text level, for the most part, requiring you to review the narrative as a whole for many of the scoring categories. Scores for each category are inserted on plus lines at the end of the transcript. You can add these plus lines with the *Edit menu: Insert Template → Narrative Scoring Scheme* option. The SALT program summarizes these scores and calculates a total. You can then compare these scores to typical peer performance using the *Database menu* or view independently using the *Analyze menu*. You can also compare with a linked transcript to show intervention progress or language differences. This measure is key to understanding overall narrative performance.

Scoring Guidelines

Assigning NSS Scores

The NSS is scored using a 0 - 5 point scale. 5 points are given for "proficient" use, 3 points for "emerging" use, and 1 point for "immature" or "minimal" use. Scores of 2 and 4 require scorer's judgment. Scores of zero (0) are given for poor performance and for a variety of child errors including telling the wrong story, conversing with the examiner, not completing/refusing the task, abandoned utterances, unintelligibility, and when target components of the NSS are imitated. The scores for each characteristic can be considered individually or combined into a total composite score (highest possible score being 35).

Description of NSS characteristics

1. Introduction: Scores are determined by the presence, absence, and qualitative depiction of character and setting components.

2. Character Development: Scores are based on the acknowledgement of characters and their significance throughout the story.
3. Mental States: Narratives are evaluated based on the vocabulary used to convey character emotions and thought processes. The frequency as well as the diversity of mental state words is considered. For example, if a story provides frequent opportunities to verbalize anger themes and a child marks each of these with "mad," he/she will not receive as high of a score as a child who explains one opportunity using "mad," another using "angry," another using "upset," and so on. Mental state words can be either adjectives, e.g., *sad, happy, scared*, or active cognitive-state words, e.g., *believe, know, remember*.
4. Referencing: Scores are given according to the consistent and accurate use of antecedents and clarifiers throughout the story. Student's use of correct pronouns and proper names should be considered in this score.
5. Conflict/Resolution: Scores are based on the presence/absence of conflicts and resolutions required to express the story as well as how thoroughly each is described.
6. Cohesion: The sequencing of, details given to, and transitions between each event are examined.
7. Conclusion: Scores are based on the conclusion of the final event as well as the wrap-up of the entire story.

NSS Scoring Rubric

Refer to the scoring rubric at the end of this appendix for a guide to assigning scores for each of the NSS characteristics of a narrative.

Helpful Scoring Tips:

- Be familiar with the narrated story. It is recommended that the scorer have a copy of the story to reference while scoring.
- Print the narrative transcript.
- Read the transcript as fluidly/inclusively as possible, ignoring SALT transcription codes.
- Write comments and circle or flag key words/utterances such as mental state words or difficulty with referents and pronouns.
- For *each* characteristic, review the NSS before assigning a score. Read the criteria along the continuum of points. Determine what is present in the transcript and score accordingly. This will insure better intra- and inter-rater reliability.
- Conflict/Resolution and Cohesion are story grammar elements which are distributed across the entire narrative. They do not occur at one static point within the story. The scoring of these characteristics must take into account the story as a whole.
- Conflict/Resolution (CR) is based on the presence of CRs necessary for telling a complete story as well as the clarity and richness in which these story elements are expressed. A child who is missing elemental conflicts and/or resolutions will receive a proportionately lower score than a child who narrates all conflicts and resolutions necessary for advancing that story. A child who expresses these CRs clearly and comprehensively receives a proportionately higher score than a child who narrates under-developed CRs.
- Frequently review what constitutes a score of 0 or NA. Explanations are given at the bottom of the NSS scoring rubric.
- Proficiency in assigning scores will develop with experience.

Using SALT to enter NSS scores

The *Edit menu: Insert Template -> Narrative Scoring Scheme* option may be used to insert the NSS plus line template at the bottom of your transcript. Then type the individual scores after each label.

NSS Template	Example of NSS Scoring
+ Introduction: + CharacterDev: + MentalStates: + Referencing: + ConflictRes: + Cohesion: + Conclusion:	+ Introduction: 3 + CharacterDev: 2 + MentalStates: 2 + Referencing: 2 + ConflictRes: 1 + Cohesion: 3 + Conclusion: 2

Analyzing the NSS scores

The *Analyze menu: Narrative Scoring Scheme* report lists each individual NSS score along with the composite score.

Comparing your NSS scores to the database samples

The *Database menu: Narrative Scoring Scheme* lists each individual NSS score along with the composite score. Scores are listed for your transcript and for the selected database samples.

NSS SCORING RUBRIC

Characteristic	Proficient/Advanced (5)	Satisfactory/Adequate (3)	Minimal/Immature (1)
Introduction	**1) Setting**: • States general place and provides some detail about the setting, e.g., reference to the time of the setting, daytime, bedtime, season. • Setting elements are stated at appropriate place in story. **2) Characters:** • Main characters are introduced with some description or detail provided.	**1) Setting:** • States general setting but provides no detail. • Description or elements of setting are given intermittently through story. • May provide description of specific element of setting, e.g*., the frog is in the jar*. **2) Characters:** • Characters of story are mentioned with no detail/description.	• Launches into story with no attempt to provide the setting.

Character Development	• Main character(s) and <u>all</u> supporting character(s) are mentioned. • Throughout story it is clear child can discriminate between main and supporting characters, e.g., more description of, emphasis upon main character(s). • Child narrates in first person using character voice, e.g., "*You get out of my tree", said the owl*.	• Both main and active supporting characters are mentioned. • Main characters are not clearly distinguished from supporting characters.	• Inconsistent mention of involved or active characters. • Character(s) necessary for advancing the plot are not present.
Mental States	• Mental states of main and supporting characters are expressed when necessary for plot development and advancement. • A variety of mental state words are used.	• Some use of evident mental state words to develop character(s).	• No use of mental state words to develop character(s).
Referencing	• Provides necessary antecedents to pronouns. • References are clear throughout story.	• Inconsistent use of referents/antecedents.	• Excessive use of pronouns. • No verbal clarifiers used. • Speaker is unaware that listener is confused.
Conflict Resolution	• Clearly states all conflicts and resolutions critical to advancing the plot of the story.	• Under developed description of conflicts and resolutions critical to advancing the plot of the story. **OR** • Not all conflicts and resolutions critical to advancing the plot are present.	• Random resolution(s) stated with no mention of cause or conflict. **OR** • Conflict mentioned without resolution. **OR** • Many conflicts and resolutions critical to advancing the plot are not present.

Cohesion	• Events follow a logical order. • Critical events are included while less emphasis is placed on minor events. • Smooth transitions are provided between events.	• Events follow a logical order. • Excessive detail or emphasis provided on minor events leading the listener astray. **OR** • Transitions to next event unclear. **OR** • Minimal detail given for critical events. **OR** • Equal emphasis on all events.	• No use of smooth transitions.
Conclusion	• Story is clearly wrapped up using general concluding statements such as "and they were together again happy as could be".	• Specific event is concluded, but no general statement made as to the conclusion of the whole story.	• Stops narrating and listener may need to ask if that is the end.
Scoring: Each characteristic receives a scaled score 0-5. Proficient characteristics=5, Emerging=3, Minimal/ Immature=1. The scores in between, 2 and 4, are undefined, use judgment. Scores of 0, NA are defined below. A composite is scored by adding the total of the characteristic scores. Highest score=35. A score of 0 is given for child errors. Examples include: telling the wrong story, conversing with examiner, not completing/refusing task, using wrong language creating inability of scorer to comprehend story in target language, abandoned utterances, unintelligibility, poor performance, and/or if components of the rubric are entirely imitated. A score of NA (non-applicable) is given for mechanical/examiner/operator errors. Examples include: interference from background noise, issues with recording (cut-offs, interruptions), examiner quitting before child does, examiner not following protocol, and examiner asking overly specific or leading questions rather than open-ended questions or prompts.			

APPENDIX

Q

Expository Scoring Scheme

Introduction

The Expository Scoring Scheme (ESS) assesses the content and structure of an expository language sample, similar to how the Narrative Scoring Scheme (see Appendix P) provides an overall measure of a student's skill in producing a narrative. Expository skills are critical to the curriculum in middle and high school and relate to state educational standards. The ESS is comprised of 10 characteristics for completing an expository language sample. The first 8 characteristics correspond to the topics listed on the planning sheet that is given to students. These topics, in turn, were developed based on the descriptions of sports (both individual and team) found in *Rules of the game: the complete illustrated encyclopedia of all the sports of the world* (Diagram Group, 1990). To ensure that the topics also reflected what is expected for explanations of games, The Card Game Web site (www.pagat.com) was consulted.

There is less research on this procedure than on the NSS, but clinically it captures deficits in organization, listener perspective, and overall appreciation for explaining relative situations, the overall goal of the game, the rules, and strategies to win. We believe it provides you with a valuable tool to document expository language.

Scoring Guidelines

Assigning ESS Scores

The ESS is scored using a 0 - 5 point scale. 5 points are given for "proficient" use, 3 points for "emerging" use, and 1 point for "immature" or "minimal" use. Scores of 2 and 4 require scorer's judgment. Scores of zero (0) are given for poor performance and for a variety of errors including telling the wrong story, conversing with the examiner, not completing/refusing the task, abandoned utterances, unintelligibility, and/or when target components of the ESS are imitated. Significant factual errors reduce the score for that topic. The scores for each characteristic can be considered individually or combined into a total composite score.

Description of ESS characteristics

1. Object of Contest: The main objective the game/sport
2. Preparations: What players need to do to prepare for the game/sport, including playing area, equipment, and personal preparations
3. Start of Play: The initial situation, e.g., *One football team lines up at their own 30-yard line for the kickoff, while the other team spreads out in its own territory to receive,* and how the game/sport begins
4. Course of Play: Unit of play, e.g., turn, quarter, set, as well as major roles and major plays
5. Rules: Major rules and consequences for rule violations
6. Scoring: Various ways to score and point values
7. Duration: How long the game/sport lasts using units, how the game ends, and tie breaking procedures
8. Strategy: What skilled players do to win game/sport

9. Terminology: Major terms of game/sport with definitions of new terms[15]
10. Cohesion: Overall flow of the sample, including order, covering topics completely, and smooth transitions[16]

ESS Scoring Rubric

Refer to the scoring rubric at the end of this appendix for a guide to assigning scores for each of the ESS characteristics of an expository.

Helpful Scoring Tips

- Be familiar with the topic of the expository, i.e., the game or sport being explained.
- Print the expository transcript.
- Read the transcript as fluidly/inclusively as possible, ignoring SALT transcription codes.
- Write comments and circle or flag key words/utterances such as those relating to terminology and rules.
- For *each* characteristic, review the ESS scoring rubric before assigning a score. Read the criteria along the continuum of points. Determine what is present in the transcript and score accordingly. This will insure better intra- and inter-rater reliability.
- Frequently review what constitutes a score of 0 or NA. Explanations are given at the bottom of the ESS scoring rubric.
- Scoring the ESS is a subjective measure by nature; however, as you gain experience, the process of scoring will become reliable.
- When beginning to score, you may want to compare your scores against the training transcripts or with another scorer. The training transcripts were scored by several scorers experienced with the ESS.

Using SALT to enter ESS scores

Use the *Edit menu: Insert Template → Expository Scoring Scheme* option to insert the ESS plus line template at the bottom of your transcript. Then type the individual scores after each label.

ESS Template	Example of ESS Scoring
+ Preparations:	+ Preparations: 2
+ ObjectOfContest:	+ ObjectOfContest: 3
+ StartOfPlay:	+ StartOfPlay: 3
+ CourseOfPlay:	+ CourseOfPlay: 3
+ Scoring:	+ Scoring: 4
+ Rules:	+ Rules: 3
+ Strategy:	+ Strategy: 3
+ Duration:	+ Duration: 3
+ Terminology:	+ Terminology: 3
+ Cohesion:	+ Cohesion: 3

[15] This characteristic might be analogized to the Referencing category in the NSS, which also assesses how well a student takes into account the background knowledge of the listener.

[16] Cohesion was adopted directly from the NSS; consider how well sequencing and transitioning are handled

Analyzing the ESS scores

The *Analyze menu: Expository Scoring Scheme* report lists each individual ESS score along with the composite score.

Comparing your ESS scores to the database samples

The *Database menu: Expository Scoring Scheme* lists each individual ESS score along with the composite score. Scores are listed for your transcript and for the selected database samples.

ESS Scoring Guide

Characteristic	Proficient/Advanced (5)	Satisfactory/Adequate (3)	Minimal/Immature (1)
Object	Full description of the main objective.	Mention of the main objective.	Mention of winner but no, or limited, description how that is determined. **OR** Description of another aspect of the contest, such as strategy or scoring.
Preparation	**1) Playing Area**: Labels place and provides details about shape & layout. **AND/OR** **2) Equipment**: Labels items and provides detailed description, including function. **AND/OR** **3) Player Preparations**: Provides detailed description.	**1) Playing Area**: Labels place and provides limited details about shape & layout. **OR** **2) Equipment**: Labels items with limited description. **OR** **3) Player Preparations**: Provides some description.	**1) Playing Area**: Labels place but no details about shape & layout. **OR** **2) Equipment**: Labels items with no description. **OR** **3) Player Preparations**: Provides limited description.
Start	Describes initial situation and how play begins.	Describes initial situation or how play begins, but not both.	Limited description of the initial situation or how play begins.
Course of Play	Detailed description of: A unit of play **AND/OR** major roles **AND/OR** major plays	Some description of: A unit of play **AND/OR** major roles **AND/OR** major plays	Limited description of: A unit of play **AND/OR** major roles **AND/OR** major plays
Rules	Clear statement of major rules and, when applicable, consequences for violations.	Mentions major rules and, when applicable, consequences for violations but without full detail.	Minimal or no mention of major rules or consequences for violations.
Scoring	Full description of ways to score and point values.	Incomplete description of ways to score and point values.	Limited description of ways to score or point values.
Duration	Clear description of: How long the contest lasts, including, when applicable, the units in which duration is measured. **AND/OR** How the contest ends. **AND/OR** Tie breaking procedures.	Some description of: How long the contest lasts. **OR** How the contest ends. **OR** Tie breaking procedures.	Limited description of: How long the contest lasts. **OR** How the contest ends. **OR** Tie breaking procedures.
Strategy	Full description of some ways to win the contest that are not required by the rules but are what competent players do.	Mention of some ways to win the contest that are not required by the rules but are what competent players do.	Vague or incomplete mention of some ways to win the contest that are not required by the rules but are what competent players do.

Terminology	Terms of art are clearly defined whenever introduced.	Some terms of art defined, but not consistently or clearly.	Terms of art introduced but not further defined.
Cohesion	Topics follow a logical order. **AND** Topics are completely covered before moving on to another. **AND** Smooth transitions between topics.	Topics follow a logical order. **OR** Topics are completely covered before moving on to another. **OR** Smooth transitions between topics.	Little discernable order to topics, much jumping between topics. **AND** Abrupt transitions between topics.
Scoring: Each characteristic receives a scaled score 0-5. Proficient characteristics=5, Emerging=3, Minimal/ Immature=1. The scores in between, 2 and 4, are undefined, use judgment. Significant factual errors reduce the score for that topic. Scores of 0, NA are defined below. A composite is scored by adding the total of the characteristic scores. Highest score=50. A score of 0 is given for student errors. Examples include not covering topic, explaining a different game or sport, not completing/refusing task, student unintelligibility, and abandoned utterances. A score of NA (non-applicable) is given for mechanical/examiner/operator errors. Examples include interference from background noise, issues with recording (cut-offs, interruptions), examiner quitting before student does, examiner not following protocol, and examiner asking overly specific or leading questions rather than open-ended questions or prompts.			

APPENDIX

R

Persuasion Scoring Scheme

Introduction

The *Persuasion Scoring Scheme* (PSS) assesses the content and structure of a persuasive language sample. Persuasion skills relate to state educational standards and cut across modes of communication: speaking, listening, reading, and writing (National Governor's Association, 2010). The ability to persuade is critical to success in college and career and to full participation in social and civic life. The persuasion task challenges high school students to take into account the listener's perspective and to use complex language to express complex ideas. The PSS is comprised of 7 characteristics for completing a persuasive language sample. The characteristics correspond to the topics listed on the planning sheet that is given to students.

Samples contained in the SALT Persuasion reference database have all been coded for the PSS. This database can be utilized to compare a student's persuasion skills to those of his/her typically-developing peers. Clinicians can compare individual characteristics of the PSS or the composite score using the database. The persuasion task may be repeated to assess progress of persuasion skills through the high school years.

Scoring Guidelines

Assigning PSS Scores

The PSS is scored using a 0 - 5 point scale. 5 points are given for "Proficient/Advanced" production, 3 points for "Satisfactory/Adequate" production, and 1 point for "Minimal/Immature" production. Scores of 2 and 4 are undefined and require judgment. Refer to the PSS scoring guide at the end of this appendix.

Helpful Scoring Tips

- Print the transcript.
- Read the transcript as fluidly/inclusively as possible, ignoring SALT transcription codes.
- Write comments and circle or flag key words/utterances pertaining to points on the planning sheet
- For *each* point, review the PSS scoring rubric before assigning a score. Read the criteria along the continuum of points. Determine what is present in the transcript and score accordingly. This will insure better intra- and inter-rater reliability.
- Frequently review what constitutes a score of 0 or NA. Explanations are given at the bottom of the PSS scoring rubric.
- Scoring the PSS is a subjective measure by nature; however, as you gain experience, the process of scoring will become reliable.

Using SALT to enter PSS scores

Use the *Edit menu: Insert Template → Persuasion Scoring Scheme* option to insert the PSS plus line template at the bottom of your transcript. Then type the individual scores after each label.

PSS Template	Example of PSS Scoring
+ IssueID: + SupportReasons: + PointOfView: + Compromises: + Conclusion: + Cohesion: + Effect:	+ IssueID: 2 + SupportReasons: 3 + PointOfView: 3 + Compromises: 3 + Conclusion: 4 + Cohesion: 3 + Effect: 3

Analyzing the PSS scores

The *Analyze menu: Persuasion Scoring Scheme* report lists each individual PSS score along with the composite score.

Comparing your PSS scores to the database samples

The *Database menu: Persuasion Scoring Scheme* lists each individual PSS score along with the composite score. Scores are listed for your transcript and for the selected database samples.

PSS Scoring Rubric

Characteristic	Proficient/Advanced (5)	Satisfactory/Adequate (3)	Minimal/Immature (1)
Issue Identification and Desired Change	• Existing rule or situation is clearly understood before supporting reasons are stated. • Desired change is clearly stated.	• Existing rule or situation can be discerned; may require shared knowledge. • Desired change can be discerned.	• Speaker launches into persuasion with no mention of existing rule or situation. • Desired change is difficult to determine.
Supporting Reasons	• Reason(s) are comprehensive; include detail. • Benefit(s) to others are clearly understood.	• One or more reasons are offered to support desired change. • Benefit(s) to others are unclear or omitted.	• Reason(s) are confusing or vague. • Significant/obvious reason(s) are not stated. • Reason(s) are not plausible; do not support change.
Other Point of View (Counter Arguments)	• Other point(s) of view are clearly explained; include detail. • Includes language to support or refute other point of view.	• Other point(s) of view are acknowledged. OR • Dismissive of other point(s) of view.	• Other point(s) of view are unclear or omitted.
Compromises	• Includes language, with some detail, to support or refute compromising.	• Compromise(s) are acknowledged. OR • Dismissive of compromising.	• Compromises are unclear or omitted.
Conclusion	• Desired change is clearly restated/summarized. • Arguments are clearly restated/summarized. • Concludes using language such as, “to conclude”, “therefore”, “and so”, “in sum”, etc. • First step(s) for change are mentioned.	• Desired change is restated. • One or more supporting reasons are restated. • Ending is inferred and/or lacks transition to conclusion, e.g., “And that’s all”, “that’s it”, “I’m done”.	• Summary statement(s) are omitted. • Unclear to listener that the persuasion task is completed.

Cohesion	• Points are fully covered before moving on to another. • Transitions between points are smooth/clear using mature language. • Referents are clear. • Listener can easily follow the argument.	• Point are covered, but lack organization. • Transitions between points are acceptable. • Referencing is adequate. • Listener can follow the argument with some effort.	• Points are not fully covered before moving onto another. • Abrupt transitions between points. • Referents are unclear, hard to follow. • Argument is difficult to follow.
Effectiveness	• Argument is extremely compelling. • Argument is entirely plausible. • Argument is well stated. • Mature language is used. • Minimal errors of syntax/form. • Supported points well. • Speaker's delivery is passionate. • Speaker engages listener.	• Argument is compelling. • Argument is plausible. • Argument requires little or no clarification. • Acceptable syntax/form. • Speaker's delivery is clear; not necessarily passionate. • Effort to persuade is evident. • Speaker makes some attempt to engage listener.	• Argument is minimally or not compelling. • Argument is not plausible. • Language is unclear. • Errors of syntax/form may be prevalent. • Speaker's delivery lacks effort; not passionate . • Speaker makes no attempt to engage listener. • Speaker uses inappropriate/immature tone.
Scoring: Each characteristic receives a scaled score 0-5. Use points as a guideline to determine level of proficiency for each characteristic. Not *all* points listed in each characteristic must be present when assigning score. Proficient/Advanced = 5, Satisfactory/Adequate = 3, Minimal/Immature = 1. The scores in between, 2 and 4, are undefined; use judgment. Add the scores for the seven characteristics to yield a composite score. Highest possible score = 35. A score of 0 is given for student errors such as not completing the task when prompted, refusing the task, unintelligible production(s), and abandoned utterances leaving characteristics incomplete. A score of NA (non-applicable) is given for mechanical/examiner/operator errors**,** e.g., interference from background noise, issues with recording (cut-offs, interruptions), examiner not following protocol, examiner interrupting student.			

APPENDIX

S

Oral Narrative Quality (ONQ)

Introduction

There are many ways to add hand-scored analyses to your language samples. The Oral Narrative Quality (ONQ) is one example. The ONQ scoring was applied to the AGL (Ana Gets Lost) samples in the NZ-AU Story Retell database.

The ONQ is designed for AGL narratives. The SALT menu options are not available if the +Context line indicates that the transcript is conversation, expository, or persuasion or if the +Subgroup line does not contain AGL.

The rubric for the AGL story is provided at the end of this appendix.

Assigning ONQ Scores

The ONQ is scored using a 0 - 5 point scale for each of eight categories. Five (5) points are given for "proficient" use, 3 points for "emerging" or "inconsistent" use, and 1 point for "minimal or "immature" use. An overall score of zero (0) is given if the story is not the same as the original at all. A score of NA (non-applicable) is given for Mechanical/Examiner/Operator Errors (i.e., interference from background noise, issues with recording (cut-offs, interruptions), examiner quitting before child does, examiner not following protocol, examiner asking overly specific or leading questions rather than open-ended questions or prompts). The scores for each characteristic can be considered individually or combined into a total composite score (highest possible score being 40). Note that if any individual ONQ scores are NA, the composite score cannot be computed.

The ONQ consists of the following eight story characteristics:

- Introduction : Scores are determined by the presence, absence, and qualitative depiction of character and setting components.
- Main Character : Scores are based on the acknowledgement of the main character and the significance of this character throughout the story.
- Supporting Character(s) : Scores are based on the acknowledgement of the supporting characters and their significance throughout the story.
- Conflict: Scores are based on the presence/absence of conflicts required to express the story as well as how thoroughly each is described.
- Coherence : The sequencing of, details given to, and transitions between each event are examined.
- Resolution: Scores are based on the presence/absence of resolutions required to express the story as well as how thoroughly each is described.
- Conclusion : Scores are based on the conclusion of the final event as well as the wrap-up of the entire story.

Helpful Scoring Tips

- Print the narrative transcript.
- Read the transcript as fluidly/inclusively as possible, ignoring the codes.
- Write comments and circle or flag key words/utterances.
- For *each* characteristic, review the ONQ before assigning a score. ReadThis will insure intra- and inter-rater reliability.
- The characteristics Conflict, Coherence, and-Resolution are story grammar elements which are distributed across the entire narrative. They do not occur at one static point within the story. The scoring of these characteristics must take into account the story as a whole.
- Application of scores for the characteristics of Conflict and Resolution (CR) is based on the presence of CRs necessary for telling a complete story as well as the clarity and richness in which these story elements are expressed. A child who is missing elemental conflicts and/or resolutions will receive proportionately lower scores than a child who narrates all conflicts and resolutions necessary for advancing that story. A child who expresses these CRs clearly and comprehensively receives proportionately higher scores than a child who narrates under-developed CRs.
- Frequently review what constitutes a score of 0 or NA. Refer to the explanations given previously.

Using SALT to Enter ONQ Scores

Use **Edit menu → Insert Template → Oral Narrative Quality** to insert the ONQ plus line template at the bottom of your transcript. Then type the individual scores after each label.

ONQ Template	Example of NSS Scoring
+ Introduction:	+ Introduction: 3
+ Theme:	+ Theme: 2
+ MainChar:	+ MainChar: 5
+ SuppChar:	+ SuppChar: 1
+ Conflict:	+ Conflict: 3
+ Coherence:	+ Coherence: 3
+ Resolution:	+ Resolution: 3
+ Conclusion:	+ Conclusion: 4

Analyzing the ONQ Scores

- Use the **Analyze menu → Oral Narrative Quality** report to list each individual ONQ score along with the composite score.
- Use the **Database menu → Oral Narrative Quality** to list each individual ONQ score along with the composite score. Scores are listed for your transcript and, if available, for the selected database samples.

Oral Narrative Quality (ONQ) Rubric – Ana Gets Lost story

Characteristic	**Content**	**Proficient (5 points)**	**Emerging (3 points)**	**Minimal/ Immature (1 point)**
Introduction	• *Stay at home/ couldn't go* • *Parents go out* • *Ana is sick* • *Brother looks after her*	Setting stated; At least 3 setting points are mentioned.	Setting stated minimally, i.e., no more than 2 setting points are provided.	Only 1 info point provided. Launches into the story with no attempt to provide setting or story theme.

Theme	*Gets lost*	Story theme stated at the right moment in the story.	Mentions "lost" in title or first sentence, not in story retell, or mentions at the end "don't get lost again".	Says "can't find them". No story theme stated.
Main Character	*Ana*	Main character introduced to listener by name in the first sentence. All further references are appropriate.	"Ana" in title, later just "her" or a different name. Story does not start with Ana. E.g., "her parents go out. Ana is not allowed to go….."	Main character <u>consistently</u> referred to by pronoun.
Supporting Character/s	• *Mum and dad* • *big brother or (big) Brother Tom* • *A Policeman*	All supporting characters are mentioned. They are introduced appropriately. All further references are appropriate.	No name for brother. Or just "Tom" and no explanation. Policeman introduced with <u>The</u> policeman. Parents introduced with "them", later "mum and dad."	No mention of brother. Consistent use of <u>The</u> mum and dad OR Only 1 parent mentioned OR Parents not mentioned. No mention of police(man).
Conflict	<u>*Bored.*</u> Includes <u>rationale</u> for character's behaviour. Ana goes out to find her parents <u>because</u> she is bored. Provides the relationship connecting events and actions.	This can be implied: "There was nothing to do/ no one to play with." So, when Tom fell asleep, she went out..... Needs to be clear that Ana went out because she had nothing to do.	Vague rationale or statement for the character's behaviour. E.g., "asked brother to play, <u>brother said no</u>. When he fell asleep, she went out" Or "Ana <u>wants/decides</u> to go out."	No rationale for character's behaviour. E.g,. "Asked her brother if he wanted to play. When he fell asleep she went out looking for mum and dad." (It is not clear that the brother said no, or why she went out.) No mention that she wanted to play or was bored.
Coherence	Critical Events: • *Parents have gone out.* • *Leaves the house to look for mum and dad.* • *Gets lost /or/ not know what to do and cry* • *Policeman finds her* • *Policeman takes her home*	Events follow a logical order. All critical events are included. Smooth transitions provided between events.	Events follow a logical order. 1 critical event missing. Not clear why she left the house.	Story is missing 2 or more critical events. Events are provided in random order. Minimal or no connection between events. Transitions between events are lacking.
Resolution	Resolutions: • *Home (safely)* • *Parents happy OR Parents thank the police.*	Clear resolution regarding characters, conflicts and events. Both resolutions are mentioned.	One resolution provided for characters, conflicts or events. Only one mentioned. Or out of sequence.	Poor resolution provided, some mention of the policeman. No resolution provided.

Conclusion	Endings: *Policeman told her not to get lost again AND/OR Policeman drove away OR good alternative, e.g., "mother said she wouldn't get lost again."*	Smooth transition to conclusion. At least one "ending" is mentioned.	Story finishes with parents are happy or policeman took her home (i.e., the resolution/s) without mentioning one of the endings.	No conclusion is provided. Story stops halfway. Child stops talking and it's not clear that that is the end of the story.

Guide to the SALT Variables

Variables Included in the *Standard Measures Report*

	Language Measure	Description
	Current Age	Current age of speaker
TRANSCRIPT LENGTH		
	Total Utterances	Total number of utterances
#	C&I Verbal Utts (*current analysis set*)	Number of utterances in the current analysis set
	All Words Including Mazes	Total number of completed words (*excludes part words*)
	Elapsed Time	Elapsed time in minutes
INTELLIGIBILITY		
	% Intelligible Utterances % Intelligible Words	% of verbal utterances or words that do not contain unintelligible segments (*excludes mazes*)
MACRO ANALYSIS		
	NSS Composite Score ESS Composite Score PSS Composite Score ONQ Composite Score	Included if the sample is a narrative, expository, or persuasion (*defined by +Context: Nar, +Context: Expo, +Context: Pers*) and the specific scoring scheme has been applied on plus lines in the transcript; composite score is the sum of the individual scores
SYNTAX/MORPHOLOGY		
#	MLU in Words MLU in Morphemes	Mean length of utterances in words or morphemes (*excludes mazes*)
#	% Utterances with Verbs Mean Verbs per Utterance	- percent of utterances which contain verbs - ratio of the number of verbs to the number of utterances (*verbs are identified as either "Verbs" or "Copula Forms" using the Grammatical Category algorithm – only available for English samples*)
#	SI Composite Score	Included only if the sample is coded for Subordination Index; composite score is the average of the individual scores
SEMANTICS		
#	Number Total Words (NTW)	Total number of words (*excludes mazes*)
#	Number Different Words (NDW)	Number of different word roots (*excludes mazes*)
#	Moving-Average NTW Moving-Average NDW	Estimates NDW using a moving window, e.g., for window length of 100 words, calculates NDW for words 1–100, 2-101, 3-102, and so on to the end of the sample; final value is the average of the individual NDWs. NTW is the window length.
DISCOURSE (*not included for narrative or expository samples*)		
	Mean Turn Length (utts) Mean Turn Length (words)	Average number of consecutive utterances/words (*excludes mazes*)
	% Responses to Questions % Responses to Intonation Prompts	% of another speaker's questions/intonation prompts that were responded to, where response is defined as an utterance from the target speaker immediately following the question or prompt
	% Utts with Overlapping Speech	Number of utterances containing overlapping speech
	% Utts Interrupted Other Speaker	Number of times target speaker interrupted another speaker
VERBAL FACILITY		

	Words/Minute	Ratio of all words produced to the elapsed time (*excludes part* words)
	Pause Time as % of Total Time	Percent of elapsed time that consists of pause time
#	Maze Words as % of Total Words	Percent of total words that are in mazes
	% Abandoned Utterances	Percent of total utterances that were abandoned
ERRORS		
#	% Utterances with Errors	Percent of utterances which contain omissions or error codes
	Number of Omissions	Number of omitted words or bound morphemes
	Number of Error Codes	Number of words or utterances coded as errors

Measures based on the C&I Verbal Utts (*current analysis set*)

Follow-up reports based on results of the *Standard Measures Report*

When one or more measures on the *Standard Measures Report* indicates the need for more detailed information, use the Analyze and Database menus to support your findings. Below are suggestions for where to look further.

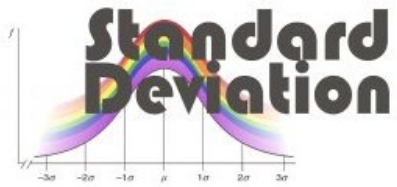
	Language Measure	Additional Reports/Comments
	• Current Age	
TRANSCRIPT LENGTH		
#	• Total Utterances • C&I Verbal Utts • All Words Including Mazes • Elapsed Time	• Read the transcript • Analyze menu: Summary of Utterance Types • Analyze quality of narratives by applying NSS/ESS/PSS/ONQ coding (see MACRO ANALYSIS section)
INTELLIGIBILITY		
	• % Intelligible Utterances • % Intelligible Words	• Listen to the audio to determine if unintelligibility is due to the client's speech production, or whether it is due to equipment and/or environment • Analyze menu: Standard Utterance Lists (*select unintelligible & partly intelligible*) • Database menu: Transcript Length & Intelligibility
MACRO ANALYSIS		
	• NSS Composite Score • ESS Composite Score • PSS Composite Score • ONQ Composite Score	• Analyze/Database menus: Narrative Scoring Scheme • Analyze/Database menus: Expository Scoring Scheme • Analyze/Database menus: Persuasion Scoring Scheme • Analyze/Database menus: Oral Narrative Quality

SYNTAX/MORPHOLOGY		
# # # #	• MLU in Words • MLU in Morphemes • % Utterances with Verbs • Mean Verbs per Utterance	• Analyze/Database menus: Syntax/Morphology Summary • Analyze/Database menus: Utterance Distribution Tables • Analyze menu: Bound Morpheme Tables (*expand if desired)* • Apply Subordination Index (SI) coding
#	• SI Composite Score	• Analyze/Database menus: Subordination Index
SEMANTICS		
# # # #	• Number Total Words (NTW) • Number Different Words (NDW) • Moving-Average NTW • Moving-Average NDW	• Analyze/Database menus: Semantics Summary • Analyze menu: Word Root Tables (*expand if desired)* • Analyze menu: Standard Word Lists (*specify which to view*) • Analyze/Database menus: Grammatical Categories (*English only*) • Analyze menu: Grammatical Category Lists (*English only*)

DISCOURSE (*not included for narrative, expository, or persuasion samples*)		
	• Mean Turn Length (utterances) • Mean Turn Length (words) • % Responses to Questions • % Responses to Intonation Prompts • % Utts with Overlapping Speech • % Utts Interrupted Other Speaker	• Analyze/Database menus: Discourse Summary • Analyze/Database menus: Turn Length Distribution Tables • Analyze menu: Standard Utterance Lists (*select 2nd speaker questions and/or intonation prompts and look at following entries; select utterances with overlapping speech; select 2nd speaker interrupted utterances and look at following entries*)
VERBAL FACILITY AND RATE		
#	• Words/Minute • Pause Time as % of Total Time • Maze Words as % of Total Words • % Abandoned Utterances	• Analyze/Database menus: Verbal Facility Summary • Analyze menu: Standard Utterance Lists (*select utterances with pauses, utterances with mazes, and/or abandoned utterances*) • Analyze menu: Fluency Codes and Behaviors (*if sample was coded for fluency*)
ERRORS		
	• % Utterances with Errors • Number of Omissions • Number of Error Codes	• Analyze/Database menus: Errors Summary • Analyze menu: Omissions and Error Codes (*look for patterns*) • Analyze menu: Code Summary • Analyze menu: Word Code Tables • Analyze menu: Utterance Code Tables • Analyze menu: Standard Utterance Lists (*select utterances with omissions, error codes*)

Understanding SALT Measures: Standard Deviation

Originally posted as a SALT blog on October 10, 2018



So there is this odd thing that happens once in a while when you are using SALT: a measure comes back with a seemingly nonsensical standard deviation (SD) value. We've seen them come in as low as 21 SDs below the mean. And it's not a mistake.

Why does this happen? Is there anything valuable you can learn from this result? How can you report this result (*for example on an IEP report*) in a meaningful way?

Ok, so a quick refresher on the concept of standard deviations. Standard deviation is roughly: the amount of difference you might expect to see between scores.

***Not interested in the stats? You can skip this section if you want. We get back to speech and language stuff below.**

_____

The statistical formula used to calculate standard deviations looks like this:

You don't really need to understand this formula for our purposes. The point is this: standard deviation is basically the average variation in your data.

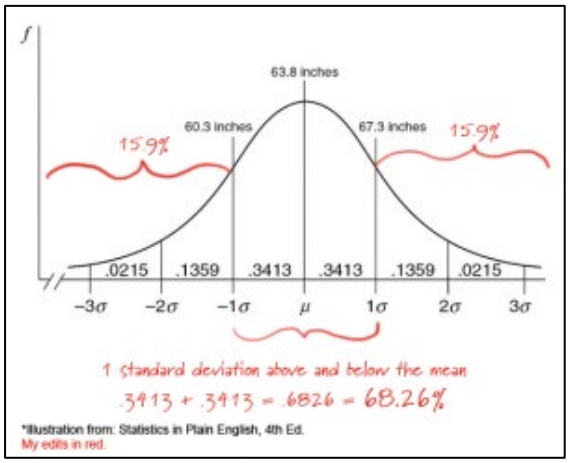
$$s = \sqrt{\frac{\Sigma(X - \bar{X})^2}{n-1}}$$

where s is sample standard deviation,
Σ is to sum,
X is each score in the distribution,
$\bar{X}$ is the sample mean,
n is the number of cases in the sample.

Illustration from: Statistics in Plain English, 4th Ed. (Urdan, 2017)

Imagine I'm measuring the height of patients in my women's clinic. I might find that they range from 53 to 74 inches, with an average of 63.8 inches and a standard deviation of 3.5 inches. What does that mean? Well, the average woman will be 63.8 inches tall, but anywhere between 60.3 and 67.3 inches is pretty standard.

And what does "pretty standard" mean in this context? That's the joy of the standard deviation: by the magic of math, 68.3% of the observations in our normally-distributed data are always within 1 standard deviation above or below the mean. In turn, 2 standard deviations contain 95.4% of the observed data, and 3 standard deviations contain 99.7% of the observed data. In our height example, 1 standard deviation = 3.5 inches. So, 68.3% of the women in our data are between 60.3 and 67.3 inches. And the inverse also holds: if 68.3% of women are within 1 standard deviation, then 31.7% are further out (in the "tails" of the distribution), half (15.9%) above and half below the mean.



But we can also turn the standard deviation around and use it as a standardized unit of measure to describe individual data points. This is called the Z-score and it is defined as the number of standard deviations a given data observation lies away from the mean. On SALT reports you will see the Z-score labeled as "+/- SD."

So what if a woman walked into my clinic who was exactly 1 standard deviation above the mean? Well, she would be 67.3 inches tall, 15.9% of women in the clinic would be taller than her, and the rest of the women (84.1%) would be shorter.

But what if I pulled a women's file from my records at random? Without opening the file, how likely is it that this woman is taller than 67.3 inches? Well, it's not a very good bet: only a 15.9% chance.

Finally, imagine we find a misplaced file in the hallway, right between our clinic and the men's basketball clinic next door. We look at the file and see that the person's height is 74.3 inches. Without knowing anything else about this individual, we can say that he or she is exactly 3 SDs above the norm for women in my clinic. So how likely is it that this file belongs to my clinic? Well, recall that 3 SDs contains 99.7% of the observed data and the remaining 0.3% is split between the upper and lower tails of the distribution. This means that one of my clients, chosen at random, would have only a 0.15% chance of being that tall, so maybe we better check next door first.

And that is what standard deviation and the Z-score really have to tell us: the likelihood that a randomly-selected member of the population from which our sample is drawn would have a result at least as extreme as the one we are observing in this case.

So, what do I want you to take away from this example? Three things:

- You need to know who the ***sample population*** is.
- Standard deviation depends on the ***variation*** in your sample population.
- Standard deviation measures the likelihood that a randomly-selected member of the sample population would have a result at least ***as extreme*** as the one we are observing in this case.

Standard Deviation (SD)	Percent of scores that are within this many SDs (above or below) the norm	Percent of scores that are NOT within this many SDs (above or below) the norm, i.e., percent of scores which are more than this many SDs either above or below norm.	Percent of scores which are more than this many SDs above the norm OR below the norm, but not both above and below.
1	68.3%	31.7%	15.85%
2	95.4%	4.6%	2.30%
3	99.7%	0.3%	0.15%

(A nifty calculator for calculating probability given the +/- standard deviation (aka: Z-score) can be found here: https://measuringu.com/pcalcz/)

Now let's bring it back to speech and language pathology.

So, what's happening when SALT returns ridiculously extreme +/- SD scores? To illustrate, I'll use an example of one SALT measure where this happens most often: intelligibility. And the key to understanding why this happens is to look at 1) who the sample population is, and 2) how much variation there is in the results.

First, the sample population. The students sampled in the SALT databases are typically developing, the samples were elicited by experienced SLPs in a quiet area using good recording equipment, and the samples were transcribed by professional SALT transcribers. These are near-perfect circumstances for getting high intelligibility scores. For example, in the SALT *Narrative Story Retell* database, an average of 98.9% of utterances from 10-year-olds have no unintelligible segments.

Second, the variation. There is very little variation in the number of intelligible utterances found in the database samples; the results are clustered in a very small range. For 10-year-olds in the *Narrative Story Retell* database, scores range from 93.75% to 100% intelligible. This small variation results in a small standard deviation value. So even seemingly minor deviations from the mean can result in very high +/- SD scores.

The real takeaway here is that you may have clients who have low intelligibility scores and thus have very high standard deviations from the SALT database norms. But is this a meaningful result? That really depends on what question you are asking. Remember, what SALT's +/- SD for intelligibility really measures is: the likelihood that a typically-developing speaker under near-perfect sampling conditions would randomly produce the observed amount of intelligible utterances.

In determining whether or not a client has a speech sound disorder, this can be a meaningful bit of information. If your client's transcript was 21 standard deviations below the norm, for example, the answer is: it is very, very, very unlikely (the actual probability is beyond most calculators' ability to display correctly) that a typically-developing speaker would have this result.

But if the question you want to ask is: 'how big a problem does this speaker have?' then, no, the standard deviations do not really tell you very much at all. It is SO tempting to say that if your client's result is that extreme, then their problem must be that extreme as well. But it just doesn't work that way because the very high number of +/- SDs is just a result of the limited variability of this measure found in the database samples collected from typically-developing speakers.

So what should you put in your report? Well, you can present this information as strong evidence of the existence of a speech sound disorder. But take care when including the +/- SD value. Remember, *by definition* approximately 99.7% of the sample data lies within 3 standard deviations from the mean. Reporting anything beyond +/- 3 SDs may improve accuracy, but it does not add much meaning to your report and may confuse your audience (unless, of course, they too read this blog). This is why the text-based Performance Report, introduced with SALT 18, now reports +/- SD scores greater than 3 as "more than 3 SDs" rather than using the calculated SD values. That way, the result is highlighted as significant, but doesn't look ridiculously extreme.

REFERENCES

Acarlar, F. & Johnston, J. (2006). Computer-based analysis of Turkish child language: Clinical and research applications. *Journal of Multilingual Communication Disorders*, *4* (2), 30-43.

Aram, D., Morris, R., & Hall, N. (1993). Clinical and research congruence in identifying children with specific language impairment. *Journal of Speech and Hearing Research*, *36* (3), 580-591.

Australian Curriculum Assessment and Reporting Authority [ACARA]. (2012). The Australian Curriculum - English. Retrieved from www.australiancurriculum.edu.au

Bedore, L.M. (1999). The acquisition of Spanish. In O. L. Taylor & L. B. Leonard (Eds.), *Language acquisition across North America: Cross-cultural competence and cross-linguistic perspectives* (157-208). San Diego, CA: Singular Publishing.

Bishop, D. V. M., Snowling, M. J., Thompson, P. A., Greenhalgh, T., & the Catalise consortium. (2016). CATALISE: A Multinational and Multidisciplinary Delphi Consensus Study. Identifying Language Impairments in Children. *PLoS ONE, 11*(7), e0158753.

Bishop, D. V. M., Snowling, M. J., Thompson, P. A., Greenhalgh, T., & the Catalise consortium. (2017). Phase 2 of CATALISE: A multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. *Journal of Child Psychology and Psychiatry, 58*(10), 1068-1080.

Boscolo, B., Bernstein Ratner, N., & Rescorla, L. (2002). Fluency of schoolaged children with a history of specific expressive language impairment: An exploratory study. *American Journal of Speech-Language Pathology*, *11*, 41-49.

Brown, R. (1973). *A first language: The early stages.* Cambridge, MA: Harvard University Press.

Channell, R. W., & Johnson, B. W. (1999). Automated grammatical tagging of child language samples. *Journal of Speech, Language, and Hearing Research*, *42*, 727-734.

Coleman, C. (2013). How can you tell if childhood stuttering is the real deal? Retrieved from http://blog.asha.org/2013/09/26/how-can-you-tell-if-childhood-stuttering-is-the-real-deal/.

Common Core State Standards Initiative (2015). English Language Arts Standards. Retrieved from http://www.corestandards.org/ELA-Literacy/.

Covington, M. A., & McFall, J. D. (2010). Cutting the Gordian knot: The moving-average type–token ratio (MATTR). *Journal of Quantitative Linguistics*, *17*, 94–100.

Crago, M., Annahatak, B., & Ningiuruvik, L. (1993). Changing patterns of language socialization in Inuit homes. *Anthropology and Educational Quarterly*, *24* (3), 205-223.

Crystal, D., Garman, M., & Fletcher, P. (1976). *The grammatical analysis of language disability*. London: Edward Arnold.

Diagram Group (Ed.) (1990). *Rules of the game: the complete illustrated encyclopedia of all the sports of the world,* New York: St. Martin's Press.

Dollaghan, C., & Campbell, T.F. (1998). Nonword repetition and child language impairment. *Journal of Speech, Language, and Hearing Research*, *41*, 1136-1146.

Dunn, L. M., & Dunn, D. M. (2007). *Peabody Picture Vocabulary Test - 4*. Circle Pines, MN: American Guidance Service.

Evans, J., & Craig, H. (1992). Language sample collection and analysis: Interview compared to free play assessment contexts. *Journal of Speech and Hearing Research*, *35*, 343–353.

Freiberg, C., Wicklund, A., & Squier, S. (2003). *Speech and Language Impairments, Assessment and Decision Making, Technical Assistance Guide*. Retrieved from http://sped.dpi.wi.gov/sites/default/files/imce/sped/pdf/slguide.pdf.

Guo, L.-Y., Eisenberg, S., Ratner, N. B., & MacWhinney, B. (2018). Is putting SUGAR (sampling utterances of grammatical analysis revised) into language sample analysis a good thing? A response to Pavelko and Owens (2017). *Language, Speech, and Hearing Services in Schools, 49*(3), 622-627. doi:doi:10.1044/2018_LSHSS-17-0084

Gillam, R., & Pearson, N. (2017). *Test of Narrative Language (Second Edition)*, Austin, TX: Pro-Ed.

Gillam, R., & Pearson, N. (2004). *The Test of Narrative Language.* Austin, TX: Pro-Ed.

Gilmore, A., Croft, C., & Reid, N. (1981). *Burt Word Reading Test. New Zealand Revision*. Wellington: NZCER.

Hammill, D. & Newcomer, P. (1988). *Test of Language Development, Primary (TOLD-P)*. Austin, TX: Pro-Ed.

Handford, M. (1987). *Where's Wally?* London: Walker Books.

Hart, B. & Risley, T. (1999). *The Social Word of Children: Learning to Talk*. Baltimore, MD: Paul H. Brookes Publishing.

Haynes, W. & Pindzola, R. (2011). *Diagnosis and Evaluation in Speech Pathology*, CourseSmart, eTextbook, 8/E.

Heilmann, J., Malone, T., Andriacchi, K., & Westerveld, M. (2015). Don't say no until i finish talking: Persuasive discourse of high school students. Presented at the annual meeting of the *American Speech-Language-Hearing Association*, Denver, CO.

Heilmann, J., Malone, T., & Westerveld, M. F. (2020). Properties of spoken persuasive language samples from typically developing adolescents. *Language, Speech & Hearing Services in Schools, in press*.

Heilmann, J., Miller, J., Iglesias, A., Fabiano-Smith, L., Nockerts, A., & Digney Andriacchi, K. (2008). Narrative Transcription Accuracy and Reliability in Two Languages. *Topics in Language Disorders*, *28* (2), 178-188.

Heilmann, J., Miller, J., & Nockerts, A. (2010a). Sensitivity of narrative organization measures using narrative retells produced by young school-age children. *Language Testing*, *27* (4), 603-626.

Heilmann, J., Miller, J., & Nockerts, A. (2010b). Using language sample databases. *Language, Speech, and Hearing Services in Schools*, *41*, 84-95.

Heilmann, J., Miller, J., Nockerts, A., & Dunaway, C. (2010). Properties of the Narrative Scoring Scheme using narrative retells in young school-age Children. *American Journal of Speech-Language Pathology, 19*, 154-166.

Heilmann, J., Nockerts, A., & Miller, J. (2010). Language sampling: Does the length of the transcript matter? *Language, Speech, and Hearing Services in Schools, 41*, 393-404.

Heilmann, J., & Westerveld, M. (2013). Bilingual language sample analysis: Considerations and technical advances *Journal of Clinical Practice in Speech-Language Pathology, 15*(2), 87-93.

Hughes, D., McGillivray, L., Schmidek, M. (1997). *Guide to Narrative Language: Procedures for Assessment.* Eau Claire, WI: Thinking Publications.

Hunt, K. (1965). *Grammatical structures written at three grade levels* (Research Report No.3). Urbana, IL: National Council of Teachers of English.

Jones, M. A., & Lodholz, C. (1999). *Story Grammar Rubric*. Unpublished document, Madison Metropolitan School District and the Language Analysis Lab, Waisman Center, University of Wisconsin, Madison.

Justice, L., Bowles, R., Kaderavek, J., Ukrainetz, T., Eisenberg S., & Gillam, R. (2006). The Index of Narrative Microstructure: A clinical tool for analyzing school-age children's narrative performances. *American Journal of Speech-Language Pathology*, *15*, 177-191.

Leadholm, B. & Miller, J. (1992). *Language sample analysis: The Wisconsin Guide*. Madison, WI: Wisconsin Dept. of Public Instruction.

Lee, L. & Canter, S. (1971). Developmental Sentence Scoring: A Clinical Procedure for Estimating Syntactic Development in Children's Spontaneous Speech. *Journal of Speech and Hearing Disorders, 36,* 315-340.

LENA™ Research Foundation (2015). Retrieved from http://www.lenafoundation.org/.

Lennox, M., Westerveld, M. F., & Trembath, D. (2018). Evaluating the effectiveness of PrepSTART for promoting oral language and emergent literacy skills in disadvantaged preparatory students. *International Journal of Speech-Language Pathology, 20*(2), 191-201.

Lester, H. (1987). *Pookins Gets Her Way*, Boston, MA: Houghton Mifflin.

Lester, H. (1986). *A Porcupine Named Fluffy*, Boston, MA: Houghton Mifflin.

Loban, W. (1963). *The Language of Elementary School Children.* Urbana, IL: National Council of Teachers of English.

Loban, W. (1976). *Language development: Kindergarten through grade twelve*. Urbana, IL: National Council of Teachers of English.

Long, S.H., Fey, M.E., and Channell, R.W. (2008). *Computerized Profiling*. Cleveland, OH: Case Western Reserve University.

Malone, T., Heilmann, J., Miller, J.F., DiVall-Rayan, J., & M. Rolland (2010, November). Reaching the Tweeners: Extending Two SALT Databases to Grades 5-6. Presented at the annual meeting of

the *American Speech-Language-Hearing Association*, Philadelphia, PA.

Malone, T., Miller, J., Andriacchi K., Heilmann J., Nockerts, A., Schoonveld, E. (2008), Teenage expository language samples, Presented at the *American Speech and Hearing Association*, Chicago, IL.

Mayer, M. (1974). *Frog Goes to Dinner,* New York, NY: Dial Press.

Mayer, M. (1973). *Frog On His Own,* New York, NY: Dial Press.

Mayer, M. (1969). *Frog, Where Are You?,* New York, NY: Dial Press.

Mayer, M. & Mayer, M. (1975). *One Frog Too Many,* New York, NY: Dial Press.

McCabe, A., & Rollins, P. R. (1994). Assessment of preschool narrative skills. *American Journal of Speech-Language Pathology, 3*, 45-56.

McWhinney, B. (2000). *The CHILDES project: Tools for analyzing talk. Third Edition.* Mahwah, NJ: Lawrence Erlbaum Associates.

Miller, J. (1981). *Assessing Language Production in Children: Experimental Procedures, Second Edition*, New York: Allyn and Bacon.

Miller, J. F., Andriacchi, K., & Nockerts, A. (2016). Using language sample analysis to assess spoken language production in adolescents. *Language, Speech, and Hearing Services in Schools, 47*, 99-112.

Miller, J. F., & Chapman, R. (1981). The relation between age and mean length of utterance in morphemes. *Journal of Speech and Hearing Research*, *24*(2), 154-161.

Miller, J., Heilmann, J., Nockerts, A., Iglesias, A., Fabiano, L., & Francis, D. (2006). Oral language and reading in bilingual children. *Journal of Learning Disabilities Research to Practice, 21*(1), 30-43.

Miller, J., & Iglesias, A. (2015). *Systematic Analysis of Language Transcripts (SALT), Version 16* [Computer software]. SALT Software, LLC.

Miller, J., & Klee, T. (1995). Quantifying language disorders in children. In P. Fletcher and B. MacWhinney (Eds.), *The handbook of child language* (545-572). Oxford, UK: Basal Blackwell.

National Center for Education Statistics (2006). The condition of education 2006. Retrieved from http://nces.ed.gov/pubs2006/2006071.pdf.

National Governors Association Center for Best Practices, Council of Chief State School Officers (2010). *Common Core Standards, English Language Arts & Literacy in* Ministry of Education. (2007). *The New Zealand Curriculum for English-medium teaching and learning in years 1 - 13*. Wellington, NZ: Learning Media.

Moyle, J. (2004). *New Zealand Articulation Test*. Tauranga, New Zealand: Tauranga Group Special Education.

Neale, M. D. (1999). *Neale Analysis of Reading: Third Edition*. Melbourne: ACER Press*History/Social Studies, Science, and Technical Subjects*. Washington, D.C.: National Governors Association

Center for Best Practices, Council of Chief State School Officers. Retrieved from http://www.corestandards.org/ELA-Literacy.

Nelson, N. W. (2014a). Classroom-based writing assessment. In A. Stone, E. Silliman, B. Ehren, & G. Wallach (Eds.), *Handbook of Language and Literacy Development and Disorders* (2nd ed., pp. 524-543). New York, NY: Guilford Press.

Nelson, N. W. (2014b). Integrating language assessment, instruction, and intervention in an inclusive writing lab approach. In B. Arfé, J., Dockrell, & V. Berninger (Eds.), *Writing development in children with hearing loss, dyslexia, or oral language problems* (pp. 273-300). New York, NY: Oxford University Press.

Nippold, M. (2010). *Language Sampling with Adolescents*. San Diego, CA: Plural Publishing.

Nippold, M. (2007). *Later language development: school-age children, adolescents, and young adults (3rd Edition)*. Austin, TX: Pro-Ed.

Nippold, M., Hesketh L., Duthie, J., & Mansfield, T. (2005). Conversational versus expository discourse: A study of syntactic development in children, adolescents, and adults. *Journal of Speech, Language, and Hearing Research, 48*, 1048-1064.

Nippold, M., Mansfield, T., Billow, J. & Tomblin, J.B., (2008) Expository Discourse in Adolescents With Language Impairments: Examining Syntactic Development. *American Journal of Speech-Language Pathology,* (17) 356–366.

Nippold, M. A., Moran, C. A., Mansfield, T. C., & Gillon, G. T. (2005, July). *Expository discourse development in American and New Zealand youth: A cross-cultural comparison*. Paper presented at the the 10th International Congress for the Study of Child Language, Berlin, Germany.

Olswang, L., Bain, B. & Johnson, G. (1991). Using Dynamic Assessment with children with language disorders. In S. Warren & J. Reichle (Eds.), *Causes and effects in communication and language intervention*. Baltimore, MD: Brookes Publishing.

Paul, R. (2007). *Language Disorders from Infancy through Adolescence: Assessment and Intervention (3rd Edition)*. St. Louis, MO: Mosby.

Paul, R., Norbury, C. F., & Gosse, C. (2018). *Language disorders from infancy through adolescence. Listening, speaking, reading, writing, and communicating* (5th ed.). Baltimore, MD: Mosby Elsevier.

Pearce, W. M., & Flanagan, K. (2019). Language abilities of Indigenous and non-Indigenous Australian children from low socioeconomic backgrounds in their first year of school. *International Journal of Speech-Language Pathology, 21*(2), 212-223.

Peterson, C, McCabe A. (1983). *Developmental psycholinguistics: Three ways of looking at a child's narrative*. New York: Plenum.

Pezold, M. J., Imgrund, C. M., & Storkel, H. L. (2020). Using computer programs for language sample analysis. *Language, Speech, and Hearing Services in Schools, 51*(1), 103-114.

Plante, E., & Vance, R. (1994). Selection of preschool language tests: A data-based approach. *Language, Speech, and Hearing Services in Schools*, *25*, 15-24.

Renfrew, C. E. (1995). *The Bus Story Test: A test of narrative speech (3rd Edition).* Oxford, UK.

Rice M., Smolik, F., Perpich, D., Thompson, T., Rytting, N., & Blossom, M. (Apr 2010). Mean length of utterance levels in 6-month intervals for children 3 to 9 years with and without language impairments, *Journal of Speech, Language, and Hearing Research*, *53*, 333-349.

Schneider, P., Dubé, R. V., & Hayward, D. (2005). *The Edmonton Narrative Norms Instrument.* Retrieved from www.rehabmed.ualberta.ca/spa/enni/.

Semel, E., Wiig, E., & Secord, W. (2003). *Clinical Evaluation of Language Fundamentals – Fourth Edition (CELF-4).* San Antonio, TX: Psychological Corporation.

Semel, E., Wiig, E. H., & Secord, W. A. (2006). *Clinical Evaluation of Language Fundamentals - Fourth Edition - Australian Standardised Edition*. Marrickville: Harcourt Assessment.

Socio-Economic Indexes for Areas (2011). *Australian Bureau of Statistics, Census for Population and Housing, Australia, 2011*. Retrieved from http://www.abs.gov.au/ausstats/abs@.nsf/mf/2033.0.55.001/.

Steig, W. (1982). *Doctor De Soto*, New York: NY: Farrar, Straus, and Giroux.

Stein, N., & Glenn, C. (1982). Children's concept of time: The development of a story schema. In W.J. Friedman (Ed.), *The developmental psychology of time* (255-282). New York: Academic Press.

Stein, N., & Glenn, C. (1979). An analysis of story comprehension in elementary school children. In R. Freedle (Ed.), *New directions in discourse processing* (53-120). Noorwood, NJ: Ablex.

Strong, C. (1998). *The Strong Narrative Assessment Procedure*. Eau Claire, WI: Thinking Publications.

Swan, E. (1992). *Ko au na galo* (Ana gets lost).Wellington, New Zealand: Learning Media, Ministry of Education.

Thordardottir E. (2005). Early lexical and syntactic development in Quebec French and English: implications for cross-linguistic and bilingual assessment. *International Journal of Language & Communication Disorders*, *40* (3), 243-278.

Urdan, T. C. (2017). *Statistics in Plain English, 4th Edition*. New *Journal of Speech-Language Therapy, 53/54*, 34-41.

van Bysterveldt, A., Westerveld, M., Gillon, G., & Foster-Cohen, S. (2012). Personal narrative skills of school-aged children with Down syndrome. *International Journal of Language & Communication Disorders, 47*(1), 95-105.

van Zaalen-Op't Hof, Y., Wijnen, F., & Dejonckere, P. (2009). Language planning disturbances in children who clutter or have learning disabilities. *International Journal of Speech-Language Pathology, 11*(6), 496-508.

Westby, C. E. (2005). Assessing and remediating text comprehension problems. In H. W. Catts & A. G. Kamhi (Eds.), *Language and reading disabilities* (2nd ed., pp. 157-232). Boston, MA: Pearson Education.

Westerveld, M. F. (2014). Emergent literacy performance across two languages: Assessing four-year-old bilingual children. *International Journal of Bilingual Education and Bilingualism, 17*(5), 526-543.

Westerveld, M. F., & Claessen, M. (2014). Clinician survey of language sampling practices in Australia. *International Journal of Speech-Language Pathology, 16*(3), 242-249.

Westerveld, M., & Gillon, G. (1999/2000). Narrative language sampling in young school-age children. *New Zealand Journal of Speech-Language Therapy, 53/54*, 34-41.

Westerveld, M., & Gillon, G. (2001). Oral language sampling in 6-year-old New Zealand children from different cultural backgrounds. *New Zealand Journal of Speech - Language Therapy, 56*, 5-17.

Westerveld, M. F., & Gillon, G. T. (2008). Oral narrative intervention for children with mixed reading disability. *Child Language Teaching and Therapy, 24*(1), 31-54.

Westerveld, M. F., & Gillon, G. T. (2010a). Profiling oral narrative ability in young school-aged children. *International Journal of Speech-Language Pathology, 12*(3), 178 - 189.

Westerveld, M. F., & Gillon, G. T. (2010b). Oral narrative context effects on poor readers' spoken language performance: Story retelling, story generation, and personal narratives. *International Journal of Speech-Language Pathology, 12*(2), 132 - 141.

Westerveld, M. F., Gillon, G. T., & Boyd, L. (2012). Evaluating the clinical utility of the Profile of Oral Narrative Ability in 4-year-old children. *International Journal of Speech-Language Pathology, 14*(2), 130-140.

Westerveld, M., Gillon, G., & Miller, J. (2004). Spoken language samples of New Zealand children in conversation and narration. *Advances in Speech-Language Pathology, 6*(4), 195-208.

Westerveld, M. F., Gillon, G. T., & Moran, C. (2008). A longitudinal investigation of oral narrative skills in children with mixed reading disability. *International Journal of Speech-Language Pathology, 10*(3), 132-145.

Westerveld, M. F., & Heilmann, J. J. (2012). The effects of geographic location and picture cues on children's story retelling performance. *Asia Pacific Journal of Speech, Language, and Hearing, 15*(2), 129-143.

Westerveld, M. F., & Moran, C. A. (2011). Expository language skills of young school-age children. *Language, Speech, and Hearing Services in Schools, 42*(2), 182-193.

Westerveld, M. F., & Roberts, J. M. A. (2017). The oral narrative comprehension and production abilities of verbal preschoolers on the autism spectrum. *Language, Speech, and Hearing Services in Schools*(48), 260-272.

Westerveld, M. F., & Vidler, K. (2015). The use of the Renfrew Bus Story with 5- to 8-year-old Australian children. *International Journal of Speech-Language Pathology, 17*(3), 304 - 313.

Westerveld, M. F., & Vidler, K. (2016). Spoken language samples of Australian children in conversation, narration and exposition. *International Journal of Speech-Language Pathology, 18*(3), 288-298.

Wiig, E., Secord, W., & Semel, E. (2004). *Clinical Evaluation of Language Fundamentals Preschool - Second Edition*. San Antonio: TX: Psychological Corporation.

Wisconsin Department of Public Instruction (2003). *Speech and language impairments assessment and decision making. Technical assistance guide.* Retrieved from http://dpi.wi.gov/sped/speech.html.

Woodcock, R. W. (1991). Woodcock Language Proficiency Battery-Revised: English and Spanish. Itasca, IL: Riverside Publishing.

INDEX

$ speaker labels, 22

% abandoned utterances, 250
% utterances with errors, 34
% utterances with verbs, 33, 249

abandoned utterances, 49, 64
Acarlar, Funda, 24
accessibility, 4
African American English, 52
age range, 38
age-matched, 5, 11, 45
American Speech Language Hearing Association, 51, 85, 144
Ana Gets Lost, 73
analysis set, 28, 29, 46
analyze menu, 28, 29, 30, 46, 58, 61
Aram, Dorothy, 56
articulation, 21
ASHA. *See* American Speech Language Hearing Association
Assigning Structural Stage, 2
autism, 3, 9, 46

Bates, Liz, 50
best practice, 2, 51
bias, 3, 55
bound morpheme, 227
bound morpheme table, 30
bound morphemes, rationale, 212
Brown, Roger, 1

C&I verbal, 28, 29, 250
C&I verbal utts, 249
Channell, Ron, 30
child utterance, 22
code switch, 23, 228
codes, 23, 24
Common Core, 3, 10, 76
communication units, 218
Communication Units, 21, 218
comparison set, 30, 31, 37, 38
comparison to database, 15, 16
Concomitant behaviors, 89
consistency, 4, 20, 21
conversation, 5, 7, 8, 9, 10, 11, 13, 21
Conversation database, 13, 38, 177
conversational samples, 61
criterion referenced, 2
C-unit segmentation, 218
customized coding, 23, 59, 69, 76, 86

database menu, 28, 30, 36, 58
delayed language, 49, 50, 60
dependent clauses, 166
derivational morphemes, 212, 213
developmental disabilities, 3, 9
Developmental Sentence Scoring, 2, 69
dialect, 3, 52
discourse, 9, 34, 44, 46, 67, 68, 249, 252
discourse deficits, 50, 67
DiVall-Rayan, Joyelle, 76, 94
Down syndrome, 103

edit menu, 46
Edmonton Narrative Norms Instrument, 15, 56, 199
elicit language sample, 16
elicitation protocol, 17, 175, 177, 181, 184, 191
eligibility, 53, 55
ENNI. *See* Edomonton Narrative Norms Instrument
ENNI database, 199
error codes, 123, 250
errors, 62, 250, 252
ESS. *See* expository scoring scheme
event narrative, 10
examiner, 16
examiner utterance, 22
exposition, 3, 7, 10, 14
expository, 6, 10, 11, 14
Expository database, 14, 191
expository scoring scheme, 50, 66, 144, 237

fast speaking rate, 50, 69
favorite game or sport task, 166
FGS task. See Favorite Game or Sports task
fluency, 85, 86, 88, 92
fluency codes, 86, 88
foot pedal, 20
formal measure, 53
French transcription, 24
frog stories, 14, 189

Gillam, Ron, 15
Gillon, Gail, 12, 72, 150, 164
grade-matched, 5, 11
grammatical categories, 30, 46, 61
guide to appendices, 147

Hayward, Denyse, 200
Heilmann, John, 54, 172
help system, 5, 20, 144

identification lines, 22
Iglesias, Aquiles, 24
inflectional morphemes, 212
informal measure, 53
insert code, 46
intelligibility, 17, 28, 33, 249, 250

Justice, Laura, 56

Kay-Rainingbird, Elizabeth, 24
Keillor, Garrison, 52

language disorder, 51
language sample analysis, 1, 27, 48, 94
LARSP, 2
late talkers, 9
link transcripts, 16, 46, 70, 71
Loban, Walter, 49
low semantic content, 50
LSA. *See* language sample analysis

Malone, Tom, 53, 172, 194
maze, 5, 29, 34, 49, 58, 59, 64
maze summary, 30, 40, 64
mean length of utterance. *See* MLU
mean verbs per utterance, 33, 249
MLU, 1, 5, 19, 29, 33, 41, 49, 51, 56, 58, 60
morphology, 33, 249
Moving Average NDW, 34
Moving Average NTW, 249
moving-average NDW, 249

narration, 7, 9, 11
narrative organization, 50, 65
narrative scoring scheme, 193
Narrative Scoring Scheme, 50, 66, 231
Narrative SSS database, 13, 181
narrative story retell, 5, 7, 21
Narrative Story Retell database, 14, 184
NDW, 5, 19, 30, 33, 49, 58, 60, 65, 69
New Zealand / Australia databases, 12
New Zealand databases, 72, 165
non-verbal behaviors, 9
norm referenced, 51, 54, 56, 57
normative graphs, 144
NSS, 193, *See* Narrative Scoring Scheme
NTW, 5, 19, 33
number of different words, 249, *See* NDW
number of total words, 5, 249, *See* NTW

omissions, 62
ONQ. *See* oral narrative quality
Oral Narrative Comprehension, 159
oral narrative quality, 67, 245
Oral Narrative Quality rubric, 98, 156

parenthetical remarks, 29, 141, 225
Paul, Rhea, 46, 51
pauses, 19, 34, 49, 58, 63
percent abandoned utterances, 250
percent responses to questions, 67
percent standard deviation, 33
percent utterances with verbs, 33, 249
performance report, 30, 35, 113
personal narrative, 10, 72, 162
persuasion, 6, 8, 11, 13, 65, 169, 170, 173, 174
persuasion database, 13
Persuasion database, 169
persuasion scoring scheme, 50, 66, 144, 171, 242
Phonological Units, 21
planning sheet, 196
Play database, 13, 175
play sample, 8, 9
plus line, 23
PONA. See Profile of Oral Narrative Ability
procedural narration, 10
Profile of Oral Narrative Ability, 73
PSS. *See* persuasion scoring scheme

Quick Look, 36, 59, 110

raw score, 33, 48
reference database, 5, 8, 11, 15, 16, 28, 36, 46
references, 258
reliability, 3, 5, 15, 23, 24
Response to Intervention, 70, 136
Rojas, Raúl, 24
Rolland, Mary-Beth, 53
RtI. *See* Response to Intervention

SAE. See Standard American English
SALT, 1
SALT analysis, 48, 57
sample length, 11, 33
sampling context, 7, 8
scaled score, 52
Schneider, Phyllis, 15, 200
SD, 33, 56, 57, 254
semantics, 29, 33, 109, 119, 126, 228, 249, 251
sensitivity, 52, 55
SI, 193, *See* Subordination Index
significant deficit, 56
SMR. *See* standard measures report
Spanish transcription, 24
speaker label line, 22
speaker turn, 68
speaking rate, 34
specificity, 52, 55
spelling, 21, 77, 78, 84
SSS. *See* Narrative SSS database
Standard American English, 52
standard deviation, 33, 48, 52, 56, 57, 59
Standard Deviation, 254
standard measures report, 16, 29, 32, 33, 38, 48, 58
standard score, 52, 54
standard utterance list, 30, 40, 64
standard word list, 30, 46, 61
standardize, 2, 4, 6, 51, 52, 53, 54, 55, 56
Story Quality Rubric, 156, 157
story script, 189

stuttering. *See* fluency
subordination index, 193
Subordination Index, 19, 62, 63, 111, 144, 224
syntax, 33, 48, 63, 65, 69, 111, 128, 224, 249
Systematic Analysis of Language Transcripts, 1

Thordardottir, Elin, 24
timing line, 22
TNL Narrative Samples database, 204
TNL2 Narrative Samples database, 201
topic change, 69
topic initiation, 9
topic maintenance, 9, 69
transcribe, 2, 4, 17, 19, 20
transcript, 22
transcript cut, 29
transcript header, 22
transcript length, 16, 33, 48, 249, 250
transcription conventions, 19, 22, 208
transcription format, 19, 20, 21
T-unit. *See* Minimal Terminable Unit
Turkish database, 24
turn length, 69
turn taking, 9

utterance, 21, 22
utterance distribution table, 41, 60
utterance formulation, 34, 49, 63, 65

validity, 3, 5, 15, 16, 17
van Bysterveldt, Anne, 94
verbal facility, 34, 48, 250, 252
verbal fluency, 19
Vidler, 74
Vis Dubé, Rita, 200

Westerveld, Marleen, 12, 72, 94, 150, 164, 167
word, 21
word base, 29
Word Lists, Bound Morphemes, & Utterance Distribution report, 41, 42
word retrieval, 34, 49, 63, 64, 65
word root table, 30, 46
words per minute, 5, 34, 51, 69
WPM. *See* words per minute
written sample coding scheme, 78
written samples, 7, 21, 51, 76, 77, 80, 81, 84

YouTube, 144

User level:
Beginning-Intermediate

www.saltsoftware.com

ISBN 978-164826301-9