SECTION IV: GUIDELINES FOR INTERPRETATION

I. Diagnostic Questions to Aid Interpretation of SALT Data

A. Examiner Influences: When you begin to interpret data from a SALT printout, consider the influence of the examiner’s language on the language the child produces. Judge sample results with regard to:

1. Examiner questions (e.g. requests for specific information/possible communicative pressure on child, number of requests which require single word response/impact on MLU, examiner question types, number of questions asked by the examiner without allowing time for a response, etc.).
2. Does the examiner give the student ample time to respond (pause time)?
3. What is the examiner’s MLU and language complexity?
4. Does the examiner interrupt the dialogue?
5. What is the ratio of examiner talk to student talk?

B. Timing

1. Does the student speak slowly, or are the words per minute reduced by pauses?
2. How do the examiner’s words per minute compare with the student’s?
3. Look at the pauses in the transcript. Why did they occur? (Consider examiner style, organizational/syntactical/semantic student deficits.)
4. Is the number of utterances per minute inflated/deflated by the student’s MLU?

C. Intelligibility

1. Does the examiner gloss to increase intelligibility? How much? How does this affect examiner MLU and the flow of discourse?
2. Does the amount of this behavior greatly influence the number of percentage of complete and intelligible utterances? Does it affect the flow/discourse?
3. Does the rate of speech reduce intelligibility? (See words per minute.)

D. Mazes and Overlaps: Look at the content of any mazes included in the sample. Consider

1. Does the student repair the utterance by revising?
2. What are the content and form of mazes?
3. What effect does sentence length have on the number of mazes? (See mazes by utterance length chart.)
4. How long are most mazes? What is the range of maze lengths? (See maze by maze length chart.)
5. Is there more than one maze per sentence? Under what conditions do multiple mazes occur? (See utterances by number of mazes chart; see sample.)
6. Are there pauses associated with mazing or lack of mazing? (See sample.)
7. Are there grammatical form/word finding/organizational difficulties that influence mazes? (See sample and word lists.)

E. Look at the instances of overlap, if any. Consider:
   1. Why did the overlap(s) occur? (Consider examiner role, time allowed for student response, student interjecting information late in dialogue as he retrieves/formulates language needed, student anticipating and subsequently interrupting, etc.).
   2. What are the student’s turn taking skills? (May need to do additional discourse analysis.)
   3. What is the relationship to pauses within the sample?
   4. What is the relationship to mazes within the sample?

F. Semantics
   1. Who selected the topic? Is it familiar to the student?
   2. How many topics were discussed in the sample?

G. Word Lists
   1. When any area on the word lists is reduced, you must consider sampling constraints in interpretation of the data and probe for student proficiency with other tasks.
   2. The question forms, negatives, conjunctions, modals, and pronouns that SALT considers are listed in the tables.

H. MLU
   1. MLU is influenced by many of the factors listed above.
   2. Can you find any reason why the student’s MLU is unusual for their age?

I. Bound Morphemes Tables
   1. The tables will identify any bound morphemes, which were omitted in an obligatory context.
   2. Check the sample for errors. Do the errors cause the comprehension difficulties? Are the error forms used correctly elsewhere in the sample suggesting that the form is emerging normally? Are there error patterns?
J. Cultural Sensitivity
   1. When analyzing a SALT sample, use of ethnic dialect is not an error.
      a. Can the child code switch easily?
      b. How much Ethnic Dialect or Standard English do they use?
      c. Is the use of dialect topic specific?
   2. The interpretation of the sample is only as culturally sensitive as the clinician. Keep a dialectical feature reference available.
   3. Mazes, MLU, pause time total and different words are not influenced by the use of an ethnic dialect.
   4. Language samples from African American children collected under the same speaking conditions as the reference database suggest that valid comparisons can be made. Hong children who are learning English as a second language demonstrate an increased number of mazes, greater pause time, and shorter MLUs. These differences are most likely the effect of second language learning and not evidence of a language disorder unless progress cannot be documented over time.
   5. Language Sample Analysis is less culturally biased than standardized tests because it is “child-driven” (open-ended) and interpreted with information about the child’s cultural background.

II. Profiler Program
   A. Introduction to the Profiler Program
      SALT Profiler is designed to analyze language samples by comparing an individual’s SALT transcript to a reference database of language measures.

      This database consists of language sample date from normal 3, 4, 5, 6, 7, 9, 11, and 13-year old children drawn from preschools in Madison, Wisconsin, or from the Madison Metropolitan School District. Additional 3, 5, and 7-year-old subjects were drawn from rural areas in northern Wisconsin. This subject population of over 250 children is a random sample reflecting the diverse socio-economic status of the Madison Metropolitan area and rural Wisconsin. There are children from a variety of economic backgrounds and ability levels. Their ages are all within 6 months of the specific age group in which they are included. For example, all children in the 7-year-old age group are from 6 years and 6 months, to 7 years and 6 months in age. Language samples containing at least 100 complete and intelligible child utterances were collected from each subject in both conversational and narrative contexts.

   B. Profiler Analysis
      There are 3 levels of analysis included in the Database Profiler Program. There are selected from the Analyze menu with the Compare option.
1. **Level 1: Standard Measures**

The level 1 analysis includes measures designed to give you a general idea of how the target speaker compares to the selected database transcripts. Measures that are marked with a pound sign (#) are based on the speaker’s complete and intelligible utterances. The rest of the measures are based on the speaker’s total utterances.

The numbers in the first column are the values from the individual transcript. The other values are the accumulated values of them matching database transcripts. The mean, standard deviation (SD), minus one SD (-SD), plus one SD (+SD), percent SD (SD/mean), and minimum and maximum data values are all listed. Those student values that are at least one SD from the mean but are less than two SD’s from the mean are followed by one asterisk "*". Those student values that are two or more SD’s from the mean are followed by two asterisks "**". Note that the asterisks merely identify measurement categories to be reviewed by the Speech/Language Clinician and are not conclusive evidence of difficulty or a “score.”

The following table lists and describes each of the measures included in the level 1 analysis.

**LEVEL 1: STANDARD MEASURES**

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>MEASURE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>CA</td>
<td>Current age of target speaker <em>(if available)</em></td>
</tr>
<tr>
<td></td>
<td>Total Utterances</td>
<td>Total # of speaker attempts</td>
</tr>
<tr>
<td>Syntax/Morphology</td>
<td># MLU (morph)</td>
<td>Mean length of the utterances in morphemes</td>
</tr>
<tr>
<td>Semantics</td>
<td>TTR</td>
<td>Type-token ratio <em>(no. of diff. words/total words)</em> calculated on the first 50 C&amp;I utt</td>
</tr>
<tr>
<td></td>
<td># Diff. Word Roots</td>
<td>No. of diff. word roots <em>(excludes mazes)</em></td>
</tr>
<tr>
<td></td>
<td># Total Main Body Words</td>
<td>Total no. of main body words <em>(excludes mazes)</em></td>
</tr>
<tr>
<td>Intelligibility</td>
<td>% Intel. Utterances</td>
<td>Percent of the complete verbal utterances that are complete and intelligible</td>
</tr>
<tr>
<td>Mazes and Overlaps</td>
<td># Utts w/Mazes</td>
<td>No. of utterances containing mazes</td>
</tr>
<tr>
<td></td>
<td># No. of Mazes</td>
<td>Total no. of mazes</td>
</tr>
<tr>
<td></td>
<td># No Maze Words</td>
<td>Total no. of maze words</td>
</tr>
<tr>
<td></td>
<td># % Mz Wds/Tot Wds</td>
<td>Percent of total words that are in mazes</td>
</tr>
<tr>
<td></td>
<td>Utts w/Overlaps</td>
<td>No. of utterances containing overlapping speech</td>
</tr>
<tr>
<td>Verbal Facility and Rate</td>
<td>No. Complete Words</td>
<td>Total no. of completed words <em>(includes mazes)</em></td>
</tr>
<tr>
<td></td>
<td>Elapsed Time</td>
<td>Transcript duration in minutes if timing information is found in transcript <em>(elapsed time is estimated from surrounding timing lines)</em></td>
</tr>
<tr>
<td></td>
<td>Utts/Minute</td>
<td>Total no. utterances / elapsed time</td>
</tr>
<tr>
<td></td>
<td>Words/Minute</td>
<td>Total completed words / elapsed time</td>
</tr>
<tr>
<td></td>
<td>Betw. Utt Pauses</td>
<td>No. of pauses between utterances (: and ; lines)</td>
</tr>
</tbody>
</table>

LSA-Interpretation
2. Level 2: Further Analysis

The “Level 2: Further Analysis:” option includes more detailed measures. These measures include counts on several standard word lists, specific bound morpheme totals, additional maze information, utterance length distributions, and specific error code totals.

All measures refer to a target speaker and are based on either the complete and intelligible utterances or all the utterances, depending on whether the (#) sign precedes the category. The numbers in the first column are the individual transcript values. The other values are the accumulated values of the matching database transcripts. The mean, standard deviation (SD), minus one SD (-1SD), plus one SD (+1SD), percent SD (SD/mean), and minimum and maximum data values are all listed. Those student values that are at least one SD from the mean but are less than two SD’s from the mean are followed by one asterisk “*”. Those student values that are two or more SD’s from the mean are followed by two asterisks “**”.

The following table lists and describes each measure included in the level 2 analysis.

**LEVEL 2: FURTHER ANALYSIS**

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| Word Lists        | Five of the SALT1 standard word lists are included: Question Words, Negatives, Conjunctions, Modal Aux. Verbs and Personal Pronouns. There are two counts given for each of these lists. The “Total” is a count of the total number of occurrences of any of the words in the list. The “Type” is a count of the number of different words in the list that occurred. Counts of the specific words in the list are available in the Level 3 analyses. *These
Bound Morphemes

The total occurrences of the following bound morphemes are given: /3s, /ED, /ING, /S, and /Z. Bound morphemes omitted in obligatory context (marked with an asterisk) are not included in this list.

Types of Mazes

- Filled Pauses
  - Part Maze
  - Whole Maze

- Maze Repetitions
  - Part Word
  - Word
  - Phrase

- Maze Revisions
  - Part Word
  - Word
  - Phrase

Filled pauses include the following words: UM and UH. These words are read from the beginning of the word list file “SALT.LST” that comes with the profiler program. If this file cannot be found, you will be informed of this and the counts will be zero.

No. of mazes in which some of the words, but not all, are filled pauses
No. of mazes that consist entirely of filled pauses.

Maze Distributions

- No. of Mazes by Maze Length
- No. of Mazes by Utterance Length
- % of Utts with Mazes by Utt Length
- No. of Verbal Utts by No. of Mazes

Utt. Distribution

- No. of Utterances by Utt Length

Expanded Error Codes

The Level 1 Standard Measures analysis contains counts on the following four error codes:

- [EO=] Total no. of overgeneralization error codes
- [EP=] Total no. of pronoun error codes.
- [EW=] Total no. of other word-level error codes
- [EU=] Total no. of utterance-level error codes

The equal sign (=) at the end of the code is the SALT “match any” symbol and stands for any or no characters in that position. Specifically, [EO=] would count all codes that begin with “[EO]”

The expanded error codes give separate counts for the actual codes found (e.g. [EO:got] or [EO=:went]).
3. **Level 3: Selected Words and Utts**

The “Level 3: Selected Words & Utts” option includes lists of words and utterances. There is no database information in these lists, just counts of specific words found in the transcript and lists of utterances with specific characteristics. Because these lists tend to be long and may contain more detail, they are not provided unless requested. There are counts of 2 different types of words: 1) words from the standard word lists, and 2) words with specific bound morphemes. There are 5 different categories of utterances: 1) utterances that contain mazes, 2) utterances that contain overlapping speech, 3) utterances that contain pauses, 4) utterances with error codes, and 5) unintelligible or incomplete utterances.

**LEVEL 3: SELECTED WORDS & UTTERANCES**

<table>
<thead>
<tr>
<th>LIST</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word List Expansions</td>
<td>Words included in the standard word lists from the Level 2 Analysis (Question Words, Negatives, Conjunctions, Modal Aux, Verbs and Personal Pronouns)</td>
</tr>
<tr>
<td>Bound Morpheme Expansions</td>
<td>Words containing the bound morphemes listed on the Level 2 Analysis (/3S, /ED, /ING, /S, and /Z). Words containing omitted bound morphemes are also included.</td>
</tr>
<tr>
<td>Utterances with Mazes</td>
<td>Utterances that contain mazes</td>
</tr>
<tr>
<td>Utterances with Overlaps</td>
<td>Utterances that contain overlapping speech</td>
</tr>
<tr>
<td>Utterances with Pauses</td>
<td>All utterances that contain pauses, either timed or untimed. Unintelligible and incomplete utterances are included.</td>
</tr>
<tr>
<td>Utterance with Omissions</td>
<td>Utterances that contain words or bound morphemes that were marked as omissions in the main body of the utterance.</td>
</tr>
<tr>
<td>Utterances with Error Codes</td>
<td>Utterances that contain the error codes listed in the Level 1 and Level 2 analyses ([EO=], [EP=], [EW=], and [EU=])</td>
</tr>
<tr>
<td>Unintelligible or Incomplete Utterances</td>
<td>All utterances not in the set of complete and intelligible utterances. These include abandoned and interrupted utterances as well as those that contain unintelligible segments (X’s)</td>
</tr>
</tbody>
</table>

**C. Interpreting Results**

1. **A Clinical Typology of Language Disorders**

The following Typology summarizes seven perceived types of language disorders along with the associated variables of Profiler data, which may be affected.

**A CLINICAL TYPOLOGY OF LANGUAGE DISORDERS**

(Adapted from Miller 1987;1991)

<table>
<thead>
<tr>
<th>CLINICAL TYPES</th>
<th>CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utterance Formation</td>
<td>Maze revisions at word and phrase level units; increased mean length of utterances; pauses within and between utterances; word order errors.</td>
</tr>
<tr>
<td>Word Finding</td>
<td>Maze revisions and repetitions at word or part-word level units; pauses within utterances; word omissions; word choice errors.</td>
</tr>
<tr>
<td>Hypo-verbal rate</td>
<td>Decreased number of utterances and words per minutes; pauses within and between utterances.</td>
</tr>
<tr>
<td>Hyper-verbal Rate</td>
<td>Increases number of utterances and words per minute which may be combined with reduced</td>
</tr>
</tbody>
</table>

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As you can see, there is one category for developmental delay, and 6 different types of “disordered” performance generally defined by different error patterns. Each of the types of productive language deficits will be reviewed with a brief example transcript to provide a “feel” for the nature of these children. It should be noted that these categories are not well documented nor validated by research at this time. A child may exhibit difficulty in more than one area. They are clinically valid by virtue of that fact that SLPs easily recognize examples of these types of deficits. The descriptive “edges” of the categories remain fuzzy. The strength of language sample analysis lies in its utility to describe any aspect of language performance that you can define. The flexibility of language sample analysis provides opportunity to use both quantitative methods comparing individual performance with that of peers, and clinical judgment using clinical experience to interpret language performance and develop an intervention plan. Following each example transcript is a list of the SALT database Profiler variables that correspond to the characteristics listed above.

2. Utterance Formulation Problems
This narrative sample is from a boy, 8.5 years of age that is representative of the kinds of mazes children with formulation problems exhibit. Many of the mazes in utterances could be interpreted as an inability to retrieve the appropriate word, though the majority are the result of utterance formulation problems. His MLU is 2 standard deviations above the mean for children his age, which is typical of children with formulation problems. He is attempting to retell the story Rumpelstiltskin.