Fast Measure of Complex Syntax

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Measuring complex syntax can be a daunting task, given differences in linguistic description, infrequency of use of many forms, and lack of standards for interpretation.[1-3]

Researchers at SALT Software, in Muscoda, WI, faced this problem in 2002 when they participated in a large study funded by the National Institutes of Health and the Institute of Education Sciences to document reading and school achievement outcomes of bilingual educational programs.

The SALT researchers provided measures of oral language that could be evaluated along with other educational outcomes in children learning English as a second language. Story retell samples were collected from each child in Spanish and English. The researchers needed to identify a measure of complex syntax that could be calculated from these narrative samples in both languages. Because more than 20,000 samples were collected, they also needed a measure that could be completed quickly and accurately.

The researchers revived the Subordination Index (SI) measure as it coded each utterance in a language sample and resulted in a single value representing syntactic complexity.[4-6]

They adapted the original scoring guidelines to create parallel coding schemes for both English and Spanish. Coding for SI was completed efficiently and accurately.[7]

These scores and other measures from the narrative samples were calculated using the Systematic Analysis of Language Transcripts (SALT) software.[8]

SI was one of more than 20 measures of vocabulary syntax, rate, fluency and narrative structure calculated by SALT. The index is a measure of syntactic complexity that produces a ratio of the total number of clauses to utterances.

Main and subordinate clauses contain both a subject and a predicate. Main clauses can stand by themselves, while subordinate clauses depend on the main clause to make sense. They are embedded within an utterance as a noun, adjective or adverbial clause that defines complex syntax. The SI analysis counts the number of utterances containing clauses, and the composite SI score is calculated using a formula that divides the total number of clauses by the total number of utterances.

SALT software facilitates the coding process by allowing the user to select the appropriate subordination code from a built-in code list. The selected code is inserted automatically at the end of the utterance. When coding is completed, the software calculates the composite SI score and enters it on a "plus" line at the end of the transcript.

Perhaps the biggest advance in revitalizing the SI is the availability of comparison scores from typical speakers. SALT contains a number of reference databases with samples from typical speakers in a variety of sampling contexts. Analyses of these databases revealed that SI is developmentally robust. A significant linear trend was observed in the bilingual database, confirming that children's SI scores in Spanish and English increased significantly across grades.

SALT offers an added measure of sentence complexity that only takes five to eight minutes after

transcription. For example, a speech-language pathologist who is concerned about the language performance of a third-grader would collect a story retell narrative language sample, transcribe the sample using SALT transcription conventions, and access the SI coding option to add a subordination code at the end of each utterance. Calculations of the SI and SALT standard measures then can be compared to the results of a set of age-matched peers retelling the same story. The calculations take only a few seconds, and the report provides a profile of measures across vocabulary, syntax, rate, fluency errors and omissions. The addition of the SI measure provides a valuable index of complex syntax along with other measures of oral language.

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