A Measure of Semantic Complexity Among Predications

Morton Wiener, Maureen Rubano, and Robert Shilkret

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A scale for assessing the complexity or density of utterances was developed using 10 categories of semantic relations (e.g., temporal ordering, causality). The categories are inferable from the particular "meanings" of the words (e.g., connectives, particular tense variations) used in an utterance. The scale was applied to three samples of subjects to assess its interjudge reliability and to compare the utterances of fourth-, sixth-, and eighth-grade children from middle- and working-class neighborhoods. It was also used to compare the complexity of utterances for different types of visual stimuli (used to elicit language samples). Interjudge reliabilities were more than acceptable for each of the samples, and significant differences in semantic density were found across grade, between children from working-class and middle-class neighborhoods, and for the stimuli used to elicit the utterances. When two of the three types of eliciting visual stimuli were equated for content and exposure conditions, the differences in verbal density between eliciting conditions were not replicated. The usefulness of the scale for assessing utterance density and by implication, comprehension difficulty of utterances and of texts, is discussed.

BACKGROUND

Most of the earlier efforts to assess text for utterance complexity and the presumed difficulty for comprehension had been focused on such measures as (a) vocabulary difficulty, inferred from ratings of word familiarity and/or of frequency of occurrences in some verbal corpus, (b) measures of sentence length,

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2 Department of Psychology, Clark University, Worcester, Massachusetts 01610.

3 Mount Holyoke College, South Hadley, Massachusetts 01075.
and (c) kinds of grammatical organizations (e.g., embedded clauses). More recently, influenced by the work of linguists, particularly by the transformational grammar approach (Chomsky, 1965), concerns about complexity and difficulty shifted to measures of the number of transformations required to go from a "kernel" sentence to the sentence to be comprehended. Still more recently, investigators concerned with "artificial intelligence" or computer models of thought and language (e.g., Shank & Colby, 1973) have begun to recognize more explicitly that much of the difficulty in understanding comes from the vast amount of inferential activity that is required to go from a particular utterance to its "meaning" or "significance." Although Wiener & Shilkret (1974) were not concerned specifically with computer analogues, they—working within a psychological rather than a linguistics tradition—also began to explore some semantic contributions to the difficulties of producing or comprehending utterances and texts.

For Wiener & Shilkret the difficulty in encoding or decoding utterances or texts was posited to be the number of simultaneous (in contrast to successive) discriminations or coordinations of relationships among predications within an utterance. The assumption was that the greater the number of such discrimination-coordinations among the components in an utterance, the more "difficult" it should be for a communicator. The term "density of information" within an utterance could be used as an alternative to the construct "complexity."

This perspective was deemed useful for identifying some sources of difficulty expected during acquisition of speech and for decoding of texts as these become more "complex." For example, although infants or young toddlers may have a number of words already present in their active vocabularies, early on at least, they do not combine these words into units even as limited as two words. Our explanation, like that of others, is that two-word utterances are more complex in that they include the individual components and a relationship between the two (e.g., "baby shoe"), that is, a coordination of the two components. In a three-word (or larger) unit there are additional coordinations or relations among the components, i.e., subject-predicate, subject-object, predicate-object. What "belongs" to what must be discriminated. To the extent that the content in an utterance includes at least a subject-predicate relation, then the addition of any other lexical, semantic or syntactic component, all of which incorporate information about an additional relationship, can be considered an increase in the density of an utterance (e.g., a sentence), all other factors held constant. Given this basic orientation, Wiener & Shilkret (1974) outlined some possible sources of such relational information which requires integration if comprehension is to occur.

**Associativity**

This parameter assesses the relative degree of common associations among the words in an utterance and is believed to be a contribution to the density of