
A Linguistic Analysis of Simplified and Authentic Texts

SCOTT A. CROSSLEY

*Department of English
Mississippi State University
P.O. Box E
Mississippi State, MS 39762-5505
Email: scrossley@mail.psyc.memphis.edu*

PHILIP M. McCARTHY

*Fed Ex Institute for Technology
4th Floor, RM 410
Institute for Intelligent Systems (IIS)
University of Memphis
Memphis, TN 38152
Email: pmccarthy@mail.psyc.memphis.edu*

MAX M. LOUWERSE

*202 Psychology Building
The University of Memphis
Memphis, TN 38121
Email: mlouwers@memphis.edu*

DANIELLE S. McNAMARA

*202 Psychology Building
The University of Memphis
Memphis, TN 38152-3230
Email: d.mcnamara@mail.psyc.memphis.edu*

The opinions of second language learning (L2) theorists and researchers are divided over whether to use authentic or simplified reading texts as the means of input for beginning- and intermediate-level L2 learners. Advocates of both approaches cite the use of linguistic features, syntax, and discourse structures as important elements in support of their arguments, but there has been no conclusive study that measures these differences and their implications for L2 learning. The purpose of this article is to provide an exploratory study that fills this gap. Using the computational tool Coh-Metrix, this study investigates the differences between the linguistic structures of sampled simplified texts and those of authentic reading texts in order to provide a better understanding of the linguistic features that comprise these text types. The findings demonstrate that these texts differ significantly, but not always in the manner supposed by the authors of relevant scholarship. This research is meant to enable material developers, publishers, and classroom teachers to judge more accurately the value of both authentic and simplified texts.

AS SUGGESTED BY DAY AND BAMFORD (1998), there is currently a divide within the field of second language (L2) materials development over the use of authentic reading texts versus the use of simplified reading texts as the means of language input for beginning and intermediate L2 learners. The present popular trend, which has lasted for over 20 years, has favored the use of authentic texts for all levels of L2 learners (e.g., Bacon & Finnemann, 1990; Swaffar, 1985; Tomlinson, Bao, Masuhara, & Rubdy, 2001). Despite this trend, the majority of L2 learning texts at the beginning and intermediate levels still depend on simplified input, and many material writers and L2 specialists continue to emphasize the practi-

cal value of simplified texts, especially for beginning and intermediate L2 learners (e.g., Johnson, 1981, 1982; Shook, 1997; Young, 1999).

Proponents on both sides of the argument assert the respective linguistic merits of simplified and authentic texts, but with little empirical evidence. This lack of evidence is due to the fact that the data-based research previously conducted was concerned primarily with the effects of text types (simplified or authentic) on student recall and comprehension, not with the linguistic properties of the texts. Although advocates of both approaches cite the underlying presentation of linguistic features, syntax, and discourse structures as important elements that support their preferences, no conclusive or comprehensive study has empirically examined how these features differ between the authentic and simplified text types.

The purpose of this article is to provide an exploratory study that begins to fill this research gap. Using the computational tool Coh-Metrix (Graesser, McNamara, Louwerse, & Cai, 2004; McNamara, Louwerse, & Graesser, 2002), which measures over 250 language and cohesion features, this study investigated the differences in linguistic structures between sampled simplified and authentic reading texts. This research is meant to enable L2 reading researchers, material developers, and publishers to judge more accurately the comparative linguistic value of both text types by concentrating on the differences and similarities between them in cohesion and other language features at the lexical, intersentential, and sub-sentential levels. This article will also address how these linguistic features correlate to those features presupposed to exist in the texts. In doing so, the authors hope to provide the lacking empirical data that demonstrate which linguistic features characterize simplified and authentic texts.

SIMPLIFIED TEXTS

According to Simensen (1987), simplified texts are texts written (a) to illustrate a specific language feature, such as the use of modals or the third-person singular verb form; (b) to modify the amount of new lexical input introduced to learners; or (c) to control for propositional input, or a combination thereof. There are many proponents of simplified texts, especially for beginning and intermediate L2 learners (e.g., Day & Bamford, 1998; Hill, 1997; Shook, 1997). Much of the foundation for their advocacy of simplified texts rests on theories concerning input in the field of second language acquisition (SLA) and on beliefs about the linguistic nature of simplified texts.

According to Tweissi (1998), researchers in SLA have come to believe that the cognitive mechanisms that lead to language acquisition reflect simplistic orientations similar to those located in simplified texts. These cognitive mechanisms mimic the language found in caretaker talk and teacher talk and help the language learner acquire a language in a relatively structured way. Allen and Widdowson (1979) suggested that the proponents of simplified texts assume that these texts benefit L2 learners because they exclude unnecessary and distracting idiosyncratic style without suffering a loss of the valuable communication features and concepts that are found in real texts. In addition, simplified texts are often seen as valuable aids to learning because they accurately reflect what the reader already

knows about language and have the capacity to extend this knowledge (Davies & Widdowson, 1974). Simplified texts also contain increased redundancy and amplified explanation (Kuo, 1993), both of which are important in the learning of an L2.

Perhaps the most influential hypothesis supporting the use of simplified texts in L2 learning environments is Krashen's (1981, 1985) theory of comprehensible input. At its core, this theory states that learners develop language along a natural order and by coming to understand input that is slightly beyond their current language ability level (the so-called *i + 1* system). As long as the input is understood and there is enough of it, the learner will be exposed to the necessary language features (such as grammar, morphology, and semantics); hence, there is no real need for formal instruction. According to Krashen, comprehensible input is necessary for L2 acquisition, but it is not sufficient by itself because learners also need to be motivated affectively to comprehend the input they receive. Krashen argued that teacher talk and interlanguage are sources of comprehensible input that allow the learner to understand the new forms of language.

Simplification is not without its critics though. From a theoretical standpoint, many linguists find fault with the language features used in simplified texts. Long and Ross (1993) summarized this position by addressing the idea that the removal of complex linguistic forms in favor of more simplified and frequent forms must inevitably deny learners the opportunity to learn the natural forms of language. Widdowson (1978) argued that the process of simplifying vocabulary and syntax might actually complicate the message of a text. Furthermore, Meisel (1980) argued that elaboration modifications, which are common to simplified texts, generally result in extended utterances and grammar that can be more complex than those of the original because they formulate hypotheses about language that are approximations or overgeneralizations of the actual rules. Another problem with simplification, especially lexical simplification, is that the simpler and more common words in the English lexicon are likely to have more than one meaning, thus displaying high degrees of polysemy. Thus, according to Davies and Widdowson (1974), when more difficult and precise words are replaced with simpler and more frequent words, the text difficulty can actually increase. In addition, some critics have hypothesized that the use of simplified texts to assist L2 learners may actually be counterproductive

because these texts may not allow the learners to graduate to more advanced texts that have sentences of natural length, more complex structural patterns, and more deeply embedded linguistic cues different from those of simplified texts (Honeyfield, 1977; Mountford, 1976).

Tickoo (1993) and Ellis (1994) pointed out that it is doubtful whether simplification actually eases the burden on the learner in comprehending or acquiring language skills because research findings appear to be divided over the positive or negative effects of simplification. Ellis (1993) had noted earlier that no studies clearly supported the notion that pedagogically or naturally simplified input facilitates language acquisition. This position was also supported by Parker and Chaudron (1987), who conducted a review of all the previous studies on the effects of input modifications on comprehension. They concluded that if linguistic modifications, such as simplified syntax and vocabulary, helped comprehension, they did not do so consistently.

AUTHENTIC TEXTS

Researchers generally define an authentic text as a text originally created to fulfill a social purpose in the language community for which it was intended (e.g., Grellet, 1981; Lee, 1995; Little, Devitt, & Singleton, 1989). According to this definition, novels, poems, newspaper and magazine articles, handbooks and manuals, recipes, postcards, telegrams, advertisements, travel brochures, tickets, timetables, and telephone directories written in the target language for the genre-intended target language audience can all be considered authentic texts.

Proponents of authentic texts are more likely to cite pedagogical approaches as evidence to support the use of authentic texts than are supporters of simplified texts. They do so because of an overwhelming pedagogical trend toward communicative language teaching that emphasizes the use of authentic language whenever possible so that students can be introduced to real context and natural examples of language (Larsen-Freeman, 2002). Other pedagogical approaches used to support the use of authentic texts include (a) Krashen's (1981, 1985) input hypothesis theory, which suggests that authentic texts are more comprehensible and therefore have a greater communicative value than simplified texts (Devitt, 1997; Tomlinson, 1998); (b) whole language instruction (Goodman, 1986), which advances the view that L2 learners need to be introduced to enriched

context such as authentic texts so that they can use functional language and see language in its entirety (Goodman & Freeman, 1993); and (c) Cummins's (1981) theory of cognitive academic language proficiency (CALP), which suggests that rather than simplifying language, teachers should embed language in meaningful contexts through the use of authentic language and text.

Supporters of authentic texts often turn to theories of cohesion, which claim that the more language depends on cohesive devices, the more coherent it is and the easier it is to understand. According to Phillips and Shettlesworth (1988), the linguistic cohesive devices and resulting coherence found in authentic texts make them more comprehensible than simplified texts, which depend on distorted information structures. Many other researchers in L2 reading research have also supported the use of authentic texts, based on the assumption that authentic texts exhibit greater cohesion. Honeyfield (1977) and Lautamatti (1978), for example, suggested that modifications to authentic texts affect the texts' cohesion and coherence, resulting in texts that, although simplified, are more difficult than the authentic texts for L2 readers to understand and manage. Other researchers in the L2 reading field have argued that recognizing and understanding cohesive devices, such as conjunctions and other intersentential linguistic devices, are vital to the development of information processing and reading comprehension skills in L2 learners (Cowan, 1976; Mackay, 1979). Goodman (1976) also argued that good readers take advantage of the natural redundancy found in authentic texts, using it to help them reconstruct the entire text even if they have learned only a portion of the graphic material itself. Moreover, according to Johnson (1982), the normal redundancy within authentic texts is likely a factor in helping L2 learners come to understand unfamiliar words without too much disruption in their overall understanding of the text.

Because most simplified texts are created using readability formulas that cut word and sentence lengths and omit connectives between sentences in order to shorten them, they lack the cohesiveness of authentic texts. Therefore, according to many researchers (e.g., Goodman & Freeman, 1993; Long & Ross, 1993), attempts at simplification often result in a text that is more difficult to comprehend and decipher than an authentic text. According to Vincent (1983) and Parker and Chaudron (1987), the tendency for simplified language to alter natural language redundancy can

make the task of creating meaning more complex for the learner.

Teachers and researchers who criticize the use of authentic texts in beginning and intermediate classrooms often do so because they believe that L2 learners find it difficult to process congruently all the stages of linguistic input found in an authentic text. For this reason, they feel that authentic texts may not only be too lexically and syntactically complex for L2 learners, but also too conceptually and culturally dense for successful understanding (e.g., McLaughlin, 1987; McLaughlin, Rossman, & McLeod, 1983; Shook, 1997; Young, 1999). Furthermore, critics of authentic texts assume that when average readers are exposed to authentic texts that exceed their ability levels, their reading processes are disrupted because they must decipher the meaning by referencing outside sources such as dictionaries. This disruption not only slows down the learner's reading process, but it may also have a negative affective toll, possibly damaging the student's language confidence (Rivers, 1981).

In sum, proponents of authentic texts in the L2 classroom support their position from a linguistic perspective by pointing out that authentic texts provide more natural language and naturally occurring cohesion than simplified texts, and that the simplification process may inadvertently create unnatural discourse that reduces helpful redundancy and may, in effect, increase the reading difficulty of the text (Crandall, 1995). Support for the use of authentic materials in the L2 classroom also centers on the idea that L2 learners are at a linguistic disadvantage when they use textbooks developed from idealized data and inauthentic texts that abridge the target language to the point of distortion. Many proponents of authentic texts believe that simplified texts serve only to teach students unnatural and atypical language structures (Kennedy & Bolitho, 1984; Willis, 1998).

Supporters of simplified texts, however, argue that beginning L2 learners benefit from texts that are lexically, syntactically, and rhetorically less dense than authentic texts. They also argue that simplified texts are warranted because they exhibit many of the linguistic strategies used in first language acquisition, such as the simplified language and discourse structures found in caretaker talk or teacher talk.

Neither side can provide empirical evidence to support its argument. Although proponents of both simplified and authentic texts base many of their arguments on the linguistic features of L2 texts, no comprehensive study has been undertaken to show what those features are, if they

differ between text types, and if they support the various arguments proposed by L2 reading theorists. Consequently, this study looked at a range of cohesion-based language features in both authentic and simplified texts in order to determine whether the assumed differences were present.

COHESION AND READABILITY

Although many simplified and authentic texts have been examined using shallow-based readability formulas (Goodman & Freeman, 1993; Long & Ross, 1993; Shook, 1997) and vocabulary counts (Bamford, 1984), few, if any, texts have been assessed for deeper level linguistic features. Moreover, little research has been done within the L2 reading field to determine which linguistic features are prevalent in both types of texts.

Shallow-based readability formulas, such as the Flesch Reading Ease and the Flesch-Kincaid Grade Level formulas, which rely mainly on word length (defined as the number of either letters or syllables in a word) and sentence length to assess the difficulty of texts, are useful for initial assessment of text difficulty. Discourse analysts, however, have criticized these formulas as being weak indicators of comprehensibility (Davison & Kantor, 1982). Kantor and Davison (1981) hypothesized instead that the comprehensibility of a text is located outside sentence and word length and depends more on global factors, such as the presentation of ideas, local discourse information, and background information. Graesser et al. (2004) also criticized the dependence on classic readability formulas because of the possibility, or likelihood, that in following the formulas, writers and publishers would lower a textbook's grade level simply by reducing word and sentence length, which would create choppy sentences and reduce cohesion.

An alternative to traditional readability formulas for determining text difficulty is the assessment of textual cohesion. Many researchers within the field of L2 reading (e.g., Cohen, Glasman, Rosenbaum-Cohen, Ferrara, & Fine, 1979; Cowan, 1976; Mackay, 1979), linguistics (e.g., De Beaugrande & Dressler, 1981; Halliday, 1985; Halliday & Hasan, 1976; Hoey, 1983), and discourse processing (e.g., Graesser, McNamara, & Louwerse, 2003; Louwerse, 2001, 2004; McNamara, Kintsch, Butler-Songer, & Kintsch, 1996; van Dijk & Kintsch, 1983) have argued that understanding cohesive devices is necessary for developing information processing and reading comprehension skills in L2 reading because

cohesive devices are essential for the managing of textual understanding. Unlike traditional readability formulas, which are based on shallow and more local levels of cognition, the assessment of cohesive devices in a text provides a better analysis of readability because cohesive devices are often based on deeper and more global levels of cognition (Graesser et al., 2004).

MEASURING COHESION COMPUTATIONALLY

Recent advances in various disciplines have made it possible to investigate computationally various measures of text and language comprehension that supersede surface components of language and instead explore deeper, more global attributes of language (Graesser et al., 2004). Coh-Metrix is a computational tool that measures cohesion and text difficulty at various levels of language, discourse, and conceptual analysis. The goal of its designers was to improve reading comprehension in classrooms by providing a means to write better textbooks and to match textbooks to the intended students more appropriately (Graesser et al., 2004; Louwerse, 2004; McNamara et al., 2002). Coh-Metrix is an improvement over conventional readability measures because it provides a detailed analysis of language and cohesion features and eventually matches this textual information to the background knowledge of the reader (McNamara et al., 2002). The system integrates lexicons, pattern classifiers, part-of-speech taggers, syntactic parsers, shallow semantic interpreters, and other components that have been developed in the field of computational linguistics (Jurafsky & Martin, 2000). It analyzes text cohesion in several ways, including coreferential cohesion, causal cohesion, density of connectives, latent semantic analysis metrics, and syntactic complexity. For the purposes of comparison, it also includes standard readability measures such as Flesch-Kincaid Grade Level and several metrics of word and language characteristics such as word frequency, parts of speech, concreteness, polysemy, density of noun phrases, and familiarity measures (Graesser et al., 2004).

Many of these measures parallel the linguistic features used to support arguments for both sides in the debate over using authentic or simplified texts for L2 reading. Because of the close match between the variables measured by Coh-Metrix and the linguistic features cited in L2 reading literature, this study explored the possibilities of using Coh-Metrix as a means to process and analyze the linguistic features of L2 reading texts.

COH-METRIX MEASURES USED FOR ANALYSIS

Seven sets of Coh-Metrix measures were selected for this analysis. These metrics included causal cohesion, connectives and logical operators, coreference measures, density of major parts of speech measures, polysemy and hypernymy measures, syntactic complexity, and word information and frequency measures.

Causal Cohesion

Causal cohesion is measured in Coh-Metrix by calculating the ratio of causal verbs to causal particles. The causal verb count is based on the number of main causal verbs identified through WordNet (Fellbaum, 1998; Miller, Beckwith, Fellbaum, Gross, & Miller, 1990). Main causal verbs include verbs such as *kill*, *make*, and *pour*. The causal particle count is based on a defined set of causal particles such as *because*, *consequence of*, and *as a result*. The incidence of causal verbs and causal particles in a text relates to the text's ability to convey causal content and causal cohesion. Causality is relevant to texts that depend on the causal relations between events and actions (e.g., stories with an action plot or science texts with causal mechanisms). Causality, however, is generally not considered important for texts that describe static scenes or express abstract logical arguments (Graesser et al., 2004; Trabasso & van den Broek, 1985). Measures that look at how causality is represented in L2 reading texts were selected because many publishers suggest that materials writers simplify plot structure (Simensen, 1987). In the process of simplifying plot structure, it is quite possible that causal verbs and particles may be removed, resulting in a lower ratio of causal verbs and particles.

Connectives and Logical Operators

Connectives play an important role in the creation of cohesive links between ideas. Coh-Metrix measures connectives through their density in two dimensions. The first dimension contrasts positive versus negative connectives, whereas the second dimension calculates connectives associated with particular classes of cohesion identified by Halliday and Hasan (1976) and Louwerse (2001). These connectives include those that are associated with positive additive (*also*, *moreover*), negative additive (*however*, *but*), positive temporal (*after*, *before*), negative temporal (*until*), and causal (*because*, *so*) measures. The logical operators measured in Coh-Metrix include variants of *or*, *and*,

not, and *if-then* combinations, all of which have been shown to relate directly to the density and abstractness of a text and to correlate with higher demands on working memory (Costerman & Fayol, 1997). Connectives were included in this analysis because of the lexical control evident in simplification processes and in publisher's guidelines, which call for the careful use of connectives in L2 reading texts (Simensen, 1987). Given this lexical control in simplified texts, it is likely that the incidence of connectives and logical operators would be greater in authentic texts than in simplified texts.

Coreference

The current version of Coh-Metrix currently measures three forms of lexical coreference between sentences: noun overlap, argument overlap, and stem overlap. Noun overlap measures how often a common noun appears in two sentences. Argument overlap measures how often two sentences share common arguments (nouns, pronouns, and noun phrases), whereas stem overlap measures how often a noun in one sentence shares a common stem with other word types in another sentence. These types of cohesive links have been shown to aid in text comprehension and reading speed (Kintsch & van Dijk, 1978). Coh-Metrix also measures semantic similarity between parts of text using latent semantic analysis (LSA; Deerwester, Dumais, Furnas, Landauer, & Harshman, 1990; Landauer & Dumais, 1997; Landauer, Foltz, & Laham, 1998). LSA is a mathematical and statistical technique for representing deep world knowledge based on large corpora of texts.¹ LSA uses a general form of factor analysis to condense a very large corpus of texts to between 300 and 500 dimensions. These dimensions simply represent how often a word occurs within a document (defined at the sentence level, the paragraph level, or in larger sections of texts), and each word, sentence, or text ends up being a weighted vector. Texts are matched by comparing the cosine between two sets of vectors (the bag of words included within the document) and receive values between -1 and 1 . The closer the value is to 1 , the closer the semantic relationship. As a marker of underlying human understanding, LSA has been tested against standard human assessment measures, such as vocabulary and subject matter tests, word sorting and category judgments, and has been shown to have overlapping scores with human participants (Landauer et al., 1998). Because simplified texts are often created with considerations for increased clarification and

elaboration (Young, 1999), and because publisher guidelines urge writers of simplified texts to take great care with pronominal reference (Simensen, 1987) and to use simplified word lists, these measures of coreference were chosen for this study. It seemed likely that coreferentiality would be greater in simplified texts than in authentic texts as a result of the attention paid to word types, clarification, and pronominal reference.

Density of Major Parts of Speech

Material developers and writers often want to know how frequently particular parts of speech occur in the text. In relation to this concern, Coh-Metrix tallies incidence scores for specific classes of parts of speech as defined by the Brill (1995) parts of speech tagger, which uses an algorithm to assign part of speech categories to all words within a text. The major parts of speech include pronouns and content words (nouns, verbs, adjectives, and adverbs), but the Brill parts of speech tagger also tags minor parts of speech, such as cardinal numbers, determiners, and possessives. This study considered all parts of speech tags available through the Brill tagger because publishers' guidelines urge materials writers to use lexical constraint when simplifying texts (Simensen, 1987). Because of this constraint, it seemed likely that simplified texts would demonstrate less part of speech density than authentic texts.

Polysemy and Hypernymy

Using WordNet, Coh-Metrix tracks the ambiguity and abstractness of a text by calculating the polysemy values, the number of meanings a word has, and the hypernymy values, the number of levels a word has in a conceptual, taxonomic hierarchy (Fellbaum, 1998; Miller et al., 1990). Measuring polysemy and hypernymy values was relevant to this study because the process of simplification consists of eliminating words and phrases, deleting low-frequency vocabulary words (Young, 1999), and controlling for ambiguity and vocabulary (Simensen, 1987). One shortcoming of simplified texts that was presupposed by previous researchers is that lexical simplification may lead to a reliance on more common words in the text (Davies & Widdowson, 1974). Given that in English more common words are more likely to have multiple meanings than less common words (Zipf, 1949), it seemed likely that simplified texts would exhibit higher degrees of polysemy and possibly hypernymy.

Syntactic Complexity

In defining syntactic complexity, it is assumed that sentences with difficult syntactic composition, which includes the use of embedded constituents, are structurally dense, syntactically ambiguous, or ungrammatical (Graesser et al., 2004). Using this assumption, Coh-Metrix measures syntactic complexity in three main ways. First, it measures noun-phrase density by calculating the mean number of modifiers per noun phrase. The second and third metrics that Coh-Metrix uses measure the mean number of high-level constituents (defined in Coh-Metrix as sentences and embedded sentence constituents) per word and per noun phrase. According to Coh-Metrix, sentences with difficult syntactic composition have a higher ratio of constituents per word and noun phrase (Graesser et al., 2004) than do sentences with simple syntax.

Tracking the syntactic complexity of L2 reading texts is important because most simplified texts are controlled for restrictions in structure, sentence length, sentence complexity, and vocabulary. They are also sometimes controlled for restrictions on the flow of information and on the presentation of background ideas and concepts. Texts are also simplified by shortening sentences to control for idiomatic speech, complex syntax, and low-frequency lexicon (Cripwell & Foley, 1984). In addition, simplified texts constructed for specific learners also depend on specific grammar constructions and use particular lexicons (Long & Ross, 1993). For these reasons, their dependency on reduced language features and unnatural language, it seemed likely that simplified texts would exhibit more syntactic complexity than authentic texts. Although it seems counterintuitive, this prediction is not based on language in context, but on language as a linguistic product. In this sense, beginning-level simplified texts should, as a result of shorter sentence lengths, depend on more complex syntactic structures than authentic texts because they are likely to use more modifiers before the noun phrases and have more embedded constituents per word and noun phrase than would authentic texts.

Word Information and Frequency

Coh-Metrix calculates word information on four matrices: familiarity, concreteness, imagability, and meaningfulness. All these measures are from the MRC (Medical Research Council) Psycholinguistic database (Coltheart, 1981) and are

based on the works of Gilhooly and Logie (1980), Paivio (1965), and Toglia and Battig (1978).

Word frequency in Coh-Metrix refers to metrics of how often particular words occur in the English language. The primary frequency count in Coh-Metrix comes from the database from the Centre for Lexical Information (CELEX), which consists of frequencies deriving from the early 1991 version of the COBUILD corpus, a 17.9 million word corpus. As many researchers have argued (Haberlandt & Graesser, 1985; Just & Carpenter, 1980), word frequency is important because frequent words are normally read more rapidly and understood better than infrequent words.

We chose these measures of word frequency and information because they correspond to the simplification strategy of limiting vocabulary range. Among beginning readers, vocabulary is limited to the most common English words, typically the most common 1,000 words (Cripwell & Foley, 1984). Also, material writers, when simplifying texts by shortening sentences, often control for idiomatic speech, complex syntax, and low-frequency lexicons (Long & Ross, 1993). This manipulation of lexicon seemed likely to lead to a text that exhibits lower word frequency, while presenting higher word familiarity, meaningfulness, concreteness, and imagability.

METHODS

Text Selection

A total of 105 texts were taken from seven beginning English as a second language (ESL) textbooks. Because of the exploratory nature of this initial study, a general corpus that reflected the breadth of text samples found within beginning-level ESL texts was selected instead of a corpus based on text types or audience. The corpus comprised reading passages found in grammar textbooks, reading and writing textbooks, and basic readers. All reading passages of about 100 words or more from the selected ESL textbooks were included (see Table 1 for details). Reading samples from grammar textbooks were included because they are used to introduce ESL learners to the process of reading in an L2 and were often adaptations of human interest stories (e.g., about cultural differences or families), general science articles (e.g., about inventions or astronauts), biographies (e.g., about Helen Keller or Charles Lindbergh), or children's literature (e.g., *The Emperor Has No Clothes* or *Cinderella*) that were similar to those found in the authentic readings. Reading passages found in grammar textbooks at the

TABLE 1
Text Characteristics

Text	Type	Expository	Narrative	Topics	Length (<i>M</i>)
<i>Visions</i>	Authentic	33%	66%	Varied	705.2
<i>Voices</i>	Authentic	66%	33%	Varied	268.7
<i>Amazing Stories</i>	Simplified	16%	84%	Varied	243.8
<i>Communicative Grammar</i>	Simplified	57%	43%	Varied	180.4
<i>Grammar in Context</i>	Simplified	69%	31%	Varied	243.3
<i>Grammar Links</i>	Simplified	48%	52%	Varied	250.6
<i>Kaleidoscope</i>	Simplified	64%	36%	Varied	268.9
Stepping into English (BCW)	Simplified	0%	100%	Folk Tale	759.0
Stepping into English (L & M)	Simplified	0%	100%	Folk Tale	1,052.0

Note. *Visions* (McCloskey, & Stack, 2004a); *Voices* (McCloskey, & Stack, 2004b); *Amazing stories* (Berish & Thibaudeau, 1999); *Communicative grammar* (Kirn & Darcy, 1996); *Grammar in context* (Elbaum, 2001); *Grammar links* (Butler & Podnecky, 2000); *Kaleidoscope* (Sokmen & Mackey, 1998); Stepping into English (BCW; Barnett, 1990a); Stepping into English (L & M; Barnett, 1990b).

beginning level also included typical textual structures such as character description, plot developments, and discourse features.

Although the purposes of reading, writing, and grammar textbooks differ, and the propensity of passages in grammar textbooks to focus on certain constructions could influence some findings,² we believed it was necessary to include all text varieties in this exploratory analysis in order to understand better the full breadth of differences between authentic and simplified texts used for beginning ESL students. However, because of the perceived bias against using authentic texts in beginner textbooks, authentic texts were difficult to locate. There are many beginning ESL textbooks, but very few material writers use authentic texts at the beginning level. As a result, the authentic corpus used for this analysis was limited in its diversity by the difficulty of locating beginning ESL textbooks that included authentic texts.

Of the nine selected textbooks, two (McCloskey & Stack, 2004a, *Visions*, and 2004b, *Voices*) contain authentic texts,³ whereas the other seven (Barnett, 1990a; Barnett, 1990b; Berish & Thibaudeau, 1999; Butler & Podnecky, 2000; Elbaum, 2001; Kirn & Darcy, 1996; Sokmen & Mackey, 1998) depend on simplified texts as input. The total size of the two corpora was 36,747 words. The simplified corpus contained 21,117 words ($M = 261$, $SD = 135$) and 81 texts. The authentic corpus contained 15,640 words ($M = 651$, $SD = 285.9$) and 24 texts. Given the limited electronic availability of these corpora, text size was not considered a factor, particularly because Coh-Metrix normalizes its findings based on text length or provides normalized ratio scores.

Statistical Analysis

To distinguish between differences in text types, *t* tests were used. Although there is some concern that multiple statistical analyses may result in an increase in the probability of Type I errors, the statistical analyses conducted here were theoretically motivated, and thus the predictions were made a priori. Consequently, we did not consider it necessary to lower the confidence levels of the statistical analyses.

RESULTS

Causal Cohesion

As predicted, in the current study, the authentic texts and simplified texts differed significantly in their causal relations in that authentic texts were more likely to have a higher ratio of causal verbs to causal particles than were simplified texts, $t(1, 105) = 2.19$, $p = .03$ (see Table 2).

Connectives

Contrary to prediction, the incidence of connectives did not differ significantly between the authentic and simplified texts. Significant

TABLE 2
Means and Standard Deviations for Causal Particles and Verbs

	Authentic Texts		Simplified Texts	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Causal particles and verbs	1.32	3.14	0.53	0.51

differences were found in specific categories of connectives, including positive causal connectives, negative additive connectives, and negative temporal connectives. In these categories, authentic texts showed a greater number of positive causal connectives, $t(1, 105) = 1.65, p = .04$, and negative temporal connectives, ($U = 720.0, z = -3.36, p = .001, n = 105$),⁴ whereas simplified texts had a greater number of negative additive connectives, $t(1, 105) = -2.79, p = .007$ (see Table 3).

Lexical Coreference

As predicted, when the simplified and authentic texts were compared, significant differences were found in all three primary categories of coreferential cohesion. The simplified texts had a greater amount of overall coreferential cohesion $t(1, 105) = -2.83, p = .006$, stem overlap; $t(1, 105) = -2.57, p = .012$, noun overlap ($U = 516.50, z = -3.48, p = .001, n = 105$); and argument overlap, $t(1, 105) = -2.42, p = .016$, than did the authentic texts (see Table 4).

Density of Logical Operators

Contrary to prediction, when authentic and simplified texts were compared for logical operators, no significant difference between the two text types was noted. When specific categories of logical operators were compared, the authentic texts showed a significantly greater number of *ifs*, ($U = 697.50, z = -2.50, p = .013, n = 105$) and conditional constructions ($U = 660.50, z = -2.51, p = .012, n = 105$) than did the simplified texts (see Table 5).

Latent Semantic Analysis

As predicted, significant differences were found between the LSA scores of authentic and simpli-

TABLE 4
Means and Standard Deviations for Coreferential Cohesion

	Authentic Texts		Simplified Texts	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
	<i>MR</i>	<i>SR</i>	<i>MR</i>	<i>SR</i>
All coreferential	.50	.30	.72	.34
Stem overlap	.26	.16	.35	.14
Noun overlap	34.02	816.50	58.62	4748.50
Argument overlap	.16	.08	.23	.14

Note. *MR* = mean of ranks; *SR* = sum of ranks.

fied texts. Most notably, LSA scores for sentence to sentence all, $t(1, 105) = -2.00, p = .049$, LSA sentence to sentence adjacent, $t(1, 105) = -2.07, p = .041$, and sentence to paragraph, $t(1, 105) = -4.17, p < .001$, showed significant differences, revealing that the simplified texts exhibited more semantic similarity between sentences and within paragraphs than did the authentic texts. However, no significant difference was noted for sentence to text comparisons (see Table 6).

Incidence of Major Parts of Speech

As predicted, significant differences were found between the simplified and authentic texts in their parts of speech use: The authentic texts revealed a greater number of less frequent linguistic features, including comparative adverbs ($U = 516.50, z = 2.01, p = .044, n = 105$), gerunds ($U = 705.00, z = -2.04, p = .041, n = 105$), interjections ($U = 715.50, z = -3.05, p = .002, n = 105$), modals ($U = 571.00, z = -3.09, p = .002, n = 105$),

TABLE 5
Means and Standard Deviations for Logical Operators

	Authentic Texts		Simplified Texts	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
	<i>MR</i>	<i>SR</i>	<i>MR</i>	<i>SR</i>
Density logical operators	43.28	12.70	39.01	16.28
Number of <i>and</i>	29.02	11.12	24.47	11.70
Number of <i>if</i>	64.44	1,546.50	49.61	4,018.50
Number of <i>or</i>	48.33	1,160.00	54.38	4,405.00
Number of conditionals	65.98	1,583.50	49.15	3,981.50
Number of negations	58.04	1,393.00	51.51	4,172.00

Note. *MR* = mean of ranks; *SR* = sum of ranks.

TABLE 3
Means and Standard Deviations for Connectives

	Authentic Texts		Simplified Texts	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
	<i>MR</i>	<i>SR</i>	<i>MR</i>	<i>SR</i>
Incidence connectives	73.33	18.01	71.18	20.38
Positive additive	37.10	13.44	71.18	20.38
Positive temporal	14.01	7.09	13.96	9.51
Positive causal	15.49	5.77	12.24	9.07
Negative additive	9.51	5.13	13.99	10.78
Negative temporal	63.50	1,524.00	49.90	4,041.00

Note. *MR* = mean of ranks; *SR* = sum of ranks.

TABLE 6
Means and Standard Deviations for Latent Semantic Analysis

	Authentic Texts		Simplified Texts	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
LSA overall	.77	.23	.94	.27
LSA sentence to text	.28	.09	.31	.08
LSA sentence to sentence (all)	.16	.06	.20	.07
LSA sentence to sentence (adj)	.16	.07	.19	.07
LSA sentence to paragraph	.19	.08	.27	.09

particles ($U = 796.50$, $z = -2.20$, $p = .028$, $n = 105$), past particles ($U = 398.00$, $z = -4.39$, $p < .001$, $n = 105$), predeterminers ($U = 825.50$, $z = -2.30$, $p = .021$, $n = 105$), superlative adverbs ($U = 803.50$, $z = -2.11$, $p = .035$, $n = 105$), *wh*-determiners ($U = 680.00$, $z = -2.55$, $p = .011$, $n = 105$), *wh*-pronouns ($U = 704.00$, $z = -2.13$, $p = .034$, $n = 105$), pronouns, $t(1, 105) = 2.08$, $p = .040$, and verbs, $t(1, 105) = 2.13$, $p = .035$. The simplified texts also showed a significantly greater incidence of overall nouns, $t(1, 105) = -2.43$, $p = .017$, and singular proper nouns, ($U = 705.00$, $z = -2.04$, $p = .042$, $n = 105$), as was expected. In general, the authentic texts displayed a greater, though not significant, tendency to use more diverse parts of speech than did the simplified texts. The simplified texts showed a greater, but not significant, use of all other noun classes, third-person singular verbs, determiners, and adjectives (see Table 7).

Polysemy and Hypernymy

Contrary to our predictions, we found no significant differences between the polysemy and hypernymy values of the simplified and authentic texts. Generally, the authentic texts showed a slightly higher tendency to contain ambiguous words, whereas the simplified texts showed a tendency to contain more abstract words, but these findings were not significant (see Table 8).

Syntactic Complexity

Consistent with our expectations, the results indicated that the overall syntactic complexity of the simplified texts was significantly greater than that of the authentic texts, $t(1, 105) = -2.30$, $p = .045$. This finding is likely the result of the

TABLE 7
Means and Standard Deviations for Parts of Speech

	Authentic Texts		Simplified Texts	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
	<i>MR</i>	<i>SR</i>	<i>MR</i>	<i>SR</i>
Nouns overall	276.87	46.72	305.00	50.60
Pronouns	106.26	38.40	89.38	33.90
Verb incidence	192.95	22.97	178.71	30.17
Comparative adverbs	59.70	1,432.50	51.02	4,132.50
Gerunds	64.13	1,539.00	49.70	4,026.00
Interjections	63.69	1,528.50	49.83	4,036.50
Modals	69.71	1,673.00	48.05	3,892.00
Particle incidence	60.31	1,447.50	50.83	4,117.50
Past participle	76.92	1,846.00	45.91	3,719.00
Predeterminers	59.10	1,418.50	51.19	4,146.50
Singular proper nouns	41.88	1,005.00	56.30	4,560.00
Superlative adverbs	60.02	1,440.50	50.92	4,124.50
<i>Wh</i> determiners	65.17	1,564.00	49.40	4,001.00
<i>Wh</i> pronoun	64.17	1,540.00	49.69	4,025.00

Note. *MR* = mean of ranks; *SR* = sum of ranks.

simplified texts' significant dependency on noun phrases to form the syntax for developing meaning and to demonstrate intention in the text when compared to that dependency in authentic texts, $t(1, 105) = -5.45$, $p < .001$. It may also be the result of elaboration schemes used by material writers to provide meaningful input to the reader at the cost of longer sentence constructions. Consequently, the simplified texts showed a significant difference in the number of constituents per word, $t(1, 105) = -2.68$, $p = .009$, and showed greater trends, but not significance, toward more constituents per sentence than did the authentic texts, $t(1, 105) = -1.85$, $p = .067$ (see Table 9).

Word Information

In line with our expectations, the authentic texts and simplified texts differed significantly in the word information categories of familiarity and

TABLE 8
Means and Standard Deviations for Polysemy and Hypernymy

	Authentic Texts		Simplified Texts	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Polysemy	7.61	0.93	7.35	1.34
Verb hypernymy	1.89	0.15	1.84	0.20
Noun hypernymy	5.07	0.42	4.93	0.50

TABLE 9
Means and Standard Deviations for Syntactic Complexity

	Authentic Texts		Simplified Texts	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Syntactic complexity all	2.79	0.50	3.08	0.63
Noun-phrase density	240.26	60.10	303.36	46.38
Modifiers per noun phrase	1.02	0.03	1.03	0.04
Number constituents per word	0.15	0.04	0.17	0.04
Number constituents per sentence	1.61	0.10	1.86	0.07
Syntactic logic	43.28	12.70	39.00	16.28

frequency. The simplified texts were significantly more likely to contain words that were more familiar than were the authentic texts, $t(1, 105) = -4.02, p < .001$, whereas word frequency comparisons demonstrated that the simplified texts contained a significantly greater number of more frequent words than did the authentic texts, $t(1, 105) = -2.04, p = .044$. However, in the word information categories of concreteness and imaginability, we found virtually no differences between the authentic texts and the simplified texts. For the meaningfulness of words and the age of acquisition, no significant differences were found (see Table 10).

DISCUSSION

The large-scale analysis of cohesion and linguistic features in ESL instructional texts presented

TABLE 10
Means and Standard Deviations for Word Information

	Authentic Texts		Simplified Texts	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Familiarity	576.92	8.05	584.16	7.66
CELEX word frequency	2.36	0.19	2.44	0.16
Concreteness	394.83	28.60	394.20	24.45
Imagability	428.46	25.64	428.33	21.43
Colorado meaningfulness	434.79	13.56	438.92	13.56
Age of acquisition	295.50	25.61	302.35	39.10

in the current study provides empirical evidence as to whether authentic and simplified texts differ in text difficulty. A computational analysis of the lexical, syntactical, and discourse differences between the authentic and simplified beginning reading texts using the computational tool Coh-Metrix has provided many preliminary answers to questions posed in the debate over the linguistic features that comprise authentic and simplified texts.

The results of this analysis, although limited by the corpora size and the diversity of text samples, suggest that authentic texts are significantly more likely than simplified texts to contain causal verbs and particles. Therefore, they are possibly better at demonstrating cause-and-effect relationships and developing plot lines and themes than are simplified texts. This finding supports many of the criticisms that have been leveled against simplified texts by proponents of authentic texts, including claims that simplified texts exhibit stilted and unnatural language, do not demonstrate natural cause-and-effect relationships, and do not develop plots and ideas sufficiently.

In addition, authentic texts use significantly more causal connectives and negative temporal connectives than do simplified texts, and they appear to use more connectives than simplified texts. This difference may result from the tendency in simplified texts to avoid developing and linking ideas with the more complex connectives, such as modifiers and logical connectors, and to depend instead on the more common connectives such as *and*, *or*, and *but*. Furthermore, the authentic texts analyzed in the current study displayed, on average, more logical operators than did the simplified texts and a significantly higher number of *ifs* and conditional clauses. This finding is not surprising given that conditionals have long been considered a fairly complex feature of English syntax, but these intricate logical operators are necessary for discussing hypothetical situations. Their absence from simplified texts, which may make the modified texts more concrete and less abstract, subsequently limits the discourse structure of the text. The use of connectives is one of the major lexical features that create cohesive bonds between sections of text (Halliday, 1985). Minimizing these bonds in simplified texts may lead to readings that do not elaborate, extend, or enhance the ideas of the texts to the full degree present in the authentic texts. As Johnson (1982) noted, simplified texts may be more difficult for L2 learners to understand because of the missing logical operators and connectives.

The authentic texts used in the current study showed significantly less coreferential cohesion than did the simplified texts, which demonstrated a significantly greater amount of noun overlap, argument overlap, and stem overlap. This finding runs counter to the beliefs of many researchers in the field of L2 reading who have assumed that authentic texts display greater coreferentiality and helpful redundancy than do simplified texts. Simplified texts, because of their dependence on noun phrases, avoidance of pronominal reference, and simple syntactic structures, provide a greater amount of stem, noun, and argument overlap. As a result, when examined for coreference, the simplified texts showed greater cohesion than did the authentic texts. This finding is not surprising, given that simplified texts provide smaller lexical domains than do authentic texts, which, in turn, allow for less lexical variance and more coreferential overlap. Furthermore, when compared to the simplified texts, the authentic texts analyzed in this study showed significantly less semantic similarity among parts of text according to LSA measurements. This difference was especially evident in the sentence-to-sentence measurements and in the sentence-to-paragraph measurements of LSA. These LSA findings support those of the lexical overlap measures and indicate, as other researchers (e.g. Crandall, 1995; Day & Bamford, 1998; Nuttall, 1996; Swaffar, 1981) have claimed, that simplified texts in beginning ESL readers provide greater redundancy and semantic overlap than do authentic texts. Redundancy that is available from more than one source or from a combination of sources has been shown to assist readers in understanding the message and intention of a text and is an important means by which readers can connect to a text (Haber & Haber, 1981; Smith, 1988).

In the analysis of lexical features, the authentic texts in the current study revealed a much greater diversity of word types, especially in the complex part of speech types such as comparative adverbs, gerunds, interjections, modals, particles, past particles, predeterminers, superlatives, *wh*-determiners, *wh*-pronouns, and all pronouns in general. The simplified texts, however, showed a significantly greater number of noun phrases and a higher average of noun-phrase modifiers, such as determiners and adjectives, than did the authentic texts. This tendency illustrates a potential weakness in simplified texts that has been noted by supporters of authentic texts (e.g., Kennedy & Bolitho, 1984; Long & Ross, 1993; Willis, 1998): the inability of simplified texts to expand into natural language and their inclination to rely on sim-

ple syntactical structures depending on the use of noun phrases and their qualifiers.

Some differences between the authentic and simplified texts appeared in the abstract features of the lexicon, such as polysemy, hypernymy, word familiarity and meaningfulness, and word frequency. In general, the polysemy and hypernymy values indicated that the authentic texts had a slightly higher inclination toward ambiguous words, whereas the simplified texts showed an inclination toward more abstract words, but neither of these findings was significant. This finding counters the fear among researchers who favor authentic texts that simplified texts, by using familiar words and lexical simplification, may result in texts that are more ambiguous and difficult to read than authentic texts (Davies & Widowson, 1974). However, the simplified texts sampled in this study suggested that authentic texts did not demonstrate a tendency toward greater ambiguity.

In the analysis of word information and frequency in the current study, the authentic texts used significantly fewer familiar words and more abstract words, with a higher average age of acquisition than did the simplified texts. In addition, the authentic texts used significantly greater numbers of lower frequency words than did the simplified texts. The use of more frequent, familiar words in simplified texts should allow them to be processed more quickly than the words in authentic texts, suggesting that simplified texts may be advantageous for beginning L2 readers (Carrell & Grabe, 2002). The fear that the dependence on familiar words in simplified texts might lead to ambiguity because common words are more likely to have higher levels of polysemy than less common words appears to be unfounded.

One indirect problem found in simplified texts is their syntactic complexity. Simplified texts show a tendency to have more modifiers per noun phrase and more constituents per sentence than do authentic texts. They also show a significantly higher number of constituents per word than do authentic texts. In general, these findings demonstrate that simplified texts, in their effort to provide more accessible language, may depend too heavily on certain constructions, such as noun phrases, and, as a result, may create a burdensome syntactic structure that does not lead to either authentic discourse or ease of understanding. Furthermore, simplified texts, in their attempt to elaborate meaning by using simple syntactic constructions, may in fact create sentences that have more constituents and, thus, place a heavier processing burden on the reader

than do authentic texts. These findings support the criticism that simplified texts may contain atypical language structures (Kennedy & Bolitho, 1984; Willis, 1998). Moreover, these findings support Honeyfield's (1979) acknowledgment that short, choppy syntax resulting from the process of simplification is problematic because it makes texts unnaturally plain. These results also support the research by Johnson (1982), which revealed that L2 learners interacting with simplified texts containing cropped grammatical sentences actually understood the sentences less well than they understood authentic sentences that contained more natural examples of relative and time clauses.

CONCLUSION

The results of this study suggest that simplified texts provide ESL learners with more coreferential cohesion and more common connectives and rely more on frequent and familiar words than do authentic texts. The results further indicate that simplified texts demonstrate less diversity in their parts of speech tags, display less causality, depend less on complex logical operators, and demonstrate more syntactic complexity than do authentic texts. Finally, the results suggest that no significant differences exist between simplified and authentic texts in their abstractness and ambiguity.

Although we believe that additional research in this field is needed, particularly studies with larger and more diverse corpora and studies that consider different types of learners and genres, the present study, nevertheless, demonstrates how the use of computational tools such as Coh-Metrix can be of assistance to L2 reading researchers, material developers, and publishers of L2 materials. This exploratory analysis into the lexical, syntactic, and rhetorical construction of both simplified and authentic reading texts has substantially enhanced our understanding of what differences exist between the two types of texts, but further research into the effects of these differences, along with the differences between more specific texts, would also be valuable.

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NOTES

¹ LSA has various specialized spaces. This analysis will use the standard college space, which is based on the Touchstone Applied Science Associates (TASA) corpus.

² The simplification of syntax is common across all simplified texts. This analysis will not solely focus on syntactic complexity, but also on cohesive devices, general linguistic features, semantics, and other discourse structures.

³ *Voices in Literature* also included two adapted texts, but these were not included in the authentic analysis.

⁴ In cases where the data samples were not normally distributed, a Mann-Whitney test for nonparametric samples was used instead of a *t* test.

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NEW *MLJ* EDITOR NAMED FOR 2008

The Steering Committee of the National Federation of Modern Language Teachers Associations (NFMLTA), which owns *The Modern Language Journal*, has selected Leo van Lier to succeed Sally Sieloff Magnan as Editor of the *MLJ*.

Professor van Lier is a native of the Netherlands, where he started his career as a teacher. He obtained his PhD in Linguistics from Lancaster University in the United Kingdom. He has worked in Europe, Latin America, New Zealand, and the United States, and is a lifelong student of languages, including Dutch, English, Spanish, German, French, Danish, Finnish, Japanese, and Quechua (though he does not claim to be proficient in all these languages). Currently he is Professor of Educational Linguistics at the Monterey Institute of International Studies in Monterey, California. His books include *Introducing Language Awareness* (Penguin, 1995); *Interaction in the Language Curriculum: Awareness, Autonomy, and Authenticity* (Longman, 1996); and *The Ecology and Semiotics of Language Learning: A Sociocultural Perspective* (Kluwer/Springer, 2004). He is general editor of the book series Educational Linguistics, published by Springer Publishers. His current research interests include the ecology of learning, semiotics, action-based language learning, and equitable uses of technology in education.

Professor van Lier's term will officially begin on January 1, 2008, with 2007 serving as a transitional year between the Magnan and van Lier editorships. It is likely that new submissions will be referred to van Lier starting early in 2007 with Magnan handling resubmitted manuscripts until summer 2007. The editorial office, where all submissions should be sent until further notice, will remain with Magnan, at the University of Wisconsin–Madison, until the transition is complete.

The NFMLTA recognizes the diligent work of the selection committee for their valuable service in recruiting and selecting van Lier to the editorship.

Heidi Byrnes, chair
 Richard Donato
 Judith E. Liskin-Gasparro
 Lourdes Ortega
 Renate Schulz
