Surface-Structure Transformations and Advertising Slogans: The Case for Moderate Syntactic Complexity

Samuel D. Bradley
Cornell University

Robert Meeds
Kansas State University

ABSTRACT

Since its introduction in 1957, Noam Chomsky's theory of transformational grammar has been the subject of much psycholinguistic research. Through several metamorphoses, the theory has remained controversial as to whether it represents how the mind actually processes language. Psycholinguists have studied this area over several decades. Syntactic structure has been studied in terms of recall and effects on reaction time to secondary tasks, but little is known about syntactic structure and attitude formation. Advertising researchers have looked at the effects of many types of complexity (e.g., semantic and visual), but few have investigated the effects of syntactic complexity on attitude formation. This study used a within-subjects experiment to examine how surface-structure transformations affected readers' comprehension, recognition, recall, and attitudes toward slogans. As expected, syntactic complexity did not affect the comprehension of advertising slogans, but simple-syntax versions—especially the active voice—showed an advantage in recognition. Slogans with moderate syntactic complexity showed a significant positive effect on free morphemic

recall and attitude toward the advertisement, but a high degree of syntactic manipulations resulted in significantly lower free morphemic recall and attitudes toward the ad, suggesting a possible curvilinear relationship. These findings and implications for advertising professionals and educators are discussed. © 2002 Wiley Periodicals, Inc.

Chomsky's (1957) theory of transformational grammar has had an indelible effect on linguistics and psycholinguistics. At its introduction and through later evolutions, Chomsky's theories have been the genesis of plentiful research. If nothing else, Chomsky has been heuristic. Psycholinguistic research centered on transformational grammar filled the late 1960s and early 70s. Fundamentally, Chomsky's theory suggests that each sentence has two structures, an underlying structure that conveys the meaning of the sentence and a superficial structure determining how words and phrases are arranged. The mind then has to apply transformations to move from one structure to the other. Controversy has seemed to follow much of the transformational grammar-based research, and the question of the psychological reality of such a grammar remains unanswered to many. That is, it is unproven whether the human mind actually engages in the transformations when processing language.

The original aim of transformational grammar was to produce a linguistic structure that would separate all of the grammatical sequences of the target language from the ungrammatical sequences of that language (Chomsky, 1957). The original theory has itself undergone many transformations (e.g., Chomsky, 1965, 1968, 1976, 1980, 1981) since it was first introduced. It was proposed that the psychological reality of Chomsky's theory could be tested if individual psychological units (i.e., transformations) had an associated unit time cost and could be measured serially (Berwick & Weinberg, 1983). Early research was promising (e.g., McMahon, 1963; Miller & McKean, 1964; Gough, 1965), but later studies cast doubt on the theory (e.g., Fodor & Garrett, 1967; Walker, Gough, & Wall, 1968). Since then, researchers (e.g., Berwick & Weinberg, 1983) have attempted to find other ways to show the psychological reality of transformations.

Linguistic research has investigated whether syntactic variations have an effect on recall and on reaction time to a secondary task (e.g., Britton, Glynn, Meyer, & Penland, 1982), but this research is not centered on Chomsky's transformational alterations to syntactic structure. Additionally, these authors were unable to locate any research looking at the effect of transformation manipulation on attitude formation. Some advertising researchers (e.g., Anderson & Jolson, 1980; Meeds, 1999; Thorson, Reeves, & Schleuder, 1985) have looked at other aspects

of textual complexity and attitude formation in advertising, but the effects of transformations on attitude formation are largely unknown. Only one study investigating syntactic complexity and advertising persuasion was found in the literature (Lowrey, 1998). There is a compelling reason, however, to investigate syntactic complexity with the use of both theories of psychology and of linguistics (such as transformational grammar). Without a linguistic theoretical context, syntactic complexity findings offer precious little predictive power to the writer. Much of the research on syntactic complexity has focused on embedded clauses [e.g., "The disease that the medicine which the scientist discovered cured the damaged liver" (McDaniel, 1981, p. 489)]. Although these findings were significant, they offer true predictive power only in terms of embedded clauses, which are unnatural to read and scarcely appear in advertisements. It remains untested whether widely tested embedded-clause findings pertain to other types of syntactic complexity. Chomsky's theory, however, puts complexity on a continuous scale. If research reveals, for example, that three transformations consistently lead to poor processing, then a writer would know to avoid combining any three transformations.

Even a cursory observation of advertising slogans indicates that syntactic variations are commonly used, for example: "Trident Sugarless gum is recommended by four out of five dentists for their patients who chew gum" (passive, imbedded clause); "Have you driven a Ford lately?" (interrogative, adverb separated from verb); "We love to fly, and it shows" (compound sentence); "Beef—It's what's for dinner" (object comes before verb); "Olive Garden—When you're here, you're family" (moved clause); "The best trucks are built Ford tough" (passive, subject implied).

LITERATURE REVIEW

Transformational grammar begins with a kernel sentence, "simple, declarative, active, with no complex verb or noun phrases" (Chomsky, 1957, p. 107). This kernel was presumed to be of primary theoretical importance in early psycholinguistic research (Fodor, Bever, & Garrett, 1974). The kernel also was the foundation for more complex utterances. All other sentences of the target language can be derived by transforming the kernel sentence (Chomsky, 1957). A kernel (e.g., "You want the book.") can be transformed into a negative, passive, question, or a combination of these, such as a negative interrogative (e.g., Don't you want the book?). These transformations, then, create a relationship between the kernel and its variations. "Transformations impose a taxonomy upon the sentence types of a language: Sentences are interrelated insofar as they share portions of their transformational histories" (Fodor et al., 1974, p. 226).

Linguists use the term *grammar* differently than the traditional notion of schoolmarms and subject/verb agreement. In this specialized sense, a grammar is a device with a finite set of rules that generates the sentences used in language. Hence, it is sometimes called a generative grammar. A grammar, like a native speaker, must be able to generate an endless number of grammatical utterances from a relatively small corpus of the possible grammatical expressions (Chomsky, 1957). Additionally, Chomsky (1957) argued that grammar was independent of the sentence being meaningful in the semantic sense. To illustrate his point, Chomsky offered the now-famous pair of utterances: "Colorless green ideas sleep furiously" and "Furiously sleep ideas green colorless." Although both are nonsensical, Chomsky (1957) argued that the former is clearly grammatical to speakers of English, whereas the latter is not. Evidence has been found to suggest information-processing implications for the subset of utterances that are grammatical. For example, recall of well-formed, grammatical material is characteristically different than rote recall (Fodor et al., 1974). In the laboratories of psycholinguists, however, transformational grammar and its derivations have had a mix of successes and failures. Many of the results on either side remain controversial, especially those dealing with the psychological reality of transformations.

Deep and Surface Structures. Chomsky (1965) argued that ". . . the syntactic component of a grammar must specify, for each sentence, a deep structure that determines its semantic interpretation and a surface structure that determines its phonetic interpretation" (p. 16). Deep structure is the basic structure of the sentence that conveys its meaning, whereas surface structure describes the morphological and syntactic arrangement of the words and phrases in the sentence itself. A key component of the theory of transformational grammar is that the two structures are distinct and that the surface structure is obtained by the application of formal "grammatical transformations" (Chomsky, 1965, p. 16). To illustrate how similar surface structure can fail to reveal altogether different deep structures, Chomsky (1965) offered the following pair:

(1) I persuaded John to leave
(2) I expected John to leave (p. 22).

In this pair, the subject *I* is followed by a verb and the same phrase, but in the first sentence an action happens to the object *John,* whereas in the second the action is only a mental one. Accordingly, a simple passive transformation shows how two sentences can have the same deep structure but different surface structures. These two sentences mean the same thing, but the constituents are arranged differently:

(3) Arlene played the tuba

(4) The tuba was played by Arlene (Carroll, 1999, p. 36).

Early research (e.g., Miller, 1962) supported Chomsky's theory by offering evidence that readers took longer to process sentences that deviate from the simple kernel sentence (e.g., kernels that have been transformed into passives, negatives or interrogatives). These findings supported the psychological reality of the linguistic model.

Competing Theories. Some researchers (e.g., Bresnan, 1978) have held that a generative grammar had no use if it did not exactly match the psychological performance of speakers of that language. This strict interpretation could be seen in the derivational theory of complexity, which assumed that transformations were performed serially and could be verified mathematically (Berwick & Weinberg, 1983). The time to produce a negative passive from the kernel could be determined, for example, by adding the time of the negative and passive transformations. Early research was promising (e.g., Gough, 1965; McMahon, 1963; Savin & Perchonock, 1965). However, later studies (e.g., Slobin, 1966; Walker et al., 1968) appeared to disprove DTC altogether. Chomsky (1968) meanwhile suggested that a generative grammar need not make claims about human performance. Others (e.g., Bresnan, 1978) called for a relaxation of the one-to-one ratio and urged that a type of grammar could explain a type of mental process. Such relaxations have allowed the debate over the psychological reality of transformations to continue.

Language Processing and Persuasion. The psychology literature has long acknowledged that cognitive processing capacity is a limited resource (e.g., Britton et al., 1982). Various psycholinguistic studies have attempted to determine what effect various manipulations would have on the allocation of the limited cognitive capacity. Britton et al. (1982) conducted a series of experiments wherein the overall semantic meaning of the text was held constant while the syntactic surface structure was varied. This study examined both word complexity and syntactic complexity, and the researchers found that both dimensions affected recall about the text that had been read. That is, more recall questions were answered correctly by participants who had read the simple-syntax version of the passages than the complex syntax versions. Secondary-task reaction times, which indicate the amount of attention devoted to the reading task at a precise moment, also were faster among participants who read the simple-syntax versions. An overall analysis suggested that syntactic manipulations had a greater impact on cognitive capacity allocation than word-complexity manipulations. "The findings also indicate that more cognitive capacity is required to parse complex syntax than simple syntax" (Britton et al., 1982, p. 59). The effects

of this cognitive burden on message processing remain to be fully understood.

In a widely tested model of persuasion called the elaboration likelihood model (ELM), Cacioppo, Petty, and colleagues (Cacioppo, Petty, & Morris, 1983; Petty and co-workers, 1979, 1983, 1986, 1988) have constructed a model that may shed light on the role of complex syntax in advertising message processing and persuasion. According to this model, when elaboration likelihood is high, readers are likely to concentrate on the central message of the argument (Petty & Cacioppo, 1986). Likewise, when elaboration likelihood is low, the message is apt to be processed peripherally. When more cognitive effort is expended in message processing (e.g., parsing complex syntax), the ELM predicts that the likelihood of elaboration will increase (Petty, Cacioppo, & Schumann, 1983). However, research also has demonstrated that when a text is less comprehensible, elaboration is less likely (Petty et al., 1988).

Complexity in Advertising. Problems encountered by readers in sentence-level processing have also been of interest to advertising researchers. Anderson and Jolson (1980) found that highly technical language in ad copy fostered negative attitudes. Meeds (1999) furthered this line of inquiry and found that when technical language was accompanied by explanatory phrases, consumers learned more about the products and developed more positive attitudes about the ads. Complexity in advertisements has been studied in other ways, too. Cox and Cox (1988) found that the visual complexity (i.e., a complex dominant visual element) of an advertisement mitigated wear-out effects of exposure to that ad. That is, participants rated visually complex ads higher than visually simple ads after multiple viewings. In fact, despite the recommendations of advertising educators and creative directors, simplicity may be too strongly valued. In a study that held constant levels of informativeness and concreteness while manipulating the readability level as measured by common indices (e.g., Dale-Chall Formula, Fry readability graph), Macklin, Bruvold, and Shea (1985) found that readability made no difference on attitudes toward the ad, brand, or purchase intent. "In short, 'Keep it simple!' is too simple when considering the complex processes involved in influencing consumers' attitudinal judgments" (Macklin et al., 1985, p. 33). Chamblee, Gilmore, Thomas, and Soldow (1993) found that advertisements with higher lexical complexity actually *helped* readership. In discussing those findings, Chamblee et al. (1993) suggested that although people often try to expend the least amount of cognitive effort possible, more complex ads demand a higher processing effort, and that increased effort may affect memory and the formation of attitudes. This is consistent with the elaboration likelihood model, which suggests consumers process advertisements more deeply when they think about the information in the ad

(Petty & Cacioppo, 1979). Chamblee et al. (1993) concluded that copywriters should not always strictly adhere to the "'keep it short and simple' rule of thumb" (p. 27). As can be seen in these examples, however, the preponderance of literature in advertising copy research has investigated semantic manipulations, lexical complexity, or visual variations; far less research has concentrated on syntactic variations.

In a series of experiments investigating syntactic complexity and attitude formation in advertisements, Lowrey (1998) suggested that complex syntax had implications for advertising persuasiveness apart from its effects on comprehension. In a broadcast context where the viewer could not control the pace of the message, Lowrey found that moderate complexity had a negative effect on recall and recognition but did not demonstrate an effect on attitudes. In a print medium, however, Lowrey found that syntax did affect attitudes, specifically interacting with the strength of the claim in that study. But syntax did not affect recall of the print ads. Like many pure psycholinguistic studies, Lowrey manipulated syntax by using left- and right-branching sentences but held manipulations at a moderate level, thereby boosting external validity in an advertising context. This study hopes to build upon these results by investigating syntactic complexity with the use of Chomsky's transformations. Different transformations can be applied to the same text, adding additional levels of complexity as additional transformations are applied.

In a psycholinguistic study where participants were given sentences of equal meaning with varying levels of syntactic complexity, the syntax manipulations had no significant impact on comprehension or retention of meaning, but they affected other variables that indicated a higher degree of elaboration for the complex syntax (McDaniel, 1981). McDaniel (1981) said one possible explanation for the discrepancy between the performance on meaning and other variables is that participants were instructed to pay attention to the messages, which increased personal involvement for the meaning of the sentence and the likelihood that participants elaborated on the meaning. There were no cues to pay attention to syntax—a method that is replicated in this study—so the instructions should not have increased involvement with the surface structure. This is consistent with Lang's (2000) limited capacity model of mediated message processing, which offers support for this difference in encoding. "Some bits of information in the encoded mental representations of messages may be more thoroughly stored than others. In other words, all of the bits of information encoded from a message do not receive equivalent amounts of processing during storage" (Lang, 2000, p. 50). Thus, it is predicted that:

> **H1:** When the deep structure (semantic content) of advertising slogans in print advertisements is held constant, surface-structure

manipulations that increase syntactic complexity will not adversely affect recognition of the slogans' meaning.

Because the models of elaboration suggest that complex-syntax copy can lead to deeper processing than simple-syntax copy, there is reason to believe that there may be differences in the recall of surface structure among various levels of syntactic complexity. Although McDaniel (1981) found no significant difference in the memory for meaning of a sentence, more recent psycholinguistic research (Potter & Lombardi, 1990; Lombardi & Potter, 1992) suggests that memory for surface structure will decay after a distracter task. Participants have been able to identify changes in word order that did not affect semantic content, but such recognition was poor after only one intervening sentence between exposure and testing (Sachs, 1974). Support has been found for the hypothesis that complex surface structure is reduced to the kernel, whose meaning is stored. When asked to recall the sentence, participants then regenerate it through the normal process of sentence production (Potter & Lombardi, 1990; Lombardi & Potter, 1992). "The much slower loss of the conceptual content of the sentence is presumably due to the greater distinctiveness of the information as well as to the fact that a reader or listener's goal is normally to extract and encode meaning, discarding the lexical and syntactic forms that convey meaning" (Potter & Lombardi, 1998, p. 277). Again, this coincides with Lang's (2000) limited-capacity model. Further, McDaniel (1981) claimed that syntactic recognition tasks required more to remember on the part of the reader (e.g., passive constructions add the word "by" and a helping verb), an argument that favors recognition of simple-syntax forms. Thus the following is predicted:

H2: Syntactically simple advertising slogans will show enhanced recognition over slogans with surface-structure manipulations that increase syntactic complexity after short-term memory for surface structure is allowed to decay.

Yet syntactically complex sentences should take longer to process, which could result in more time spent with complex versions and better recall for the information therein (Cooper & Pantle, 1967). Lowrey (1998) found in two experiments with print ads that syntax did not affect the number of claims recalled. Traditional methods of testing recall in advertisements (e.g., day-after brand-name recall or copy-point recall), however, appeared unsuitable for the goals of this study. If moderately complex syntax does lead to deeper processing without compromising comprehensibility of the text, then participants should be able to free recall more words from complex slogans than from simple slogans. Thus, it is further hypothesized that:

H3: Moderately syntactically complex advertising slogans will show enhanced unaided recall than slogans with simple surface structure.

Although the effects of syntactic manipulation have been investigated in terms of recall and secondary task performance, little research has probed the effects of syntax on attitude formation, specifically A_{ad}. Yet if such effects exist, they would seem to have to be robust in order to be seen with statistical significance in an applied advertising setting. That is, the advertising message must compete with the consumer's environment if it is received under typical "low involvement, rushed, noisy, uncontrolled-disorganized, and nondecision-oriented conditions . . ." (Batra & Ray, 1983, pp. 129–130). Despite these many potential distractions, that does not mean syntactic complexity in advertising cannot have an effect. Even when consumer involvement is low, the message may increase awareness and mere-exposure affect, which may influence later purchase decisions even though attitudes may initially remain unchanged (Batra & Ray, 1983). Despite the prevalent couch-potato description of American society, cognitive capacity is still involved in processing media messages. "The mind is not passively tape-recording but rather is constantly constructing interpretations, which are then encoded into long-term memory" (Harris, Dubitsky, & Bruno, 1983, pp. 258–259). Lowrey (1998) found an interaction between claim strength and syntax on brand attitude in one experiment and a three-way interaction among claim strength, involvement, and syntax on attitudes in another experiment. "The series of experiments reported here suggests that syntactic complexity has implications for the persuasiveness of ads beyond its effects on comprehension as noted in previous psycholinguistic research" (Lowrey, 1998, p. 202).

When syntactic complexity is kept at a moderate level—as it would appear in actual advertisements—Lowrey (1998) concluded that syntax interacts with motivation to process rather than ability to process. However, if as these authors suspect, moderate complexity does not sacrifice comprehensibility, then it should render participants more likely to examine the central arguments of the slogan. Britton et al. (1982) posit that when two texts have the same meaning but differ in syntax, the complex syntax will assume more cognitive capacity, and Petty et al. (1983) found that participants assigned higher ratings to products in cogent ads than specious ads. Under these findings, then, moderately complex syntax should boost cognitive processing, which in turn can positively affect attitude formation. Thus the following is hypothesized:

H4: Grammatical transformations that increase syntactic complexity in print advertisement slogans will have a positive main effect on attitudes toward the advertisement (A_{ad}).

METHOD

To test the hypotheses offered here, this study was constructed as a 2 (active voice, passive voice) $\times$ 2 (particle in place, particle moved) factorial treatment structure in a completely randomized design. Voice and particle position were within-subjects factors. The resulting four treatment conditions (active particle in place / active particle moved / passive particle in place / passive particle moved) were counterbalanced across four product types (camcorder, water filter, inkjet printer, mountain bike), resulting in 16 counterbalanced orders. The active-particle-in-place condition is the simple syntax condition, for it is a kernel with no transformations. The active-particle-moved and passive-particle-in-place conditions represent the moderate level of syntactic complexity for this study because each has one transformation. Finally, the passive-particle-moved condition is the highly complex version because it contains two transformations. The dependent variables were comprehension of semantic content, unaided morpheme recall, recognition of syntax, and A_{ad}.

Participants. Ninety-nine undergraduate students enrolled in introductory mass communications courses at a Midwestern university participated in the experiment for extra credit. Prior to data entry, the data for one participant who was a non-native speaker of English were removed, as were the data from two other students who failed to follow instructions. The data from 96 students were retained for analysis ($n = 96$).

Stimulus Materials. The stimulus set consisted of six 1-page print ads. Layout and illustration effects were controlled, with each ad featuring a photo of the product on the left half of the ad and a product slogan on the right half. Image size and typeface were held constant between the ads. The surface structures of the slogan of the second through fifth ads were manipulated and were tested in the subsequent question set. To control for primacy and recency effects, the first and sixth ads (soft drink and VCR) were not manipulated. Four product categories (camcorder, water filter, inkjet printer, and mountain bike) were chosen from a list of 12 product categories based on their relevance as rated by a group of mass communication students who were not participants in the experiment. Fictional brand names were used so that existing brand loyalties would not interfere with the treatment effects. The slogans appear in the Appendix.

Procedure. The purpose of this study was withheld from the participants, a method suggested by a review of literature. Participants were told they would see mass communication content in both print and television formats, and then answer questions about that content.

When participants arrived for the viewing, they were read instructions from a script informing them that they were about to view a series of print advertisements and television content. They were asked to pay attention to both types of content. Participants were scheduled in small groups of 8–10 at times convenient to them. The participants were randomly assigned among the 16 presentation orders. They were given a packet that included instructions for viewing the ads, the ads themselves, and the pencil–and-paper questionnaire. Each participant saw the same first and last distracter ads. Each participant saw one ad for each product, each representing one of the four treatment conditions. The order of presentation for product types and treatment conditions was counterbalanced across the orders with the use of a Latin square to ensure randomization. The ads and the questionnaire were separated by a page asking participants to stop and wait for further instructions. This page was a different color from the rest, and the experimenter watched to ensure the participants did not proceed. When all participants arrived at the page, they watched a 10-minute distracter video of sea mammals swimming underwater. The distracter was used to minimize ceiling effects on recall and recognition. After viewing the distracter tape, participants were allowed to proceed through the questionnaire at their own pace. Four semantic recall questions about the video were included in the questionnaire for consistency, but the results are not of interest to this study. Unaided recall and comprehension of semantic content were tested before syntax recognition, so that participants would not be exposed to the slogans a second time before attempting to recall their wording or meaning.

INDEPENDENT VARIABLES

Two grammatical transformations were selected as treatment conditions to maximize the external validity of the study. Because semantic meaning could not be held constant if the slogans were to undergo the question or negative transformations, this study employed voice and particle movement transformations because they also occur frequently in ad slogans.

Voice. Sentences maintain their semantic content when they are changed from the active to the passive voice. Transformational grammar predicts that individuals must transform a passive sentence back to the kernel, thereby investing extra processing effort on passive sentences. Additionally, the active voice is widely coached in advertising copywriting classes, while the passive voice is eschewed.

Particle Movement. Most grammatical transformations are unsuitable for this type of study. To be plausible for an advertising study in-

vestigating syntactic complexity, a transformation must not alter semantic content, and it must not make the text unintelligible. Some psycholinguistic research that has investigated syntactic complexity has used language that simply would never appear in any ad and offers little insight for the profession. This self-embedded sentence is just one such example, "The car that the man whom the dog bit drove crashed" (McDaniel, 1981, p. 488). In a further articulation of transformational grammar, Chomsky (1976) theorized that when a particle is moved from its original position, it leaves behind a trace, which then must be recovered from deep structure. These traces represent a place of reorientation for the reader. In a passive sentence, for example, one would expect a trace for the object directly after the verb because English is a language that employs a standard subject-verb-object ordering, which should cause the reader to expect an object after the verb. In the following passive sentence, the object has already been presented, so the reader has to reorient to who was kissed:

(5) The boy was kissed [trace] by the girl.

In addition to moving the constituents of a passive sentence, particles can be moved within a clause. This is called a particle-movement transformation. In English, for example, the adverb can be moved away from the verb.

(6) Officials quickly rushed to the fire.
(7) Officials rushed to the fire quickly.

When parsing a sentence, it is inefficient for the parser to keep an entire verb clause active waiting for an adverb that may or may not come. When no adverb is detected proximate to the verb, the brain assumes none is coming. When an adverb is encountered at the end of the sentence, the parser must interrupt processing to determine where the adverb belonged, or where its trace should have been:

(8) The boy [trace] rushed through the glassware shop clumsily.

Because of the unique rules of movement, there is not a consensus among scholars that adverbial movement shares equal transformation status with passives and negatives (see Berwick & Weinberg, 1983, for a complete discussion), but such transformations have been studied under the rubric of transformational grammar. Some particle movements are unacceptable for a study such as this, however. Adverbs can be moved in English as shown above, but adjectives generally cannot. The following sentence is clearly unacceptable in English:

(9) The coat blue is too heavy.

Adverbial movements, however, are common in English, and adverbs are often used in advertising slogans. For these reasons, a particle-movement transformation that relocates the adverb was selected for this study.

Each slogan constructed for this study consisted of a fictional brand name, a verb, an adverb, and an object (e.g., Visadel digitally safekeeps your memories). The adverb was moved from its natural place before the verb to the end of the sentence as the particle movement transformation (e.g., Visadel safekeeps your memories digitally).

Demographics. Students were also asked the following demographic variables: major, sex, age, and whether or not they were native speakers of English. Finally participants were asked whether they had guessed the purpose of the study. No one correctly identified the purpose.

DEPENDENT VARIABLES

Comprehension of Semantic Content. If a participant correctly encoded the meaning of a slogan, then the participant should have been able to recognize a paraphrase of that meaning (McDaniel, 1981). For each of the four product types, the slogan was paraphrased into a semantic equivalent that did not use any of the keywords from the original (e.g., the slogan for the inkjet printer, "Comtech accurately reproduces your thoughts," became "The output closely resembles your ideas"). For each product type, three incorrect alternatives were also offered based on marketable product features (e.g., "It is extremely quiet" for the inkjet printer). All alternatives were written in the kernel form. Participants picked from four alternatives for each product type. To correct for guessing, correct responses were coded as three points, missing responses were coded as one point, and incorrect responses were coded as zero points. Average comprehension was then coded as the mean of the four product scores.

Unaided Morphemic Recall. Previous research (McDaniel, 1981) has shown that if meaning were tested without repeating any key words, it would not prime syntactic recall. Participants were given the four product types and asked to recall the phrase that had appeared in the advertisement for that product to the best of their ability. Miller (1991) suggests that any attempt to measure word knowledge must confront the morpheme, which is the smallest unit of a language that carries meaning. There are two types of morphemes, free morphemes and bound morphemes. Free morphemes are any words that can stand alone and convey meaning (i.e., singular words with no prefixes or suffixes). Bound morphemes are changes to words (e.g., adding *-s* for a plural or *-ly* to form an adverb) that cannot stand alone. Psycholinguistics pre-

dicts that people do not store a separate meaning for a noun and its plural (e.g., book and books), but store the free morpheme *book* and the bound morpheme *-s* that can be added to make most English nouns plural. Each slogan in this study has exactly four free morphemes (i.e., subject, adverb, verb, and object) in every treatment condition. To test this effect without the confound of the additional words (i.e., *by*) or bound morphemes (i.e., *-ed*) required by the passive transformation, participants' free recall of slogans can be analyzed in terms of free morphemes, or meaning units. Responses were coded from 0 to 4 depending on the number of correct morphemes from the major units (i.e., subject, adverb, verb, and object) from the original slogans and summed across product type. By using the free morpheme as the unit of analysis, participants got one point, for example, for writing *rugged* when they had seen *ruggedly,* because the free morpheme captures the unit of meaning. All responses were coded after mutual agreement by a pair of trained coders.

Syntactic Recognition. All four versions of the slogan were provided in a multiple-choice format. This approach should negate false priming effects because each syntactic version is equally primed and the order of presentation in the questionnaires was counterbalanced. Each response was coded on two dimensions from 0 to 1. The first variable tested whether the participant chose the voice accurately, and the second tested whether the participant chose the particle position correctly. Additionally, the responses were summed during data analysis to determine which responses were correct on both counts. Finally responses were separated into entirely correct and not entirely correct for comparison.

Attitude Toward the Ad. Participants completed a five-item, 7-point semantic differential on their attitudes toward each of the ads (i.e., good/bad, likable/not likable, informative/uninformative, interesting/uninteresting, clear/unclear). Order of the adjectives was randomized. A factor analysis was run on the scales, and they all loaded on a single factor. Reliability checks showed acceptable internal consistency among the scales for each product type ($\alpha = 0.89$, 0.85, 0.88, 0.85). This allowed the semantic differentials to be averaged into one attitude toward the ad (A_{ad}) measurement for each product.

A manipulation check was run with a second group of participants ($n = 36$). Participants rated each slogan on two 7-point semantic differentials (i.e., complex sentence structure/simple sentence structure; easy to read/difficult to read. The order of presentation for product and treatment condition was randomized and counterbalanced, and no two slogans for the same product appeared on the same page. Reliabilities for the two semantic differentials for each of the four treatment conditions showed alphas above 0.70 (active/particle in place, 0.75; active/particle

moved, 0.80; passive/particle in place, 0.84; passive/particle moved, 0.72). An ANOVA among the four treatment conditions on the two-item scale showed that the manipulation was successful (F [1,35] = 18.49, $p < .001$, eta² = 0.35). Planned comparisons also showed differences among the levels of complexity in the predicted direction. The high-complexity condition (i.e., passive/particle moved) was rated as significantly more complex ($M = 3.98$) than the pooled mean of the two moderately complex conditions (i.e., active/particle moved and passive/particle in place) ($M = 3.26$, t [35] = 4.76, $p < .001$). Likewise, the moderately complex conditions were significantly more complex ($M = 3.26$) than the kernel ($M = 3.00$, t [35] = 2.58, $p < .01$).

The four product categories were counterbalanced across treatment conditions to protect against a main effect of product on attitude. A validity check showed that there was no product category by treatment condition interaction (F [9,80] = 1.10, p = NS).

RESULTS

Initial analyses showed no main effects or significant interactions among the demographic variables and the manipulated factors. As a result, demographics were dropped from further analyses to preserve degrees of freedom.

Hypothesis 1 predicted that comprehension of the semantic content of the advertising slogans would not be affected by variations in the syntactic complexity of the slogans' surface structures. Although this hypothesis predicts a null result and it is not appropriate to conclude that an accepted null hypothesis is statistically true (i.e., in a statistical sense, the null would fail to be rejected rather than accepted), it was important to test H1 in this manner because ad copywriting conventions favoring simple text structures are in part based on the notion that simple text is easier to comprehend. The authors' prediction was that complex text was not more difficult to comprehend. Three within-subjects ANOVAs were run to test the prediction of no difference in semantic comprehension. All three were consistent with the prediction. The first test was for the active/passive voice manipulation and showed that semantic comprehension for active slogans was not significantly different from comprehension for passive slogans ($M = 4.16$ versus 4.10, F [1,95] = 0.03, p = .86). The second test was for the particle-movement manipulation, which similarly showed that comprehension for slogans with standard-placed adverb particles were not significantly different from comprehension for slogans in which the particles had been moved ($M = 4.01$ versus 4.25, F [1,95] = 0.93, p = .34). The third ANOVA tested for possible interactive effects between voice and particle movement and also showed no significant differences (F [3,93] = 0.18, p = .91), as shown in Figure 1. Contrasting each mean against the other three with
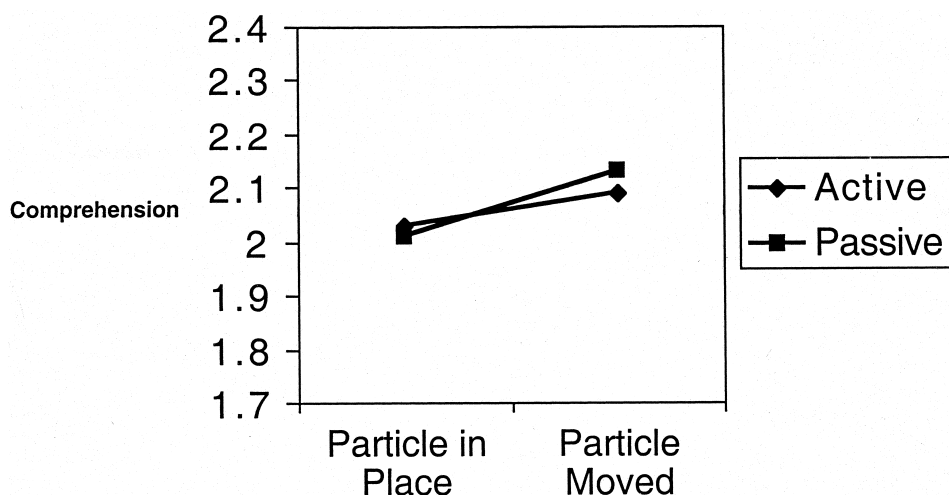
Figure 1. The effect of syntactic complexity on semantic recognition. Scores reflect the mean score for each treatment condition. Correct responses were coded as a 3.

two-tailed t tests, none of the observed differences approached significance (active/particle not moved versus others, t [95] = −0.26, p = .79; active/particle moved versus others, t [94] = 0.23, p = .82; passive/particle not moved versus others, t [93] = −0.44, p = .66; passive/particle moved versus others, t [93] = −0.48, p = .63. Thus, syntactic complexity did not produce statistically significant differences in readers' comprehension of semantic content.

Hypothesis 2 predicted that simple surface structure would enhance recognition of the ad slogans. All three of the within-subjects ANOVAs were significant, supporting H2. Recognition was better for active slogans than for passive slogans (M = 1.57 versus 0.92, F [1,95] = 43.81, p < .001, eta^2 = 0.32). Recognition was also better for slogans in which the adverb was not moved than in slogans in which it was moved (M = 1.54 versus 0.94, F [1,95] = 35.81, p < .001, eta^2 = .27), and the voice-by-particle movement interaction was significant as well (F [3,93] = 20.05, p<.001, eta^2 = 0.39), as shown in Figure 2. Specifically, correct recognition for simple (or kernel) structure was higher than was correct recognition for the overall average of the other three conditions (M = 1.65 versus 1.11, t [95] = 6.37, p < .001). A possible rival explanation for this finding, however, is that participants were not actually recognizing the kernel form, but simply picking it during the recognition task as the slogan that sounded better than the other three choices. If this were true, though, participants could be expected to *incorrectly* pick the kernel form as frequently as they correctly recognized the kernel form or as frequently as they correctly recognized a complex form. Subsequent analyses showed this was not the case, however, as incorrect
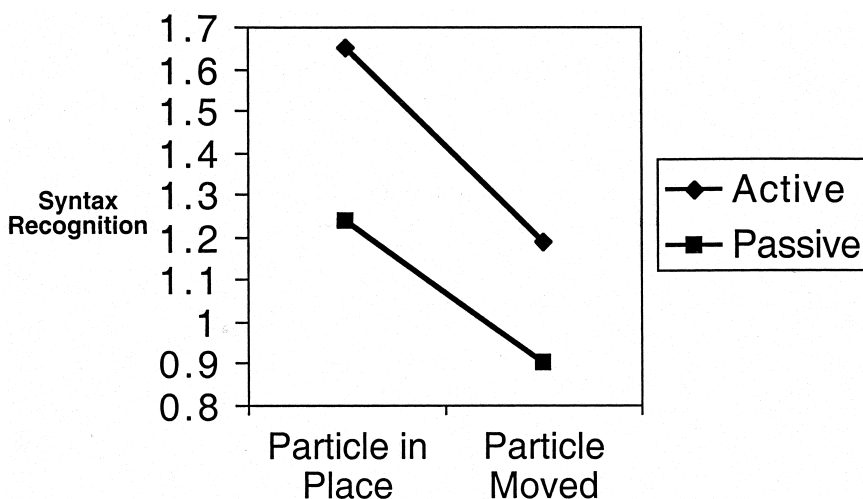
Figure 2. The effect of syntactic complexity on syntactic recognition. Scores reflect the mean number of manipulations recognized. Responses received one point for correctly recognizing the voice (active or passive) and one point for correctly recognizing the adverb placement (in place or moved).

guessing of the kernel form was significantly lower than both correct recognition of the kernel (t [95] $= -11.75$, $p < .001$) and correct recognition of complex structures (t [95] $= -5.45$, $p < .001$). This latter finding is significant in another way. If participants were relying only on their deep structure representation of the slogans (which would most closely correspond with the kernel form), they would, by default, be more likely to believe the kernel form was what they had previously seen, thus making them less able to recognize the complex syntactic forms that they had actually seen. Since the opposite was the case, this suggests that some memory for the surface structure (whether it was complex or simple) was retained even after the distracter task.

Hypothesis 3 predicted that unaided recall of the ad slogans would be enhanced by moderate syntactic complexity. The two main effects tests did not support H3. The main effect test for the voice manipulation was significant, but with recall of morphemes from the simpler active slogans being significantly higher than recall of morphemes from passive slogans ($M = 1.35$ versus 0.99, F [1,95] $= 6.44$, $p < .05$, eta² $= .06$). Movement of the adverb had no effect on morphemic recall ($M = 1.17$ vs. 1.18, F [1,95] $= 0.00$, $p = .95$). Consistent with H3, however, voice and particle placement significantly interacted (F [3,93] $= 2.78$, $p < .05$, eta² $= .08$), as shown in Figure 3. Specifically, recall was highest for the moderate-complexity version in which active slogans contained adverbs that had been moved ($M = .73$, t [94] $= 1.93$, $p < .05$). Recall was lowest for the most drastically transformed condition— passive slogans in which the adverbs had been moved ($M = .45$, t [93] $= -2.59$, $p < .01$).
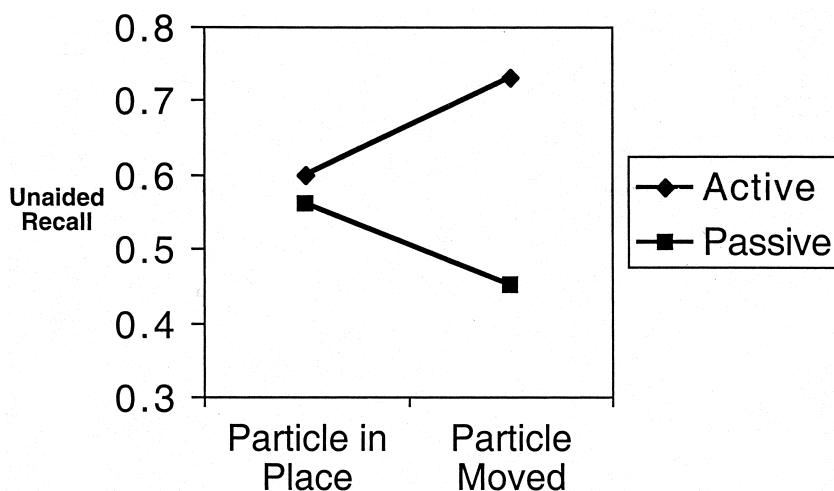
Figure 3. The effect of syntactic complexity on unaided morphemic recall. Scores reflect the mean number of free morphemes recalled without cues.

Additionally, when the two moderate complexity conditions (active/particle moved and passive/particle not moved) were contrasted against the other conditions, moderate complexity overall led to improved morphemic recall (t [94] = 1.94, $p < .05$).

The fourth hypothesis predicted that A_{ad} would also be enhanced by moderate syntactic complexity. Similar to the H3 results, the within-subjects ANOVA test on active versus passive voice indicated that active-voice slogans resulted in better attitudes than passive voice slogans (M = 4.13 versus 3.91, F [1,95] = 6.25, $p < .05$, eta² = 0.06). Particle placement did not influence A_{ad} (F [1,95] = 0.69, p = .41). The voice-by-
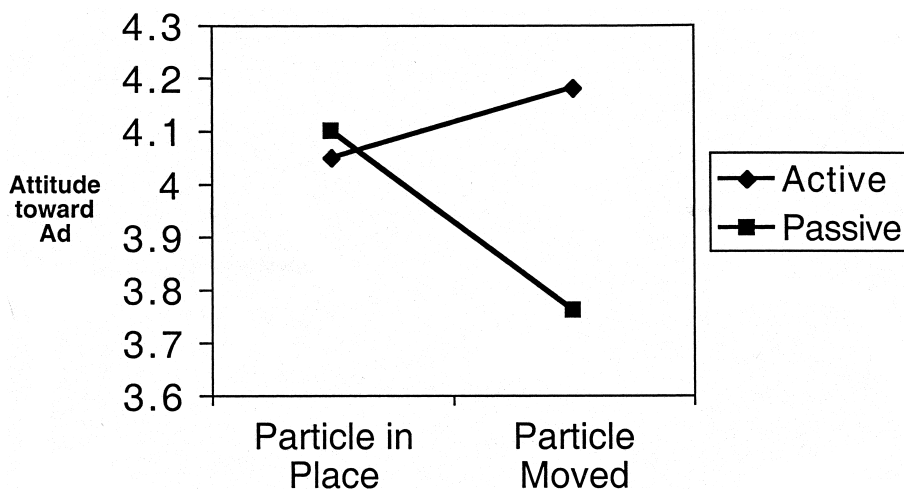

Figure 4. The effect of syntactic complexity on attitude toward the ad. Scores reflect the mean for a five-item semantic differential.

particle interaction was significant, though (F [3,93] = 4.90, $p < .01$, eta^2 = 0.14), as shown in Figure 4. As predicted in this interaction, active slogans in which the adverb had been moved exhibited the highest A_{ad} ($M = 4.18$, t [94] = 1.77, $p < .05$). Passive slogans in which the adverb had been moved (i.e., the high-syntactic-complexity condition) exhibited the lowest A_{ad} ($M = 3.76$, t [92] = -3.75, $p < .001$), thus supporting the concept of a curvilinear effect for syntactic complexity in which moderate levels of complexity can have a positive effect on A_{ad}, but higher levels of complexity can have a negative effect on A_{ad}.

DISCUSSION

The results of this study challenge the conventional wisdom that ad copy should be kept as simple as possible, but they did so in ways that are both traditional and counterintuitive. Most advocates of the active voice say that it is better understood. According to this and other research (McDaniel, 1981), that appears to be untrue. No difference has been found in comprehension of active and passive voice sentences. Active voice was examined here from the transformational grammar perspective, and along with the passive transformation, particle movement also showed no significant difference in comprehension.

Although comprehension was similar, however, unaided morphemic recall, recognition, and attitudes did show differences. In recognition, the active voice had an advantage over the passive. Likewise, unmoved particles showed an advantage over moved particles in recognition, and the two syntactic manipulations interacted to the detriment of recognition, with the simplest syntactic structure (i.e., the kernel) being the most recognizable. It appears to be more difficult to recognize surface structure that has undergone transformations. In the case of the passive, McDaniel's (1981) explanation of participants having to recall more words (i.e., "by" and a helping verb) can explain this poorer performance, but this is not the case with adverbial movement. As Chomsky's theory suggests, it appears to be more difficult to regenerate complex surface structure from deep structure. This finding alone hardly justifies avoiding complexity. Although advertisers want slogan recognition, this finding for simplicity was based on one exposure to fictitious brands. The sacrifice in one-exposure recognition rates for syntactically complex slogans may be outweighed by the benefits in other areas.

In recall of morphemic units and attitude formation, complex syntax has effects that would be suspected under the elaboration likelihood model. Moderate syntactic complexity boosted morpheme recall and attitudes, which may be due to the more effortful processing required by the transformation. This study and others of advertising syntax (e.g., Lowrey, 1998) have used moderately complex syntax in hopes of maintaining external validity, as opposed to the relatively severe complexity

used in psycholinguistic studies. Supporting this notion, two transformations (i.e., more severe complexity) appear to harm recall and attitude formation.

Based on the main-effects tests in Hypotheses 2–4, the most obvious explanation is that participants simply preferred the active voice, but that does not appear to be the case for two reasons. Although participants did pick the active voice more than the passive voice during recognition, they did so with a pattern. They were more likely to pick the correct nonkernel sentence than to incorrectly pick the kernel. Additionally, a bias for seeing the simple syntax does not explain the increased performance at unaided morpheme recall. The only prime in that measurement was the product category, yet recall of units of meaning was significantly higher for active versions, and the particle movement interacted with voice. A simple preference for simple syntax, or the active voice in particular, cannot account for these findings if meaning alone is recovered from the deep structure. Equally pertinent is the fact it has been shown that memory for syntax decays after only one intervening sentence. In this study, morpheme recall was tested after a 10-minute distracter task. So it appears that simple syntax has an effect during the encoding stage and these results are not simply an artifact of a simple-syntax bias.

Elaborative processing models suggest that, within limits, complexity could help with encoding because more time is spent during the encoding process. The results of this study are consistent with these models. Such elaborative processing does not appear to have had a positive effect on comprehension or recognition in this case. Where elaborative processing may have had an effect, however, is in morpheme recall and attitude formation. The results show that two transformations significantly lowered A_{ad}. Although the means suggest the possibility of a curvilinear relationship, these data are not conclusive in that regard. Participants appear to accept one transformation in a slogan as a positive, but two transformations are unfavorable. Advertising students are taught to twist the ordinary, to bend a cliché or use a metaphor in a new way. It is possible that slightly varying the syntax in an ad is seen as refreshing, but too much syntactic complexity is an overload. Clearly more research is needed to determine whether such relationships are found in other advertising textual forms.

Limitations. This study points to some interesting possibilities, but it has its limitations. Foremost is the fact that these tests were conducted after just one exposure. In the marketplace, consumers often encounter an advertisement several times. These data do not address any possible wear-in or wear-out effects syntactic structure might have.

Second, no study based on transformational grammar is completely without controversy. Many question the psychological reality of the transformations Chomsky proposes altogether. Some less applied stud-

ies on syntactic complexity use prose so twisted that it is barely intelligible. Therein lies the quandary for advertising research. If syntactic complexity is severely manipulated to tease out an effect, then the results become almost useless to the advertising practitioner because the stimuli have no external validity.

The particle-movement transformation was used here as a compromise. It leaves the slogan intelligible, yet it adds another degree of complexity. But like almost everything related to Chomsky's theories, the particle movement is not universally accepted. Some argue that because the adverb is restricted to movement within one clause, it does not count as a true transformation. That is, one cannot say "Clearly the optometrist observed that the boy could see." If the adverb *clearly* is moved out of the embedded clause, it then modifies the verb *observed*. These results suggest that adverbial movement does add some degree of syntactic complexity, but they do not disprove the critics who say particle movement is not a full-fledged transformation.

CONCLUSIONS

There continues to be more evidence against those who say advertising copy should be as simple as possible. As the body of research on complexity in advertising grows, it seems that the situation really is more complex than just keeping copy simple. If complex syntax had no discernable effect on comprehension and negatively affected attitudes only when used at extreme levels, then it does not make sense to avoid certain syntax just because it is complex. It is possible that moderate complexity is more cognitively engaging for readers. In ads for products and services where the overriding goal is to convey information, then a limited degree of syntactic complexity does not appear to decrease the comprehension of that information or the attitudes toward those advertisements. Indeed, if continuing research furthers the notion that syntactically complex copy is feasible if approached moderately, then copywriters may have yet another way to write about products and services, and educators may be wise to desimplify their simple rule.

Chomsky's theory states that the kernel is the beginning of the grammar. To encode or produce an utterance, one must go through that kernel. Although it has been shown that performing such transformations is not a rigidly serial process, sentences that must be transformed are judged to expend more cognitive effort. The range of effects of such syntactically complex material remains largely unexplored. Further research is needed to examine the exact relationship between complex syntax and persuasion. The positive effect of moderate complexity in persuasion appears to be caused by the increased elaborative processing it engenders. Future studies in this area should include a measure of elaborative processing, such as a thought-listing task. Additionally, it

would be beneficial to explore at what point the increased cognitive effort becomes overtaxing and makes a text less comprehensible. Results in such studies have often been counterintuitive, and they sometimes show that conventional wisdom may be too simple.

APPENDIX A

Ad Copy Manipulations for Voice and Particle Movement

Order

- Active, particle in place
- Active, particle moved
- Passive, particle in place
- Passive, particle moved

Camcorder

- Visadel digitally safekeeps your memories
- Visadel safekeeps your memories digitally
- Your memories are digitally safekept by Visadel
- Your memories are safekept by Visadel digitally

Water Filter

- Evpure proudly guarantees each drop
- Evpure guarantees each drop proudly
- Each drop is proudly guaranteed by Evpure
- Each drop is guaranteed by Evpure proudly

Inkjet Printer

- Comtech accurately reproduces your thoughts
- Comtech reproduces your thoughts accurately
- Your thoughts are accurately reproduced by Comtech
- Your thoughts are reproduced by Comtech accurately

Mountain Bike

- Dynaflex ruggedly conquers the competition
- Dynaflex conquers the competition ruggedly
- The competition is ruggedly conquered by Dynaflex
- The competition is conquered by Dynaflex ruggedly

REFERENCES

Anderson, R. E., & Jolson, M. A. (1980). Technical wording in advertising: Implications for market segmentation. Journal of Marketing, 44, 57–66.

Batra, R., & Ray, M. L. (1983). Advertising situations: The implications of differential involvement and accompanying affect responses. In R. J. Harris (Ed.), Information processing research in advertising (pp. 127–151), Hillsdale, NJ: Erlbaum.

Berwick, R. C., & Weinberg, A. S. (1983). The role of grammars in models of language use. Cognition, 13, 1–61.

Bresnan, J. (1978). A realistic transformational grammar. In M. Halle, J. Bresnan, & G. A. Miller (Eds.), Linguistic theory and psychological reality (pp. 1–59). Cambridge, MA: MIT Press.

Britton, B. K., Glynn, S. M., Meyer, B. J., & Penland, M. J. (1982). Effects of text structure on use of cognitive capacity during reading. Journal of Educational Psychology, 74, 51–61.

Cacioppo, J. T., Petty, R. E., & Morris, K. J. (1983). Effects of need for cognition on message evaluation, recall, and persuasion. Journal of Personality and Social Psychology, 45, 805–818.

Carroll, D. W. (1999). Psychology of language. (3rd ed.). Pacific Grove, CA: Brooks/Cole.

Chamblee, R., Gilmore, R., Thomas, G., & Soldow, G. (1993). When copy complexity can help ad readership. Journal of Advertising, 33, 23–28.

Chomsky, N. (1957). Syntactic structures. The Hague: Mouton.

Chomsky, N. (1965). Aspects of the theory of syntax. Cambridge, MA: MIT Press.

Chomsky, N. (1968). Language and mind. New York: Harcourt Brace Jovanovich.

Chomsky, N. (1976). Conditions on rules of grammar. Linguistic Analysis, 2, 303–351.

Chomsky, N. (1980). Rules and representations. New York: Columbia University Press.

Chomsky, N. (1981). Lectures on government and binding. Dordecht: Foris.

Cooper, E. H., & Pantle, A. J. (1967). The total-time hypothesis in verbal learning. Psychological Bulletin, 68, 221–234.

Cox, D. S., & Cox, A. D. (1988). What does familiarity breed? Complexity as a moderator of repetition effects in advertising evaluation. Journal of Consumer Research, 15, 111–116.

Fodor, J. A., Bever, T. G., & Garrett, M. F. (1974). The psychology of language: An introduction to psycholinguistics and generative grammar. New York: McGraw-Hill.

Fodor, J. A., & Garrett, M. F. (1967). Some syntactic determinants of sentential complexity. Perception and Psychophysics, 2, 289–296.

Gough, P. B. (1965). The verification of sentences. Journal of Learning and Verbal Behavior, 5, 107–111.

Harris, R. J., Dubitsky, T. M., & Bruno, K. J. (1983) Psycholinguistic studies of misleading advertising (pp. 127–151). In R. J. Harris (Ed.), Information processing research in advertising. Hillsdale, NJ: Erlbaum.

Lang, A. (2000). The limited capacity model of mediated message processing. Journal of Communication, 50, 46–70.

Lombardi, L., & Potter, M. C. (1992). The regeneration of syntax in short term memory. Journal of Memory and Language, 31, 713–733.

Lowrey, T. M. (1998). The effects of syntactic complexity on advertising persuasiveness. Journal of Consumer Psychology, 7, 187–206.

Macklin, M. C., Bruvold, N. T., & Shea, C. L. (1985). Is it always as simple as "Keep it simple!"? Journal of Advertising, 14, 28–35.

McDaniel, M. A. (1981). Syntactic complexity and elaborative processing. Memory & Cognition, 9, 487–495.

McMahon, L. (1963). Grammatical analysis as part of understanding a sentence. Unpublished doctoral dissertation, Harvard University, Cambridge, MA.

Meeds, R. (1999, March). The effects of technical language and sentence level context on consumers' processing of ad copy for high-tech products. Paper presented at the American Academy of Advertising Conference, Albuquerque, NM.

Miller, G. A. (1962). Some psychological studies of grammar. American Psychologist, 17, 748–762.

Miller, G. A. (1991). The science of words. New York: Scientific American.

Miller, G. A., & McKean, K. A. (1964). A chronometric study of some relations between sentences. Quarterly Journal of Experimental Psychology, 16, 297–308.

Petty, R. E., & Cacioppo, J. T. (1979). Issue involvement can increase or decrease persuasion by enhancing message-relevant cognitive responses. Journal of Personality and Social Psychology, 37, 1915–1926.

Petty, R. E., Cacioppo, J. T. (1986). Communication and persuasion: Central and peripheral routes to attitude change. New York: Springer.

Petty, R. E., Cacioppo, J. T., & Kasmer, J. A. (1988). The role of affect in the elaboration likelihood model of persuasion. In L. Donohew, H. E. Syphher, & E. T. Higgins (Eds.), Communication, social cognition, and affect (pp. 117–146). Hillsdale, NJ: Erlbaum.

Petty, R. E., Cacioppo, J. T., & Schumann, D. (1983). Central and peripheral routes to advertising effectiveness: The moderating role of involvement. Journal of Consumer Research, 10, 135–146.

Potter, M. C., & Lombardi, L. (1990). Regeneration in the short-term recall of sentences. Journal of Memory and Language, 29, 633–654.

Potter, M. C., & Lombardi, L. (1998). Syntactic priming in immediate recall of sentences. Journal of Memory and Language, 38, 265–282.

Sachs, J. S. (1974). Memory in reading and listening to discourse. Memory and Cognition, 2, 95–100.

Savin, H. B., & Perchonock, E. (1965). Grammatical structure and the immediate recall of English sentences. Journal of Learning and Verbal Behavior, 4, 348–353.

Slobin, D. (1966). Grammatical transformations and sentence comprehension in childhood and adulthood. Journal of Learning and Verbal Behavior, 5, 219–227.

Thorson, E., Reeves, B., & Schleuder, J. (1985). Message complexity and attention to television. Communication Research, 12, 427–454.

Walker, E., Gough, P., & Wall, R. (1968). Grammatical relations and the search

of sentences in immediate memory. Proceedings of the Midwestern Psychological Association.

Correspondence regarding this article should be sent to: Samuel D. Bradley, Department of Communication, Cornell University, 336 Kennedy Hall, Ithaca, NY 14853 (sbradley3@hotmail.com).