Morphological Relationships Revealed Through the Repetition Priming Task*

Laurie Beth Feldman†

INTRODUCTION

Attempts to study morphology experimentally are not new. One methodology for exploring a speakers' knowledge about morphological relationships among words asks subjects directly to judge which words have internal morphological structure. Variants of the method include asking whether a complex word "comes from" a certain base or alternatively, whether pairs of words share some morphological component (e.g., Derwing, 1976, 1986). A second methodology looks for improved performance (i.e., perceptual threshold sensitivity or recognition fluency) over successive presentations of a base morpheme. One task using this methodology employs a variation of the lexical decision task known as repetition priming. Here, morphological variants of a base word are presented and the pattern of facilitation among related forms is interpreted to reflect, at least in part, how those forms are organized in the lexicon of the user.

In the repetition priming procedure (Forbach, Stanners, & Hochhaus, 1974; Scarborough, Cortese, & Scarbrough, 1977; Stanners, Neiser, Hernon, & Hall, 1979), each word and pseudoword is presented twice for a lexical decision judgment. The reduction in decision latency relative to a first presentation, that is, the facilitation due to repetition, is measured. (The first presentation of the item is the "prime." The second presentation is the "target.") For facilitation to occur it is not necessary that the identical word be repeated as prime and target. Generally, morphologically related words including inflections and derivations also reduce target lexical decision latencies—sometimes as fully as an identical repetition. This finding invites an interpretation of repetition priming effects as abstract and lexical in origin (Fowler, Napps, & Feldman, 1985: Monsell, 1985; Stanners et al., 1979), although critics of the approach emphasize the perceptual analysis of a specific visual pattern or the memory trace thereof (e.g., Feustel, Shiffrin, & Salasoo, 1983; Jacoby & Brooks, 1984).

Serbo-Croatian, the dominant language of Yugoslavia, has some special properties that have been exploited in the investigation of morphological organization in the internal lexicon. First, numerous inflected and derived variants are used productively in Serbo-Croatian. Consequently, large families of morphologically related words exist. Second, as in English word formation is complex in that there is no unique relation between the form of an affix and its function (compare DISCUSS - DISCUSSION with PROFESS - PROFESSION). Third, Serbo-Croatian is transcribed in two different alphabets, Roman and Cyrillic, and most characters are unique to their respective alphabet. Children learn both alphabets in elementary school and the abundance of printed material in both alphabets guarantees that competence in both alphabets is maintained by adults. As a result, most words in Serbo-Croatian have printed forms in the two alphabets that are visually quite distinct and equally familiar to the skilled reader.

As noted above, one interpretation of repetition priming effects is that the facilitation due to repetition is principally based on the retrieval of information from specific prior episodes or from the repeated perceptual identification of the same pattern in a similar format and context (Johnston, Dark & Jacoby, 1985). Moreover, it has been argued that the "visual characteristics of the display and the configuration of letters in the item ...are probably preserved between successive
presentations of a letter string." (Feustel et al., 1983: p. 344). In an experiment designed to probe the contribution of visual similarity between prime and target (Feldman & Moskovljević, 1987, Expt 1), morphologically related prime-target pairs were inflected case forms of masculine and feminine nouns in Serbo-Croatian. Primes were printed in either Roman or Cyrillic alphabet characters and targets were always printed in Roman. In that experiment, significant and numerically equivalent facilitation occurred in both the alphabet-preserved (Roman-Roman) and the alphabet-alternating (Cyrillic-Roman) conditions. Recognition latencies to dative case targets were 90 ms faster when either a Cyrillic or a Roman transcription of the same word occurred approximately ten items earlier in the list. This outcome suggests that the basis of facilitation in the repetition priming paradigm lies not with surface attributes that are repeated over multiple instances, such as visual similarity of prime and target, but with some more abstract relationship. This interpretation is consistent with the work of Kirsner and colleagues (Kirsner & Dunn, 1985; Kirsner, Dunn, & Standen, 1987).

In another experiment conducted with Serbo-Croatian materials (Feldman & Moskovljević, 1987, Expt 2), the role of orthographic and phonological similarity between prime and target was investigated by comparing facilitation with real derivations to facilitation with an unrelated monomorphemic word whose structure suggested that it was a derived form. For example, in the triad KORA, KORICA and KORAK, the first member is a nominative form for the word meaning "step" and the second is its diminutive derivation. They are orthographically and phonologically similar but morphologically unrelated to the last member of the triad, which is a pseudodiminutive meaning "crust." Pseudodiminutives are actual monomorphemic words, with a nondiminutive meaning that is unrelated to the target, in which the initial portion is identical to the full target word and the final portion is identical to a diminutive suffix. In that study, significant facilitation occurred for words only when prime and target were morphologically related. Structural similarity of the initial and final portion of prime-target pairs was not sufficient to produce even partial facilitation among word pairs. Pseudodiminutive primes produced no facilitation (1 ms) for structurally similar but morphologically unrelated targets. On the basis of these two experiments it may be concluded that the effects obtained in the repetition priming task cannot be attributed simply to repetition of the same alphabetic (visual) pattern or to repetition of the same orthographic and phonological form. The pattern of facilitation requires the presence of a base morpheme that is repeated across successive presentations. Some theorists have interpreted this outcome as evidence that morpheme units are represented lexically whereas others view it as revealing activation among word forms formed from the same base morpheme.

The present report describes a series of experiments designed to probe the organization of morphologically related words in the mental lexicon of an English speaker. It represents work conducted in collaboration with Carol Fowler and with Elaine Stotko in which the repetition priming procedure of Stanners et al. (1979) was used to investigate constraints on morphological organization. Here, prime and target are morphologically related and the pattern of facilitation to targets as a function of prime type is examined. First, evidence is provided that inflections and derivations produce the same pattern of facilitation. Next, it is shown that primes are equally effective whether or not they preserve the pronunciation and spelling of the base. Collectively, these results suggest that an interpretation of repetition priming based on multiple activations of a lexical entry composed of a base morpheme is inadequate because of the difficulty in forming these variants from the base. In later studies, consideration is given to whether or not the transparency of morphological structure in morphologically complex words is sensitive to the familiarity of the word or to the semantic overlap of prime and target. Finally, evidence that the pattern of facilitation observed with morphological relatives as primes is distinct from that observed with other kinds of semantic relationships is provided.

Inflections and derivations compared

Inflections and derivations differ with respect to the productivity of rules and the predictability of their meaning from a semantic analysis of their constituents. Whereas inflections rarely produce new shades of meaning, derivations are much less constrained semantically and often change meaning once formed (compare TERRIFIC with TERROR). (Aronoff, 1976). Moreover, because letter length of the plausible suffixes varies, derivations tend to be less similar physically to their bases than are inflections, at least in English (Fowler et. al., 1985). Consequently, on linguistic
grounds, inflectional and derivational primes might be expected to perform differently. These two types of morphological primes have been compared in the repetition priming task. In one study (Fowler et al., 1985, Expt 2a), triads consisted of uninflected verbal targets, inflected forms with-S and inflected forms with-ED. In a second study (Fowler et al., 1983, Expt 2b), triads consisted of uninflected verbal targets and two neutral\textsuperscript{1} affixed forms (Chomsky & Halle, 1968) selected from the set -MENT, -LESS, -ER, -LY, -NESS, -ABLE, and -FUL. List construction was similar in both studies. Three versions of each test order containing 200 items were created and presented for a lexical decision judgment. Each list included forty-eight word targets and forty-eight orthographically legal but meaningless pseudoword targets. Each pseudoword was matched in length to a word. Targets were preceded forty-eight items earlier in the list by a prime. Targets appeared in the same serial position across all three test orders but the prime varied. Fillers were introduced to maintain necessary lags between prime and target. A subject viewed one test order. A subject saw, therefore, each morpheme twice, once as a prime and once as a target. All subjects viewed three types of primes, either base and S and ED inflections, or base and two different derivations and across test orders each target occurred with each type of prime.

Errors and extreme reaction times (greater than 2000 ms or more than 2.5 SD from the subject's or item's mean) were excluded from the analyses. In addition, when a subject responded incorrectly to the prime, both prime and target responses were eliminated from the analyses. Table 1 summarizes the mean recognition latencies for targets with inflectional and derivational primes.

A one-way analysis of variance with latencies to targets with No Prime, Identity, and Morpheme primes as levels of the factor Condition revealed significant facilitation in both the Identity and Inflectional prime conditions and no significant difference between those two conditions. The analysis of Identity and Derivational forms produced a similar pattern. Facilitation to a base form by a derivational relative was as strong as facilitation by an inflectional relative.

That the pattern of facilitation for inflected and derived primes was the same suggests that the basis of repetition priming among forms cannot be a common lexical entry from which all morphological variants are generated by rule. While it is plausible that facilitation among inflected forms and bases occurs because the same lexical entry is activated twice, and it is reasonable to assume that the base form constitutes the lexical entry from which inflectional variants are generated by rule, based on issues of productivity and semantic predictability the base form plus rule account cannot apply to derived words. Alternatively, it can be proposed that facilitation derives from activation among words (as contrasted with a base morpheme) that are members of a family of morphologically related words and that these relationships are stronger than the relationships among semantically related but morphologically-unrelated words. This interpretation was supported in a subsequent study (Fowler et al., 1985, Expt 3) that examined repetition priming among words that cannot be generated from each other either by simple rules of inflection or derivation.

Table 1. Mean decision latency (ms) to targets preceded by Identity, Inflectional and Derivational primes.

<table>
<thead>
<tr>
<th>PRIME</th>
<th>No Prime</th>
<th>Identity</th>
<th>Inflectional</th>
<th>Derivational</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>manage</td>
<td>manage</td>
<td>manage</td>
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<td>715</td>
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</tr>
</tbody>
</table>

Do alternations in spelling and pronunciation obscure morphological relationships?

It is evident that morphological relationships among regular morphological variants are discovered by skilled readers. Are morphological relationships between words that undergo alternations to the base morpheme similarly handled by the skilled reader? Using the method described above, subjects performed a lexical decision judgment to primes and targets that were morphologically related. In this study (Fowler et al., 1985, Expt 3), morphological relatives consisted of triads composed of one base form and two affixed forms one of which preserved the spelling and pronunciation of the base and one of which did not. In the Sound Only set, one affixed form preserved both sound and spelling and the other preserved only the spelling. An example is HEAL, HEALER, HEALTH. In the Sound and Spelling Set, one affixed word had the same spelling and pronunciation of the base component as the unaffixed word while the other did not. An example is CLEAR, CLEARLY, CLARIFY. Because no unambiguous difference in facilitation for inflected and derived forms has been observed with this technique in the previous study (but see Stanners et al., 1979), sets included both inflections and derivations. Moreover, neutrally and nonneutrally affixed forms were selected. Unaffixed words in the Sound only and the Sound and Spelling lists were matched on length and frequency as were the affixed forms. Phonological overlap between the unaffixed and affixed forms was matched across lists by counting each vowel, consonant or stress change as a change. As in earlier experiments, the lists also contained pseudowords derived from real words by changing one or two letters in other words.

Three test orders were created in a manner analogous to that described in the previous experiment. Each base morpheme appeared once in a prime and once in a target. The test orders differed with respect to prime (Identity, Morpheme-No Change, Morpheme-Change), and the serial position of each target was constant over lists. Targets were always the unaffixed form. Half of the targets were from the Sound only set and half from the Sound and Spelling set and each type of prime (Identity, No Change, Change) was equally represented. In all, there were forty-eight word targets and forty-eight pseudoword targets, and lists were constructed so that the interval between prime and target was forty-eight items. A subject viewed one test order. All subjects viewed all three types of primes on different items and across test orders each target was preceded by each type of prime.

Errors and extreme reaction times were deleted from all analyses by the procedure described above. Results of an analysis of variance revealed significant facilitation when a morphologically related prime preceded the target. Table 2 summarizes decision times for word and pseudoword targets preceded by primes that undergo change and primes that do not change (Fowler et al., 1985, Expt 3). The effect of stimulus set (Sound only/Sound and Spelling) was significant but did not interact with type of prime.

<table>
<thead>
<tr>
<th>PRIME</th>
<th>No Prime</th>
<th>Identity clear</th>
<th>No Change clearly</th>
<th>Change clarify</th>
<th>prime target</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORDS</td>
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<td></td>
<td></td>
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<td>clear</td>
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<td></td>
</tr>
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</table>

That is, the same pattern of facilitation was observed for both sets of stimulus materials. Most important, among the prime conditions, Identity differed from No Change and Change primes but the latter two conditions did not differ one from the other. That is, the effect of sharing or not sharing spelling or pronunciation with the base (viz., target reaction times were 575 and 584, respectively) was not significant. Finally, neutral and nonneutral derivations were compared in order to determine whether the equivalence of inflectional and derivational primes reported earlier (Fowler et al., 1985, Expt 2) is restricted to derivations that preserve the pronunciation of the base morpheme. The outcome mirrored the overall analysis and indicated no difference between No Change (neutral) and Change (nonneutral) derivations with respect to facilitation of an unaffixed target.

In summary, the major finding of Fowler and her colleagues (1985, Expt 2) was that the magnitude of facilitation is not reduced when the orthographic or phonological forms of affixed primes and unaffixed targets do not fully overlap. Because effects of form overlap were not observed, effects of orthographic and phonological similarity could not be distinguished. Evidently, regularly affixed words, and words that undergo alternations, are equally effective primes for their morphological relatives in the repetition priming task. This outcome supports the claim that the facilitation observed in the repetition priming task cannot be due to multiple activations of the same base morpheme where all morphological relatives are derived from the base by rules of inflection or derivation. Alternatively, the claim that facilitation derives from activation among members of a family of morphologically related words is supported. What are the constraints on the activation between word forms? In the next study (Feldman & Stotko, unpublished data a), we asked whether the familiarity of a morphologically complex word is critical to recognition of its base morpheme.

Are less familiar words analyzed more readily with respect to morphemic structure than more familiar words?

Prior to conducting a repetition priming procedure, a group of thirty-five subjects rated the familiarity of a list of words in order to obtain a measure of familiarity. Subjects were instructed to use the full range of scores, from 1 to 7 of the scale. Examples of very familiar and very unfamiliar words were provided. The list contained clusters of words that differed in frequency and shared a base morpheme although members of a cluster were distributed throughout the list. Based on the familiarity ratings, a collection of twenty-seven word triads was selected. Each triad included a target noun and two morphological relatives, and all members were known to all raters. One member of each triad was more familiar than the target (High familiarity prime) and the other was less familiar than the target (Low familiarity prime). Both morphological relatives were derivations of the base noun. For example, the high and low familiarity primes for the target MULTIPLE were MULTIPLY and MULTITUDE. In the experimental list, for half the triads, the base form served as target and for the other half a derivation was the target.

The lists also contained pseudowords that were constructed by changing up to three letters in the root of one of the target words. All substitutions formed legal letter strings. For example, MACTICAL was derived from PRACTICAL and DRACIALIZE from SPECIALIZE. The pseudowords were also presented in “morphologically related” high and low familiarity forms. For example, DRACIAL and DRACIALITY.

For the lexical decision task, three test orders containing 114 items were created. Each included equal numbers of word and pseudoword targets and all three types of primes (viz., Identity, High and Low). There were twenty-seven word targets and twenty seven pseudoword targets, each of which was preceded earlier in the list by its prime. Lists were constructed so that the interval between first and second presentations of a word (or pseudoword) ranged from seven to thirteen items with an average of ten. In order to maintain appropriate lags, six filler items were also included. Words appeared in the same serial position across all three test orders but the prime varied. For example, the word AUDIBLE was presented as the target in all three orders but within each test order it was preceded, in the same position, by either AUDIBLE, AUDIENCE or AUDITION.

A subject viewed one test order. Each subject saw, therefore, every morpheme twice, once in a prime and once in a target. All subjects viewed all three types of primes on different items and across test orders each target was preceded by each type of prime. No subject participated in both the familiarity assessment and the lexical decision tasks.

Errors and extreme reaction times (greater than 1250 ms or less than 350 ms) were eliminated
from all analyses. In addition, when a subject responded incorrectly to one member of a prime-target pair, both responses were eliminated from subsequent analyses. The error pairing procedure eliminated an additional 3% of all responses. Table 3 summarizes the mean recognition times for words and pseudowords with highly familiar and less familiar primes for the Feldman and Stotko data.

A one-way analysis of variance with latencies to targets with No prime, Identity, High and Low familiarity primes as levels of the factor Condition revealed significant facilitation in the Identity condition and numerically reduced but statistically significant facilitation when either derivation served as a prime. Most important, there was no significant difference between primes that were of higher and lower familiarity than the target.

Evidently, the relative familiarity of primes does not influence the magnitude of facilitation observed in the present task. High and Low familiarity primes produced statistically equivalent and numerically similar measures of facilitation despite differences in recognition latency to the primes themselves (583 High vs 694 Low). The differences between latencies to primes can be interpreted as evidence that the primes did, in fact, differ on familiarity. Nevertheless, the present outcome provides no evidence that the morphological structure of less familiar words is considered more readily than that of more familiar words. In this respect, morphological analysis contrasts with the phonological analysis of a word because it is not sensitive to a word’s frequency of use (e.g., Seidenberg, 1985). It should be mentioned that because of the constraints of the present task, only correct responses provide interpretable data. Consequently, no extremely unfamiliar words were included. It is possible that effects might still emerge with another task and a more expanded range of familiarity. Another possibility is that the pattern of facilitation is determined by the semantic similarity of prime and target. This outcome was reported for semantically related pairs (Fischler, 1977) but has not been examined for morphological relatives. The hypothesis that semantic similarity of prime and target influences the pattern of facilitation observed in repetition priming was explored in the next study (Feldman & Stotko, unpublished data).

**Does semantic similarity enhance the recognition of morphological relationships?**

In order to establish a measure of semantic overlap, a group of forty subjects judged which of two word pairs was closer semantically. The list contained thirty-eight pairs of pairs such as CREATE/CREATURE and CREATE/CREATION and subjects were instructed to indicate which of the pairs was more similar in meaning. Based on the responses of the initial group of subjects, a collection of twenty-seven triads was formed. Each included a semantically close and a semantically far morphological relative. All relatives were derivations. Examples of triads with Identity, Close and Far primes are ACTOR/ACTUAL/ACTUARY; PEDAL/PEDESTRIAN/PEDESTAL; CREATE/CREATION/CREATURE. Pseudowords were constructed in the manner described above. Note that the distinction between close and far is meaningless here. Examples of pseudoword triads are SICTOR/SICCTION/SICSTUARY; CHADEL/CHADESTRIAN/CHADESTAL; BREATE/BREATION/BREATE.

<table>
<thead>
<tr>
<th>PRIME</th>
<th>No Prime</th>
<th>Identity</th>
<th>High</th>
<th>Low</th>
<th>prime</th>
</tr>
</thead>
<tbody>
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<td><strong>PSEUDOWORDS</strong></td>
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<td>653</td>
<td>689</td>
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<td></td>
</tr>
</tbody>
</table>

Table 3. Mean decision latency (ms) to targets preceded by Identity, High and Low Familiarity primes.

From Feldman & Stotko, unpublished data a.
For the lexical decision task, three test orders each containing 114 items were created according to the constraints of lag and the ratio of words to pseudowords adopted in the previous study. Each subject viewed all types of primes and across test orders, each target was preceded by its Identity, Close and Far semantic prime. No subject participated in both the semantic judgment and lexical decision tasks.

Errors and extreme response times (greater than 1100 or less than 350 ms) were eliminated from all analyses. In addition, responses were deleted according to the error pairing procedure described above. By this procedure, an additional 2% of all responses were eliminated. Table 4 summarizes mean recognition times over subjects for the Feldman and Stotko data.

A one-way analysis of variance with latencies to targets in the No Prime, Identity, Close and Far semantic prime conditions showed significant facilitation in the Identity condition and dramatically diminished facilitation for both semantically Close and Far derivations. The reduced facilitation in the semantically Close and Far conditions relative to the Identity prime condition was unexpected. Central to the current focus of discussion, there was no significant difference in the magnitude of facilitation observed with primes that varied in their degree of semantic overlap with the target. This outcome is not surprising if the facilitation observed in the repetition priming paradigm is believed to be distinct from that observed when prime and target are semantically related but morphologically distinct. This claim was tested in the fifth and final study to be described.

It has been demonstrated that repetition priming persists over longer lags than semantic or associative priming. Whereas effects of repetition priming occur over intervals of two days (Scarborough et al., 1977) and lags of 48 intervening items (Fowler et al., 1985), effects of semantic priming are not evident at lags of two items (deGroot, 1983; Dannenbring & Briand, 1982; Davelaar & Coltheart, 1975). The distinction in the duration of facilitation has led some researchers (e.g., Henderson, Wallis & Knight, 1983; Den Heyer, Goring & Dannenbring, 1985) to posit distinct underlying principles of lexical organization for morphological relationships and other semantic relationships. A similar conclusion derives from a comparison of neural events during different experimental conditions. In particular, event-related potentials, transient perturbations to the electroencephalogram after the onset of an external event, vary under conditions of semantic and repetition priming (Rugg, 1987). Finally, the semantic similarity of prime and target correlates positively with the magnitude of facilitation in a semantic priming task (Fischler, 1977) although, as reported above (Feldman & Stotko, unpublished data), no effect of semantic overlap has been observed in repetition priming. In order to probe further the claim that morphological priming is distinct from other types of semantic priming, a study was conducted (Fowler & Napps, unpublished data) in which target words were preceded by highly associated antonyms or by themselves. If subjects are able to anticipate upcoming target items, or if the basis of facilitation in repetition priming is the presence of a semantic relationship regardless of morphological considerations, then antonyms should reveal facilitation in the present experimental setting. Alternatively, if a morphological relationship is a precondition for facilitation at these lags then no facilitation by antonyms is anticipated.

Subjects generated associations to a set of target words, items for which at least 90% of subjects provided the same association (an antonym) were selected as antonym primes. There were 54 word targets and an equal number of antonym targets. Lists were constructed to include both words and pseudowords and Identity and Antonym primes (for words). The interval between prime and target was 36 items. Words appeared in the same serial position across test orders but the prime that preceded it varied. For example, in one test order, COLD was preceded by HOT and in the other it was preceded by its identical form, COLD.

By analogy to the experiments described above, a subject viewed one test order that included both Identity and Antonym primes and across test orders each target was preceded by both types of prime. No subject participated in both the association and the lexical decision phases of the experiment.

Errors and extreme scores were eliminated according to the criteria described in Fowler et al., (1985, Expt 1). In addition, responses were eliminated according to the error pairing procedure described above. Results are summarized in Table 5.

A one-way analysis of variance with latencies to targets with No Prime, Identity and Antonym primes revealed statistically significant facilitation in the Identity condition and no facilitation in the antonym condition. The presentation of a highly associated and semantically related prime did not facilitate recognition of the target.
Table 4. Mean decision latency (ms) to targets preceded by Identity, Close and Far Semantic primes.

<table>
<thead>
<tr>
<th>Prime</th>
<th>WORDS</th>
<th>PSEUDOWORDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Prime</td>
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</tbody>
</table>

From Feldman & Stotko, unpublished data b.

Table 5. Mean decision latency (ms) to targets preceded by Identity and Antonym primes.

<table>
<thead>
<tr>
<th>Prime</th>
<th>WORDS</th>
<th>PSEUDOWORDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Prime</td>
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</tr>
<tr>
<td>696</td>
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</tr>
</tbody>
</table>

From Fowler & Napps, unpublished data.

As noted above, this outcome is not anticipated if the basis of facilitation in repetition priming is purely semantic in origin or if subjects can anticipate upcoming targets. Conversely, if the basis of facilitation in the repetition priming task exploits the relationship among words that share a base morpheme, then this result is readily interpretable. In conclusion, it is morphological relationships that govern facilitation in this task.

**DISCUSSION**

In a series of studies employing the repetition priming paradigm, significant facilitation among word forms was observed for a) regular inflected and derived forms and b) forms that undergo alternations in pronunciation and spelling. In addition, the magnitude of facilitation to target latencies was equivalent for inflectionally and derivationally related primes. Facilitation to target words in this task was interpreted as evidence that these words share a lexical entry. This entry must fully specify all of the morphologically related forms, however, because many variants cannot be generated from the base morpheme by general rules. Finally, relatedness within an entry is not a function of familiarity of word forms nor of the semantic similarity of forms because neither factor influenced the magnitude of facilitation. By contrast, experimental measures of relatedness may be sensitive to the formal overlap or the regularity between forms (Fowler et al., 1985).

Repetition priming and semantic or associative priming both reveal principles of organization for lexical knowledge. They contrast with respect to longevity of facilitation and to the role of semantic similarity of prime to target. Semantic facilitation does not occur at long lags whereas repetition priming does. In addition, neither the factors of semantic overlap of morphologically related pairs nor strong semantic relationships without morphological relationships (viz., antonym pairs) figure prominently in the results observed with the repetition priming paradigm although they are evident in semantic priming. These differences support the claim that the principle of lexical organization for morphological relationships and other semantic relationships are distinct.
In conclusion, the outcome of a series of experimental studies suggests that lexical entries for sets of morphologically related words include more words than simply those variants that can be generated from the base morpheme by a rule. Neither the spelling nor the pronunciation need be preserved. In addition, the meaning of morphologically complex forms need not be predictable from that of the base and its affixes. In summary, all morphological relationships are captured in the mental lexicon of the skilled reader.

REFERENCES


FOOTNOTES


†Also State University of New York at Albany.

‡Two types of suffixes exist in English (Chomsky & Halle 1968). Neutral affixes include inflections and some derivations and these affixes do not affect the pronunciation of the stem to which they are attached. By contrast, nonneutral affixes do affect the pronunciation of the stem. According to Chomsky and Halle's theory, neutral affixes are separated from the stem morpheme by a word boundary whereas nonneutral affixes are separated by a morpheme boundary and phonological rules apply over morpheme but not word boundaries.