

Grammatical priming of inflected nouns by inflected adjectives*

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Abstract

Two experiments are reported in which subjects made rapid lexical decisions about inflected nouns preceded by inflected adjectives or pseudoadjectives that did or did not agree grammatically. Both adjectives and pseudoadjectives were shown to affect lexical decision times for nouns, suggesting that the priming of inflected nouns by inflected adjectives occurred at the level of the inflections. Inflected pseudonouns, however, were not affected similarly, suggesting that lexical factors were contributing to the priming in addition to grammatical factors. This instance of grammatical priming is described as an effect that arises post-lexically, based on the outcomes of relatively independent lexical and syntactical processors.

Two broad questions may be raised with regard to the processing of nouns in an inflected language: (1) How are the cases of a noun organized with

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regard to each other in the internal lexicon?; and (2) How are inflected nouns linked to other lexical types such as prepositions and inflected adjectives? Serbo-Croatian is an inflected language in which the noun takes a gender (masculine, feminine or neuter) and is declined in seven forms (nominative, accusative, instrumental, genitive, dative, locative, vocative), both in the singular and the plural. The fourteen inflected forms of a Serbo-Croatian noun can be viewed as forming a noun system (Lukatela, Gligorijević, Kostić, and Turvey, 1980). Ordinarily in a sentence an inflected Serbo-Croatian noun is grammatically related to a preposition and to one or more adjectives. Although they are not declined, prepositions are specific to inflected noun endings. A given preposition goes with at least one noun case, sometimes several cases but never with all noun cases. Adjectives are declined but not necessarily with the same inflected endings as nouns. When qualifying a noun, however, the inflection of the adjective and the inflection of the noun must agree grammatically (for example, if the noun is masculine and in the singular accusative form, the adjective must be masculine and in the singular accusative form).

With respect to the first question raised above on the organization of the cases there is evidence to suggest that frequency—precisely, the frequencies with which the various inflected noun forms occur in ordinary language usage—is not a major determinant of a Serbo-Croatian noun system's organization. In a lexical decision task nouns in the nominative singular form were accepted as words faster than nouns in the oblique forms. Among the oblique forms, however, decision times did not differ despite marked differences among the oblique forms in their respective frequencies of occurrence (Lukatela *et al.*, 1978; Lukatela *et al.*, 1980). Apparently, the nominative and oblique forms are qualitatively distinguished in the organization of a noun system with the nominative assuming a pivotal role. However, in either an oblique or nominative form a noun appears to be represented in the lexicon as a single unit corresponding to the complete word rather than as a combination of distinct units corresponding to morphemic constituents. The stems and suffixes of Serbo-Croatian nouns do not appear to be stored separately. An observation of the unitary representation of nouns, however, does not rule out the possibility that noun representations *indicate* their stem/suffix structure (Stanners, Neiser and Painton, 1979; Taft and Forster, 1975).

With respect to the second question raised above (on the processing relation of nouns to other lexical types), it has been shown that with Serbo-Croatian words a preposition preceding a noun case with which it is grammatically consistent speeds up lexical decision on the noun. However, lexical decision on an inflected noun form that is grammatically inconsistent with the preceding preposition is not appreciably slowed (Lukatela, Kostić, Feldman and

Turvey, 1983). Facilitation (and inhibition) effects among words are often explained (but not always, see Discussion) by a notion of activation spreading out from one excited region of the lexicon to neighboring regions and/or by a notion of a directing of attention to a specified region of the lexicon. The first of these mechanisms may be suited to semantic relations among lexical entries but it is not easily generalized to grammatical relations such as between members of a closed class like prepositions and an open class like nouns (and it is not easily generalized to semantic relations in natural discourse, as Foss (1982) has noted). The notion of an automatic spread of activation refers to a specific linkage between particular representations of particular words (see Collins and Loftus, 1975)—(direct) stimulation of one lexical representation leads mechanically and inevitably to the (indirect) stimulation of other lexical representations. The relation of prepositions to nouns, however, is not sensibly portrayed as linkages among particular internal representations of complete words. (What would rationalize the linkage of *above* and *elephant*?) If there are linkages one might expect them to be defined over the small set of prepositions and the small set of morphemes that comprise the inflected endings of nouns. By such an account, prepositions would not be linked to the very many noun system but to the few sets of inflected endings that the very many noun systems share. The problem with this account is that the inflected endings of (Serbo-Croatian) nouns do not appear to be stored as sets separately from their stems.

The present experiments extend the inquiry into Serbo-Croatian nouns and their processing relation to other word types. Here the focus is the relation of nouns to adjectives. Two related questions are raised. First, can adjectives affect the time to lexically evaluate nouns with which they are grammatically consistent? And second, if adjectives can affect lexical decisions on nouns do they do so at the morphological level, that is, the level of stems and affixes (rather than, say, the whole word level)? Support for the view that adjectival influences on nouns can be mediated by processes at the level of inflected endings would be provided by the demonstration that both adjective contexts and pseudoadjective contexts (letter strings derived from adjectives by changing the initial or middle consonant) expedite lexical decisions on noun targets when the inflection of the contextual item and the target are in grammatical agreement.

The selection of nouns used in the experiments was guided by the following considerations. With a few exceptions Serbo-Croatian nouns fall into three declensional classes according to the inflected ending of the genitive singular case. These three classes are designated (after Bidwell, 1970) as Class A (where the genitive singular ending is /e/, for example, ZENE), Class O (where the genitive singular ending is /a/, for example, COVEKA), and Class

C (where the genitive singular ending is /i/, for example, STVARI). The dominating gender for Class A nouns is feminine. The nouns in Class C are almost exclusively feminine but Class C occurs less frequently than Class A. Class O nouns are mostly masculine and neuter nouns. From a consideration of nouns in the ordinary, written language, Dj. Kostić (1965, Reference note 1) reports that the masculine gender accounts for 52%, the feminine gender for 36% and the neuter gender for 12%. Consequently, the nouns in the corpus of words from which the stimuli of the present experiment were drawn occurred in the three genders in approximately the proportions identified by Dj. Kostić, with the masculine and neuter nouns drawn from the declension Class O and the feminine nouns drawn from the declension Class A.

The adjectives in the corpus of words from which the stimuli were drawn were common adjectives all declined as indefinite adjectives. Common adjectives are those that can be declined *both* definitely and indefinitely. The indefinite declension of an adjective applies when the function is either predication or attribution. In the latter role the indefinite adjective is not accompanied by a deictic such as "this", "that", etc., and is referentially vague. Definite adjectives are restricted to the attributive function and are always conjuncted with a deictic. When an adjective qualifies an inanimate noun in the masculine gender the indefinite and definite declensions are distinguished by the inflected endings of the nominative singular and accusative singular. There are, however, no such written distinctions for the definite and indefinite adjectival declensions when the word being qualified is an inanimate noun in the feminine gender. (Although such distinctions can be found in the spoken language in the form of stress variations.) The choice of the referentially less precise indefinite declension was motivated, in part, by the desire to keep to a minimum the semantic relation between the adjectival and nominal forms paired in the experiments.

Experiment 1

The first experiment was directed at the effect of grammatical consistency between adjectives (real and pseudo) and nouns in the nominative singular and genitive singular cases. These two cases are the most frequently occurring noun cases—the nominative singular accounting for approximately 25%, and the genitive singular accounting for approximately 20%, of all instances of the noun (Dj. Kostić, 1965, Reference note 1; Lukatela *et al.*, 1980). The inflections of these two cases for adjectives and nouns of all three genders are shown in Table 1. Only for the feminine gender are the adjectival and nominal inflections identical.

Table 1. *Nominative singular and genitive singular inflections of Serbo-Croatian adjectives and nouns as a function of gender*

	Masculine		Feminine		Neuter	
	Adjective	Noun	Adjective	Noun	Adjective	Noun
Nominative singular	∅	∅	A	A	∅	E or O
Genitive singular	OG	A	E	E	OG	A

∅ = Null morpheme.

There is some reason to believe that the effect of a preceding grammatically consistent adjective on lexical decision will not be of the same magnitude for nouns in the nominative singular case and nouns in the genitive singular case. As noted above, the nominative singular of a noun is qualitatively distinguished from the oblique cases of a noun and appears to play a pivotal role in the organization of a noun's case system (Lukatela *et al.*, 1980). Moreover, the nominative singular is less dependent on grammatical factors for its interpretation than are the oblique cases (see Lukatela *et al.*, 1983). It was expected, therefore, that for nouns in the genitive singular lexical decision would be fastest when the prime was grammatically consistent but for nouns in the nominative singular lexical decision times would be less partial to the grammatical consistency of prime and target.

Method

Subjects

Fifty-six undergraduate students from the Department of Psychology at the University of Belgrade participated in the experiment. All subjects had previously participated in reaction time experiments.

Materials

A list of 150 adjective-noun pairs was constructed with all adjectives and nouns (1) drawn from the mid-frequency range of Dj. Kostić's table, (2) in the nominative singular form and (3) comprising pairs that were congruent

in gender. This list was presented to 70 students (from the Department of Linguistics) who judged the associative strength of each pair—that is, the degree to which the adjective and the noun in a pair were related. The 28 adjective–noun pairs that were judged to be most weakly associated were used to generate four groups of 28 word–word pairs: nominative singular–nominative singular pairs, nominative singular–genitive singular pairs, genitive singular–nominative singular pairs and genitive singular–genitive singular pairs. (In each of the foregoing pair types, the first case is that of the adjective and the second case is that of the noun.)

A different set of adjective–noun pairs, drawn from the original list of 150 pairs, was used to generate four corresponding groups of 28 pseudo-adjective–pseudonoun pairs (by changing either the initial or middle letter of both the adjective and the noun). Another set of 28 pairs from the original list of 150 pairs was used to generate four corresponding groups of 28 pseudo-adjective–noun pairs (by changing either the initial or middle letter of the adjective). Finally, one further, different set of 28 pairs was transformed into four corresponding groups of 28 adjective–pseudonoun pairs (by changing either the initial or middle letter of the noun). Throughout the generation of these different groups—that paired pseudowords or paired a pseudoword with a word—the pseudoword version of a noun or adjective in nominative singular or genitive singular preserved the case ending.

The adjectives and pseudo-adjectives were presented as Roman letter strings (IBM Gothic) arranged horizontally in the upper half of 35 mm slides. In contrast, nouns and pseudonouns were arranged horizontally in the lower half of 35 mm slides. The ‘adjective’ slides and the ‘noun’ slides were grouped into pairs as determined above to yield a total of 448 pairs of slides ($28 \times 4 \times 4$) of which a given subject saw 112 pairs.

Design

The major constraint on the design of the experiment was that a given subject never encountered a given word or pseudoword in any of the pairs more than once. This was achieved by dividing subjects into four groups with 14 subjects in each group and by dividing each set of 28 pairs into four subgroups of 7 pairs. In sum, a subject saw 7 pairs of stimuli from each of the 16 groups of pairs. Put differently, each subject saw the same adjectives and nouns as every other subject but not necessarily in the same grammatical case nor necessarily in the same type of nominative–genitive permutation.

Procedure

On each trial, two slides were presented. The subject's task was to decide as rapidly as possible whether the letter string contained in a slide was a word. Each slide was exposed in one channel of a three-channel tachistoscope (Scientific Propotype, Model GB) illuminated at 10.3 cd/m². Both hands were used in responding to the stimuli. Both thumbs were placed on a telegraph key button close to the subject and both forefingers on another telegraph key button two inches further away. The closer button was depressed for a 'No' response (the string of letters was not a word); and the further button was depressed for a 'Yes' response (the string of letters was a word).

Latency was measured from the onset of a slide. The subject's response to the first slide terminated its duration and initiated the second slide unless the latency exceeded 1300 ms in which case the second slide was initiated automatically. The duration of the second slide, unlike that of the first, was fixed at 1300 ms.

Results and discussion

A mean reaction time was computed for each subject by averaging over the seven nouns or seven pseudonouns in each group of prime-target pairs. Reaction times less than 300 ms and longer than 1300 ms were excluded as were the times associated with erroneous responses. The total number of responses excluded by the preceding criteria did not exceed 1.5%.

Table 2 reports the pseudounoun data. As can be seen, there were no differences due to the type of prime, the grammatical case of the prime, or the grammatical case—inflected ending—of the pseudounoun. The mean reaction times to the primes themselves were 706 ms and 726 ms, respectively, for adjectives in the nominative singular and genitive singular forms, and 841 ms and 870 ms, respectively, for pseudoadjectives inflected in the fashion of the nominative singular and genitive singular. Table 3 reports the noun data. The only effects that were significant according to the analysis of variance on both subject and item means were: grammatical case of the adjectival prime ($F(1,52) = 24.31$, $MSe = 2082$, $p < .001$ and $F(1,27) = 4.46$, $MSe = 5676$, $p < .05$) and grammatical case of the noun target ($F(1,52) = 145.26$, $MSe = 2733$, $p < .001$ and $F(1,27) = 26.36$, $MSe = 7532$, $p < .001$).

The failure to observe a significant priming effect by either adjectives or pseudoadjectives might have been expected. Approximately half of the words used in the experiment were feminine. The genitive singular form of feminine nouns (and adjectives) are identical to the nominative plural form of feminine

nouns (and adjectives) (see Table 1). As noted, the nominative singular case of nouns has not proven to be sensitive to priming. If the nominative plural is similarly indifferent to priming and if the feminine 'genitive singular' noun forms of the present experiment were interpreted as nominative plural forms then the adjectival and pseudoadjectival priming of nouns would be thwarted.

Table 2. *Lexical decision and percentage error for pseudonouns in Experiment 1 as a function of type and grammatical case of adjectival prime*

Type of prime	Grammatical case of prime	Grammatical case of target pseudonoun	
		Nominative	Genitive
Adjective	Nominative	822 ^a	845
		3.3 ^b	5.1
	Genitive	834	833
Pseudoadjective		3.3	2.8
	Nominative	821	822
		3.1	3.3
	Genitive	824	833
		3.1	2.6

^aReaction time (ms).

^bError.

Table 3. *Lexical decision latencies and percentage error for nouns in Experiment 1 as a function of type and grammatical case of adjectival prime*

Type of prime	Grammatical case of prime	Grammatical case of target noun	
		Nominative	Genitive
Adjective	Nominative	727 ^a	781
		4.3 ^b	4.8
	Genitive	720	744
Pseudoadjective		4.6	4.8
	Nominative	713	795
		7.9	6.6
	Genitive	694	773
		4.3	2.8

^aReaction time (ms).

^bError.

Table 4 distinguishes the mean decision times for the masculine/neuter items from those for the feminine items. Inspection of Table 4 suggests that (1) adjectival and pseudoadjectival effects were present for the masculine/neuter genitive singular forms (corroborated by a subject analysis, $F(1.52) = 6.22$, $MSe = 21961$, $p < .02$, but not by an item analysis) and absent for the feminine genitive singular forms (the prime case by target case interaction was not significant by either subjects or items analysis); and (2) the commonly obtained (e.g., Lukatela *et al.*, 1978; Lukatela *et al.*, 1980; Lukatela *et al.*, 1983) faster decision times for nominative singular forms relative to oblique forms was not found with the feminine noun data, implying that the feminine nouns in the 'genitive singular' were not being interpreted as such. It should be noted that a similar but less pronounced confounding of cases is also true for the neuter genitive singular (which is written identically to the nominative plural and genitive plural). However, whereas for the feminine gender both nouns and adjectives assume identical forms in the genitive singular and nominative plural, for the neuter gender identity of forms holds only for nouns.

Experiment 2

The second experiment used the same design, the same procedure and the same adjective-nouns pairs as those of the first experiment but replaced the genitive singular case by the dative-locative singular case and with a new group of 56 subjects from the same subject pool. In the declension of adjectives and nouns the dative singular and the locative singular are identical in each of the three genders. The characteristic inflections common to dative singular and locative singular are shown in Table 5. With respect to the noun case confoundings identified above, the dative singular-locative singular in-

Table 4. *Lexical decision latencies of Experiment 1 as a function of noun gender*

Type of prime	Grammatical case of prime	Gender and case of target noun			
		Masculine/Neuter		Feminine	
		Nominative	Genitive	Nominative	Genitive
Adjective	Nominative	721	810	739	719
	Genitive	696	746	731	727
Pseudoadjective	Nominative	708	833	719	731
	Genitive	697	803	704	728

Table 5. *Inflections of dative singular and locative singular adjectives and nouns as a function of gender*

	Masculine	Feminine	Neuter
Adjective	OM	OJ	OM
Noun	U	I	U

flexion across the three genders is not shared with the nominative plural and, in fact, is shared with no other case. Thus, in comparison to Experiment 1, grammatical priming between feminine gender words should be observed in Experiment 2 if, indeed, the failure to obtain such priming in Experiment 1 was due to case confounding.

Results and discussion

The mean lexical decision latencies were computed in the manner described in Experiment 1. The positive and negative responses to the adjectival primes were similar in pattern to those reported for Experiment 1. Negative responses to the pseudonoun targets are given in Table 6. No main effects or interactions were significant. Table 7 reports the noun data for all three genders taken together. The analysis of variance on subject means and item means (reported in parentheses) revealed significant effects for the grammatical case of the adjective prime, $F(1,52) = 40.59$, $MSe = 1372$, $p < .001$

Table 6. *Lexical decision latencies and percentage error for pseudonouns in Experiment 2 as a function of type and grammatical case of adjectival prime*

Type of prime	Grammatical case of prime	Grammatical case of target noun	
		Nominative	Dative/Locative
Adjective	Nominative	758 ^a	758
		4.6 ^b	5.6
	Dative/Locative	757	774
Pseudoadjective		3.6	2.0
	Nominative	763	767
		750	760
	Dative/Locative	3.3	4.8

^aReaction time (msec).

^bError.

Table 7. *Lexical decision latencies and percentage error for nouns in Experiment 2 as a function of type and grammatical case of adjectival prime*

Type of prime	Grammatical case of prime	Grammatical case of target noun	
		Nominative	Dative/Locative
Adjective	Nominative	672 ^a	726
	Dative/Locative	668	685
Pseudoadjective	Nominative	656	708
	Dative/Locative	647	673
		0.8	3.3

^aReaction time (msec).

^bError.

($F(1,27) = 8.05$, $MSe = 3460$, $p < .01$); for the grammatical case of the noun target, $F(1,52) = 61.27$, $MSe = 2508$, $p < .001$ ($F(1,27) = 22.98$, $MSe = 3343$, $p < .001$), for the type of adjectival prime, $F(1,52) = 7.88$, $MSe = 4104$, $p < .01$ ($F(1,27) = 8.85$, $MSe = 1827$, $p < .01$), and for the interaction between the grammatical case of the adjectival prime and the grammatical case of the noun target, $F(1,52) = 16.10$, $MSe = 1841$, $p < .001$ ($F(1,27) = 4.84$, $MSe = 3060$, $p < .05$). All other two-way and three-way interactions were nonsignificant. The significance of the type of adjectival prime may be attributed to the difference between responding positively to two successive stimuli (in the adjective trials) and responding negatively to the first stimulus and positively to the second stimulus (in the pseudoadjective trials). Intuitively, this interpretation suggests slower decision times for targets following pseudoadjectives. Inspection of Table 7 (and of Table 3) shows, to the contrary, that pseudoadjective primes were associated with overall faster decisions. One is tempted to say that the effect of word primes is predominantly 'inhibitory'.

Table 8 reports the mean lexical decision times for the nouns partitioned according to the masculine/neuter gender and feminine gender categories. Inspection of Table 8 and comparisons with the pattern of results in Table 4 suggests that grammatical priming occurred in both categories in the second experiment in contrast to the first and lends credence to the interpretation given of the feminine gender data of the first experiment.

Table 8. *Lexical decision latencies of Experiment 2 as a function of noun gender*

Type of prime	Grammatical case of prime	Gender and case of target noun			
		Masculine/neuter		Feminine	
		Nominative	Dative/Locative	Nominative	Dative/Locative
Adjective	Nominative	663	717	682	741
	Dative/Locative	652	672	680	685
Pseudoadjective	Nominative	651	708	662	708
	Dative/Locative	643	669	649	682

Discussion

The theoretically important descriptors "facilitation" and "inhibition" are not applicable to the data of Experiments 1 and 2. In neither experiment is there a neutral context to provide a baseline. The results are more prudently summarized in terms of an inequality and an equality:

- (1) The lexical decision time for a noun in a grammatically congruent adjective or pseudoadjective context is less than the lexical decision time for a noun in a grammatically incongruent adjective or pseudoadjective context; and
- (2) The lexical decision time for a pseudonoun in a grammatically congruent adjective or pseudoadjective context is equal to the lexical decision time for a pseudonoun in a grammatically incongruent adjective or pseudoadjective context.

An adjective or pseudoadjective defines a minimal grammatical context (cf. Kroll and Schweikert, 1978) for a target noun. In terms of a distinction suggested by Seidenberg, Tannehaus, Leiman and Bienkowski (1982), this minimal grammatical context is "nonpriming", meaning that it contains no lexical items that are semantic relatives or associates of the target item. By argument, a nonpriming context cannot have a selective influence on the lexicon; a selective influence is solely a consequence of intralexical processing. It is suggested that intralexical processing reflects the interconnections of entries in semantic memory but it does not reflect grammatical structure and pragmatic knowledge (Forster, 1979). The context that gives rise to intralexical processing—one that contains items associatively and/or semantically related to the target—is termed "lexical priming" by Seidenberg *et al.*

(1982). In the introduction and elsewhere (Lukatela, Moraca, Stojnov, Savić, Katz, & Turvey, 1982) it has been argued that the effect on lexical decision of minimal grammatical contexts (e.g., a preposition for a noun, a pronoun for a verb) does not lend itself to the notion of processing based upon interconnections among individual lexical representations. Consequently, as Lukatela *et al.* (1982) remark "... semantic facilitation and grammatical facilitation are probably best understood not as expressions of a single mechanism but rather as an expression of different mechanisms that stand in a complementary relation ..." (p. 299).

The sentiment of the preceding quotation is given expression in the language-processing system proposed by Forster (1979). Forster's system is composed of three sub-systems: (1) a lexical processor that accesses the representations in the lexicon of the target word and the context words (or word); (2) a syntactic processor that assigns a syntactic structure to the sentence constituted by the target word and its context; and (3) a message processor that assigns meaning to the syntactic structure. All three sub-systems feed into a decision-maker (e.g., is it a word?). Differences in positive lexical decision times for target items associated with different contexts may originate in the decision making process, that is, post lexically (West and Stanovich, 1982). Consider a grammatically congruent adjective-noun pair in the present experiments. The output from the lexical processor and the output from the syntactic processor will both be positive. Because of the weak association between the words in the present experiments the output from the message processor might be negative or arise too slowly to contribute to the decision making (cf. deGroot, Thomasson, & Hudson, 1982). In contrast, for a grammatically incongruent adjective-noun pair the output from the lexical processor will be positive but the output from the syntactic processor will be negative. In order for the decision-making mechanism to arrive at an appropriate response in the situation of an incongruent adjective-noun pair it must overcome the bias toward a *no* decision engendered by the syntactic processor. Overcoming this bias will take time and consequently the lexical decision latency will be slowed relative to the situation in which the adjective and noun are in grammatical agreement.

A similar account can be given of the differences between grammatically congruent and grammatically incongruent pseudoadjective-noun pairs. Here, however, it must be assumed that the syntactic processor responds positively when there is an agreement of inflection despite the fact that the contextual item is nonsense. Thus, for the lexical decision on the second member of a grammatically congruent pseudoadjective-noun pair, the lexical processor and the syntactic processor will both feed positively to the decision maker—

only the message processor's output will be negative. This is in contrast to the situation in which the inflection of the pseudoadjective and noun do not agree grammatically, for in this situation only the lexical processor's output will be positive. Consequently, the decision making will have to overcome more negative biasing and be slowed proportionately greater relative to the situation in which the pseudoadjective and noun are grammatically suited. For pseudoadjective-noun pairs lexical decision is faster when the inflections agree than when they do not agree.

Arguing from the perspective of Forster's (1979) language-processing system, it might be expected that the rejection of pseudonouns should be retarded by grammatical consistency. The negative outputs from the lexical processor and message processor will contrast with the positive output from the syntactic processor when the pseudonoun target and its context are in grammatical agreement. To arrive at the appropriate *no* response the decision maker will have to resolve the inconsistency of outputs and the bias to respond *yes*. In two previous experiments examining the effects of minimal grammatical contexts on lexical decision it was observed that pseudonouns were rejected more slowly when the preceding item was a grammatically congruent preposition (Lukatela *et al.*, 1983) and pseudoverbs were rejected more slowly when the preceding item was a grammatically congruent personal pronoun (Lukatela *et al.*, 1982). In the present experiments, however, there is no statistically significant evidence for the slowing of negative decisions by grammatical agreement.

To account for the indifference of rejection responses to grammatical congruency requires making explicit a process that is implicit in the above account of acceptance responses, namely, suffix stripping. According to the view of Taft and Forster (1975), perceiving an inflected adjective or noun involves decomposing the item into its stem and suffix (see also Stanners *et al.*, 1979; Taft, 1981). In performing lexical decision, the representation of the stem morpheme is accessed by the lexical processor and the appropriateness of the inflected ending is determined on the basis of the information stored with the stem's representation. A similar decomposition must occur for pseudoadjectives and pseudonouns except that for these items there would be no specific representation of the stem morpheme to be accessed, only close approximations.

It might be supposed that where the lexical processor focuses on the word stem, the syntactic processor focuses on the bearers of grammatical information, i.e., roughly, the suffixes of open-class words and the free morphemes of closed-class words. Whatever the bearers in any given context-target situation, the assessing of a grammatical fit takes time. Indeed, the difference between the present results and previous results with regard to negative re-

sponses might suggest that discovering the grammatical consistency in an adjective–pseudonoun or pseudoadjective–pseudonoun pair is slower than discovering the grammatical consistency in, say, a preposition–pseudonoun pair. The idea is that the longer the time taken by the syntactic processor to arrive at an output the less the likelihood that the activity of the syntactic processor will influence the time course of the lexical decision; an internally defined deadline on response selection must be assumed. For the preceding suggestion to be realizable it might have to be the case that (1) the grammatical link between closed-class, function words (e.g., prepositions, pronouns) and open-class, content words (e.g., nouns, verbs, adjectives) is 'stronger' and more rapidly assessed than the grammatical link between open-class content words (e.g., the link between adjectives and nouns); and (2) the syntactic processor can be influenced by the lexical processor. Recall that in the present experiments, although the lexical decision on a pseudonoun in the context of a pseudoadjective was not affected by grammatical consistency, the lexical decision on a noun in the same context was markedly affected. In short, the lexical status of the target made a difference—and that status is determined by the lexical processor.

In conclusion, evidence has been presented for the influencing of lexical decisions about inflected nouns by weakly associated inflected adjectives that are grammatically consistent or inconsistent with their target nouns. This effect seems to be mediated by a process that evaluates the grammar of a noun and its adjectival context primarily on the basis of the inflected morphemes. Although this effect demonstrated in "nonpriming contexts" (Seidenberg *et al.*, 1982) can be referred to as grammatical priming (Lukatela *et al.*, 1982; Lukatela *et al.*, 1983) it appears to be a postlexical effect related to, but distinct from, the priming mechanisms of automatic spreading activation and context-induced attentional processing (Neely, 1977; Posner and Snyder, 1975) that have been identified in "lexical priming" contexts (Seidenberg *et al.*, 1982). Lukatela *et al.* (1982) concluded that the grammatical priming of inflected verbs by pronouns and vice versa was automatic. Their conclusion was based in part on the observation that pronominal facilitation of verbs was virtually complete when the onsets of context and target were separated by only 300 ms. They recognized, however, that this automaticity did not refer to spreading activation. It is supposed that the present example of grammatical priming is also automatic but the kind of automaticity being referred to is closer to that suggested by de Groot *et al.*'s (1982) notion of an automatic checking for coherence (see also West and Stanovich, 1982) than it is to the more familiar notion of an automatic spreading of influences among connected representations in the internal lexicon.

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Reference note

1. Kostić, Dj. (1965) Frequency of occurrence of nouns in Serbo-Croatian. Unpublished manuscript, Institute of Experimental Phonetics and Speech Pathology, University of Belgrade.

Résumé

Dans cette étude on présente deux expériences au cours desquelles les sujets doivent faire des décisions lexicales rapides sur des noms infléchis précédés d'adjectifs infléchis ou de pseudo adjectifs grammaticalement accordés ou non. Les adjectifs et les pseudo adjectifs affectent tous deux les temps de décision lexicale pour les noms suggérant que l'effet de facilitation des noms infléchis par des adjectifs infléchis se fait au niveau des inflections. Les pseudonoms infléchis cependant ne sont pas affectés de la même manière ce qui suggère que des facteurs lexicaux contribuent, avec les facteurs grammaticaux, à la facilitation. Cet exemple de facilitation grammaticale est interprété comme un effet post-lexical sur les produits relativement indépendants des processeurs lexicaux et syntaxiques.