Pronominal feature distinctions in English

Janet Nicol & Meghan O'Donnell

This study reports the results of a study in which participants were asked to repeat a sentence and produce a tag question (e.g. *The girl behind the headmaster got punished, didn't she?*). Holding the head noun phrase constant, three properties of the noun phrase within the modifier were manipulated: number (e.g., *headmaster, headmasters*), gender (e.g., *headmaster, headmistress*), and animacy (e.g., *headmaster, blackboard*), and the goal of the study was to determine whether different types of mismatch interfered with the pronoun agreement process to different extents. Results showed a robust effect of a number mismatch, no effect of an animacy mismatch, and a small effect of a gender mismatch. These differences are discussed with reference to how words are stored in the lexicon and how they are represented during sentence processing. *

1. Introduction

Pronouns typically 'point' to a referent mentioned previously within a discourse. This is literally the case in American Sign Language, in which the signer actually points to an area in space previously identified with a referent. But spoken languages do not have this option; they must make do with merely pointing to a referent metaphorically, by using forms that echo fundamental properties of the referent. The set of fundamental properties, or *features*, includes but is not limited to number, gender and animacy.

The appearance of a pronoun in discourse requires the listener or reader to figure out which previously mentioned person or thing the pronoun is meant to refer to. Presumably, when presented with a discourse, perceivers keep running track of participants and their actions. So, when a pronoun appears, identifying the antecedent simply involves finding referents that match in number, gender and animacy. But because pronouns repeat only partial information about their antecedents, they are ambiguous. Therefore, in cases of more than one match, other considerations must enter into the pronoun resolution process.

Much of the literature on pronoun resolution has focused on the factors that affect antecedent selection in cases of ambiguity, where

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there is more than one 'match' in the discourse. For example, it has been found that the preferred antecedent for a subject pronoun (*she, he*) (but not an object pronoun) typically has a 'parallel function'; that is, is also a subject (e.g., Sheldon 1974). However, other studies have shown that if the pronoun is the subject of a subordinate clause conjoined by *because*, then there is a marked preference for the antecedent to be a 'theme' (note that *John* is a theme in *John frightened Bill because he ...* and *Bill* is a theme in *John blamed Bill because he ...*). Studies on such "implicit causality" effects on pronoun interpretation have been reported by Caramazza *et al.* (1977), Garnham *et al.* (1992), and McDonald & MacWhinney (1995).

Fewer studies have explored the processing mechanisms of pronoun resolution: These address the question of how and how quickly an antecedent may be identified. A number of investigators, for example, have reported that the appearance of a pronoun triggers re-activation of the antecedent (Corbett & Chang 1983, Cloitre & Bever 1988, Emmorey *et al.* 1991, McElree & Bever 1989, Nicol 1988, Nicol & Swinney 1999, Shillcock 1982). Others have reported that a pronoun acts to inhibit non-antecedents (MacDonald & MacWhinney 1990). Quite possibly, BOTH excitatory and inhibitory mechanisms are involved in the process. With respect to the timing of pronoun resolution, there are conflicting reports: Some studies have found immediate effects (e.g., Nicol 1988), while others have found delayed effects (Di Domenico & De Vincenzi 1996, Ehrlich & Rayner 1983, MacDonald & MacWhinney 1990). These differences may be due to differences in the tasks: First, the studies which find delayed effects typically use probe-recognition (e.g. *Was the word MAN in the sentence?*), in which the probe is either the antecedent (or part of the antecedent NP), or a non-antecedent; the studies which find immediate effects commonly use lexical decision to an associate of the antecedent or non-antecedent (and response times to a lexical decision to an associate are compared to those to an unassociated control word). Second, many of the probe-recognition tasks used visual presentation of sentences, displayed so that only a portion of the sentence is visible at a time. Since in normal reading, the reader has the option of backtracking, it is certainly possible that processes that require linking elements over some distance are computed differently in listening and reading (even when visual text is presented in such a way that backtracking is not possible). (See Nicol & Swinney 1999, for a more detailed review of the literature described above).

Relatively little attention has been paid to the question of whether pronoun resolution is carried out differently for different feature contrasts. A recent study by Osterhout & Mobley (1995) compared event-related potential (ERP) responses to number vs. gender mismatches in short sentences containing a simple NP subject and a reflexive object (e.g. *The famous actresses prepared themselves/herself to face the crowd*; *The novice actress embarrassed herself/himself on stage*). Both types of mismatch (compared to the grammatical control) showed the same pattern – a broad, positive-going wave, at about 500 ms. after the appearance of the mismatching reflexive. This waveform has been reported by a number of investigators (e.g., Osterhout *et al.* 1994, Friederici *et al.* 1996) who have examined ERP responses to ungrammaticality; in general, the late positivity is interpretable as being linked to syntactic re-analysis (Friederici *et al.* 1996). In the case of a feature mismatch, either type – gender or number – could trigger a mental re-thinking or re-processing of the sentence.

Two studies conducted by Nicol (1988) showed superficially different – but fundamentally identical – effects for number and gender. One study examined on-line pronoun resolution in sentences like the following:

(1) a. The boxers told the skier that the doctor would blame them for the injury
b. The boxers told the skier that the doctor would blame him for the injury.

In (1a), the matrix subject *the boxers* is the antecedent of the embedded pronoun *them*. In (1b), the matrix object *the skier* is the antecedent of the embedded pronoun *him*. Sentence position was controlled such that half the sentences had a plural subject and singular object and half had a singular subject and plural object. Sentences were presented auditorily and participants made a lexical decision to one of four types of visually-presented words. The word was either (a) a semantic associate of the first noun phrase (e.g. *punch*), (b) an unrelated control word matched in length and frequency to the associate of the first noun, (c) a semantic associate of the second noun (e.g. *slope*), or (d) a length and frequency matched control word. The visual probe word appeared immediately after participants heard the pronoun. Faster response times to a word's associate (than to the control word) were taken to indicate activation of that word. Hence, if response times to the probe word *punch* were faster than response times to the unrelated word matched to *punch* in length and frequency, then it was assumed that *boxer* was active at the point in the sentence at which the probe word appeared. Note that if speeded response times to the asso-

ciate were due merely to the fact that the associate had appeared in the sentence, then one would expect to see facilitation for both associates in both the (a) and (b) sentences. Results showed, however, that there was a 'selective' facilitation effect: Response times to an associate were speeded ONLY when the associate was related to the 'antecedent' of the pronoun. In other words, the results showed that *boxer* was active after *them*, and *skier* was active after *him*. (Incidentally, although it is possible to construe *them* as referring jointly to both *boxers* and *skier* (that is, the doctor blamed all of them for the injury), the response time data did not reflect this possibility. It is possible that this interpretation requires an additional inference which has not been made at the point when the probe word appears).

Nicol's second study examined the processing of sentences in which gender was manipulated:

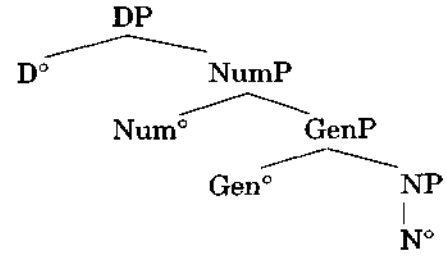
(2) a. The ballerina told the skier that the doctor would blame him for the injury
b. The ballerina told the skier that the doctor would blame her for the injury.

The results of this study showed a selective facilitation effect when the pronoun was masculine (i.e., after *him*, only *skier* was active), but both *ballerina* and *skier* were active after the feminine pronoun. A plausible explanation for this asymmetry is that pronoun resolution processes consider all NPs that do NOT MISMATCH the pronoun. In (2a), *ballerina*, which is female by definition, mismatches the masculine pronoun; *skier*, which is gender-neutral, does not mismatch the pronoun. But in (2b), neither *ballerina* nor *skier* mismatch the feminine pronoun. Hence, both are active after the pronoun *her*. Obviously such an account also explains the results of the number experiment: A plural pronoun triggers a search for a non-mismatching NP (a non-singular NP), and a singular pronoun triggers a search for a non-mismatching NP (a non-plural one). But since number is a binary feature – a noun is either singular or plural, not number-neutral – the two pronoun cases are symmetric. In sum, the different pattern of results for number and gender is due not to a difference in the 'process' of pronoun resolution, but rather to a difference in feature specificity. Presumably, if the gender study had contained only sentences with gender-specific nouns, exactly the same pattern of results would have been observed for the gender and number studies. [1]

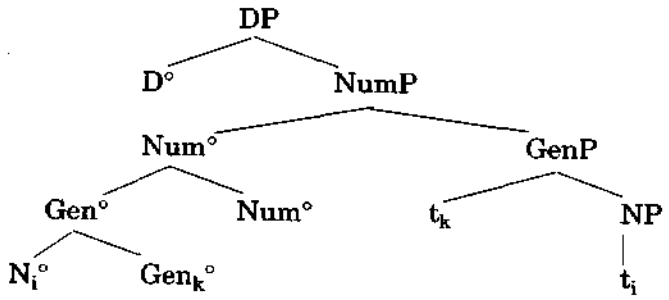
This is not to say that gender and number are always processed in exactly the same fashion. After all, gender and number differ in a

very basic way, at least for English. Let us suppose that common count nouns are represented in the lexicon unspecified for number. When speakers wish to convey 'more than one', they append the plural ending; however, when they wish to convey 'one', they add nothing: Any unadorned form is ultimately assumed to be singular (Bock & Eberhard 1993). Hence, any count noun may be turned into its plural counterpart. But there is no parallel operation for gender specification. The archaic -er/-ess alternation is certainly not currently productive and the form of and combinatorial constraints on the 'feminine suffix' vary unpredictably (sometimes following the agentive suffix, as in *authoress* (and possibly *waitress*, and *huntress*), sometimes not, as in *actress*, *waitress*, *murderess*; sometimes appearing as -ess, sometimes -ix (as in *aviatrix*), and sometimes as -ette (as in *majorette*), though this is actually a diminutive ending (e.g., *cigarette*, *kitchenette*). Moreover, female and male counterparts are often represented with words that are morphologically and phonologically unrelated (e.g. *aunt-uncle*, *queen-king*, *girl-boy*, etc. ...). The lack of a systematic morpho-phonological relationship between feminine and masculine counterparts in English makes it unlikely that one counterpart is derived from the other, in the way that a plural might be said to be derived from a singular.

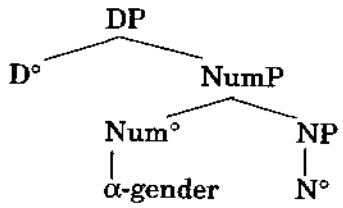
This difference between number and gender has been addressed in formal linguistic analysis by the postulation of different NP structures. This body of research contends that functional elements constitute separate syntactic entities, and in fact, head their own projections in the same way that lexical elements do (see Pollock 1989, Chomsky 1991, among others). More specifically, Abney (1987) proposes that nominals are composed of a maximal projections of the functional category D (for determiner), rather than the lexical category N, as previously assumed. Picallo (1991), following the 'functional XP hypothesis', assumes that the features gender and number head their own projections, (referred to, respectively, as Gen and Num) as other functional elements do, leading to the d-structure shown below:



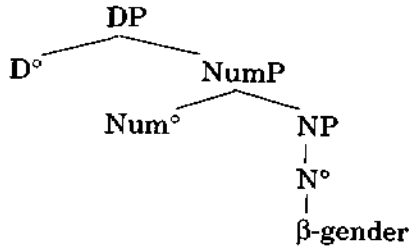
The most convincing argument for this structure is its ability to account for the order in which suffixes appear at S-structure. Within this framework, the N° moves left-ward via successive cyclic head-to-head movement, satisfying the Head Movement Constraint (Travis 1984, Baker 1988, Chomsky 1991). That is, the N° adjoins to Gen°, then the complex [N° Gen°] adjoins to the Num°. This results in the following s-structure:



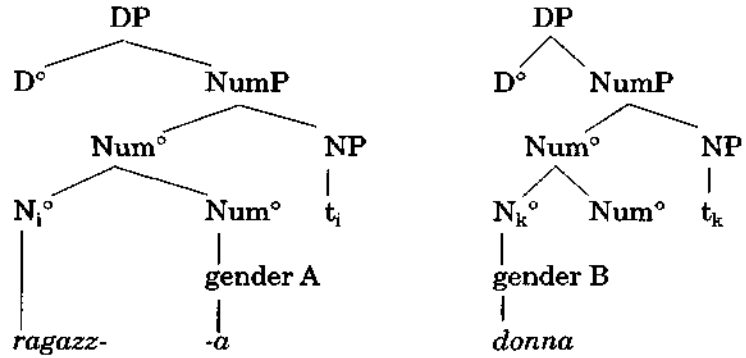
In contrast, Ritter presents independent arguments supporting Num as the head of the functional category NumP (1991, 1993), while arguing that gender is a feature that is realized either on the functional head Num or on the lexical head N, depending on cross-linguistic specifications (1993). For example, in Spanish, gender is base-generated as a feature attached to Num. The d-structure looks like this:



In Hebrew, on the other hand, gender features are part of the lexical entry of the N, so the d-structure looks like the following.



Di Domenico (1995) and Di Domenico & De Vincenzi (1996) argue that, in Italian, gender information may be carried either by the noun itself, or it may appear as part of the NUM, depending on the noun. For words which are part of a full paradigm, like *ragazza*('girl'), *ragazze* ('girls'), *ragazzo* ('boy'), *ragazzi* ('boys'), gender information (which they refer to as 'Gender A') is assumed to be dissociated from the root noun and appears, just as number information does, under NUM. But words like *donna* ('woman'), and *sedia* ('chair') have no masculine counterparts: For such words, gender information ('Gender B') must be represented lexically. The different s-structures are shown below.



Let us extend this analysis to English, whose pronominal features include number, gender, and animacy. Number information would be represented under NUM, as in Italian. If we assume that English has only 'Gender B' (given the variability of gender-marked forms and the non-productivity of such forms in newly coined words), then the distinction between how number and gender information is represented is simply this: Number is carried by a syntactic projection within the DP, but gender is carried by the noun itself. Finally, animacy should pattern with gender: Since there are no animate-inanimate pairs (either conceptually or lexically), animacy information would be represented with a given lexical item.

How might this difference manifest itself during processing? Features which are part of a lexical item should be less dissociable from that item than features which are part of a phrase in which the item appears. Hence, number information (as well as definiteness; that is, information which is carried by a determiner) should be more readily dissociated than should gender information. Indeed, for Spanish, García-Albea *et al.* (1989) have reported more 'stranding

errors' involving number than gender. A 'stranding error' in language production arises when a 'word exchange error' (the transposition of words which have a common category (usually nouns)) leaves an inflection in its originally intended position (e.g. *I gave the boys to the present* instead of *I gave the presents to the boy*). Their error data show that "it is the number suffix that gets stranded more often than the gender suffix" (p. 153). This finding is compatible with the notion that gender is part of a lexical item but number is "appended".

Another way that this difference could appear in processing is in the distribution and extent of agreement errors. This is the focus of the present study. The task we employ is one that has been used by Bock and a number of other investigators to examine the organization of the language production system: Participants are presented with a sentence or a sentence fragment and they must repeat it and provide an ending. Most of the researchers who have employed this 'repetition-completion' technique have used it to elicit verb agreement errors. For example, Bock & Miller (1991) presented participants with spoken 'preambles' like the following: *The author of the speeches* ... Participants repeated the preamble and then immediately provided a sentence ending; for example, *The author of the speeches was at the party*. Some proportion of the time, especially when the two nouns mismatch in number, participants make verb agreement errors (e.g. *The author of the speeches were at the party*). One finding is particularly robust: Errors arise when the head NP and the following NP mismatch in number, but only when the head is singular. In other words, the error rate increases when the preamble is *The author of the speeches* (vs. *The author of the speech*), but there is no parallel increase when the preamble is *The authors of the speech* (vs. *The authors of the speeches*). In short, there is an asymmetric mismatch effect. Bock & Eberhard (1993) have argued that this asymmetry is due to the markedness of the plural form. If the production system takes special note of a plural, this NP may 'stand out', and – occasionally –produce interference. Hence, the pattern of errors suggests a difference in the representation of singular NPs and plural NPs during the production of sentences.

Obviously, it is not possible to compare number and gender features in English by eliciting verb agreement errors, since verbs do not agree in gender with their subjects. However, it is possible to elicit *pronouns* and compare errors rates for gender marked vs. number marked forms. Pronoun errors have been reported by Bock (1995), Bock *et al.* (1993), and Bock *et al.* (1999). These studies used the repetition-completion task described above, with one small

difference: complete clauses were presented, and participants were asked to repeat the sentence and add a tag question containing a pronoun. For example, a participant might hear *The gang leader with the dangerous rivals vanished* ... and say, *The gang leader with the dangerous rival vanished, didn't he?*. In such constructions, the pronoun that is produced must agree with the head of the matrix subject. In these studies, a pronoun agreement error was made about 15% of the time.

In the experiment reported below, tag questions were elicited. The sentence preambles presented to subjects always contained a complex NP in which there was a singular head noun followed by a noun which was either congruent or incongruent with the head in terms of number or gender. In addition, an animacy contrast was introduced: the head and following noun either matched or mismatched in animacy. The dependent measure is the number of errors produced (errors in mismatching cases are compared to the number of errors in matching cases). It is important to emphasize that the focus here is *not* on repetition errors. That is, one approach might be to examine the types of errors that participants make in repeating back the preamble; e.g., if the preamble is *The girlscout with the kittens giggled*, one could determine whether speakers are more likely to substitute *girlscouts* for *girlscout* than they are to substitute *boyscout* for *girlscout*. This is not the approach taken here, because such errors could represent mistakes of perception. Therefore, only fully correct repetitions are considered, and the focus is on the indirect effect of aspects of the nonhead on how the head NP is represented. Specifically, this study addresses the question of whether number vs. gender contrasts in the 'nonhead' have differential interference effects on the process of selecting a tag pronoun matched in number or gender to the 'head'.

Given the differences between number and gender outlined above, one prediction is that if the two nouns within the complex subject mismatch, then errors may arise only when a feature is represented syntactically, not lexically. This notion is compatible with a syntax-based explanation for subject-verb agreement errors offered by Vigliocco *et al.* (1995), and Vigliocco & Nicol (1998). Normal subject-verb agreement is achieved through the "transmission" of the number features of the head NP to INFL, and an error arises if the plural feature of the 'nonhead' is accidentally transmitted. It could be argued that erroneous transmission is more likely if the feature is represented syntactically. This would predict the occurrence of number errors but not the occurrence of gender or animacy errors.

2. Experiment

2.1. Method

2.1.1. Participants

There were fifty-six participants. They were University of Arizona undergraduates who participated for course credit.

2.1.2. Materials and Design

Thirty-two sets of twelve sentences were created. Each sentence contained a complex subject NP (containing an NP followed by a PP) and an intransitive verb, such as *The little boy behind the curtain trembled.* For the experimental sentences, the head NP was always singular (balanced by plural heads in the filler sentences). In each set of twelve, the number of the nonhead (the NP within the PP) was manipulated, so that six items contained a singular nonhead and six contained a plural nonhead. In addition, eight of the twelve items contained an animate head, and four contained an inanimate head. In the eight animate head sentences, the nonhead was (a) the same gender as the head; (b) the opposite gender; (c) unmarked with respect to gender; or (d) inanimate. Half of the animate head sentences contained a marked feminine noun (e.g. *godmother*) as head and half contained a marked masculine noun (e.g. *groom*) as head. (It is important to bear in mind for the ensuing analyses that the female head sentences constitute one set of sentences and the male head sentences constitute a different set; hence, the two sets do not lend themselves to direct comparison). In the four inanimate head sentences, the nonhead was either inanimate or animate (and unmarked for gender). These contrasts are illustrated in Table 1; the full set of experimental stimuli appear in the Appendix.

In order to prevent participants from hearing more than one variant of each set of twelve, these sentences were counterbalanced across eight presentation lists. For example, each of the animate head sentences appeared in one of the eight lists. Suppose that the eight sentences above appeared, in Lists 1-8, one variant per list, in the order given in the table. The inanimate head sentences would then be distributed across the 'first' four lists, since the sentence variants in these lists did not contain any of the NPs in the inanimate head sentences. Hence, if a participant was presented with the sentence *The fairy godmother next to the boy vanished*, she might also hear another variant from the set, such as *The story book about the pumpkin vanished* (as long as neither head NP nor modifying NP was repeated).

Table 1. Example of stimulus set.

Nonhead Gender	*Nonhead Number*	*Animate Head:*
Match Head	Match Head	The little boy behind the policeman trembled.
Match Head	Mismatch Head	The little boy behind the policemen trembled.
Mismatch Head	Match Head	The little boy behind the policewoman trembled.
Mismatch Head	Mismatch Head	The little boy behind the policewomen trembled.
Neutral	Match Head	The little boy behind the police officer trembled.
Neutral	Mismatch Head	The little boy behind the police officers trembled.
Inanimate	Match Head	The little boy behind the curtain trembled.
Inanimate	Mismatch Head	The little boy behind the curtains trembled.
Nonhead Animacy	*Nonhead Number*	*Inanimate Head:*
Match Head	Match Head	The little dog behind the curtain trembled.
Match Head	Mismatch Head	The little dog behind the curtains trembled.
Mismatch Head	Match Head	The little dog behind the police officer trembled.
Mismatch Head	Mismatch Head	The little dog behind the police officer trembled.

But a participant who heard *The fairy godmother next to the pumpkin vanished* did not also hear *The story book about the pumpkin vanished*. The sets of 12 sentences were counterbalanced across the lists such that each list contained an equal number (4) of each of the twelve types of sentences. In addition, a set of 48 filler items was constructed. These items all contained plural head subjects followed by modifier and balanced the experimental items in all respects: The head and nonhead either matched or mismatched in terms of number, gender or animacy. The experimental and filler sentences were pseudo-randomized. Each list contained the same order of sentences. Sentences were tape-recorded by the experimenter at a normal rate of speech. Five practice items began each list.

2.1.3. Procedure

Participants were tested individually in a small test-room. Sentences were played out over headphones from a transcription tape recorder. Participants pressed a footpedal to hear a sentence and released the footpedal when the sentence ended. They then repeated the sentence and produced a tag question. An experimenter was present during each session, and both scored the utterances on-line, and tape-recorded them for later verification.

2.1.4. Scoring

The following response categories were used to score the utterances: (a) Correct (the sentence was repeated correctly and the tag question was correct); (b) Pronoun number error (with correct repetition of the sentence); (c) Pronoun gender error (with correct repetition of the sentence); (c) Pronoun animacy error (with correct repetition of the sentence); (d) Sentence Repetition Error; (e) Multiple Errors; (f) Incomplete or No Response.

2.2.Results

For expository clarity, results for each error type will be discussed in turn, beginning with the pronoun errors. Where appropriate, means were subjected to two analyses of variance, one with participants (F1) and one with items (F2) as the random variable.

2.2.1. Number Errors

Table 2 displays the pronoun number errors (and error rate) for all the number match vs. number mismatch conditions.

Table 2. Number Errors (Summed Over Item Types). (N = 1344 per condition)

Nonhead Number	*Example of Sentence Types*	*Errors*	*%*
Match Head	The X behind the Y VERBed.	14	1.0
Mismatch Head	The X behind the Ys VERBed.	100	7.4

Analyses of variance show this difference to be highly significant: F1(1,55) = 39.927; p < .001; F2(1,63) = 49.541; p < .001.

It should be noted that three of the head NPs could be construed by participants to be ambiguous between singular and plural: *congressman*, *selectman*, and *policeman*. Although these were recorded with slight variations in final vowel quality—thereby disambiguating the singular and plural forms—some participants may not have been sensitive to this difference. Therefore, additional analyses were conducted without these items. Removal of these items produces a numerical difference in the means: the errors drop from 100 to 77 for sentences with plural nonheads and 14 to 10 for sentences with singular heads. This suggests a tendency for ambiguous items to be subject to some extent to 'context' effects; being interpreted as plural

if followed by a plural and singular if followed by a singular. In any case, removing these items did not change the statistical results; even when only the errors from the animate head sentences are analyzed, a number mismatch still produces a hardy effect (F1(1,55) = 17.756, p < .001, F2(1,27) = 18. 098, p < .001).

2.2.2. Gender Errors

The number and rate of pronoun gender errors is shown in Table 3. Totals are given for the animate head conditions, in which the nonhead was either matched or mismatched in gender to the head.

Table 3. Gender Errors (Summed over Number Conditions) for Feminine and Masculine Head and Nonhead Conditions. (N = 224 per condition)

Nonhead Gender	*Examples*	*Errors*	*%*
Match Masc. Head	The little boy behind the policeman/-men trembled.	1	0.4
Mismatch Masc. Head	The little boy behind the policewoman/-women trembled.	7	3.1
Match Fem. Head	The stagemother next to the movie actress/-es got criticized.	2	0.9
Mismatch Fem. Head	The stagemother next to the movie actor/-s got criticized.	11	4.9

Table 3 shows that either type of mismatch (feminine head, masculine nonhead; masculine head, feminine nonhead) triggers some degree of interference. Unlike the asymmetry found for number (Bock et al. 1993, Bock et al. 1995), this study showed a symmetric pattern of errors. Analyses of variance show a main effect of head-nonhead gender congruence (F1(1,55) = 8.846, p = .004; F2(1,30) = 3.788, p = .061) but, not surprisingly, no interaction of head gender and head-nonhead congruence. Hence, in subsequent analyses, the two head genders are collapsed.

Table 4 shows the mean number of errors (and percentages) for all four nonhead conditions: gender match, gender mismatch, gender neutral, and inanimate. It is clear from the table that the fewest errors arose when the head and nonhead matched in gender, and the greatest number when the head and nonhead mismatched in number. Not surprisingly, the two 'intermediate' cases – in which the nonhead neither matched nor mismatched – produced an intermediate number of errors.

Table 4. Gender Errors (Summed over Head Gender and Nonhead Number). (N = 448 per condition)

Nonhead Gender	*Examples*	*Errors*	*%*
Match Head	The little boy behind the policeman/-men trembled.	3	0.7
Mismatch Head	The little boy behind the policewoman/-women trembled.	18	4.0
Neutral	The little boy behind the police officer(s) trembled.	9	2.0
Inanimate	The little boy behind the curtain(s) trembled.	11	2.5

Analyses of variance show a main effect of local noun type ($F1(3,165) = 3.395$, $p = .019$; $F2(3,90) = 2.684$, $p = .051$). A comparison of errors for gender matched nonhead conditions vs. inanimate nonhead conditions was significant ($F1(1,55) = 10.532$, $p = .002$; $F2(1,30) = 5.538$, $p = .025$), as was (as mentioned above), the comparison of only the gender matched nonhead conditions vs. mismatch ($F1(1,55) = 8.846$, $p = .004$; $F2(1,30) = 3.788$, $p = .061$). The gender-neutral nonhead condition did not differ significantly from the gender-match condition.

2.2.3. Animacy Errors

Animacy errors were tallied for the conditions in which the nonhead either matched or mismatched the head in animacy. These appear in Table 5. (Note that two of these conditions – the animate head/neutral nonhead and animate head/inanimate nonhead – were reported above, where they contrasted with the gender matching and gender mismatching conditions; here they are compared to the two inanimate head conditions).

As is clear from the table, animacy errors are infrequent, and variations in animacy appear to have no effect whatsoever. Not surprisingly, analyses of variance showed no significant effects or interactions.

2.2.4. Other Errors

Since the number of animate head and inanimate head sentences differ (because the animate head sentences contained a greater number of contrasts) analyses were conducted on each set separately. First, consider repetition errors (the participant mis-repeats some

Table 5. Animacy Errors (Summed over Head Gender and Nonhead Number). (N = 448 per condition)

Nonhead Animacy	*Examples*	*Errors*	*%*
Match Inanimate Head	The little dog behind the curtain(s) trembled.	7	1.6
Mismatch Inanimate Head	The little dog behind the police officer(s) trembled.	6	1.3
Match Animate Head	The little boy behind the police officer(s) trembled.	8	1.8
Mismatch Animate Head	The little boy behind the curtain(s) trembled.	6	1.3

part of the sentence). For 'animate' head sentences, analyses of repetition errors showed no main effects, only an interaction of head gender with nonhead number (there were more repetition errors when the head was feminine and nonhead plural): $F1(1,55) = 5{,}017$, $p = .029$; $F2(1,30) = 3.381$, $p = .076$. As pointed out above, the sentences with a feminine head NP were a different set from the sentences with a masculine head NP; therefore, it is difficult to interpret such error differences.

For 'inanimate' head sentences, there were more repetition errors when the nonhead was plural than singular ($F1(1,55) = 3.299$, $p = .075$; $F2(1,31) = 6.060$, $p = .02$), and this difference was greater for the inanimate nonhead sentences ($F1(1,55) = 10.993$, $p = .002$; $F2(1,31) = 10.181$, $p = .003$).

The final error group is the set of miscellaneous errors, responses which contained at least more than one error and all failures to respond (these are grouped together because response failures and multiple errors could both signal some difficulty with a particular item). For 'animate' head sentences, there were no main effects or interactions. For 'inanimate' head sentences, there was a main effect of nonhead number (more errors when the nonhead was plural): $F1(1,55) = 11.667$, $p = .001$; $F2(1,31) = 4.130$, $p = .051$.

2.2.5. Correct Responses

For 'animate' head sentences, there was a main effect of number (obviously, more correct responses when the nonhead was singular): $F1(1,55) = 19.757$, $p < .001$; $F2(1,30) = 15.422$, $p < .001$. There were no other significant effects or interactions. For 'inanimate' head sen-

tences, there was a main effect of number ($F1(1,55) = 28.160$, $p < .001$; $F2(1,30) = 30.523$, $p < .001$) and a significant interaction of nonhead animacy and number (a greater effect of number on when nonheads were inanimate) ($F1(1,55) = 10.053$, $p = .002$, $F2(1,30) = 10.649$, $p = .003$). These results suggest that, when asked to produce tag questions, participants have the least difficulty with sentences in which the NPs are inanimate and singular, such as *The statue in front of the church crumbled*. This point will be addressed below.

3. Discussion

The results of this study showed that a number mismatch had a robust interference effect, an animacy mismatch had no interference effect whatsoever, and a gender mismatch produced a small interference effect. The effects of number and animacy follow from the predictions outlined in the introduction. However, even a small effect of a gender mismatch was not predicted. On the assumption that interference (hence, the occurrence of a pronoun error) is the result of a 'mis-percolation' of a feature in NUM, it follows that a plural feature should cause interference, but gender features (which are an inherent part of a noun, rather than part of a DP) should not.

There are two ways to deal with the finding that errors do arise in gender mismatch cases. One way is to claim that for a small set of items in English – the pairs which show a transparent morpho-phonological relationship – gender is syntactically marked, not lexically marked (contrary to what was claimed in the introduction), that a subset of the items used in this study were of this type, and that these are responsible for the effect. Inspection of the items suggests that there may be a greater tendency for errors to occur with items which contain words like *actor/actress* or *waiter/waitress* (vs. *mother/father*, *milkmaid*, *cardinal*), but errors are not restricted to these items. [2] Hence, it appear that there is some other factor in play.

The other way to handle the occurrence of gender errors is to argue that interference is not simply the result of the percolation of a syntactically represented feature of the nonhead, but is due to a more general memory problem. That is, errors may arise because a speaker is uncertain about whether a just-uttered sentence contained a given concept (e.g. *girl*), or its counterpart (e.g. *girls*). In other words, a speaker may lose track of certain featural aspects of the head, and in such cases, the feature specification of the nonhead is adopted.

Clearly, if interference arises from a failure to remember all the featural details of a noun, one would expect that phonological differences would reduce the possibility of confusion, since a memory representation for a just-uttered sentence is likely to contain at least some phonological information. Hence, a gender error would be more likely to occur when a noun such as *waitress* appeared in the sentence than when a noun such as *girl* appeared, but errors in the latter case could still occur. It follows then, that number errors would be most frequent, since most nouns in English (and all the nouns used in this study) have a phonologically-related number counterpart. Further, animacy errors should be almost nonexistent because animacy counterparts simply do not exist. Here's how this would work. If the sentence is *The girl behind the headmistresses got punished*, a speaker uttering this sentence might know very well that one of the NPs was plural, but be uncertain about which one it was (even though the speaker has just correctly uttered the sentence). The fact that both *girl* and *headmistress* have singular and plural forms makes such uncertainty possible. In contrast, if the sentence is *The girl behind the school desk got punished*, a speaker will not be confused about animacy because *girl* does not have an inanimate counterpart and *school desk* does not have an animate counterpart. Presumably, speakers keep track of which lexical items they have uttered, though details like number, definiteness, etc. ... may slip. The presence of a counterpart has a clear effect on whether features slip. Bock and her colleagues (Bock *et al.* 1993) have found, for example, that plural nonheads like *scissors*, which have no singular counterparts, trigger fewer verb agreement errors than do true plurals (i.e., participants produce an error like *The book by the scissors are ...* far less often than *The book by the knives are ...*). Similarly, Eberhard (1993) has found that mass nouns like *chalk* (as in *the chalk for the blackboards*) are resistant to interference, presumably because *chalk* has no plural counterpart (except in the unusual case in which one means *types of chalk*). In sum, the possibility of interference may well rest on the presence or absence of counterparts: most count nouns have singular and plural forms, but not animate and inanimate forms. With respect to gender, the situation is mixed: some nouns have gender counterparts, but others do not. Hence, with respect to the notion of counterparts, number, gender, and animacy present a three-way contrast in English: number counterparts exist from most nouns and these are typically phonologically related; gender counterparts exist for many (though certainly not all) human nouns, and few are phonologically related; animacy counterparts do not exist.

This analysis accounts for the pattern of gender errors across the four different nonhead conditions: The most errors arose when there was a mismatch; the fewest arose when there was a match; and an intermediate number occurred when the nonhead was either inanimate or gender neutral. In cases of memory failure for featural details of the head, adoption of the relevant feature specification of the nonhead will be constrained by the feature composition of both the head and the nonhead. So, for example, an error such as *The little boy behind the policewoman trembled, didn't she?* would be due to loss of the gender feature of the head, and the adoption of the gender specification of the nonhead. Presumably, the failure to recall the pronominal features of the head also occurs in the gender match condition, but in this case, the adoption of nonhead gender specification will result in a correct utterance. But an error such as *The little boy behind the curtain trembled, didn't she?* is not due to the adoption of the nonhead gender because the nonhead, being inanimate, would be unspecified for gender. In such a case, the speaker might simply make a guess as to the gender of the head, and half the time an error will result. Finally, errors arise some proportion of the time in the gender-neutral condition (e.g. *The little boy behind the police officer trembled, didn't she?*) because the nonhead may become specified on the whim of the speaker (who may be thinking of, e.g., a female police officer). If gender-neutral nouns become specified in an arbitrary fashion, then errors should arise in the same way as they do for the mismatch condition described above, and they should do so about half the time. This predicts that gender-neutral nonhead sentences should show half the error rate of the mismatch sentences, as is indeed the case, as shown Table 4.

Another result of this study is that gender errors are symmetric with respect to the gender of the head. Recall from the discussion of subject-verb agreement studies that one of the most robust effects to emerge from the verb production studies is the 'asymmetric mismatch effect' – the finding that most verb agreement errors occur when the head NP is singular and a subsequent NP (typically part of a modifier of the head) is plural. [3] Bock & Eberhard (1993) and Eberhard (1993) have argued that with respect to number in English, the singular form is a 'featureless' default form, while the plural is marked with a plural feature. They suggest that a feature must be present to cause interference, so featureless forms are unable to interfere with the agreement process. There is also an asymmetric mismatch effect for pronoun errors in tag questions. Although plural heads were not included as part of the experimental materials in this study, past

research has shown that although the asymmetry may be diminished with tag pronouns, it is still very much present (Bock *et al.* 1992, Cutting, *et al.* 1995). What this asymmetry suggests is that when speakers make number errors in tag pronouns, it is because they notice that one of the NPs was plural, but lose track of which one it was. In contrast, they do not take special note that one of the NPs was singular; the singular form is the default. We argue that there is no parallel for gender. Even for the gender cases which contain gender-marked suffixes (that is, those that are arguably most like the number examples, pairs like *actress/actor*), there is no default form because (a) it would have to be stipulated which form is the default, and (b) the lexical entry would need to contain information about the morpho-phonological relationship between the feminine and masculine forms (and if each relevant lexical entry must be specified with detail about the two forms so that the derived forms are the correct ones, this is not so different from simply 'listing' the two forms). Hence it seems most sensible to us to assume that number counterparts share a lemma, or lexical entry, but gender counterparts – in English – do not. In short, apart from differences in error rate, number and gender show a different pattern of errors: Number is asymmetric; gender is symmetric.

It is important to emphasize that this analysis is about the representations of lexical items in English. For languages in which there is a systematic morphological transparency between feminine and masculine forms, an argument could be made for shared lexical entries and even for the possibility that one variant is derived from the other. (See Harris 1991 for a discussion of Spanish as one such language). For such languages, gender and number errors could well show a similar pattern.

Address of the Author:

Janet L. Nicol, Psychology 312, University of Arizona, Tucson, AZ 85721,
e-mail: nicol@u.arizona.edu

NOTES

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[1] Not all of the materials used in this study had the characteristics of example (2b). That is, some of the items contained a masculine noun like *king* or *uncle*; but since there are far more marked feminine nouns in English than marked masculine nouns, most of the items were like (2b).

[2] Gender errors occur with about 65% of the items containing nouns which have a phonologically-related counterpart, and with about 35% of the items which contain nouns that have no such counterpart.

[3] This effect has been reported for English (e.g., Bock & Miller 1991, Bock & Cutting 1992, Bock & Eberhard 1993, Vigliocco & Nicol 1998) and Spanish (Anton-Mendez 1997) but appears to be less robust in some languages like Italian and French (Vigliocco *et al.* 1995, Franck & Butterworth 1997).

APPENDIX

Experimental items are listed below. Sentences are coded by type. In the first column, **A** = Animate noun; **I** = Inanimate noun. Nouns within a complex NP are designated in order of appearance. In the second column, the gender of the first noun is given as **F** for feminine or **M** for masculine. **I** indicates that this noun is inanimate. This is followed by an indicator of the type of second noun: **N** is neuter, **I** is inanimate, **C** is congruent with the gender of the first noun, **X** is incongruent with the gender of the first noun. The third column indicates the number of the second NP: **S** is singular; **P** is plural.

AA-MC-S	The cardinal in charge of the priest died.
AA-MC-P	The cardinal in charge of the priests died.
AA-MX-S	The cardinal in charge of the nun died.
AA-MX-P	The cardinal in charge of the nuns died.
AA-MN-S	The cardinal in charge of the parishoner died.
AA-MN-P	The cardinal in charge of the parishoners died.
AI-MI-S	The cardinal in charge of the church died.
AI-MI-P	The cardinal in charge of the churches died.
IA-I-S	The statue in front of the parishoner crumbled.
IA-I-P	The statue in front of the parishoners crumbled.
II-I-S	The statue in front of the church crumbled.
II-I-P	The statue in front of the churches crumbled.
AA-MC-S	The host for the foreign king just arrived.
AA-MC-P	The host for the foreign kings just arrived.
AA-MX-S	The host for the foreign queen just arrived.
AA-MX-P	The host for the foreign queens just arrived.
AA-MN-S	The host for the foreign monarch just arrived.
AA-MN-P	The host for the foreign monarchs just arrived.

AI-MI-S	The host for the foreign banquet just arrived.
AI-MI-P	The host for the foreign banquets just arrived.
IA-I-S	The hotel for the foreign monarch just opened.
IA-I-P	The hotel for the foreign monarchs just opened.
II-I-S	The hotel for the foreign banquet just opened.
II-I-P	The hotel for the foreign banquets just opened.
AA-MC-S	The bishop next to the widower prayed.
AA-MC-P	The bishop next to the widowers prayed.
AA-MX-S	The bishop next to the widow prayed.
AA-MX-P	The bishop next to the widows prayed.
AA-MN-S	The bishop next to the mourner prayed.
AA-MN-P	The bishop next to the mourners prayed.
AI-MI-S	The bishop next to the casket prayed.
AI-MI-P	The bishop next to the caskets prayed.
IA-I-S	The wreath next to the mourner wilted.
IA-I-P	The wreath next to the mourners wilted.
II-I-S	The wreath next to the casket wilted.
II-I-P	The wreath next to the caskets wilted.
AA-MC-S	The busboy behind the waitor shouted.
AA-MC-P	The busboy behind the waitors shouted.
AA-MX-S	The busboy behind the waitress shouted.
AA-MX-P	The busboy behind the waitresses shouted.
AA-MN-S	The busboy behind the manager shouted.
AA-MN-P	The busboy behind the managers shouted.
AI-MI-S	The busboy behind the cash register shouted.
AI-MI-P	The busboy behind the cash registers shouted.
IA-I-S	The table behind the manager broke.
IA-I-P	The table behind the managers broke.
II-I-S	The table behind the cash register broke.
II-I-P	The table behind the cash registers broke.
AA-MC-S	The policeman by the boyscout took off.
AA-MC-P	The policeman by the boyscouts took off.
AA-MX-S	The policeman by the girlscout took off.
AA-MX-P	The policeman by the girlscouts took off.
AA-MN-S	The policeman by the ranger took off.
AA-MN-P	The policeman by the rangers took off.
AI-MI-S	The policeman by the cabin took off.
AI-MI-P	The policeman by the cabins took off.
IA-I-S	The pine tree by the ranger fell over.
IA-I-P	The pine tree by the rangers fell over.
II-I-S	The pine tree by the cabin fell over.
II-I-P	The pine tree by the cabins fell over.
AA-MC-S	The godfather with the funny godson chuckled.
AA-MC-P	The godfather with the funny godsons chuckled.
AA-MX-S	The godfather with the funny goddaughter chuckled.
AA-MX-P	The godfather with the funny goddaughters chuckled.

AA-MN-S	The godfather with the funny godchild chuckled.
AA-MN-P	The godfather with the funny godchildren chuckled.
AI-MI-S	The godfather with the funny toy chuckled.
AI-MI-P	The godfather with the funny toys chuckled.
IA-I-S	The story about the funny godchild got published.
IA-I-P	The story about the funny godchildren got published.
II-I-S	The story about the funny toy got published.
II-I-P	The story about the funny toys got published.

AA-MC-S	The baritone with the tenor sang well.
AA-MC-P	The baritone with the tenors sang well.
AA-MX-S	The baritone with the soprano sang well.
AA-MX-P	The baritone with the sopranos sang well.
AA-MN-S	The baritone with the singer sang well.
AA-MN-P	The baritone with the singers sang well.
AI-MI-S	The baritone with the duet sang well.
AI-MI-P	The baritone with the duets sang well.
IA-I-S	The recording of the singer sold well.
IA-I-P	The recording of the singers sold well.
II-I-S	The recording of the duet sold well.
II-I-P	The recording of the duets sold well.

AA-MC-S	The butler beside the count eavesdropped.
AA-MC-P	The butler beside the counts eavesdropped.
AA-MX-S	The butler beside the countess eavesdropped .
AA-MX-P	The butler beside the countesses eavesdropped .
AA-MN-S	The butler beside the aristocrat eavesdropped .
AA-MN-P	The butler beside the aristocrats eavesdropped .
AI-MI-S	The butler beside the front door eavesdropped .
AI-MI-P	The butler beside the front doors eavesdropped .
IA-I-S	The painting beside the aristocrat fell down.
IA-I-P	The painting beside the aristocrats fell down.
II-I-S	The painting beside the front door fell down.
II-I-P	The painting beside the front doors fell down.

AA-MC-S	The congressman with the outlandish uncle got fired.
AA-MC-P	The congressman with the outlandish uncles got fired.
AA-MX-S	The congressman with the outlandish aunt got fired.
AA-MX-P	The congressman with the outlandish aunts got fired.
AA-MN-S	The congressman with the outlandish relative got fired.
AA-MN-P	The congressman with the outlandish relatives got fired.
AI-MI-S	The congressman with the outlandish office got fired.
AI-MI-P	The congressman with the outlandish offices got fired.
IA-I-S	The party for the outlandish relative got cancelled.
IA-I-P	The party for the outlandish relatives got cancelled.
II-I-S	The party in the outlandish office got cancelled.
II-I-P	The party in the outlandish offices got cancelled.

AA-MC-S	The best man next to the father-in-law got tipsy.
AA-MC-P	The best man next to the fathers-in-law got tipsy.

AA-MX-S	The best man next to the mother-in-law got tipsy.
AA-MX-P	The best man next to the mothers-in-law got tipsy.
AA-MN-S	The best man next to the wedding participant got tipsy.
AA-MN-P	The best man next to the wedding participants got tipsy.
AI-MI-S	The best man next to the flower arrangement got tipsy.
AI-MI-P	The best man next to the flower arrangements got tipsy.
IA-I-S	The gift next to the wedding participant got tipped over.
IA-I-P	The gift next to the wedding participants got tipped over.
II-I-S	The gift next to the flower arrangement got tipped over.
II-I-P	The gift next to the flower arrangements got tipped over.

AA-MC-S	The bachelor with the unpleasant landlord disappeared.
AA-MC-P	The bachelor with the unpleasant landlords disappeared.
AA-MX-S	The bachelor with the unpleasant landlady disappeared.
AA-MX-P	The bachelor with the unpleasant landladies disappeared.
AA-MN-S	The bachelor with the unpleasant neighbor disappeared.
AA-MN-P	The bachelor with the unpleasant neighbors disappeared.
AI-MI-S	The bachelor with the overdue bill disappeared.
AI-MI-P	The bachelor with the overdue bills disappeared.
IA-I-S	The delivery for the unpleasant neighbor disappeared.
IA-I-P	The delivery for the unpleasant neighbors disappeared.
II-I-S	The delivery with the overdue bill disappeared.
II-I-P	The delivery with the overdue bills disappeared.

AA-MC-S	The selectman by the chairman waved.
AA-MC-P	The selectman by the chairmen waved.
AA-MX-S	The selectman by the chairwoman waved.
AA-MX-P	The selectman by the chairwomen waved.
AA-MN-S	The selectman by the executive waved.
AA-MN-P	The selectman by the executives waved.
AI-MI-S	The selectman by the taxicab waved.
AI-MI-P	The selectman by the taxicabs waved.
IA-I-S	The suitcase by the executive exploded.
IA-I-P	The suitcase by the executives exploded.
II-I-S	The suitcase by the taxicab exploded.
II-I-P	The suitcase by the taxicabs exploded.

AA-MC-S	The hero in awe of the god bowed down.
AA-MC-P	The hero in awe of the gods bowed down.
AA-MX-S	The hero in awe of the goddess bowed down.
AA-MX-P	The hero in awe of the goddesses bowed down.
AA-MN-S	The hero in awe of the diety bowed down.
AA-MN-P	The hero in awe of the deities bowed down.
AI-MI-S	The hero in awe of the miracle bowed down.
AI-MI-P	The hero in awe of the miracles bowed down.
IA-I-S	The celebration in honor of the diety died down.
IA-I-P	The celebration in honor of the dieties died down.
II-I-S	The celebration in honor of the miracle died down.
II-I-P	The celebration in honor of the miracles died down.

AA-MC-S	The groom near the usher paced nervously.
AA-MC-P	The groom near the ushers paced nervously.
AA-MX-S	The groom near the bridesmaid paced nervously.
AA-MX-P	The groom near the bridesmaids paced nervously.
AA-MN-S	The groom near the wedding guest paced nervously.
AA-MN-P	The groom near the wedding guests paced nervously.
AI-MI-S	The groom near the limosine paced nervously.
AI-MI-P	The groom near the limosines paced nervously.
IA-I-S	The flower bed near the wedding guest smelled wonderful.
IA-I-P	The flower bed near the wedding guests smelled wonderful.
II-I-S	The flower bed near the limosine smelled wonderful.
II-I-P	The flower bed near the limosines smelled wonderful.
AA-MC-S	The little boy behind the policeman trembled.
AA-MC-P	The little boy behind the policemen trembled.
AA-MX-S	The little boy behind the policewoman trembled.
AA-MX-P	The little boy behind the policewomen trembled.
AA-MN-S	The little boy behind the police officer trembled.
AA-MN-P	The little boy behind the police officers trembled.
AI-MI-S	The little boy behind the curtain trembled.
AI-MI-P	The little boy behind the curtains trembled.
IA-I-S	The little dog behind the police officer trembled.
IA-I-P	The little dog behind the police officers trembled.
II-I-S	The little dog behind the curtain trembled.
II-I-P	The little dog behind the curtains trembled.
AA-MC-S	The male model near the salesman looked sharp.
AA-MC-P	The male model near the salesmen looked sharp.
AA-MX-S	The male model near the saleslady looked sharp.
AA-MX-P	The male model near the sales ladies looked sharp.
AA-MN-S	The male model near the salesrep looked sharp.
AA-MN-P	The male model near the sales reps looked sharp.
AI-MI-S	The male model near the sale rack looked sharp.
AI-MI-P	The male model near the sale racks looked sharp.
IA-I-S	The mannequin near the sales rep looked sharp.
IA-I-P	The mannequin near the sales reps looked sharp.
II-I-S	The mannequin near the sales rack looked sharp.
II-I-P	The mannequin near the sales racks looked sharp.
AA-FC-S	The girl behind the headmistress got punished.
AA-FC-P	The girl behind the headmistresses got punished.
AA-FX-S	The girl behind the headmaster got punished.
AA-FX-P	The girl behind the headmasters got punished.
AA-FN-S	The girl behind the teacher got punished.
AA-FN-P	The girl behind the teachers got punished.
AI-FI-S	The girl behind the school desk got punished.
AI-FI-P	The girl behind the school desks got punished.
IA-I-S	The blackboard behind the teacher got erased.
IA-I-P	The blackboard behind the teachers got erased.
II-I-S	The blackboard behind the school desk got erased.

II-I-P	The blackboard behind the school desks got erased.
AA-FC-S	The maid-of-honor with the niece turned up drunk.
AA-FC-P	The maid-of-honor with the nieces turned up drunk.
AA-FX-S	The maid-of-honor with the nephew turned up drunk.
AA-FX-P	The maid-of-honor with the nephews turned up drunk.
AA-FN-S	The maid-of-honor with the cousin turned up drunk.
AA-FN-P	The maid-of-honor with the cousins turned up drunk.
AI-FI-S	The maid-of-honor with the bouquet turned up drunk.
AI-FI-P	The maid-of-honor with the bouquets turned up drunk.
IA-I-S	The wedding picture of the cousin turned out well.
IA-I-P	The wedding picture of the cousins turned out well.
II-I-S	The wedding picture of the bouquet turned out well.
II-I-P	The wedding picture of the bouquets turned out well.
AA-FC-S	The stagemother next to the movie actress got criticized.
AA-FC-P	The stagemother next to the movie actresses got criticized.
AA-FX-S	The stagemother next to the movie actor got criticized.
AA-FX-P	The stagemother next to the movie actors got criticized.
AA-FN-S	The stagemother next to the movie star got criticized.
AA-FN-P	The stagemother next to the movie stars got criticized.
AI-FI-S	The stagemother next to the movie prop got criticized.
AI-FI-P	The stagemother next to the movie props got criticized.
IA-I-S	The microphone next to the movie star got turned off.
IA-I-P	The microphone next to the movie stars got turned off.
II-I-S	The microphone next to the movie prop got turned off.
II-I-P	The microphone next to the movie props got turned off.
AA-FC-S	The cleaning lady with the heiress got paid a lot.
AA-FC-P	The cleaning lady with the heiresses got paid a lot.
AA-FX-S	The cleaning lady with the heir got paid a lot.
AA-FX-P	The cleaning lady with the heirs got paid a lot.
AA-FN-S	The cleaning lady with the millionaire got paid a lot.
AA-FN-P	The cleaning lady with the millionaries got paid a lot.
AI-FI-S	The cleaning lady with the heirloom got paid a lot.
AI-FI-P	The cleaning lady with the heirlooms got paid a lot.
IA-I-S	The insurance policy on the millionaire cost a lot.
IA-I-P	The insurance policy on the millionaries cost a lot.
II-I-S	The insurance policy on the heirloom cost a lot.
II-I-P	The insurance policy on the heirlooms cost a lot.
AA-FC-S	The evil step-mother with the witch scared you.
AA-FC-P	The evil step-mother with the witches scared you.
AA-FX-S	The evil step-mother with the warlock scared you.
AA-FX-P	The evil step-mother with the warlocks scared you.
AA-FN-S	The evil step-mother with the fortune teller scared you.
AA-FN-P	The evil step-mother with the fortune tellers scared you.
AI-FI-S	The evil step-mother with the crystal ball scared you.
AI-FI-P	The evil step-mother with the crystal balls scared you.
IA-I-S	The evil tale of the fortune teller scared you.

IA-I-P	The evil tale of the fortune tellers scared you.
II-I-S	The evil tale of the crystal ball scared you.
II-I-P	The evil tale of the crystal balls scared you.
AA-FC-S	The lady-in-waiting next to the duchess gossiped.
AA-FC-P	The lady-in-waiting next to the duchesses gossiped.
AA-FX-S	The lady-in-waiting next to the duke gossiped.
AA-FX-P	The lady-in-waiting next to the dukes gossiped.
AA-FN-S	The lady-in-waiting next to the servant gossiped.
AA-FN-P	The lady-in-waiting next to the servants gossiped.
AI-FI-S	The lady-in-waiting next to the tapestry gossiped.
AI-FI-P	The lady-in-waiting next to the tapestries gossiped.
IA-I-S	The porcelain vase next to the servant cracked.
IA-I-P	The porcelain vase next to the servants cracked.
II-I-S	The porcelain vase next to the tapestry cracked.
II-I-P	The porcelain vase next to the tapestries cracked.
AA-FC-S	The governess in charge of the granddaughter sang softly.
AA-FC-P	The governess in charge of the granddaughters sang softly.
AA-FX-S	The governess in charge of the grandson sang softly.
AA-FX-P	The governess in charge of the grandsons sang softly.
AA-FN-S	The governess in charge of the infant sang softly.
AA-FN-P	The governess in charge of the infants sang softly.
AI-FI-S	The governess in charge of the nursery sang softly.
AI-FI-P	The governess in charge of the nurserys sang softly.
IA-I-S	The stroller in front of the infant rolled away.
IA-I-P	The stroller in front of the infants rolled away.
II-I-S	The stroller in front of the nursery rolled away.
II-I-P	The stroller in front of the nurserys rolled away.
AA-FC-S	The fairy godmother next to the girl vanished.
AA-FC-P	The fairy godmother next to the girls vanished.
AA-FX-S	The fairy godmother next to the boy vanished.
AA-FX-P	The fairy godmother next to the boys vanished.
AA-FN-S	The fairy godmother next to the child vanished.
AA-FN-P	The fairy godmother next to the children vanished.
AI-FI-S	The fairy godmother next to the pumpkin vanished.
AI-FI-P	The fairy godmother next to the pumpkins vanished.
IA-I-S	The storybook about the child vanished.
IA-I-P	The storybook about the children vanished.
II-I-S	The storybook about the pumpkin vanished.
II-I-P	The storybook about the pumpkins vanished.
AA-FC-S	The maid for the princess cost plenty.
AA-FC-P	The maid for the princesses cost plenty.
AA-FX-S	The maid for the prince cost plenty.
AA-FX-P	The maid for the princes cost plenty.
AA-FN-S	The maid for the house guest cost plenty.
AA-FN-P	The maid for the house guests cost plenty.
AI-FI-S	The maid for the guestroom cost plenty.

AI-FI-P	The maid for the guestrooms cost plenty.
IA-I-S	The maid service for the house guest cost plenty.
IA-I-P	The maid service for the house guests cost plenty.
II-I-S	The maid service for the guestroom cost plenty.
II-I-P	The maid service for the guestroom cost plenty.
AA-FC-S	The granddaughter by the cowgirl got knocked over.
AA-FC-P	The granddaughter by the cowgirls got knocked over.
AA-FX-S	The granddaughter by the cowboy got knocked over.
AA-FX-P	The granddaughter by the cowboys got knocked over.
AA-FN-S	The granddaughter by the jockey got knocked over.
AA-FN-P	The granddaughter by the jockeys got knocked over.
AI-FI-S	The granddaughter by the horse got knocked over.
AI-FI-P	The granddaughter by the horses got knocked over.
IA-I-S	The bucket by the jockey got knocked over.
IA-I-P	The bucket by the jockeys got knocked over.
II-I-S	The bucket by the horse got knocked over.
II-I-P	The bucket by the horses got knocked over.
AA-FC-S	The congresswoman near the stewardess seemed edgy.
AA-FC-P	The congresswoman near the stewardesses seemed edgy.
AA-FX-S	The congresswoman near the steward seemed edgy.
AA-FX-P	The congresswoman near the stewards seemed edgy.
AA-FN-S	The congresswoman near the flight attendant seemed edgy.
AA-FN-P	The congresswoman near the flight attendants seemed edgy.
AI-FI-S	The congresswoman near the boarding gate seemed edgy.
AI-FI-P	The congresswoman near the boarding gates seemed edgy.
IA-I-S	The luggage cart near the flight attendant seemed heavy.
IA-I-P	The luggage cart near the flight attendants seemed heavy.
II-I-S	The luggage cart near the boarding gate seemed heavy.
II-I-P	The luggage cart near the boarding gates seemed heavy.
AA-FC-S	The selectwoman in charge of the office girl got robbed.
AA-FC-P	The selectwoman in charge of the office girls got robbed.
AA-FX-S	The selectwoman in charge of the office boy got robbed.
AA-FX-P	The selectwoman in charge of the office boys got robbed.
AA-FN-S	The selectwoman in charge of the file clerk got robbed.
AA-FN-P	The selectwoman in charge of the file clerks got robbed.
AI-FI-S	The selectwoman in charge of the office file got robbed.
AI-FI-P	The selectwoman in charge of the office files got robbed.
IA-I-S	The cabinet in front of the file clerk got broken into.
IA-I-P	The cabinet in front of the file clerks got broken into.
II-I-S	The cabinet in front of the office file got broken into.
II-I-P	The cabinet in front of the office files got broken into.
AA-FC-S	The debutante with the generous grandmother just appeared.
AA-FC-P	The debutante with the generous grandmothers just appeared.
AA-FX-S	The debutante with the generous grandfather just appeared.
AA-FX-P	The debutante with the generous grandfathers just appeared.
AA-FN-S	The debutante with the generous grandparent just appeared.

AA-FN-P	The debutante with the generous grandparents just appeared.
AI-FI-S	The debutante with the generous trustfund just appeared.
AI-FI-P	The debutante with the generous trustfunds just appeared.
IA-I-S	The announcement about the generous grandparent just appeared.
IA-I-P	The announcement about the generous grandparents just appeared.
II-I-S	The announcement about the generous trustfund just appeared.
II-I-P	The announcement about the generous trustfunds just appeared.
AA-FC-S	The mid-wife with the new mother finally appeared.
AA-FC-P	The mid-wife with the new mothers finally appeared.
AA-FX-S	The mid-wife with the new father finally appeared.
AA-FX-P	The mid-wife with the new fathers finally appeared.
AA-FN-S	The mid-wife with the new parent finally appeared.
AA-FN-P	The mid-wife with the new parents finally appeared.
AI-FI-S	The mid-wife with the new technique finally appeared.
AI-FI-P	The mid-wife with the new techniques finally appeared.
IA-I-S	The article about the new parent finally appeared.
IA-I-P	The article about the new parents finally appeared.
II-I-S	The article about the new technique finally appeared.
II-I-P	The article about the new techniques finally appeared.
AA-FC-S	The milkmaid near the peasant girl giggled.
AA-FC-P	The milkmaid near the peasant girls giggled.
AA-FX-S	The milkmaid near the peasant boy giggled.
AA-FX-P	The milkmaid near the peasant boys giggled.
AA-FN-S	The milkmaid near the peasant child giggled.
AA-FN-P	The milkmaid near the peasant children giggled.
AI-FI-S	The milkmaid near the wheat field giggled.
AI-FIPP	The milkmaid near the wheat fields giggled.
IA-I-S	The plow near the peasant child rusted.
IA-I-P	The plow near the peasant children rusted.
II-I-S	The plow near the wheat field rusted.
II-I-P	The plow near the wheat fields rusted.
AA-FC-S	The damsel beside the sorceress cried out.
AA-FC-P	The damsel beside the sorceresses cried out.
AA-FX-S	The damsel beside the sorcerer cried out.
AA-FX-P	The damsel beside the sorcerers cried out.
AA-FN-S	The damsel beside the wizard cried out.
AA-FN-P	The damsel beside the wizards cried out.
AI-FI-S	The damsel beside the cauldron cried out.
AI-FI-P	The damsel beside the cauldrons cried out.
IA-I-S	The candle beside the wizard went out.
IA-I-P	The candle beside the wizards went out.
II-I-S	The candle beside the cauldron went out.
II-I-P	The candle beside the cauldrons went out.

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