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Patterns of pronoun case error*

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ABSTRACT

This paper addresses the question of whether the rate and patterns of pronoun case error are influenced by the composition of an individual pronoun's paradigm. Twenty-nine children, aged 2;6 to 4;0 were audiotaped for two 1-hour sessions, interacting with their primary caregivers engaged in free play, book reading and family album viewing. It was found that *her* was overextended for *she* at a significantly higher rate than *him* for *he* and *them* for *they*, providing evidence of a 'double-cell' effect that increases the incidence of error in the feminine pronoun. It was also found that the overextension of nominative forms (e.g. *he* for *him*), were antagonistic to the more frequently occurring type of overextension, objective for nominative (e.g. *him* for *he*). These findings indicate that the composition of a pronoun's paradigm influenced the patterns of pronoun case error observed.

INTRODUCTION

Pronoun case errors are a familiar trait of English child language (Gruber, 1967; Bloom, 1970; Huxley, 1970; Webster & Ingram, 1972; Brown, 1973; Chiat, 1981; Budwig, 1989, 1995; Loeb & Leonard, 1991; Rispoli, 1994; Vainikka, 1994; Moore, 1995; Powers, 1995; Schutze, 1997). Examples (1) through (9) are given to provide the flavour of these errors. Replacement of subject pronouns by other case forms is the prototypical pronoun case error, as exemplified by (1) through (6). Note that there are two types of subject pronoun case error: (a) the overextension of the objective form for the nominative form (examples 1, 4 & 5), and (b) the overextension of the genitive form for the nominative (examples 2 & 6). The term OBJECTIVE is

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used here, because compared with cognate languages, the English objective case is broader and more inclusive than just the accusative case. In addition to overextensions of the objective and genitive for the nominative, the phenomenon of pronoun case errors also encompasses other types of overextension, including the overextension of the nominative form for genitive and objective targets, as exemplified by (7) through (9).

(1) *Me goed. – *me* for *I*
(Jem 2;4: Aldridge, 1989, p. 195)
(2) *My taked it off. – *my* for *I*
(Jeffrey 2;6: Budwig, 1995, p. 272)
(3) *Her haves some tea. – *her* for *she*
(Hannah 2;7: Aldridge, 1989, p. 178)
(4) *Him can't see. – *him* for *he*
(Nina 2;1: Vainikka, 1994, p. 295)
(5) *Then us taked off all our clothes. – *us* for *we*
(Douglas: 3;4: Huxley, 1970, p. 164)
(6) *Our got one each. – *our* for *we*
(Sophie 2;5:24: Ingham, 1992, p. 142)
(7) *I ride he. – *he* for *him*
(Sarah 2;3: Vainikka, 1994, p. 286)
(8) *Muppet Show will get a gun and kill *they*, your girls. – *they* for *them*
(Sally 2;4: Chiat 1981, p. 89)
(9) *A car won't come to *we*. – *we* for *us*
(Eva 2;5: M. Bowerman, personal communication, 17 April 1994)

The majority of researchers have focused exclusively on subject case errors, (Gruber, 1967; Huxley, 1970; Webster & Ingram, 1972; Budwig, 1989, 1995; Loeb & Leonard, 1991; Vainikka, 1994; Moore, 1995; Powers, 1995; Schutze, 1997). Perhaps one reason why subject pronoun case errors have received so much attention is the importance of the structural conditions under which nominative case is assigned. As Haegeman (1991) explains, nominative case is assigned to the noun phrase (NP) that lies in the specifier (Spec) position of the Inflectional Phrase (IP), if the head of the IP, INFL, has the feature specification [+tense, +AGR(eement)]. Therefore, assignment of nominative case has been related to the development of functional categories (Radford, 1990; Guilfoyle & Noonan, 1992; Vainikka, 1994) and the grammatical features entailed by INFL, Tense and AGR (Schutze & Wexler, 1996).

In a recent dissertation, Schutze (1997, p. 232) accounts for the two different types of subject pronoun case error, the objective for nominative overextension (e.g. 1, 4 & 5) and the genitive for nominative overextension (e.g. 2 & 6) with the following proposal. In this recent account, INFL contains two grammatical features which control nominative case assign-

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ment: (a) TENSE, and (b) ACCORD, a grammatical feature which coordinates case with the features of finiteness. Objective subjects are possible in clauses that are specified [+Tense, −Accord], whereas genitive subjects are possible in sentences [−Tense, −Accord]. Interestingly, example (2) is a counter-example to Schutze's hypothesis, because past tense is clearly marked by the overregularization of *-ed*. Counterexamples to the proposal, such as (2), are attributed to 'noise' in the data (Schutze, 1997, p. 236), although the source of that noise is never fully addressed. The logic of Schutze's approach is straightforward. If pronoun case errors are solely the result of general structural conditions, then pronoun case errors represent a point in the development of syntax. The same type of error should occur at a particular point in syntactic development, with all the pronouns the child produces. If this is not so, then some other intervening factor or factors must be influencing the occurrence of these errors. This paper examines characteristics of pronoun case errors which indicate that the developmental syntax scenario is in need of revision, and goes on to offer proposals concerning the intervening factors which influence the rate and patterns of pronoun case errors.

The first characteristic, indicating that something is amiss with the developmental syntactic approach, is that the rate of pronoun case error is not uniform across pronouns. In Vainikka's (1994) and Schutze's (1997) examinations of the Nina data (originally collected and analysed in Suppes, 1973), it was found that the rate at which Nina overextended *her* for *she* was far greater than the rate at which she overextended *him* for *he*. Schutze (1997; p. 225) reports that Nina produced 13 overextensions of *him* for *he* and 391 correct productions of *he*, an error rate of approximately 3%. In contrast, Nina produced 141 overextensions of *her* for *she*, and a total of 15 correct productions of *she*, translating into an error rate of 90%. Independently, Rispoli (1994) and Moore (1995) have found a similar difference in subject pronoun case error rates between the third person singular masculine (3Psg masc) and the third person singular feminine pronouns (3Psg fem), with the error rate for the 3Psg fem being much higher than that of the 3Psg masc. In Rispoli's (1994, p.167) data from 12 children, the average rate of *him* for *he* overextension was approximately 5%, whereas the average overextension rate of *her* for *she* was approximately 47%. In addition, Rispoli (1994) also reported that the average rate of overextensions of *me* for *I* and *my* for *I* combined was only 10%. Of all the pronouns, the 3Psg fem stood out for its excessively high subject pronoun case error rate.

A second characteristic of pronoun case errors that presents an empirical challenge to current developmental syntactic perspectives is the existence of nominative overextensions. Hypotheses that focus exclusively on subject pronoun case errors ignore the overextension of the nominative forms for objective and genitive forms (e.g. 7–9). If these errors are ignored, the

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relationship between the more common subject pronoun case errors and these errors will remain unexplored. Rispoli (1994) found that nominative overextensions are significantly more likely in the 3Psg masc pronoun, reporting an average nominative overextension rate of 9%. In comparison, the average nominative overextension rate for the third person plural (3Pplu) pronoun was approximately 4%, and approximately 0% for the 3Psg fem pronouns. Nominative overextensions were not observed in the 1Psg pronoun. These findings were clearly not the result of sampling error, as ample targets and correct productions were found to estimate error rates. Nominative overextensions occurred (see also Chiat, 1981) and, like subject pronoun case errors, they occurred at different rates across pronouns.

In sum, at least two characteristics of pronoun case error challenge the developmental syntax approaches that have been proposed to date. These empirical problems are: (a) the rate of pronoun case error is not uniform across pronouns, and (b) the existence of nominative overextensions. These points do not necessarily mean that a developmental syntax approach is fatally flawed. Rather, the implication of these characteristics is that some factor or factors intervene in the relationship between the development of functional categories and case assignment. That is, even after functional categories begin to emerge, producing the correct case form may still be problematic. This paper reports empirical research that will help illuminate the nature of these factors.

What might intervene between functional categories and grammatical features and the production of correct pronoun case forms? The most detailed proposal is found in the research of Rispoli (1994, 1998). The proposal, labelled the pronoun 'paradigm building' hypothesis, rests on the assumption that, even after functional categories have emerged and children have begun to incorporate grammatical features into their syntax, children must also build morphological paradigms. The pronoun case forms of English are word-specific paradigms (to use a term coined in Pinker, 1984). Word-specific paradigms are inherently isolated and non-general. The idiosyncracy and isolation of the pronoun paradigms inhibit across-the-board spread and elimination of pronoun case errors.

Nominative overextensions (problem b) are not only possible in the paradigm building hypothesis, there are principles that partially determine their existence. Although nominative overextensions on the whole are infrequent, they are still more likely to occur in the 3Psg masc and 3P plu pronouns. Recall that, in Rispoli (1994), the rate of nominative overextensions in the 3Psg masc pronoun was approximately 9%, and that some nominative overextensions were observed in the 3Pplu pronoun. In contrast, the average rate of *she* overextensions was approximately 0% and overextensions of *I* were not observed. Rispoli (1994) attributed the absence of *I* overextensions to the presence of a PHONETIC CORE in the paradigm of the

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1Psg pronoun, namely the [m-] onset. It was claimed that, because *I* was suppletive in the 1Psg paradigm, it was blocked from overextension. This results in the absence of *I* overextensions. This same mechanism, the phonetic core, was claimed to account for the *he* and *they* overextensions. Because *he* and *they* contain the phonetic cores of their paradigms (onsets [h-] and [ð-] respectively), these nominatives can be overextended. The mechanism hypothesized for this pattern was the following:

> 'While children are still learning the pronoun case forms, they may fail to produce a pronoun case form by direct access. At this point, other forms of the pronoun may be accessed by mistake, leading to what the observer sees as a pronoun case error ...' (Rispoli, 1994, p. 161).

However, the fact that overextensions of *she* (Rispoli, 1994; M. Bowerman, personal communication, 17 April 1994), *we* (M. Bowerman, personal communication, 17 April 1994) and even *I* (D. Loeb, personal communication, 29 July 1997) have been observed, suggests that the phonetic core may inhibit overextensions of suppletive nominatives, but not block them out completely (Rispoli, 1998). The point for now is that the paradigm building hypothesis has something to say about nominative overextension, whereas currently formulated syntactic approaches do not.

In a more recent paper, Rispoli (1998) proposes that the rate of the prototypical pronoun case error, the overextension of the objective for the nominative, is inhibited by antagonistic patterns of overextension. By antagonism the following is intended. Two error patterns seem to be mutually inhibitory. For example, in the 1Psg pronoun, not only does *me* replace *I*, but *my* can also replace *I* (Budwig, 1989; Vainikka, 1994). In his study of a dozen children, Rispoli (1998) found that children are usually either *me*-children or *my*-children, displaying clear preferences towards one or the other as the dominant replacement for *I*. It appeared that when a child exhibited high rates of the *me* for *I* overextension, the same child also exhibited low rates of *my* for *I* overextension. The reverse situation was also true. When a child exhibited high rates of *my* for *I* overextension, the same child exhibited low rates of *me* for *I* overextension. Antagonism between patterns of overextension within a paradigm may be the general case. Applied to the 3Psg pronouns, two patterns of overextension within the same paradigm should also be antagonistic. With regard to the nominative overextensions discussed above, it is not unreasonable to ask the following question: if nominative overextensions really do exist, as reported in Rispoli (1994), might they be antagonistic to the more dominant pattern of objective for nominative overextension?

Treating the pronoun paradigms as individuals might well provide insight into the lack of uniformity of pronoun case error rate (problem a). It seems clear that *her* has an overextension rate that is noticeably higher than other

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pronominal forms. The form *her* is special in other regards, for it is the form for both 3Psg fem objective and genitive cases. In the terminology of Pinker (1984), the phonological form *her* fills two 'cells' (objective and genitive) of the 3Psg fem pronoun paradigm. A reasonable working hypothesis is that the overrepresented nature of the word form *her* impacts on the rate at which it will be overextended. If it were truly the case that *her* is overextended more than other oblique forms, it would constitute strong evidence that the structure of the individual pronoun's paradigm influences error rate.

The purpose of this paper is to test two empirical consequences of the pronoun paradigm building hypothesis of pronoun case errors. The research questions asked in this paper are the following:

Research Question 1. Is the rate of the overextension of *her* greater than the rate of the overextension of *him* and *them*?

Research Question 2. Are nominative overextensions antagonistic to overextension of the objective for the nominative?

These research questions bear on empirical problems (a) and (b) previously outlined. The first question seeks to verify the observation of a 'double-cell' effect, which appears to drive up the overextension rate of the form *her*, and thereby disturbs the uniformity of error rates across pronoun paradigms (problem a). The second research question seeks to extend our understanding of the relationship between nominative and objective overextensions (problem b). Following a proposal made in Rispoli (1998), it will test whether nominative overextensions in the 3P pronouns inhibit the more common objective overextensions.

METHOD

Participants

The participants were 29 children between the ages of 2;6 and 4;0, with a mean age of 3;1. They were recruited from child-care centres in a large urban area in the western United States. The child participants were normally developing, with no major medical complications since birth. Prior to observation, the parents reported that the children demonstrated frequent use of multi-word utterances, past-tense verb overregularizations, as well as the phenomena of interest, pronoun case errors. After transcripts of audiotaped observation sessions were made, it was found that the average Mean Words per Utterance (MWU) of the 29 child participants was 2·77, with an S.D. of 0·50. MWU was chosen as a measure of language development because it avoids the possibility of counting rote morphological forms as contributing to language complexity. Participant families were paid $15 dollars for their participation. An age appropriate book was also given for participation in the study.

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Procedures

The children and their primary caregivers were observed in two one-hour sessions, either at home or in a university playroom setting. The sessions were spaced no more than two weeks apart to minimize potential developmental change. The child–caregiver dyad was observed while engaged in three activities: (a) free play with human figure toys in a playground setting, (b) book-reading and (c) viewing family photographs. The purpose of these activities was to elicit talk using 3P pronouns. The sessions were audiotaped and context notes were taken by an observing researcher. Toys and books were selected so as to balance the number of male and female individuals represented.

Transcription and reliability

The audiotapes from the observation sessions were transcribed in the CHAT format, developed for the Child Language Database Exchange System (MacWhinney, 1995). Each transcript received two transcription passes. All child speaker utterances were transcribed during the first pass, completed within a week of the audiotaped session. During the second pass, usually within two weeks of the audiotaped session, adult utterances were filled in and all child utterances were checked again by the transcriber who performed the first pass. Independent transcript reliability was also performed on complete and intelligible child utterances in twelve randomly selected 15-minute segments by a research assistant who had neither participated in the collection of the sample nor had previously listened to the audiotape. In determining discrepancies, several minor types of mismatch were ignored: (a) forms of the same word (e.g. *bug* vs *bugs*), and (b) three pairs of words which are almost indistinguishable in child speech (*here* and *there*, *in* and *on*, *a*(*n*) and *the*). Agreement on words in child utterances for the twelve 15-minute segments ranged from 79% to 98%, with an average of 90% agreement. When the 2813 words from all 12 segments were aggregated, there was 88% agreement.

When the original and independent transcripts had differing forms of a 3P pronoun, it was considered a mismatch, with the following exceptions. In both cases, the phonetic similarity of the alleged error to the adult target was too great to ensure transcript reliability, and so these forms were not included in the subsequent analyses. When the original transcriber transcribed the genitive form *his* for the nominative form contracted with the verb *is*, *he*'*s*, the form was excluded from further analyses. This is because independent reliability transcribers seldom agreed with the transcription *his* in the subject position and almost always transcribed the grammatically correct *he*'*s*. In addition, when the original transcript had either *hers* or *his* when an adult would expect the feminine *her* 'genitive', the form was excluded from further

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analyses. Independent reliability transcribers usually heard these genitive forms as *his*.

In natural, casual adult speech the 3Pmasc and 3Pplu objective forms, *him* and *them*, are often reduced to a homophonous -'*m*. In transcribing the children's speech, both original transcriber and the independent reliability transcriber had little trouble determining which of these two forms was intended by the child based on the referent of the pronoun. Reduced objective -'*m* was retained in the database and measures of reliability contain all instances of -'*m*. Independent reliability was performed on the transcription of the 3Psg masc, 3Psg fem, and 3Pplu pronominal forms produced by the children in these 12 15-minute segments. Agreement ranged from 86% to 100% with an average agreement of 95%. When the 177 pronominal forms from these 12 segments were aggregated, there was a 93% agreement.

Coding

All non-spontaneous child utterances, such as imitations of interlocutor utterances, self-repetitions, songs, poems and routines were eliminated from the corpora for the analyses reported in this paper. The data reported in this paper are based only on complete and fully intelligible child utterances. 3Psg masc, 3Psg fem and 3Pplu pronoun forms produced by the children were scored for correct or incorrect case forms. Pronoun case errors were defined as the use of a different case form where a nominative (*he*, *she*, *they*), objective (*him*, *her*, *them*), or a genitive (*his*, *her*, *their*) was expected on the basis of the syntactic environment apparent in the surface structure of a child's sentence. The expected environment for the nominative was defined as pre-verbal or pre-adjectival (e.g. *he want that*; *she happy*), and the expected environment for objective was defined as post-verbal or post-prepositional (e.g. *give them*). The expected environment for genitive was defined as pre-nominal (e.g. *her house*). These were the same coding criteria used in Rispoli (1994). It should be noted that the contraction *they're* is homophonous with the genitive form *their*. In an effort to be conservative about coding errors, the phonetic form [ðɛr] in subject position was always considered correct.

RESULTS

Of the 29 child participants, 27 children were observed to produce at least one pronoun case error. Data from the two children who were not observed to produce any 3P pronoun case errors at all were excluded from the analyses reported here. Twenty-two of these 27 children were observed to overextend an objective pronoun for a nominative pronoun at least once. For ease of presentation, overextensions of *her* for *she* henceforth are included in the category of objective for nominative overextensions alongside *him* for *he* and *them* for *they*.

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Evidence for the double-cell effect

Research question 1 relates to the possible double-cell effect which may cause the rate of *her* for *she* overextensions to be relatively high when compared with the rates at which the other objective pronouns, *him* and *them*, are overextended for their respective nominatives. The research question is repeated for the convenience of the reader.

Research question 1. Is the rate of the overextension of *her* greater than the rate of the overextension of *him* and *them*?

Twenty-two children were observed to overextend an objective form for a nominative form. As can be seen in Table 1, there were 192 overextensions of *her* for *she* found, and 197 correct productions of *she*, representing an overextension rate of 49%. There were 71 *him* for *he* overextensions observed, and 574 correct productions of *he*, representing an objective for

TABLE 1. *Correct nominative productions subject pronoun case errors*

Pronoun	Freq.	*M*	S.D.	Range
3Psg fem				
she	197	9	15	0–57
her for *she*	192	9	10	0–36
3Psg masc				
he	574	26	21	1–43
him for *he*	71	3	5	0–17
3Pplu				
they	215	10	10	0–30
them for *they*	30	1	3	0–11

Note. $n = 22$, all children produced a minimum of one subject pronoun case error. 3Psg fem error rate = 49%, 3Psg masc error rate = 11%, and 3Pplu error rate = 12%.

nominative overextension rate of approximately 11% for the 3Psg masc pronoun. For the 3Pplu pronoun, 30 *them* for *they* overextensions were found and 215 correct productions of *they*, resulting in an objective for nominative overextension rate of approximately 12%. From these group measures, it appears that *her* had a higher overextension rate than either *him* or *them*. It also appears that *him* and *them* replaced nominatives at similar rates. Lastly, there were nearly twice as many correct productions of *he* than there were of the other two nominative forms. Recall that the stimuli were balanced in the representation of male and female referents, so that this difference between the 3Psg masc and the others was probably not due to a bias in the stimuli. Rather, it appears that there was a bias on the part of the children to produce 3Psg masc forms.

Because the estimation of error rates is affected by the number of attempts a child makes at a target, a criterion of at least five attempts at a target was

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set to include a child participant in parametric, inferential statistical analyses. Out of the 22 children who overextended an objective form for nominative, twelve were observed to produce at least five target subject pronouns for all three pronouns. The frequency of correct subject pronouns and objective for nominative overextensions for these twelve children are presented in Table

TABLE 2. *Correct nominative productions and subject pronoun case errors*

Pronoun	Freq.	*M*	S.D.	Range
3Psg fem				
she	171	14	15	0–57
her for *she*	133	11	10	0–36
3Psg masc				
he	394	33	21	16–43
him for *he*	43	4	5	0–14
3Pplu				
they	188	16	10	0–31
them for *they*	22	2	3	0–11

Note. $n = 12$, all children produced at least 5 nominative attempts in all 3P pronouns.

2. Ten of the twelve children were observed to overextend *her* for *she*. In contrast, seven of the twelve children were observed to overextend *him* for *he*, and five of the twelve were observed to overextend *them* for *they*. The most frequently occurring subject pronoun case error was *her* for *she* ($n = 133$), followed by *him* for *he* ($n = 43$), and lastly by *them* for *they* ($n = 22$). Note that the frequency of error was not merely a function of attempts to produce a subject pronoun. There were more 3Psg masc attempts ($n = 437$) than there were 3Psg fem attempts ($n = 304$). Table 2 presents pooled frequencies, not the error rates observed across the twelve children. For this information we proceed to Table 3.

TABLE 3. *Objective for nominative overextensions among 12 children*

3P pronoun	*M*	S.D.
Feminine	0·52	0·49
Masculine	0·15	0·26
Plural	0·12	0·27

Note. All children produced at least 5 nominative attempts in all 3P pronouns.

The means and standard deviations for objective for nominative overextension rates among these twelve children are shown in Table 3. The mean *her* for *she* overextension rate was 52%. Six of the twelve children exhibited 3Psg fem overextension rates of 85% or higher. In contrast, only two children exhibited a 3Psg masc overextension rate of 50% or higher. These

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same two children were the only children of the twelve who exhibited high overextension rates for the 3Pplu pronoun (57% & 100%). The mean objective for nominative overextension rates for the 3Psg masc and 3Psg plu were similar at 15% and 12% respectively. Recall that fewer children were observed to overextend *him* for *he* and *them* for *they* than were observed to overextend *her* for *she*. These differences in the number of children overextending objective for nominative forms across the pronouns may be part of the reason why the standard deviations for the 3Psg masc and 3Pplu overextension rates were larger than the means themselves.

The rates of *her*, *him* and *them* overextension for these twelve children were used as the dependent variable in a one-way repeated measures ANOVA. The results of the ANOVA were significant, $F\ (2,\ 22) = 9{\cdot}9$, $p < 0{\cdot}01$. A series of three *post-hoc* matched sample t-tests were performed to pinpoint the significant differences between the overextension rates. The *t*-tests compared: (a) the *her* for *she* rate with the *him* for *he* rate; (b) the *her* for *she* rate with the *them* for *they* rate; and (c) the *him* for *he* rate with the *them* for *they* rate. For conservative interpretation, *p* values of .01 or less were considered significant. The *her* for *she* rate differed significantly from the *him* for *he* rate, $t\ (11) = 3{\cdot}12$, $p = 0{\cdot}01$, and from the *them* for *they* rate, $t\ (11) = 3{\cdot}20$, $p < 0{\cdot}01$. In contrast, the *him* for *he* rate and *them* for *they* rate were not significantly different, $t\ (11) = 1{\cdot}55$, $p > 0{\cdot}05$ (all probabilities were two-tailed). Among these twelve children, the overextension of *her* for *she* occurred at a rate significantly higher than the overextensions of either *him* for *he* or *them* for *they*.

Recall that there were ten children who produced fewer than five attempts at one of the three subject pronouns, *he*, *she* and *they*. The data from these ten children were pooled and the objective for nominative overextension rates calculated. The overextension rate for the 3Psg fem was 38%, for the 3Psg masc 12%, and for the 3Pplu 14%. Although the differences across pronouns were found to be somewhat smaller than among the twelve children producing at least five attempts at all three subject pronouns, these pooled data provide independent confirmation of the pattern found among the first twelve children. The average overextension rate for the 3Psg fem was at least three times as large as for either the 3Pmasc or the 3Pplu, and the average overextension rates for the 3Pmasc and 3Pplu were approximately equal.

Nominative overextensions

The second research question was aimed at revealing more about the relationship between the predominant objective for nominative overextensions and the less frequent nominative overextensions.

Research question 2. Are nominative overextensions antagonistic to overextension of the objective for the nominative?

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Of the 27 children who made at least one pronoun case error, nine produced nominative overextensions. An overview of the data from these nine children is given in Table 4. The children are arranged in a numerical

TABLE 4. *Children with 3Psg masc nominative overextensions*

	Objective for nominative			Nominative overextension		
Child	Fem	Masc	Plu	Fem	Masc	Plu
13	0·00	0·00	0·00		he	they
28	0·91	0·06	0·00		he	they
2	0·00	0·04	0·00	she	he	
15	0·03	0·00	0·00	she		
3	1·00	0·00	0·00		he	
6	0·00	0·00	0·00		he	
8	1·00	0·05	N		he	
17	0·00	0·00	0·00		he	
29	0·95	0·14	0·00		he	

Note. Columns 2–4: 'N' designates the absence of an objective for nominative overextension if the child produced no more than four attempts at a subject pronoun; Proportions are displayed if the child produced five or more attempts at a subject pronoun. Columns 5–7: nominative forms designate at least 1 nominative overextension for the relevant pronoun.

sequence based on identification numbers. In columns 2 to 4 the presence or proportions of objective for nominative overextensions are displayed for the 3Psg fem (column 2), 3Psg masc (column 3) and the 3Pplu (column 4). The presence of nominative case overextensions are noted in columns 5 to 7, by the nominative form entered in the appropriate column. We see in Table 4 that only two children, 13 and 28, overextended *they* (in both cases overextending *they* for *them*), and only two children, 2 and 15, overextended *she* (in all cases for *her* genitive). The two children who overextended *they*, 13 and 28, were not observed to overextend *them* for *they* at all (column 3). Of the two children who overextended *she*, child 2 did not overextend *her* for *she*. Child 15 overextended *her* for *she* only once, representing an overextension rate of 3%. Because so few children overextended *she* and *they*, we will not pursue further comparisons between these nominative overextensions and objective for nominative overextensions in the 3Psg fem and 3Pplu pronouns. However, the data from these pronouns are congruent with the hypothesis that nominative overextensions are antagonistic to objective for nominative overextensions.

More data was available concerning the 3Psg masc pronoun. Eight children produced *he* overextensions. Five children overextended *he* for *him*, and three overextended *he* for *his*. For these eight children, the average rate at which *him* was overextended for *he* was 4%, S.D. = 4%. In order to truly test whether the *he* overextensions were antagonistic to *him* for *he* over-

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extensions, one must compare these eight children to children that did not overextend *he*. Eleven children overextended *him* for *he*, but did not overextend *he* for either *him* or *his*. The data from these children is displayed in Table 5. Of these eleven children, all but one, child 10, produced at least

TABLE 5. *Children without 3Psg nominative overextensions*

	Objective for nominative		
Child	Fem	Masc	Plu
7	0·90	0·53	0·57
10	Y	Y	0·00
12	Y	0·17	N
14	1·00	0·81	1·00
16	Y	0·03	0·33
19	Y	0·10	N
21	Y	0·45	X
23	Y	0·85	0·71
24	0·39	0·14	0·00
25	0·09	0·07	0·03
27	1·00	0·07	Y

Note. Columns 2–4: 'X' designates the total lack of subject pronoun attempts (missing data); 'Y' designates the presence, 'N' the absence of an objective for nominative overextension if the child produced no more than four attempts at a subject pronoun; Proportions are displayed if the child produced five or more attempts at a subject pronoun.

five attempts at the 3Psg masc subject pronoun. The *him* for *he* overextension rates for the remaining ten children ranged from 3 % to 81 %, a much greater range than that exhibited by the eight children who overextended *he*. For these ten children, the average rate at which *him* was overextended for *he* was 38 %, S.D. = 33 %.

The means and standard deviations of the *him* for *he* overextension rate for these two groups of children are presented in Table 6. In order to test the hypothesis that *he* overextensions and *him* for *he* overextensions are antagonistic, a non-parametric test, the median test, was used instead of a one-

TABLE 6. '*Him*' *for* '*he*' *overextensions in two groups of children*

Groups	*M*	S.D.
+*he* overextension ($n = 8$)	0·04	0·04
−*he* overextension ($n = 10$)	0·38	0·33

Note. The children in the '+*he*' group overextended *he*; the children in the '-*he*' group did not.

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way ANOVA. This was necessitated by the very large difference in variance between these two groups. The median of the *him* for *he* overextension rate for all 18 children was 7%. Of the eight children who overextended *he*, seven exhibited *him* for *he* overextension rates equal to or below the median. Of the ten children not observed to overextend *he*, seven exhibited rates of *him* for *he* overextension greater than the median. The results of the median test were significant, the Fisher exact probability (1-tailed) = 0·02. These data support the hypothesis that the overextension of the nominative *he* is antagonistic to the predominant overextension of *him* for *he*.

It is interesting to consider the relationship of nominative case overextensions to the overall patterns of objective for nominative overextensions exhibited by these children. The nine children who produced nominative overextensions (Table 4) produced objective for nominative overextensions in two pronouns at most, the 3Psg fem and 3Psg masc, but were never observed to produced objective for nominative overextensions in the 3Pplu. Conversely, six children, 7, 14, 16, 23, 25 and 27, produced objective for nominative overextensions in all three 3P pronouns (Table 5). These six children produced no nominative overextensions. This observation is interesting and deserves further research. It suggests that nominative overextensions might be related to some global aspect of pronoun case error patterns across the 3P pronouns.

Summary of results

It is evident that the 3Psg fem is different. By any measure, *her* is frequently overextended for *she*. The rate at which *her* is overextended for *she* was at least three times that at which *him* and *them* were overextended for *he* and *they*. Five of the children in this study who produced at least five attempts at the nominative feminine pronoun, replaced *she* with *her* 100% of the time. This finding replicates the results reported in Rispoli (1994), in which it was also found that the overextension of *her* far exceeded that of any other pronominal form, and the results of Moore (1995) in which case errors were more prevalent in the 3Psg feminine than in the 3Psg masculine. Clearly, there is something different about the 3Psg fem pronoun.

The relatively uncommon overextension of *he* was found to be antagonistic to the more frequently observed overextension of *him* for *he*. This also seems to be the case with regard to the 3Psg fem and 3Pplu pronoun. However, too few children overextended *she* and *they* to allow statistical inferential techniques to be used with these pronouns. In this study, nominative overextensions were never observed in a child who made subject pronoun case errors across the board, in all three pronouns at once. It may be that nominative overextensions may in some way be related to general patterns of pronoun case error across the 3P pronouns. To the author's knowledge, this

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is the first time such an antagonistic relationship between two types of pronoun case error has been detected, and these findings are in need of independent verification.

DISCUSSION

In the introduction to this paper, two characteristics of pronoun case error that challenge the developmental syntax approaches were outlined. These empirical problems are: (a) the rate of pronoun case error is not uniform across pronouns, and (b) the existence of nominative overextensions. Whereas these characteristics of the phenomenon do not invalidate current developmental syntactic approaches, they strongly suggest that pronoun case errors do not directly reflect the state of the development of INFL and its grammatical features. It was suggested that the pronoun paradigm building hypothesis (Rispoli, 1994), held some promise for understanding why this is so. This is because the paradigm building approach recognizes that the pronoun case error phenomenon does not purely reflect syntactic developments. Rather, there is a healthy dose of paradigm acquisition going on as well. The implication of the double-cell effect alone is sufficient to demonstrate the following point. If our goal is to make predictions about rates and patterns of pronoun case errors, we must take into account the structure of the individual pronoun' s paradigm.

The double-cell effect and the antagonism of nominative overextensions to the more frequently observed objective for nominative overextensions are outcomes of the way children acquire paradigms. In a recent paper mainly concerned with errors in the 1Psg pronoun, Rispoli (1998) outlines a model of pronoun case error that incorporates principles of lexical retrieval into the more general paradigm building approach, in order to account for a wide array of empirical observations concerning attested patterns of pronoun case errors. The model is based on the premise that, in retrieving a pronoun, the grammatical features of PERSON, NUMBER, GENDER and CASE guide the search for a lexical form (Levelt, 1989). Lexical form is itself broken down into word forms and the phonological information out of which the word forms are constructed (Dell, 1986). To these premises concerning lexical retrieval, a further assumption is added that during the early multiword phase of syntactic development, the influence of the grammatical feature case in the retrieval process is weak or intermittent (Schutze & Wexler, 1996; Schutze, 1997).

Figure 1 is an attempt to represent a retrieval system in which the person, number and gender features are active, but in which case features are attenuated. In this system, the features 3Psg masc activate information that is distributed into two tiers of output units: (a) words, including the forms *he*, *him*, and *his* and (b) subsyllabic units, including onsets and rimes of the

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above three word forms. If this were an adult system, case would also activate output units. The convergence of activation from person, number, and gender, on the one hand and case on the other would ensure the retrieval of the proper case form. However, initially, case features do not regularly activate any output units, hence the dotted lines.

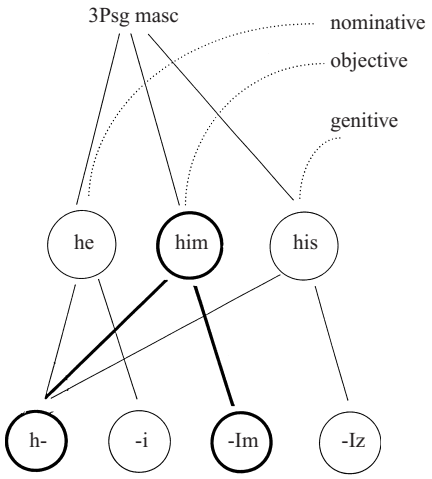


Fig. 1. 3Psg masc pronoun retrieval biased toward *him* overextensions

The *him* for *he* overextension is undoubtedly the predominant pronoun case error in this paradigm. Because the objective form appears in many types of syntactically unrestricted structures (see Schutze, 1997 for a review of these structures), its representation as a *word* is especially strong. Figure 1 is an attempt to represent a retrieval system in which the retrieval strength of the word form *him* outweighs that of all other word forms in the 3Psg masc paradigm. The increased retrieval strength of an output unit is symbolized by the darkness of the circle surrounding the unit. The retrieval strength of *him* is transmitted to subsyllabic units at the next level of output, as symbolized by the bold line descending from *him* to the onset [h-] and the rime [-Im]. In essence, *him* is overextended the most frequently because of its retrieval strength.

But how do nominative overextensions arise? Whereas the overextension of *him* is predominant, it is not the only possible overextension in this model. Turning to Fig. 2, we see a retrieval system in which the retrieval strengths of all three word forms in the paradigm are in balance. As first pointed out by Rispoli (1994), the word form *he* contains the paradigm's phonetic core, the onset [h-]. In this model, some activation is given to the onset [h-] whenever a 3Psg masc pronoun is produced, increasing the chance that a *he* overextension might occur. This model also helps to illuminate the an-

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tagonistic relationship between nominative overextensions and the more common objective overextensions. If the word form *he* has enough retrieval strength to be activated in an overextension, then it has some retrieval strength to resist being the target of an overextension. The model helps to explain how nominative overextensions can arise and why they are antagonistic to the predominant objective overextension.

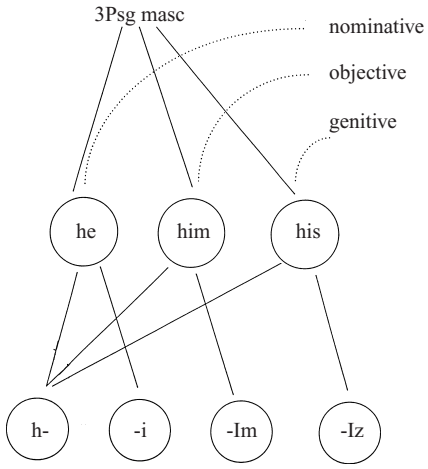


Fig. 2. Unbiased 3Psg masc pronoun retrieval.

If the onset [h-] is present in all three forms of the 3Psg masc pronoun, why, then, is *his* not overextended? There are two possible explanations congruent with the model presented in this paper. The first is that *his* actually does get overextended. As Vainikka (1994) suggests, the overextension of *his* may well be disguised by our data collection techniques as transcribed instances of the contraction *he's*. In performing the independent reliability for this study, it was found that *his* for *he's* overextensions were not consistently verifiable, and therefore were never counted. Should the existence of such overextensions be verified in the future, the case for this model would be strengthened, because this model allows for the possibility of genitive overextensions, just as it allows for the possibility of nominative overextensions. Moreover, the model has associated with it a further prediction concerning possible genitive overextensions. Like nominative overextensions, they too should be antagonistic to the predominant objective overextensions (Rispoli, 1998).

There is still a second explanation for why *he* might be more likely to be overextended than *his*, and this explanation should not be overlooked. The rime [-I] is found elsewhere in an EXTENDED 3Psg paradigm, namely the 3Psg fem nominative form *she*. Thus, the rime [-I] might well be receiving more

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activation than the rime [-Iz], because of its relationship to nominative case. This explanation entails connections across person and number features, and translates into an empirical prediction. Children who make 'gender errors' of the type *he* for *she* should also exhibit low rates of subject pronoun case error in the 3Psg masc pronoun. If *he* has enough retrieval strength to be overextended for *she*, then it should be more resistant to the overextension of *him* and *his*. It is interesting that Loeb & Leonard (1991) found that the children with specific language impairment, whom they tested, fell into two subgroups: (a) those producing high rates of objective for nominative overextension but no gender errors, and (b) those producing gender errors but relatively low rates of objective for nominative overextension. It might well be that in the extended 3Psg paradigm, gender errors like the overextension of *he* for *she* are antagonistic to objective for nominative overextension. Clearly, there is room for more research in the relationship between pronoun case errors and so called gender errors.

In this model, the mechanisms which cause pronoun case errors are clearly sensitive to the number of possible forms in a pronoun paradigm. In English, there are three possible case forms: nominative (subject), objective (object) and genitive (possessive). The mechanisms are also sensitive to the number of actual forms in a pronoun's paradigm. As can be seen in Figure 3, the 3Psg fem has only two actual word forms, with *her* doing double duty as both the objective and genitive. This gives rise to the double-cell effect. The retrieval strength of *her* can more easily exceed that of *she* during the period of pronoun case errors. The heightened retrieval strength of *her* is symbolized by the darkened circle surrounding *her* and the bold lines leading to and from *her*. It should be born in mind that high rates of the *her* for *she* overextension are not a necessity or foregone conclusion for every child. In this model and as we have seen in this study, the double-cell effect can be mediated by the retrieval strength of *she*. The *her* for *she* overextension is simply more likely than other case errors. It is not an absolute necessity.

This model can be extended beyond the 1Psg pronoun (Rispoli, 1998) and 3P pronouns. The model has empirical consequences concerning the 2P pronoun. The word form *you* should be overextended for *your* at a greater rate than the reverse, because *you* fills two cells of its paradigm. We should, therefore, see a double-cell effect. However, it should also be kept in mind that the genitive *your* may be somewhat resistant to replacement by *you* because of the phonological consistency of the 2P paradigm (i.e. the phonetic core [j-]). Thus, *you* might be overextended for *your* at a lower rate than *her* is overextended for *she*.

In stark contrast to other pronouns, the first person plural (1Pplu) pronoun, *we*, *us*, *our*, has little internal phonetic consistency. Of course, we should expect *us* to be overextended by virtue of the fact that it is the

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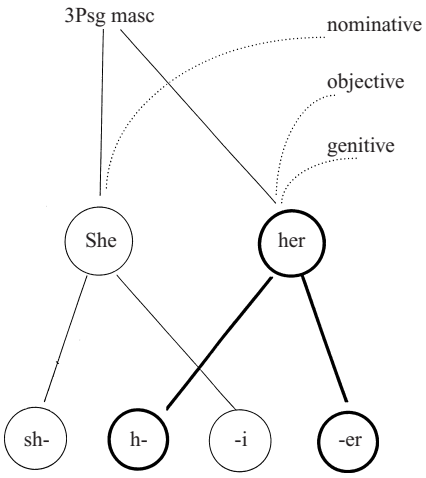


Fig. 3. Double-cell effect in the 3Psg fem pronoun retrieval system

objective form, and there is evidence that this is so (Huxley, 1970). On the other hand, each form has its own unique onset and rime, which means that no form benefits from phonetic consistency. Overextensions of *we* and *our* have been observed (see examples 6 and 9 in the introductory portion of this paper), but it remains for future research to determine the extent of these overextensions and the conditions under which they arise.

The model of pronoun case error as presented rests on certain assumptions. For example, it is assumed that a pronoun paradigm has three possible case forms: nominative, objective and genitive. However, there is a fourth pronominal form which, for historical reasons, always bears phonological resemblance to the genitive. The proforms *mine*, *yours*, *his*, *hers*, *theirs*, etc. are possessive in meaning, but they are not syntactically restricted in the way genitive case forms (which are actually determiners), objective forms (which are usually complements), or nominative forms (which are found in the specifier position of the Inflectional Phrase) are restricted. The fact that these possessive forms are not restricted by case assignment principles is the theoretical rationale for excluding them from the model. On the other hand, overextensions of *mine* for *my* have been observed (Bloom, 1970). The overextensions of *mine* for *my* are probably caused by commonalities at the phonological and semantic levels. The relatedness of the two possessive forms might well complicate the model presented here. It is possible that the two possessives cohere in their own paradigm, separate but related to the paradigm of syntactically determined case forms. This is admittedly speculative, but it should be pointed out that overextensions of *mine* for *I* or *theirs*

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for *they* do not seem to be as well attested as well as patterns of overextension within the three case form paradigms. Note that in the 3Psg masc, the two possessive forms are identical, *his*, but until we are better at verifying overextensions of *his*, there is no way of knowing whether his_1 and his_2 form their own double-cell.

Finally, there are limitations both to this study and to the model of pronoun case error presented here. The role of the input frequency of individual pronoun forms has not been discussed, but clearly this may be a factor involved in the retrieval strength of the various forms of a pronoun. The model presented here needs to be tested crosslinguistically. At present, two studies (Powers, 1995; Anderson, 1998) indicate the influence of phonetic cores in Dutch and Spanish pronoun case errors. Crosslinguistic research on the possibility of double-cell effects and nominative overextensions in other languages remains for the future. Lastly, the study reported in this paper and the model outlined here are both concerned with the production of pronoun case forms, not the comprehension of pronoun case forms. The question of how this model of production relates to comprehension is entirely open. Webster & Ingram (1974) looked specifically at the relationship between the comprehension and production of pronoun case distinctions, and their results indicate that this relationship may be complex and given to individual variation. Consideration of the relationship between comprehension and production of pronoun case forms goes beyond the scope of this paper.

CONCLUSION

The model presented in this paper accounts for a wide array of attested pronoun case errors. This model begins to account for noticeable differences in overextension rates across pronouns, such as the double-cell effect in the 3Psg fem pronoun. It can account for the less common nominative overextension, as well as the predominant form of overextension, objective for nominative. Moreover, the model helps explain how the error patterns are related to one another. These relationships have been ignored by researchers solely interested in subject pronoun case errors as a reflection of syntactic development. Evidence is accumulating that patterns of pronoun case errors are not entirely a reflection of developments in syntax, and that the process of learning a word-specific pronoun paradigm makes a significant contribution to the phenomenon. The model is tentative, but has the advantage of being empirically testable. In this model, all patterns of replacement are possible, but some are more likely than others for reasons that are ultimately related to lexical retrieval in developing paradigms. Therefore, no error is treated as inconvenient noise. All patterns of pronoun case error, no matter

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how infrequent, have the potential of informing us about the mechanisms behind this hallmark phenomenon in English child language.

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