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Li Jia

Robert Bayley

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Li Jia and Robert Bayley

1 Introduction

In Mandarin, pronominal subjects may be expressed overtly or as null in all persons in both singular and plural (1-3).

(1) Shangci Ø [1 sg] you jian shi meiyou wen ni.
last time Ø [1 sg] exist CL matter NEG ask you[2]
'There was one thing that I didn't ask you last time.'

(2) Ø [2 sg] Yao duo kan shu, Ø [2 sg] ting mei tingjian, David?
Ø [2 sg] must many look book Ø [2 sg] hear NEG hear David
'David, you must read more. Did you hear me?'

(3) Tamen [3 pl] bu cuo.
They NEG wrong
'They are doing fine.'

In addition, Mandarin allows null objects (4).

(4) Zhangsan shuo Lisi meiyou kanjian Ø.
Zhangsan say Lisi NEG see [him]
'Zhangsan said Lisi did not see him.'

Although variation in the use of null objects offers intriguing possibilities for study, in this paper we restrict our attention to null subjects because we wish to compare the constraints on this variable in a language that does not mark person or number on the verb with the constraints on languages such as Spanish that do distinguish between person and number throughout the verbal paradigm.

Variation in the use of pronominal subjects has been extensively studied in many languages, including American Sign Language (ASL) (Wulf, Dudis, Bayley, and Lucas in press), Brazilian Portuguese (Naro 1981; Paredes Silva

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[2] In accord with Li and Thompson (1981), we use the following abbreviations in the morpheme-by-morpheme glosses of Chinese examples: CL, classifier; EXP, experiential aspect (*-guo*); NEG, negative (*bù, mei(you)*); NOM, nominalizer (*de*); PFV, perfective aspect (*-le*), question (*ma*); RF, reduce forcefulness (*a*).

1993), and numerous dialects of Spanish (see e.g. Avila-Jiméniz 1996; Barrenechea and Alonso 1977; Bayley and Pease-Alvarez 1996, 1997; Bentivoglio, 1987; Cameron 1992, 1993, 1996; Enríquez 1984; Flores and Toro 2000; Hochberg 1986a, 1986b; Morales 1986; Ranson 1991; Silva-Corvalán 1994). Studies have shown that null pronoun variation is constrained by multiple linguistic factors, including coreference with the subject of the preceding clause, person, and number. However, with the exception of Wulf et al.'s study of variable subject presence with ASL plain verbs,[3] research to date has primarily examined languages with rich inflectional morphologies such as Spanish and Portuguese. Although null subjects (and null objects) in Chinese have been examined from a GB perspective (e.g. Huang 1984), no study has examined null pronoun variation in Chinese or any other spoken language with verbal systems that does not use inflectional morphology to distinguish person and number.

This study examines variation in the use of null and overt subject pronouns by speakers of Mandarin. Approximately 1,400 tokens of possible sites of variation were extracted from data collected in two different contexts: conversations among family members and friends and teacher discourse in two Chinese language heritage schools in the southwestern United States. Results of multivariate analysis show that null pronoun variation in Chinese is systematically conditioned by multiple constraints including coreference with the subject of the preceding clause, person and number, and sentence type. In some respects, the constraint ranking closely approximates that found in studies of other languages, including ASL, Portuguese, and Spanish. Despite overall similarities in the constraints on null pronoun variation in Chinese and in languages with rich inflectional morphological systems, our results do reveal several important differences which we suggest have implications for sociolinguistic methodology. Specifically, our results show a major difference between the two contexts in the use of overt vs. null pronouns.

The paper is organized as follows. We first describe the methods of the present study. We then present the results of quantitative analysis. Finally, we explore the implications of these results for the cross-linguistic study of null pronoun variation, with special attention to the influence of discourse context on the use of syntactic variables.

[3] In ASL, information about the subject is only sometimes provided through morphology. Certain verbs allow changes in form (i.e., in their use of space) that indicate the person and/or number of the subject. In the case of 'plain verbs' (Padden 1988), the verb form itself includes no information about the subject. In cases where the subject of a plain verb is null, the subject must be inferred from the context.

2 Methods

2.1 Speakers

Sixteen speakers participated in the study, ranging in age from 19 to 73. Although their places of origin and current residence varied widely, all were educated native-speakers of Mandarin. Their demographic characteristics and the context in which they were recorded are summarized in table 1.

Speaker	Birthplace	Age	Gender	Occupation	Context
1	Beijing	41	F	teacher	Chinese School
2	Liaoning	39	F	teacher	Chinese School
3	Jilin	49	F	teacher	Phone convers.
4	Jilin	72	M	physician	Phone convers.
5	Jilin	73	F	teacher	Phone convers.
6	Jilin	47	M	teacher	Phone convers.
7	Henan	42	M	univ. admin.	Phone convers.
8	Henan	19	M	student	Phone convers.
9	Fujian	58	M	univ. admin.	Phone convers.
10	Liaoning	50	M	univ. admin.	Phone convers.
11	Henan	45	M	univ. admin.	Phone convers.
12	Sichuan	39	F	univ. admin.	Phone convers.
13	Jilin	26	F	student	Phone convers.
14	Liaoning	53	F	univ. admin.	Phone convers.
15	Inner Mongolia	33	F	univ. admin.	Phone convers.
16	Inner Mongolia	31	F	univ. admin.	Phone convers.

Table 1. Speaker Characteristics

2.2 Data Elicitation

The data on which this study is based come from two separate sources, selected to provide a maximum stylistic contrast. Conversational data consist of approximately four and a half hours of recorded telephone conversations between the first author and friends and family members in China. All persons were aware that they were being recorded. Classroom data, originally collected as part of a study of language socialization of Chinese-descent children in the United States, consist of approximately six hours of talk by teachers in two Chinese heritage schools. For the classroom context, we restricted our analysis to the teachers' language for two reasons. First, we did

not have informal conversational data from Chinese native-speaking children. Second, the children in the heritage schools, located in a city in which Chinese constitute less than one percent of the population, were not fluent speakers of Chinese. Indeed, they were attending the schools to learn, or in some cases to reacquire, their parents' native language.

2.3 Data Reduction

Data were transcribed in standard *hanyu pinyin* orthography (the Romanization system used in the People's Republic). All potential sites of overt or null personal subject pronouns were identified. Tokens in contexts that require or prohibit an overt pronoun were excluded, as were tokens where the subject could not be reliably identified. Exclusions are summarized in table 2. (See Yip and Rimmington 1997 for further details on environments that categorically require or prohibit an overt pronoun.)

Category	Example
Pronoun obligatorily present	
The pivotal noun phrase in a serial verb construction	Wo xiang rang tamen lai. (I want them to come.)
With adjective predicate in declaratives	Ta hen gao. (He is very tall.)
Conventional abbreviations	
Pronoun present	
Greetings	Ni hao! (How do you do!)
Pronoun absent	
Thanks, good wishes, apologies	Ø Xiexie ni. (1 sg thank you.)
Approval	Ø Dui! (You're right.)
Request, warning	Ø Baozhong. (2 sg take care.)

Table 2. Exclusions from Quantitative Analysis

2.4 Coding

After exclusion of categorical contexts, all remaining +human sites of possible subject pronoun expression were coded for a range of linguistic and social factors: person and number, coreference with the subject of the preceding VP, sentence type, grammatical aspect, discourse context, and gender. We shall briefly describe the coding scheme used for each of the linguistic factor groups.

As in previous studies, factors were coded for person and number. Chinese distinguishes first (*wo*), second (*ni*), and third person (*ta*) pronouns. The

plural is formed by the addition of the suffix *-men*. Tokens were also coded according to whether the subject was coreferential with the subject of the previous clause (5), or whether there was a switch in reference (6).

(5) Ø [1 sg] xiwang you yi tian Ø [1 sg] zai he nimen [2 pl]
I hope exist one day I again with you
yiqi ganbei a!
together cheers RF
'I hope I can drink a toast with you again in the future.'

(6) Wo [1 sg] zhidao nimen [2 pl] pa gei wo [1 sg] tian fudan.
I know you fear give me add burden
'I know you are afraid of giving me too much trouble.'

Coding tokens for co- or switch reference, however, raised analytical issues. Many previous studies have viewed coreference as a binary factor group, a classification that suffices in most cases (but see Bayley and Pease-Alvarez 1996, 1997 on Mexican American Spanish and Paredes Silva 1993 on written Brazilian Portuguese). However, our data contain a number of examples where the subject of one VP partially overlaps with the subject of the following VP, for example.

Cameron (1992) handles such cases by means of a separate factor group that he terms "set to elements saliency." We reasoned that sentences such as (7) represent partial switches in reference that should be coded as a separate factor in the coreference factor group. In addition, the coreference factor group includes a separate factor for switch in surface form but not in underlying entity, a common situation in conversation (8).

(7) Wo [1 sg] xiang women [1 pl] hai shi yao hui qu.
I think we still be want back go
'I think we still want to go back.'

(8) Ni he qita zai meiguo de ren you lianxi ma?
2 sg and other in U.S. NOM people have contact Q
'Do you have any contact with the other colleagues in the U.S.?'
Ø [1 sg] he Wang Liu liangkou da guo dianhua.
Ø and Wang Liu couple beat EXP phone call
'I talked with Wang and Liu over the phone.'

Tokens were also coded according the type of sentence in which they appeared, statement (declarative and conditional), question, or imperative, as illustrated in (9), (10), and (11) respectively.

(9) Yi hui er wo [1 sg] yao ti wenti.
One moment I will raise question
'I will ask questions in a moment.'
(10) Ø [2 pl] Du mei du kewen?
Ø [2 pl] read NEG read text
'Did you read the text or not?'
(11) Ø [2 pl] Bu yao guang kan.
Ø [2 pl] NEG must only read
'Don't just read.'

Finally, on the basis of previous work on Spanish suggesting that verbs in the preterit, in which the event is foregrounded and dynamic (Bayley and Pease-Alvarez 1997; Silva-Corvalán 1994), would be less likely to be used with overt pronouns than verbs of other classes, we also coded for whether the verb was perfective (marked by the suffix *-le*) (12), or imperfective (13).

(12) Ø [1 sg] Zhi zoule ji jia.
I only walk-PFV several home
'I visited only a few families.'
(13) Ø [3 sg] Xianzai zai deng jiangxuejin.
she now DUR wait scholarship
'She is waiting for her scholarship now.'

3 Results

Results of multivariate analysis of 1,400 tokens with GoldVarb (Rand and Sankoff 1990) indicate that null pronoun variation in Chinese is systematic and constrained by multiple linguistic factors. Overall results show that speakers in this study used overt pronouns at a rate of 53 percent. Linguistic factor groups found to be significant at the .05 level were person and number, switch reference, and sentence type. The discourse context also proved highly significant. As we shall show, the distribution of second person forms in particular differs greatly in the two contexts examined here. Grammatical aspect and gender proved not to be statistically significant and will not be discussed further.

Table 3 shows the results for significant factor groups, with use of an overt pronoun defined as the application value.[4] Note that we have combined

[4] There are a variety of reasons for selecting the overt rather than the null variant as the application value. First, several acquisition researchers working within a principles and parameters model have claimed that the –pro is the unmarked setting in UG

factors within groups that did not differ significantly from one another where we had linguistic justification for doing so.

3.1 Coreference

As expected, a switch in reference favored use of an overt pronoun (p = .560). In cases were there was no switch in reference, overt pronouns were disfavored (p = .427). Cases where there was a partial overlap with the subject of the preceding VP (*wo* 'I', *women* 'we') patterned with switches in references. Cases where there was a switch in surface form but not in underlying entity did not differ significantly from cases where the subject was coreferential with the subject of the preceding VP. In this respect, then, subject pronoun variation in Mandarin Chinese is similar to languages such as ASL, Portuguese, and Spanish in which this variable has been studied.

3.2 Person and Number

Coding for person and number presented few problems. However, a number of issues arose in the quantitative analysis. We had originally coded person and number and discourse context as separate factor groups. In our initial analysis both groups proved to be highly significant. The results of the initial analysis, though, with a chi-square per cell greater than 3.5, indicated that there was considerable interaction between these two groups.

Closer inspection of the data revealed that most of the interaction arose in the second person singular and plural. We therefore combined the two factor groups and these are the results shown in table 3. Here we see that, as in other languages, first person singular favors the use of an overt pronoun (p = .580). Speakers used overt pronouns at a rate of 66 percent in this context. Unlike ASL and Spanish, however, among the Mandarin speakers studied here, first person plural also favors use of an overt pronoun (p = .550). Second and third person singular subjects, except for second person singular in classroom discourse, are neutral (p = .494), while third person plural subjects disfavor overt pronouns (p = .396). Second person plural subjects strongly disfavor overt pronouns in the classroom context (p = .190). Finally, the two contexts that we view as unexpected in the discourse context, second person

(e.g. Hyams, 1986, 1989; Jaeggli and Safir 1989; White 1989). Second, aside from Paredes Silva (1993), the studies that are most relevant to our inquiry (Bayley and Pease-Alvarez 1997; Cameron 1992, 1996; Silva-Corvalán 1994; Wulf et al. in press) selected the overt variant as the application value. Thus, for ease of comparison, as well as on the grounds of its wider distribution, we also selected the overt variant as the application value in our statistical analysis

singular in the classroom and second person plural in the conversational data, strongly favor overt pronouns (p = .620).

Factor Group	Factor	Weight	% overt pronoun	N
Coreference	Switch	.560	59	772
	No switch	.427	46	628
Person/number	1 sg	.580	66	393
	2, 3 sg (except 2 sg class)	.494	54	355
	1 pl	.550	58	203
	2 pl (class only)	.190	15	178
	3 pl	.396	53	36
	Contextually marked (2 sg class; 2 pl conv.)	.620	56	235
Sentence type	Statement	.588	64	854
	Question	.434	44	300
	Imperative	.288	27	246
Total	Input	.521	53	1400

X^2/cell = 1.3775; log likelihood = –859.337; all factor groups significant at $p < .05$.

Table 3. Null Pronoun Variation in Mandarin Chinese Conversational and Classroom Discourse

To obtain a clearer picture of the interaction between second person and discourse context, we performed a separate analysis from which we excluded all except the 526 second person tokens (Table 4).

Factor Group	Factor	Weight	% overt pronoun	N
Coreference	Switch	.597	48	267
	No switch	.401	32	259
Number by context	sg classroom	.695	56	215
	pl conversation	.637	60	20
	sg conversation	.559	45	113
	pl classroom	.230	15	178
Sentence type	Statement	.767	67	147
	Question	.461	36	168
	Imperative	.330	24	211
Total	Input	.357	40	526

X^2/cell = .9687; log likelihood = –276.833; all factor groups significant at $p < .05$.

Table 4. Null Pronoun Variation in Mandarin Chinese Conversational and Classroom Discourse: Second Person Only

As Table 4 shows, even with this reduced data set, switch reference and sentence type remained significant. The order of factors in the number by context factor group is singular classroom (.695) > plural conversation (.637) > singular conversation (.559) > plural classroom (.230). How may these results be accounted for?

We suggest that the distribution of second person pronominal subjects in these two contexts may be accounted for by a consideration of what is the unexpected form within a particular discourse context. In the classrooms where data were collected, teachers generally followed traditional Chinese pedagogical practice. They usually stood before the class and addressed all the members of the class as a group. As table 4 shows, second person plural pronouns were seldom expressed overtly. However, when the teachers departed from the expected practice and addressed children individually, which they also did frequently, they used overt pronouns 56 percent of the time. The conversational data come from telephone interactions, which, except in unusual cases such as conference calls, normally involve only two people. In one-to-one telephone conversations, the second person singular is clearly the expected form. Our results show that overt second person singular pronouns are used at a rate of 45 percent, slightly less than the overall rate of 53 percent for the full data set. In contrast, on the few occasions when second person plural pronouns are used in the phone conversations (n = 20)—to inquire about the interlocutor and his or her spouse or family, for example—the overt form *nimen* is used 60 percent of the time.

3.3 Sentence Type

Sentence type proved to be highly significant in both the full analysis and in the analysis restricted to second person subjects. In the full analysis, in statements, which included both declaratives and conditionals, overt pronouns were used at a rate of 64 percent ($p = .588$). In questions, overt pronouns were used at a rate of 44 percent ($p = .434$). The rate of overt pronoun use in imperatives was only 27 percent ($p = .288$).

4 Discussion

4.1 Cross-linguistic Constraints and the Effect of Discourse Context

A number of the constraints seen in this study closely match results reported for other languages. Thus, as in ASL (Wulf et al. in press), written Brazilian Portuguese (Paredes Silva 1993), and Spanish (e.g. Bayley and Pease-Alvarez 1996, 1997; Cameron 1992; Morales 1986; Silva-Corvalán 1994), a

switch in reference from the subject of the preceding verb favors an overt pronoun while subject continuity favors a null form. Also, the results for first person singular shown in table 3 match the results of studies of other languages (but cf. Paredes Silva 1993 on written Brazilian Portuguese). That is, like ASL signers and speakers of Spanish, the Chinese speakers examined here favor overt first person singular forms. Table 5 compares percentages of overt pronoun use by person and number in Mandarin, ASL, Brazilian Portuguese, and several varieties of Spanish.

As we can see, several of the results for the person and number factor group reported on here differ from results of studies of Spanish varieties in particular. The greatest difference is in the results for first and third person plural. The Chinese speakers use overt first person plural pronouns at a rate of 58 percent, compared to only 9 percent among the Mexican immigrant and Chicano children reported on by Bayley and Pease-Alvarez (1997) and 12 percent among the Mexican immigrant and Chicano adults studied by Silva-Corvalán (1994). Similar disparities may be seen in the third person plural. Finally, the overall rate of overt pronoun use by the Chinese speakers studied here is relatively high—53 percent compared to only 30 percent among the Los Angeles Spanish speakers Silva-Corvalán studied.

Person/ number	Chinese	ASL	Mex Am Spanish 1	Mex Am Spanish 2	Puerto Rican Spanish	Brazilian Port.
1 sg	66	41	37	34	42	23
2 sg	45/56	38	33*	20	–	68
3 sg	57	21	25	26	37	50
1 pl	58	13	9	12	18	–
2 pl	60*/15	25*	–	–	–	–
3 pl	53	43*	20	16	18	–

Notes: For Chinese 2 sg and pl, the first number is the percentage from the conversational data, the second from the classroom data. Sources: ASL, Wulf et al. (in press); Mexican American Spanish 1: Bayley and Pease-Alvarez (1997); Mexican-American Spanish 2, Silva-Corvalán (1994); Puerto Rican Spanish, Morales (1986); Brazilian Portuguese (written), Paredes Silva (1993). * = low token count.

Table 5. Overt pronoun use in Mandarin Chinese, ASL, Spanish, and Brazilian Portuguese by Person and Number (percentages)

The comparison of results of studies of Spanish varieties with the Chinese results presented here would seem to lend support to a functionalist explanation. That is, we might argue that speakers of Chinese use more overt

pronouns than speakers of Spanish because Chinese verbs, unlike Spanish verbs, do not provide any information about the person or number of the subject. Hence, we would expect a higher rate of overt pronoun use. The ASL results shown in table 5, however, caution us against adopting this simple—and superficially plausible—explanation. The ASL results come from a study of variable subject presence with ASL 'plain' verbs, a class of verbs that contain no information about the subject in the verb form. And, with the exception of third person plural subjects, for which there was a very low token count (n = 14), the frequencies of overt pronouns in Wulf et al.'s study more closely resemble the frequencies found in studies of Spanish varieties than in the Chinese data reported on in this paper. It seems then that a functionalist explanation cannot fully account for the difference in the use of overt pronouns by speakers of a language that does not mark person and number on the verb and speakers of a language that distinguishes person and number throughout the verbal paradigm. Rather, explanations must be sought elsewhere. We suggest the nature of the discourse type within particular contexts provides a more promising starting point in our search for an explanation.

As noted previously, our analysis showed a strong interaction between discourse context and the distribution of overt and null subjects, particularly in the second person. In the classroom teacher discourse, the second person plural was the expected form, and the teachers in our study used very few pronouns in this environment. It might be objected that teacher discourse in the classrooms contained large numbers of questions and commands which, as the results in tables 3 and 4 show, disfavor overt pronouns. However, the prevalence of questions and commands in the classroom discourse is unlikely to be the sole reason, or even the main reason, for the low incidence of overt second person plural pronouns. As table 4 shows, second person singular subjects in classroom discourse, which also frequently occur in questions or commands, strongly favor overt pronouns. In fact, 48 percent of the questions addressed to individual students (n = 65) contained overt pronouns, compared to only 9 percent of the questions addressed to the class as a group (n = 56). Forty-five percent of the pronominal subjects of teacher imperatives directed to individual students (n = 83) were overt, compared to only 8 percent of the pronominal subjects of imperatives directed to the class as a whole (n = 90). Finally, as noted earlier, in conversational data, singular and plural second person pronouns pattern in the opposite way, although the difference between singular and plural is not nearly as great in the conversational data as it is in the classroom data.

4.2 Implications for Sociolinguistic Methodology

The Chinese results for second person pronouns, we suggest, have potentially important implications for sociolinguistic methodology. Specifically, if as our results indicate, the constraints on well-studied morphosyntactic variables such as subject pronoun presence or absence are ordered differently depending on the discourse context, we need to examine data from many more contexts than sociolinguistic interviews before generalizing about constraint orders. In the case of phonological variables, we may be able to assume that the ordering of constraints will remain constant, regardless of the nature of the discourse or the context in which the variable occurs. For example, we have ample evidence that speakers of English always delete -t,d from consonant clusters more often in pre-consonantal than in pre-vocalic environments (Guy 1980; Wolfram and Schilling-Estes 1998). In the case of morphosyntactic variables such as null pronouns, however, we have no such assurance. In fact, as we have shown, we have evidence that this is not the case, not only in this study but in other studies as well. Paredes Silva, for example, suggests that the low rate of overt first person singular pronouns in her study of informal written Brazilian Portuguese may be attributable to the influence of a prescriptive norm (1993, 46). Moreover, one possible explanation for the very similar results in Bayley and Pease-Alvarez's (1997) study of children's Spanish and Wulf et al.'s (in press) study may be that the data for both studies consisted of narratives of personal experience. However, that is a topic for future investigation.

5 Conclusion

The results of multivariate analysis show that null pronoun variation in Mandarin Chinese is systematic and subject to multiple linguistic constraints: coreference with the subject of the preceding clause, person and number, and sentence type. The results also show that the discourse context interacts with the person and number factor group. Specifically, the patterning of null and overt second person pronouns differs dramatically according to the discourse context. In teacher discourse, second person plural subjects favor the null option. In telephone conversations among friend and family, second person plural subjects favor overt pronouns. For second person singular pronouns, the two discourse contexts have the opposite effect. These results, as well as the comparison of null pronoun variation across languages and modalities, suggest that studies of morphosyntactic variables need to be based on data collected in a wider variety of contexts than is usually the case because the discourse context may well effect the constraint ordering.

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Division of Bicultural-Bilingual Studies
University of Texas at San Antonio
San Antonio, TX 78249-0653
jiali9@yahoo.com
rbayley@utsa.edu