Linguistic Zero in Asia:
from Pāṇini to Pro-Drop

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As a tigress carries her cubs between her two rows of teeth, taking care lest they be dropped or bitten, so should one pronounce the Vedic speech-sounds with care, lest sounds be improperly be dropped or too strongly enunciated.

From the Pāṇiniyaçikṣa.

1. Introduction

This tigress, one assumes, would be acting according to her innate bioprogram but what of the officiant chanting Vedic speech sounds? And what can be said about linguistic material "improperly dropped" in other language situations?[1]

As the tigress is careful not to drop her cubs, some languages seem more careful not to drop their linguistic elements than others. Traditionally, some of this this difference has been accounted for by typological categorizations: in phonology or morphophonemics, by general mechanisms of elision subject to various constraints; or more recently in syntax, by a Pro-drop Parameter whose settings young children determine on the basis of rather "impovershed" input from their native language. Recent work in the minimalist generative framework, for example, discusses a "pro-module" presumably subject to such parameterised principles (Chomsky 1992:28).

What follows may seem like a questionable interweaving of two quite disparate modes of analysis. One strand below is the empirical status of grammaticality judgments—of what could be called "starring behavior" as it relates to syntactic argumentation referring to zero elements. Focus is on how latent judgments can be masked, following a suggestion of Comrie (1984). A second strand is the historical development of how zero has come to play a role in such syntactic argumentation. At least in Asian language situations like the Thai one, the intertwined nature of these strands a matter of some significance to typology and universals.

2. "Starring behavior" and the bioprogram

Grammaticality judgments in linguistic argumentation typically have the status of "givens"—of methodolicical primitives. For example, they have typically played a central role in providing empirical evidence for morphological and syntactic investigations of type in which zero elements have commonly been postulated. Speakers "star" phrase structures or sentences, one account goes, as ungrammatical if they fail to comply with structural descriptions of the language. These in turn are

grounded in a language faculty, one component of which includes autonomous syntactic computational procedures relying crucially on configurational notions such as X-bar Theory and c-command and its variants. The poverty of stimulus argument then suggests that, like the tigress above, speakers have an innate endowment crucially accounting for their highly intricate behavior.

Of course not all "starring behavior" would need relate directly to autonomous syntax. General conceptual issues might enter into starring behavior, as could contextual-pragmatic ones. Someone might star a sentence like [*Every tigress has teeth] because there might be toothless tigresses or even [*Every Vedic officiant makes his offerings] because it uses a sexist pronoun. However, for Chomsky and others who share the view of autonomous language suggested above, it seems unproblematic that, given language in this sense of competence in computational procedures, "we can distinguish the language from a conceptual system and a system of pragmatic competence" (Chomsky 1992:1; see also Roeper and Williams, 1987:xi).

But can we always do so? —Especially when it comes to method and practice? Sections below propose that Asian languages in particular stand to provide critical input into current discussions of typology and universals relating to this important issue. Pending a Pan-Asian critique, gross parametric claims relating to null elements seem hasty with respect to finding any direct evidence of bioprogram organization. We return to this strand below, but in the next section we attend to how null elements found their way into linguistic argumentation in the first place.

3. Zero elements in Pānini's Aṣṭādhāyī

Linguistic zero has its deepest roots in Asia. It harks back to the tradition of formal linguistic analysis in ancient India—preeminent in comparison to other early traditions of language study. Panini's Astadyayi (or 'eight books') written before 300 BC and probably refining centuries of earlier scholarship has served as the foundation of Indic grammatical study for over two millennia.[2] "The Paninian tradition has always remained the central tradition of Indian linguistics" (Staal 1974:69); or in the words of Rosane Rocher, "all branches of ancient Indian linguistics are overshadowed by grammar and its grand master, Panini" (1992:143).

An important probable precursor to Panini was the Siva-sutras, an ingenious linear organization of Sanskrit phonemes presupposed by the later grammars and facilitating the citation of particular sets of sounds in linguistic rules. Afterwards, the Paninian principles and issues were further elaborated and commented on by the "triad of sages" (munitraya): Katyayana, 250-300 BC?; Patanjali, 200 BC?; Bhartrhari. c. 450 AD; and by many subsequent followers.[3]

Among the eight books of Panini's Astyadhayi and its nearly four thousand verses are a number of features now standard in modern linguistic analysis, including the following:

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[2] I am indebted to my teachers Professors B. van Nooten, J. Gair and Ram Sharma for introducing me to Panini's work and to Tamara Dietrich for valuable discussions. The exact date of Panini's work is contentious, but possible references to Greek writing (*yavanani*) suggest a time slightly after Alexander's appearance in the Indus valley (about 325 BC).

[3] Panini's followers, especially Bhartrhari, developed theories of sound-meaning relationships, nested constituent structure and of the contextual determination of certain semantic features.

a. careful distinction of roots, bases and affixes and classification by morphological function;
b. recognition of voicing and vocalic ablaut;
c. analysis of abstract semantic case relations (karakas) and their effect on syntax;
d. interest in rule form, ordering, and economy of statement;
e. organization of rules by principles of default ("elsewhere rules"); application and rule precedence, covered by metarules (paribhasa; e.g., 'if two rules conflict, apply the later one'; 1.4.2);
f. algebraic representation of linguistic constants and variables, which undergo substitutions by various subsequent rules;
g. zero operators.

In the Astadyayi, an important subclass of algebraic elements consists of linguistic zero operators. As we see below, these zeros were of practical interest to Bloomfield; they were treated in some detail in an overview of Allen (1955). For purposes here, it is sufficient merely to document that the Paninian tradition recognizes four distinct zero elements, each with a different function. The names of these operators are (1) lopa, (2) luk, (3) lup, (4) slu. (1) and (2) are illustrated in the following examples based on work of Abhyankar & Shukla (1986) and of Cardonna (1988); see also Kiparsky (1982:119).

For lopa-zero, the most common item, Abhyankar & Shukla (1986:337) describe it thus: "This disappearance in the case of an affix is tantamount to its notional or imaginary presence, as operations caused by it do take place, although the word element has disappeared." (1) shows that adjustments in the course of the Sanskrit 'cowboy' derivation are triggered by the lopa-zero (after Cardonna 1988:53); (2), on the other hand, contrasts the operation of the luk-zero, where such adjustments are blocked. (3) and (4) are used for more specialized cases.

(1) Lopa-zero application: post-deletion adjustments triggered

input:	1	go-	'cow'		
	2	go + mat + *su*	'one having cows '+ [DECLENSIONAL ENDING]		
				sutra number	operation
	3	gomat + ø[LOPA]		6.1.68	(*su* dropped)
	4	gomatø		6.4.14	(vowel lengthened)
	5	gomantø		7.1.70	(adjustment)
output:	6.	goman		8.2.23	(adjustment)

(2) Luk-zero application: post-deletion adjustments blocked

input:	1	gomat + *su* + priya	'a person to whom someone with cows is dear'	
	2	gomat + ø[LUK] + priya	2.4.71	
output:	3	gomatpriya	1.1.63	
			(BUT NOT: gomanpriya]	

(3) Lup-zero application: affix is deleted, but gender and number features copied (e.g. Astadhayi 1.2.51; 4.2.81).

(4) Slu-zero application: elision of marker triggers reduplication in selected roots, the reduplicated syllable then being protected from further changes. (e.g. Astadhayi 2.4.75, 3.1.10, 3.4.76; 6.1.10).

To put the development of linguistic zero operations in a larger context, Staal has observed that it "seems certain that linguistics originated in India because of the requirements of the ritual. As far as language is concerned, these requirements were twofold. First of all, the textual material needed for the ritual had to be transmitted. Secondly, rules had to be given which enabled the priests to convert this material into ritually more effective forms" (1974:66). It is likely then that interest in linguistic accuracy for the sake of ritual effectiveness may have been the key stimulus for developing a rule system of such complexity that zero elements were adopted.

4. Socio-historical / psycholinguistic contexts of early zero rules

The transmission of Paninian grammar, including its zero functions, for centuries must have been largely a matter of oral transmission and, in the first stages of study at least, rote memorisation. As Rocher notes, "That it was supposed to be orally transmitted is clear from its use of metalinguistic accents and nasalizations...That it was meant to be memorized is evident from its cross-referencing system...Both metalanguage and extensive 'dittoing' (anuvritti) aim at conciseness, an ideal which some later grammarians carried to the extreme." (1992:142).

There is also direct testimony of the way in which this grammar was learned. Nearly a millennium after Panini and from a site far from the Ganges heartland we find an excellent description of how Paninian grammar was typically mastered. The account comes from the Chinese Buddhist pilgrim, I-tsing, who travelled to the Buddhist center of Nalanda in India in about 650 AD. Lingering for many years en route between China and India in the Summatra-based Kingdom of Srivijia, he observed there how young pupils learned their Sanskrit grammar. At the age of six they memorized the Siva-sutras. By eight, they were learning 1000 of the Paninian sutras by heart. Only after the rule corpus had been memorized were rules applied could the serious business of grammatical analysis begin (I-tsing 1966:172).

I-tsing's account would have been accurate for the tradition of Sanskrit grammatical study at other times and in other places. The general method was extended to other sorts of learning:

> "The techniques so successfully applied to the study of language, especially the concept of economy of method and the adoption of a technical terminology, were taken over by several other disciplines. This occurred naturally since Sanskrit has always been the medium of Indian scientific writing, so any young scholar had first of all to undergo a rigorous training in grammar before moving to his chosen speciality" (Wujastyk 1981).

A similar point, but emphasising content rather than method of acquisition, was made by Staal: "Fruitful exchanges developed between the grammatical tradition on the one hand and ritual studies, philosophy, logic, poetics and numerous other disciplines on the other." (1974:69).

Earlier, a traditional text of uncertain date, the Paniniyaçiksa, had made these connections more metaphorically through a personification of the Veda: "...First, Metrics which is the two legs of the Veda and the Kalpa [regulated passage of time] which is its two hands. Astronomy is its eyes and the study of Etymology is its

ears. The siksa [miscellaneous commentaries] is its nose and Grammar is its mouth."[4]

Two lines of speculation can follow from these interlinkings. First, an excursus relating only indirectly to the use of the the symbol zero in linguistic expressions. In terms of a wider possibility that can only be alluded to here, Allen (1955) and Rocher (1992:142) each note that Paninian linguistic zeros pre-date material evidence for zeros in decimal numerical expressions by several centuries. As I-tsing noted, in traditional times it was normal for males born into the Brahmin caste, and perhaps for Buddhist scholars as well, to receive extensive rote training in Paninian rules. Thus those who went on to become mathematicians, such as ceremonial experts who made complex astrological and calendrical calculations, would already have understood the operation of linguistic zero by the time studied mathematics. It is possible that through such experts Paninian linguistics had some input—perhaps even the critical input—into the invention of zero as a numeral and its use in the decimal system (Diller 1995).[5] If so, the fact that modern linguistics has borrowed zero from mathematics should be seen as the repayment of an ancient debt— but to take up these speculations would be well beyond our present scope.[6]

A second line of speculation is more directly relevant to the purpose at hand, whatever the case may have been as to the origin of mathematical zero. This speculation can be raised through wondering what might be the psycholinguistic status of rules, including rules with zero elements such as above, resulting from the type of acquisition process that I-tsing described. After Panini's time there is general consensus that Sanskrit was acquired as a second variety through what could be called formal education—mainly the memorising both of Sanskrit texts and of linguistic rules for their exigesis—rather than as a natural and effortless first-variety acquisition. Yet I-tsing tells us that pupils as young as six were initiated into this sort of study. Ingalls (1959:5) establishes that the same learning methods described above have continued to apply into the 20th century.

It seems at least plausible to propose that those who had learned Sanskrit and Paninian texts in this way to a high level of competence would feel that they had some degree of 'internal access' to native-speaker-like grammaticality judgments. If, say, the form gomanpriya 'cowboy lover' as in example (2) were encountered instead of the correct gomatpriya, such an expert would be expected to be able, as it were, to 'star' *gomanpriya as an incorrect derivation—as perhaps even an error resulting from inability to handle the luk-zero symbol correctly in the derivation. While these zero operators, and Panini's rules in general, could not possibly be taken as innate as such, if these items and processes were acquired in the way sketched above they would surely come to be felt as close to second nature by those who had mastered them.

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[4] (Trns by M. Gosh, 1938).

[5] By an interesting coincidence, the very site visited by I-tsing, and at about the same time, zero was being written as a figure in mathematical expressions on stone inscriptions. As proposed elsewhere (Diller 1995), this Srivijayan evidence, along with similar Old Khmer items, was nearly two centuries before the first currently-known material evidence of zero as a figure in India.

[6] Allen (1955:113): "The study of Sanskrit grammar and metrics seems to have led the mathematical genius of Aryabhata... Was the invention of zero also linguistically inspired?" Similarly, Staal (1974:69, emphasis added): "The discovery of mathematical zero in India came many centuries after the discovery of linguistic zero (probably by Panini...). *It is not improbable that the linguistic discovery led to the mathematical discovery*, although historical evidence in this respect is totally lacking."

5. Zero in the West

Although some conception of zero elements, especially regarding the 'dropping' of endings or of other linguistic material, is not unknown in Western linguistic study before Bloomfield, it is most clearly in his work that the formal elegance of Panini-style rules takes shape in Western linguistic discourse. Bloomfield had made an intensive study of Panini in the 1920's and was perhaps the first to apply some of Panini's descriptive technique to other 'exotic' languages, including especially Tagalog (Rogers 1987). In his Postulates of 1926 he explicitly mentions Panini and the use of zero elements (Postulate 44). In the opening of his monumental work Language he described the Astadhayai treatment of Sanskrit as "one of the greatest monuments of human intelligence. ...No other language to this day has been so perfectly described" (1933:11). Bloomfield then went on to put Paninian analysis into action in Language through the writing of expressions such as: "a zero-alternate replaces the bound form..." or "one morpheme, accompanied by a zero-feature..."(1933:216; 218).

Thus the zero lineage is traceable from the Paninian tradition, through Bloomfield, and on into current linguistic discourse. As Robins has put it:

> "A descriptive device familiar to linguists today, zero representation of an element or category, is owed directly to Panini. ...Many different uses have been made of the of the zero concept in modern linguistics. Some have protested against its excessive exploitation, but there are forms in many langauges that are most economically analysed be means of a zero element. All of these uses derive from Panini's first known application of the device"(1967:148).

Bloomfield continued to develop his use of zero rules in later writings. For example, confronted with one-word sentences in Illocano, he concluded that since "the third-person singular in this category is zero, any open expression in principle makes a full sentence: mabisin 'He is hungry"(1942:96).

Other linguists were quick to take up zero, whether as an empty morpheme or as some other technical variant, sometimes adopting more than one zero symbol in a distinctly Paninian spirit, if not always with the Paninian concern for economy. Discussing focus morphology in Bilaan, Pike employs zero symbols [#] and [...] in the comparison of forms he represents as:

(5)

kaMfe' + # + dale	"He catches them" actor focus"
kaNfe'-an-dale	"He catches them, goal focus"
dale kaMfe'...dun	"they catch him, actor focus"

Pike then writes: "This conclusion leads to # 'he, him' as having some formal status. We do not treat it as a zero morpheme, for no overt allomorph would then be part of it. Tagmemic theory rejects all totally zero units...Thus # in [kaMfe' + # + dale] is not a zero morpheme, but a zero allotagma. The dots [...], on the other hand, represent neither a zero allomorph nor a zero allotagma, but merely the absence of a tagmeme at a given point..."(1963:20).[7]

The work of Zelig Harris bridges earlier structuralist accounts and the generative-transformational approach he helped to establish along with Noam

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[7]For more recent work on zero "subjects" in Philippine languages, see McHale and McHale (1991).

Chomsky, his student. Also, this work employs zero symbols on two levels: morphophonemics and syntax. Harris, discussing the "missing" subject in English imperatives referred to " a...kernel sentence with zero variant of 'you'... [i.e. as] sentences with internal evidence of zeros" (1957:301n). On the morphological level, he similarly continued and extended the earlier usage. Also continued was discussion of auxiliary inversion as in [Do they paint] cites the item [they [paint + ø]]. Harris concludes that:

> " ... there is a zero suffix (variant of the -s) after the V paint, which moves in front of the V under the conditions indicated. Like the other suffixes, this zero is always attached to a preceding phonemic word...This zero morpheme meets the requirements for a zero - of being determined by observable conditions (namely, I, you and plurals as subject)...The -s 'third person singular' can now be considered an alternate of this zero, occurring with the remaining subjects" (1957:288).

The more recent history of zero elements in the generative-transformational paradigm is well known and need not be repeated here. Zero's early deployment in unconstrained deletion transformations has now largely given way to a richer set of null elements interacting with, and constrained by, other operations. These have included, in the 1960's and 1970's, raising, island effects and subjacency, and in the 1980's and 1990's, barrier effects, the Empty Category Principle and the related Pro-drop Parameter, along with other principles of the relativized minimality project. In recent syntactic discussions at least five differential zero elements have been considered, a number well up to Panini's standards in Sanskrit morphophonemics.

(6)
ø = t trace, left behind (and still 'properly governed') when a constituent is moved by transformation move-α
ø = controlled PRO, e.g. coreference controlled by a matrix subject as in [I want PRO to go];
ø = arbitrary PRO_{arb}, e.g. in [PRO_{arb} to travel across Bangkok is a challenge]
ø = pro, originally a missing nominal recoverable from morphological coding, i.e. "pro is licensed in a SPEC-head relation to 'strong' AGRS..." (Chomsky 1992:14, following Rizzi); also extended to cover other types of zero anaphora. Perhaps with this in mind, Chomsky (1992:28) has recently referred to 'the pro-module.'
ø = O or null operator (sometimes written ø), e.g. in a zero operator in COMP as in:

(7) $John_j$ is easy [$_{CP}$ O_j [$_{IP}$ PRO_{arb} to please t_j]] (Chomsky 1992:29).

Suffice it to conclude that recent syntactic work has continued to study constructions in terms of these zero elements, often still relying on antecedent indexing based on X-bar syntax and c-command or its variants.[8] Reformulations can become quite complex as ideas about X-bar Theory permit a greater enrichment. Thus [I tried to be polite] in one recent formulation is discussed in terms of three distinct zero items (trace, PRO and zero operator in COMP) from the list above in the complex configurational pattern:

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[8]Note that standard definitions of 'government', 'binding' and 'barriers' all rely one way or another on fundamental considerations of X-bar Theory, e.g. to maximal projections and some version of c-command (m-command or whatever).

(8) I tried [$_C$·[$_C$·[$_C$ ∅] [$_I$·[$_D$· PRO][$_I$·[$_I$ to] [$_V$·[$_D$· t] [$_V$· be polite]]]]]] (Baltin 1995:240).

6. Control and grammaticality

Let us turn now from emphasising the historical development of zero to considering its current status in questions relating to grammaticality. While (7) is normally taken to be a case of Raising, implying movement of "John" or an analogue process, (8) [I tried to be polite] is a classic case of Control, however it may be analysed or represented. For over two decades substantial theoretical interest has focused on the nature of coreference in such complement clauses, some issues of which have been construed in the form of how a zero element PRO is to be indexed (identified) or how equivalent analyses would be provided in other frameworks.

Bach (1982), Comrie (1984), Sag & Pollard (1991), Cutrer (1993) and others have summarised the extensive literature and the development of this inquiry. As a result of this research it would now be difficult to argue convincingly for reductionist positions such as the following: (i) that key Control facts could be adequately accounted for by abstract syntactic configuration alone; (ii) that they are purely semantic;[9] or (iii) that simple lexical idiosyncracy could provide a satisfying account. Whereas it used to be commonplace merely to propose that such-or-such an item was "marked +PRO$_{SUBJ}$ or +PRO$_{OBJ}$ in its lexical entry" this ploy now seems like a temporary bookkeeping technique at best.

In analysing control phenomena, Comrie (1984) has argued compellingly for a complex interaction among syntactic, semantic and pragmatic factors. His work suggests *degrees of grammaticalized subject control* characterising different items in English along lexico-semantic lines.[10] He also suggests a more general typological difference between English, on the one hand, with a weighting toward syntactic properties in control, and languages such as German or Russian, in which semantic and pragmatic factors may be more directly salient. Asian languages such as Thai seem oriented all the more in this direction.

Pragmatic factors probed by Comrie are of direct interest to the issue at hand. In discussing complement constructions with the verb *ask*, he notes that speakers of English vary as to whether they report two possible interpretations for sentences like (9). Speakers of course would accept subject control for *ask* when no overt object was present, as in (10), but would they accept this subject-control relation as possible for (9) as well? For (9), Comrie's suggestion is that "both interpretations are *latent* for all speakers of English...but that the secondary interpretation tends to be *masked* unless context makes it plausible" (Comrie 1984:452; emphasis added). That is, native speakers may vary in their first-reaction "starring behavior", this time relating not to grammatical sentencehood per se but to anaphoric interpretation, as can be shown with indices as in (11). More recently, Cutrer (1993:188) has similarly reported differing grammaticality judgments relating to *ask* complements.

(9) Otto asked Helga to leave the room. (Comrie 1984:452)

(10) Otto asked to leave the room.

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[9] For example, see Sag & Pollard's critique of accounts of Bach (1982) and Chierchia (1989).
[10] Hoonchamlong (1991:244) makes a similar proposal for certain Control phenonema in Thai.

(11) Otto_i asked Helga_j [PRO_ij to leave the room]

(12)
a. I asked the nurse to receive the injection just before bedtime.
b. I asked the nurse to receive my incoming mail at the front desk.
c. I asked the nurse to be allowed to watch TV with the other patients.
d. I asked the nurse to be allowed by the doctor to administer extra pain-killer.

Following Comrie's lead, sentences in (12) were tested with 15 speakers of Australian English, who showed some variability in their reactions. For most, (a.) and (c.) were reported to favour subject control, but (b) and (d.), object control. (Informants varied some as to whether they volunteered reports of ambiguous interpretation.) This small experiment strongly confirms Comrie's supposition regarding pragmatic context, since most informants did not appear to be relying entirely on syntactic configuration or narrow lexico-semantic properties of particular embedded verbs. Note that both *receive* and *be allowed to* could admit either interpretation. Instead, a more complicated kind of situational semantics/ pragmatics, referring to entire predicates and to background cultural knowledge about what typically happens in hospitals, was activated in deciding about coreference.

A promising way ahead with these Control problems might be to build on semantic/pragmatic insights of Comrie, Foley & Van Valin (1984), Farkas (1988) and others. Cutrer (1993:175), for example, sees Control facts following from not primarily from structural descriptions and thematic-role semantics of verbs, but from the meaning and pragmatics of entire predicates, along with clause linkage conditions of the Role & Reference framework.

However, for purposes here, what is significant is the texture of grammaticality judgments relating to Control. The critical insight here is Comrie's—*latent* interpretations that can be *masked*. This means that speakers do not automatically have naive access to their linguistic competence regarding the full range of Control possibilities in all cases—the *ask* case being a particularly clear instance of this for English. In this case, naive starring behavior should not be taken necessarily to reflect direct aspects of some bioprogram-induced structural descriptions. Rather these grammaticality judgments become entwined in just those conceptual systems and systems of pragmatic competence that some researchers have claimed are to be sharply distinguished from 'language' proper.

7. Ellipsis

Another possibly distinct species of zero element has been referred to as nominal ellipsis. Sometimes this term has been used to refer to what classical Standard Theory "Equi-NP deletion" across coordinate structures, as in (13), or even across sentences. Note, in passing, that a similar Thai construction (14) has different properties. (The purpose of pursuing this analysis is not so much to enter into substantive details of the debates but rather to confront the English-speaking reader with well-formedness problems which may evoke grammaticality sensibilities on par with those considered below in the Thai case.)

(13) I invited them to go too but didn't go.
PARAPHRASE REQUIRED BY "EQUI-NP DELETION" OR ITS ANALOGUE:
I_j invited them$_i$ to go too but $\emptyset_j$ didn't go
= (a) 'I invited them to go too but I didn't go.'
IMPOSSIBLE PARAPHRASE:
$\neq$ (b) 'I invited them to go too but they didn't go.'

(14) ฉันชวนเขาไปด้วย แต่ไม่ได้ไป

chán$_i$	chuan	kháw$_j$	pay	dûay	tàe:	$\emptyset_{ij}$	mây	dây	pay
1PSG	invite	3P	go	too	but	($\emptyset$)	not	ACCOMP	go

DEFAULT :
(a) 'I invited them* to go too but they didn't go.'
*or: him/her/x$_i$
PERHAPS POSSIBLE IN CONTEXT:
(b) 'I invited them to go but (I/we) didn't go.'

A more problematic account of nominal ellipsis refers to non-occurrence of definite nominal arguments after certain (English) verbs, including once again the verb *ask*, as in (15), and other verbs such as *watch* (16).

(15)
A. Did you ask the question?
B.   (i) Yes, I asked several times but no one answered.
     (ii) Yes, I asked it several times but no one answered.

(16)
A. Did you watch 'the Late Show' last night?
B.   (i) Yes, I watched, but I was half asleep.
     (ii) Yes, I watched it, but I was half asleep.

Note that (15)-(16) differ from the more common English phenomenon of a mere transitive/intransitive alternation, as in (17)

(17)
A. Did you eat those cookies?
B. (i) No, I didn't eat them but I know who did.
   (ii) No, I didn't, but I know who did.
SYNTACTICALLY WELL-FORMED BUT CONTEXTUALLY INAPPROPRIATE:
   (iii) No, I didn't eat but I know who did.

Lobeck (1995) has discussed at length how data of the sort in (13) and (15)-(17) might plausibly be accounted for by some realignment or extension of the empty category list in (6), perhaps extended to cover certain cases of VP ellipsis as well, as in (17-ii). Our purpose here is not to contribute to this particular debate but rather to raise a more general question of how starring behavior in these cases can be related to context, as exemplified, say in (17-B.iii).

Note that a speaker of English might well allow (15-B.i) but opt to star (17-B.iii), in effect relying on a subtle interaction of semantic, pragmatic and syntactic properties:

(i) lexical properties—presumably coded in long-term memory (whether definite direct objects can be suppressed for particular transitive/intransitive verbs);
(ii) pragmatic principles of contextual construal—presumably coded in short-term memory (which particular discourse conditions at hand could count for a referent to be taken as "definite");
(iii) configurational properties of direct objects.

Again we can raise the question of how easy it is to determine on what basis a speaker of English—other than a trained linguist, perhaps—has decided to star, or not, sentences of these types. It seems likely that something akin to Comrie's postulation of *latent* interpretations that can be *masked* in Control constructions would needed for these ellipsis constructions well.

8. Zero nominals and grammaticality in Thai

Interest in zero-anaphora phenomena in Thai goes back at least to the traditional Thai grammarian Phaya Upakitsilapasan (1937; 1979:297), who analyses it mainly terms of register difference: the spoken language, he says, is characterised by zero anaphora in positions where, in the written language characterised by "grammatical sentences", nouns or pronouns are required instead. The impact of prescriptive attitudes of this type on Thai sensibilities as to well-formedness are analysed elsewhere (Diller 1993).

But in fact, even in Phaya Upakitsilapasan's own prose one finds frequent uses of zero anaphora where his rules for "grammatical sentences" would specify nouns or pronouns. Some modern written, especially quasi-oral, genres such as folklore narrative admit very high density of zero anaphors. These are especially common in narrative topic-chains where a single actor is the main focus of attention through a sequence of events (Burusphat 1991:143).

Evers (1988), following a technique developed by Li and Thompson (1979) for Chinese, analysed a corpus of transcribed Thai conversational materials and conducted completion experiments in which transcribed texts were edited with blanks. Native-speaker subjects were then invited to fill in "missing" material, selecting between overt NP's, pronouns or zero. Evers reports a very significant degree of cross-speaker variability in terms of how blanks were filled: for 50 subjects, no two responded in the same way, although a few text sites involving topic chains were specified as zero by all subjects.

Cross-speaker variability in a completion task is also confirmed by a study of Maneeroje (1986), based on analysis of written Thai magazine texts. The study concentrated on subject, object and prepositional object positions compared across clauses in different types of hypotactic relations (e.g. coordination, subordination). For the entire text corpus analysed, about 50% the total anaphoric links were accomplished by zero. For all categories other than trans-paragraph anaphora, zero in subject position was much preferred over overt nominal or pronominal anaphoric subjects, with objects showing a less robust preference. Across paragraphs, repeated full nouns were the preferred link, a finding confirmed in work of Burusphat (1991). This finding suggests that for Thai repetition of a full, but contextually recoverable, nominal could constitute in effect a paragraphing device. Interestingly, overt pronouns in all positions were rare, with a very low (6%) overall occurrence for anaphoric linkage in Maneeroje's corpus.

(18) Zero-anaphor sequence of King Chulalongkorn (after Grima 1986)
NP_1 - NP_2 - $ø_1$ - $ø_2$ - $ø_1$ - $ø_2$ - NP_2 - $ø_4$ [= author] - $ø_1$ - $ø_2$ - $ø_1$ - pro$_{arb}$ -
- pro$_{arb}$ - pro$_{arb}$ - $ø_2$ - $ø_2$ - $ø_1$ - $ø_2$ - $ø_2$ - $ø_2$ - $ø_2$ - NP_3 - NP_3 - $ø_3$ - $ø_3$ -
- $ø_3$ - $ø_3$ - PRONOUN$_5$ - $ø_3$ - $ø_3$ - $ø_3$ - $ø_3$ -NP_6 - $ø_3$ - $ø_3$ - $ø_3$ - $ø_3$ - $ø_3$ - $ø_3$ -
- PRONOUN$_5$ - $ø_1$ ...

For writing of the earlier period before much impact of Western 'translationese', Khanittanan (1987:56), Bamroongraks (1988) and others present convincing evidence that zero anaphora was widespread in many written genres and was used in positions where Phaya Upakitsilapasan's scheme would specify overt nominals. A representative example of the prose of King Chulalongkorn has been analysed in detail by Grima (1986). (18) summarises the anaphoric structure of the passage, featuring a sequence of 5 referents which are evoked a total of 41 times in the passage, including 8 overt nominal/pronominal references interspersed with 33 zero anaphors. (pro$_{arb}$ is used here to suggest, following Grima's analysis, a missing subject with indefinite reference.) The point of Grima's analysis focuses on the first and last items in the 41-item sequence, i.e. the first NP_1 and the final $ø_1$ which is coreferential with it. Although there are a few additional intervening occurrences of null $ø_1$ in the sequence between the first and last items, the nearest referential link (viz, $ø_1$ in the second line of (18)) relevant to the final $ø_1$ spans an anaphoric complex of four different referents, including 18 intervening non-coreferential zero anaphors.

Clearly then, there is no simple mechanical "topic chain" or sentence-configurational principle accounting for this linkage. Instead, Grima shows convincingly that readers must rely on notions of hierarchical discourse organization to construe the zero anaphors—in particular, the final $ø_1$. Note that the passage continues, providing further clues; see Grima (1986). For clarity of presentation, other than the three pro$_{arb}$ items indicated, only zero anaphors that could acceptably be filled in by overt nominals or pronouns are included in (18); coreferential phenomena similar to English PRO are not shown.

It should not be concluded that all Thai writing genres of the pre-modern era observed the same principles as those accounting for (18). Inscription 49 of 1417 AD (Wat Sorasak, Fine Arts Department 1983:128) repeats contextually recoverable full noun phrases so frequently that a modern Thai authority has characterised the text as in "a flat and repetitive style" (Na Nagara and Griswold 1992:24). The inscription clearly has a legalistic purpose in which zero anaphors are not welcome; further, its rather one-dimensional discourse structure would not facilitate the hierarchical construal principles characterising (18).

That quite specific genre constraints continue to affect significantly the occurrence of zero anaphora vs overt nominals is strikingly shown in recent research of Khanittanan (1994:50). Studying differences between foreign and domestic TV broadcast news, Khanittanan discovered a virtually categorical difference in how President Bill Clinton and the (then) Thai Prime Minister Chuan Leekphai were referred to anaphorically in news after they had been overtly introduced as topical actors. Clinton and other actors in the foreign news regularly received the Thai form kháw, supposedly a normal third-person anaphoric pronoun, perhaps reflecting English source texts in "he". On the other hand, in over 100 news broadcasts in Khanittanan's sample, the Thai Prime Minister was *never once referred to with this pronoun*. Instead, he was referred to by a shortened form of his title (na:yók, the most frequent means), by zero anaphora (second most frequent), or by other means.

Khanittanan's provocative finding recalls not only the low-frequency-pronominal facts reported by Maneeroje (1986) but also earlier sociolinguistic work regarding pronominal avoidance, and hence increased zero anaphora, in certain types of Thai address and reference. Truwichian (1980), describing a preference for avoidance of overt self-reference terms by women speakers in some situations, establishes that zero anaphora may function as a means of suspending strong commitment to specific social relationships coded by overt pronouns and other self-reference forms. Probably no overt Thai pronoun is entirely devoid of sociolinguistic nuances and these nuances would certainly affect speakers' judgments about when to select zero anaphora over overt pronouns.

It would be naive to ignore this complex pragmatic/sociolinguistic background when turning to grammaticality judgments relating to zero in formal analyses of Thai. More formal aspects of zero anaphora have been analysed at length in a number of doctoral dissertations and other studies (Warotamasikkhadit 1963; Bandhumedha 1976; Rodman 1977; Grima 1978; Ekniyom 1982; Cole 1987; Kobsiriphat 1988; Pingkarawat 1989; Lagsanaging 1991; Hoonchamlong 1991 and others). A review of this work is beyond our present scope. We can be content to observe that problems relating to the status of grammaticality judgments are not infrequently raised in this work and, to the authors' credit, sometimes explicitly discussed. However, sometimes claims about constraints are couched in standard syntactic terms whereas with more reflection they should be taken as semantic/pragmatic artifacts of particular test sentences. For example, one can easily find Thai sentences which seem to demonstrate that, like the English case of (13), an Equi-NP relationship holds in Thai across coordinate structures. But this ignores clear evidence like that in (14) to the contrary, suggesting that an apparent "Coordinate Structure Constraint" in Thai is actually an epiphenomenon covertly relying on discourse-pragmatic principles involving expectations of topic chaining and the like. Thus a judgment of this sort should not be taken as evidence for a constraint based simply on abstract syntactic configuration.

For an especially clear case, consider Hoonchamlong's (1991:253ff.) critique of configurational claims regarding zero elements in Pingkarawat (1989). The detailed argumentation of the case involves the Thai taxonomy of zero elements and need not concern us here, but a critical issue involves sentences like (19)—in particular, the status of the zero anaphor in the complement clause. One group of native speakers reports that this zero must be bound by its matrix subject, but for another group of native speakers—Hoonchamlong's group—a referent outside the sentence is allowed. How to account for this rather basic disagreement between native speakers, including those with doctorates in linguistics, providing crucial evidence regarding configurational vs pragmatic determination of anaphora in Thai?

(19)

นวลคิดว่าต้องไปโรงเรียนวันนี้

nuan	khít	wâ:	ø	tô'ng	pay	ro:ngrian	wanní:.
Nuan	think	that		must	go	school	today

'Nuan thinks she must go to school today.'

9. Conclusion

I believe that the answer to the question above for Thai and to similar questions in other Asian language contexts goes back to Comrie's proposal regarding latent interpretations that can be masked. For interpretation of zero anaphors, I further propose that with languages typologically and sociolinguistically similar to Thai,

the masking effects are stronger and the phenomena are more widespread than in the English examples of control and ellipsis we have reviewed above. In the English translation of (19), decontextualised, many speakers of English would opt for the coreferential interpretation of "she" in the complement clause, perhaps even claiming this interpretation was categorical. However a trained linguist, at least, would need little time to think of discourse-based counterexamples. In the Thai case, given all of the sociolinguistic, stylistic and discourse-based complexity considered above, masking effects are all the more likely. A number of studies dealing with Chinese zero anaphora point to similar conclusions.

Further, one should emphasise that these points are not trivial in their implications for theory regarding typology and universals. For syntactic argumentation probing null elements such as those posited in (6) and their binding properties with respect to configurational properties, judgments of grammaticality like the ones considered are critically important. This starring behavior in turn affects what can be said about the relationship between posited empty categories with possibly universal properties, in turn affecting claims regarding autonomous syntax, the innate bioprogram and typology seen as a setting of innately-presented parameters.

Even granting a hypothesised system of parameterized switch-settings based on autonomous computational procedures and rooted in a bioprogram, the contention here is that starring behavior needed to establish this empirically incorporates, to varying degrees, a "noise" component—substantial in some language communities to the point of rendering it impossible to separate strictly syntactic judgments from those of other sorts. As we have established above, mediating factors of particular significance for masking latent zero elements and their interpretations in many Asian languages include at least the following considerations.

(i) General typological features may affect the status of grammaticality judgments, e.g. languages without inflectional morphology may produce judgments of a different less categorical nature from those with it.

(ii) Discourse factors relating to definiteness can affect feelings about the appropriateness of zero anaphora, ellipsis and related transitive/intransitive alternations in many languages—even in English, as noted above.

(iii) Of related importance is "pragmatic imagination"—speakers' differential ability or inclination to imagine contexts in which particular constructions or interpretations might plausibly occur in their languages.

(iv) Formal training may inculcate sensibilities relating to well-formedness through intensive rote learning, the extreme case perhaps being the memorising of formal rules of the Paninian type; but milder prescriptivism of the sort in Phaya Upakitsilapasan's work, reflecting Western models, should not be overlooked.

(v) Other sociolinguistic and pragmatic factors, including avoidance phenomena, genre and style, speech levels, translationese and translation-linked genres inevitably affect or evoke feelings about well-formedness. (One wonders whether formal training in Western linguistics might occasionally intrude into this category as well, as a form of covert neo-prescriptivism.)

Linguistic zero, starting with Panini, may indeed return to its Asian origins, but not without the accretions of globalisation and even perhaps even of neocolonialism. Whether it be news broadcasts translated from CNN or Asian academics' treatises based on Western prototypes and theories, what is stated overtly and what is left unsaid now become all the more problematic and interesting. Let us carefully be aware of the teeth of this particular tigress.

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