Lexical Indexation in Sino-Japanese Exceptionality

Lexical indexation (Pater 2006), prespecification (Inkelas 1995, Inkelas et al. 1997), and cophonology (Anttila 2002, Zoll & Inkelas 2005) represent three major proposals for dealing with exceptions in OT. It is often difficult to favor one of them on the empirical ground. The goal of this work is to argue for lexical indexation. Evidence is drawn from exceptions to a productive gemination process in Sino-Japanese.

Every Sino-Japanese stem is either monosyllabic or disyllabic. The segmental composition of a second syllable is stringently restricted in disyllabic $C_1V_1C_2V_2$ stems. C_2 is either /t/ (*t*-stems) or /k/ (*k*-stems), and V_2 is confined to /u/ and /i/. In addition, final vowels are highly predictable (Tateishi 1990). The overall pattern is summarized in (1). [u] occupies V_2 in predominant *t*-stems. In *k*-stems, the backness value of V_2 agrees with that of V_1. Sino-Japanese stems are usually bound, so they are compounded to make a word.

(1)

	V_1=a	V_1=o	V_1=u	V_1=e	V_1=i
C_2=/t/	V_2=u	V_2=u	V_2=u	V_2=u	V_2=u
C_2=/k/	V_2=u	V_2=u	V_2=u	V_2=i	V_2=i

Disyllabic stems exhibit [CVCV]≈[CVC] alternations, depending on whether gemination occurs or not across stems (Vance 1987; Sakai 1994; Itô & Mester 1996; Kurisu 2000). As exemplified in (2), *t*-stems undergo gemination when followed by a stem with an initial voiceless consonant. In contrast, *k*-stems are geminated only before a /k/-initial stem, as presented in (3). I assume that gemination occurs to reduce the number of syllables in a word (Kurisu 2000). This is attained by *Struc(σ) that militates against syllable structure in general. Output cannot be as small as monosyllabic (or even null) in order to respect Max-C.

(2)

Stem	a. *Compounds*	*Gloss*	b. *Compounds*	*Gloss*
[hat(u)]	hat-tatu	development	hatu-bai	sale
	hap-pa	ignition	hatu-geN	speech
	hak-kaku	detection	hatu-mee	invention
	haʃ-ʃiN	departure	hatu-ree	command

(3)

Stem	a. *Compounds*	*Gloss*	b. *Compounds*	*Gloss*
[gak(u)]	gak-koo	school	gaku-to	pupil
	gak-ku	school district	gaku-see	student
	gak-ki	school term	gaku-g^{y}oo	study
	gak-ka	department	gaku-neN	school year

Furthermore, there is an important morphological factor. As exemplified in (4), where square brackets indicate word boundaries, gemination is blocked in recursive compounds if a word demarcation straddles two relevant consonants even if the aforementioned phonological conditions are fulfilled (Itô & Mester 1996). This morphological requirement is achieved via CrispEdge(Word) (Itô & Mester 1999). It requires word-edge segments to be uniquely affiliated with the left and right peripheries of the word, respectively. As illustrated in (5), the examples in (4) indicate that CrispEdge outranks *Struc(σ).

(4)

Compounds		*Gloss*		
[[toku-betu]-kai]	*[[toku-bek]-kai]	special meeting	(cf. [toku-betu]	‘special’)
[yaku-[kai-ʃaku]]	*[yak-[kai-ʃaku]]	translation	(cf. [kai-ʃaku]	‘interpretation’)

(5)

	/[[toku-betu]-kai]/	CrispEdge	*Struc(σ)
a. ☞	toku-betu-kai		*****
b.	toku-bek-kai	*!	****

Now, exceptional examples are given in (6). They undergo gemination across a word demarcation. The question is how such exceptions are effectively elucidated in OT. Lexical indexation is the most efficient here. (6) is explained by lexical indexation of *Struc(σ), as demonstrated in (7). *Struc(σ)$_L$ is active only for words marked with L, so regular cases without L vacuously satisfy *Struc(σ)$_L$. As a result, CrispEdge must be normally respected at the expense of worse violations of *Struc(σ).

(6)

	Stems	*Compounds*		*Gloss*		
a.	[bet(u)]	[bes-[se-kai]]	*[betu-[se-kai]]	different world	(cf. [se-kai]	‘world’)
b.	[zit(u)]	[ziʃ-[ʃa-kai]]	*[zitu-[ʃa-kai]]	real society	(cf. [ʃa-kai	‘society’)

(7)

	/[betu-[se-kai]]/$_L$	*Struc(σ)$_L$	CrispEdge	*Struc(σ)
a.	betu-se-kai	****!		****
b. ☞	bes-se-kai	***	*	***

Prespecification maintains that exceptional properties are encoded in the lexical representation. The difficulty is that there is no effective way to encode the exceptional CVC shape. One obvious possibility is encoding the final C as moraic (i.e., /CVC$_\mu$/). But, as shown in (8), the same Sino-Japanese stems as in (6) exhibit regular behavior in simple stem compounds. They surface in [CVCV] forms unless gemination applies. Moreover, (9) shows that the same stems resist gemination in other complex compounds. Hence, prespecification fails to elucidate why exceptional stems behave regularly elsewhere. This problem arises since the irregularity is locally encoded as if a certain morpheme were responsible for exceptionality.

(8)

	Stems	*Compounds*	*Gloss*	*Compounds*	*Gloss*
a.	[bet(u)]	bek-keN	different matter	betu-ziN	different person
		beʃ-ʃi	different paper	betu-mee	different name
		bet-taku	second house	betu-biN	separate shipping
b.	[zit(u)]	ziʃ-ʃi	implementation	zitu-geN	realization
		zik-keN	experiment	zitu-zai	actual existence
		zip-pi	actual cost	zitu-eN	actual performance

(9)

	Stems	*Compounds*		*Gloss*
a.	[bet(u)]	[betu-[kai-kee]]	*[bek-[kai-kee]]	separate payment
		[betu-[koo-doo]]	*[bek-[koo-doo]]	separate behavior
b.	[zit(u)]	[zitu-[koo-ʃoo]]	*[zik-[koo-ʃoo]]	actual negotiation
		[zitu-[soo-zoku]]	*[zis-[soo-zoku]]	actual inheritance

/CVC/ prespecification is undesirable in another respect. V_2 is highly predictable (see (1)), so several previous works assume /CVC/ for disyllabic stems (Sakai 1994; Itô & Mester 1996). Given the examples as in (10) that disobey the generalization in (1), Kurisu (2000) argues that both /CVC/ and /CVCV/ are viable inputs. Analytical details differ, but all of these analyses agree that non-exceptional stems may take /CVC/. It then follows that /CVC/ cannot be reserved specifically for exceptional stems. This leads to an important finding that prespecification does not succeed even if prespecified C_μ is viewed as a property of a whole compound rather than that of a certain stem. No matter what the pertaining ranking is, the moraic specification in /CVC$_\mu$/ is lost in regular forms when gemination is blocked. The same constraint ranking should deprive the prespecified mora of exceptional forms too. Hence, I conclude that the prespecification approach fails whether prespecification is a property of particular stems or compounds.

(10)

a.	*t-stems*	*Gloss*	b.	*k-stems*	*Gloss*
	niti	day		ziku	pivot
	kiti	luck		tiku	bamboo
	rati	bound		niku	meat

Cophonology postulates multiple constraint rankings in a grammar, and each item or a class of items picks a certain ranking. As summarized in (11), two rankings coexist for the case at hand. The examples in (6) choose the ranking in (11b) while (11a) is selected by non-exceptional ones. But this cophonology analysis is conceptually problematic. The problem is that it cannot explain why the ranking in (11a) is the default. This is because the choice of (11a) and that of (11b) are equally expected. Unlike the sonority hierarchy or any other phonetically grounded scales, there is no intrinsic reason for a particular ranking between CrispEdge and *Struc(σ). Otherwise, the two constraint rankings in (11) would be contradictory. In lexical indexation, indexed *Struc(σ)$_L$ is more specific and marked than *Struc(σ). It follows that the ranking CrispEdge » *Struc(σ) is the default, so gemination is normally blocked across a word boundary.

(11) a. *Regular ranking*: CrispEdge » *Struc(σ) b. *Exceptional ranking*: *Struc(σ) » CrispEdge

In summary, the lexical indexation approach effectively handles the exceptional examples in (6), but prespecification and cophonology do not. Examples of the kind provided in (6) present a serious empirical challenge to prespecification because it is inefficient in differentiating regular and exceptional examples. Furthermore, cophonology is unsatisfactory too since it is unable to explain why regular and exceptional cases are as they are. This is a general problem with the cophonology approach to exceptionality.