Exceptional Phenomena in Optimality Theory

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1. Introduction

Exploration of exceptions has a long history in generative phonological research. It dates back at least to Lakoff (1965). Much subsequent generative work pays close attention to issues around exceptions, including Zonneveld (1978) and earlier works cited therein. They propose various apparatuses such as diacritic features, readjustment rules, and prespecification. Readjustment rules that describe irregular alternations (e.g., suppletion) imply that not all forms are amenable to phonological rules even if the relevant structural description is met. The distinction of major and minor rules in the sense of Lakoff (1965) has the same theoretical entailment. Lightner (1972) declares that all minor rules precede all major rules (i.e., the Elsewhere Condition). To the extent that rule-oriented frameworks are upheld and these proposals are supported, previous studies on exceptions framed in derivational frameworks are important. They contribute to the discovery of the nature of phonological rules and their ordering relations. Moreover, earlier literature disagrees in the source of exceptionality: lexical representation or phonological rules. This debate is significant in promoting our understanding of the phonological component responsible for aberrant surface forms.

Nevertheless, exceptional phenomena did not attract as much attention in rule-based phonological frameworks as they would deserve. Chomsky and Halle (1968) make explicit in their preface that they selectively discuss those phenomena that shed light on the organization of universal grammar. In this context, they explicitly remark that exceptions and irregularities are put outside the purview of their research for the reason that they do not contribute to uncovering the nature of universal grammar. As virtually all theoretical linguists would agree, one of the ultimate goals of linguistics is to discover the architecture of universal grammar. Given the presupposition that exceptions do not occupy the center of language, it is not surprising that exceptions did not receive much attention at the initial stage of generative phonological research.

However, the paucity of attention to exceptions is not ascribed to the misunderstanding that they do not furnish fertile ground for unveiling the architecture of universal grammar. As I discussed above, earlier works framed in derivational terms touch on the heart of derivational frameworks and the basic organization of grammar. In my opinion, the scarcity of work on exceptionality lied in the architecture of rule-based phonology per se. By hypothesis, rules are more or less language-specific, and different rules are assumed for different phenomena. Exceptions are necessarily handled with even more data-specific mechanisms and devices.

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I conjecture that this basic architecture of rule-based phonology led to the prejudice that exceptions are peripheral effects among linguistic data.

This tradition was broken soon after the inception of Optimality Theory (OT; Prince and Smolensky 2004, originally circulated as a manuscript in the early 1990s). By hypothesis, all violable constraints are universal in this theoretical framework. Exceptions are also regarded as best outputs computed by interactive constraints. In this respect, exceptions are nothing different from regular data. We are now disallowed to postulate constraints specific to exceptions. In OT, therefore, exceptions are seen as core part of linguistic systems, and regular and irregular forms must be reconciled in one way or another.

This article offers a brief review of OT approaches to exceptions. Given the limitation of available space, I pick up three representative proposals articulated in previous OT literature: prespecification, cophonology, and lexical indexation. The selection of the best approach is tough for two reasons. First, the three proposals often converge in their empirical predictions. Second, evidence conflicts. Certain evidence favors a particular approach while other evidence disfavors it. Research on exceptions is an on-going project that requires further scrutiny. Hence, I do not intend to argue below for a particular approach conclusively. Instead, I describe the gist of each proposal and its application to real data. The review of the three proposals is selective, so the reader should refer to original works cited and not cited below. I also discuss some strengths and weaknesses of each proposal to highlight empirical and conceptual differences of the three proposals. Another goal of this article is to lay out problems left for future research. Exceptionality has many unresolved issues. I discuss broad issues missing in literature in the hope that research on exceptionality will be further flourished.

In section 2, I first discuss why exceptions deserve theoretical attention. For this purpose, I focus on the important wisdom that exceptions are not rampant. Exceptions are often heavily biased for items with certain phonological characteristics. Alternatively, the scope of deviation is often restricted such that only certain irregular patterns appear in a given dimension. The systematic absence of particular exceptions is highly instructive for two reasons. First, it shows that exceptions are regulated by formal grammar. Second, exclusion of exceptional gaps becomes a good test in choosing a certain theoretical analysis over others. This theory-independent discussion is followed by section 3, where I review three previous OT approaches to exceptions: prespecification, cophonology, and lexical indexation. Section 4 discusses an obvious but unnoticed asymmetry of the representational theory (i.e., prespecification) and the non-representational theories (i.e., cophonology and lexical indexation). Section 5 brings up some broad issues to be investigated in the future. Section 6 concludes this article.

2. Patterned Exceptions

Independent of theories, there is good reason for viewing exceptions as core part of linguistic systems. Close inspection of exceptions proves that exceptions are often systematic. Items showing exceptional behavior are not entirely predictable. But exceptions are often systematic in the sense that certain types of exceptions are or are not (prone to be) attested in some dimension.

Zuraw (2000) is a good representative research in this context. She discusses nasal substitution and mid vowel raising in Tagalog. Nasal substitution is a counter-bleeding phenomenon that occurs when a nasal is followed by an obstructive (e.g., [pighati?] ‘grief’ vs. [pa-mi-mighati?] ‘being in grief’). The nasal assimilates to the following obstructive in place, and the obstructive is deleted. Nasal substitution is sporadic in Tagalog. But examples exhibit some systematicity. Zuraw observes two major tendencies related to stem-initial consonants. First, nasal substitution is more likely to take place when the initial consonant is voiceless than when the initial consonant is voiced. Second, stem-initial labials are most likely to trigger nasal substitution while dorsals are least likely to do so. Her observation is confirmed by production and acceptability judgment tests with Tagalog speakers. No matter why the two factors of interest (i.e., voicing and consonantal place) affect nasal substitution, Zuraw’s findings reveal that phonological factors can have influence on the likelihood of exceptionality.

In Tagalog, [o] and [u] are largely in complementary distribution. [o] appears in word-final syllables (e.g., [káalos] ‘grain leveler’), and [u] occurs elsewhere (e.g., [búukas] ‘tomorrow’)\(^3\). This phonotactic restriction induces mid vowel raising before a suffix (e.g., [káalos] ‘grain leveler’ vs. [kálúús-in] ‘to use a grain leveler on’). In the native vocabulary, the phonotactic restriction and mid vowel raising have some exceptions (i.e., underapplication of mid vowel raising in contexts like vowel coalescence, trans-laryngeal vowel harmony across syllables, and pseudo-reduplication. But examples are not many and unsystematic. On the other hand, loanwords have much more exceptions. The fact that
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exceptions are abundant in loanwords is not surprising because loanwords tend to retain the source quality of each sound (Itô and Mester 1999). Interesting is the fact that underapplication of mid vowel raising exhibits some tendencies with respect to its contexts. Most notably, a mid vowel in a penultimate root syllable tends to block raising (e.g., [maneh60-bin] ‘to drive (OF)’). Loanwords with a non-final mid vowel underapply mid vowel raising over the chance level whereas those without any mid vowel fail to apply the raising process under the chance level. According to Zuraw (2000), this is due to harmony across syllables. Although not every kind of identity contributes to the blocking effect alike, there is a strong tendency that the increase in shared properties decreases the probability of mid vowel raising. Zuraw (2000: 167) demonstrates that this cross-syllabic similarity effect is accumulative. This means that the likelihood of exceptionality is predictable and systematic to some extent.

Kurisu (to appear-a) discusses morpheme structure constraints imposed on Sino-Japanese stems. This case is more stringent than the Tagalog examples in the sense that exceptional patterns are more than a tendency. Certain exceptional stems exist, but a particular type of stems is systematically absent from the Sino-Japanese stem inventory.

Sino-Japanese stems are either monosyllabic or disyllabic. There is literally no exception to this generalization. The segmental composition of disyllabic (C1)V1,C2V2 stems is highly restricted. C1 is confined to /t/ (t-stems) or /k/ (k-stems), and V1 must be [i] or [u]. In addition, as observed by Tateishi (1990) building upon Martin (1952), the final vowel is highly predictable. V2 is mostly [u] in t-stems while k-stems show backness harmony between V1 and V2. There are exceptions to this predictability of V2, as exemplified in (1). There are exceptional t-stems with [i] in the V2 position. Exceptions are found regardless of the backness value of V1. By contrast, in k-stems, exceptional disharmony appears only when V1 is a front vowel. My exhaustive dictionary survey proved that no Sino-Japanese stem has the shape of [(C)Vbki], where Vb stands for a back vowel.

<table>
<thead>
<tr>
<th>(1) a. t-stems (V1=front)</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>kitʃi</td>
<td>luck</td>
</tr>
<tr>
<td>nitʃi</td>
<td>day</td>
</tr>
<tr>
<td>itʃi</td>
<td>one</td>
</tr>
<tr>
<td>fitʃi</td>
<td>seven</td>
</tr>
</tbody>
</table>

b. t-stems (V1=back)    Gloss
hatʃi           eight
ratʃi           bound

c. k-stems (V1=front)    Gloss
tʃiku            bamboo
niku            meat
iku             grow
kiku            chrysanthemum
ʒiku           pivot

It is often difficult or even impossible to identify a certain gap as systematic or accidental. Without any positive evidence for believing that the gap is accidental, the most restrictive view is interpreting it as a systematic gap. Under this restrictive mode of assumption, the lack of [(C)V,ki] is systematic, a fact that calls for some formal analysis. No matter how it is analyzed, the complete gap has something to tell us about the organization of Japanese grammar. Kurisu (to appear-a) takes this gap as empirical evidence for a cophonology analysis (see section 3.2).

Systematic gaps in exceptions or skewed distributions of exceptions are convincing indications that exceptions are grammar dependent in the sense that they are more or less regulated by grammatical requirements. Exceptional phenomena therefore deserve serious attention regardless of the theory that an analysis is framed in.

3. Approaches to Exceptions in OT

This section presents three approaches to exceptionality proposed in OT literature: prespecification, cophono1 ogy, and lexical indexation. They are clearly different conceptually, but it is often difficult to distinguish them on the empirical ground. In the rest of this section, I lay out basic ideas of the three approaches, their application to actual examples, and strengths and weaknesses of each approach.

3.1. Prespecification

The key idea of prespecification (Inkelas 1995, 1999, Inkelas and Orgun 1995, Inkelas et al. 1997) is that exceptional information is encoded underlingly, and its surface appearance is ensured by a high ranked faithfulness constraint. The role of markedness constraints is fairly limited. Prespecification is not a new analytical device in OT. It has been a quite standard tool for handling exceptional examples, particularly in combination with underspecification theory.
Inkelas et al. (1997) discuss two cases of exceptionality in Turkish: labial attraction and devoicing of coda obstruents. First, labial attraction is a morpheme structure constraint that dictates that a high vowel be round [u] after a labial consonant preceded by [a] (e.g., [kapuz] ‘watermelon (nominative)’ and [sabun] ‘soap (nominative)’). There are many exceptions to this generalization, as documented by Clements and Sezer (1982:225) (e.g., [kaptu] ‘door (nominative)’ and [kamtu] ‘reed (nominative)’). Second, obstruents are normally devoiced in codas (e.g., [ka.na.du] ‘wing (accusative)’ vs. [ka.nat] ‘wing (nominative)’) (Lees 1961, Lewis 1967, Underhill 1976, Kaisse 1986, Rice 1990). But there are cases where coda devoicing fails to apply (e.g., [ka.ta.log] ‘catalog (nominative)’ and [ka.ta.log.dan] ‘catalog (ablative)’) (Kaisse 1986, Hayes 1990).

Inkelas et al.’s proposal is simple. Exceptional segments are prespecified so lexically. For instance, [kapu] has final /u/, and [ka.ta.log] has final /g/. Assuming IDENT[round] » LABIALATTRACTION and IDENT[voice] » CODADevoicing, lexically encoded segments come out faithfully. On the other hand, alternating obstruents are underspecified for voicing. IDENT[voice] plays no role. As a consequence, underspecified coda obstruents are realized as voiceless consonants in order to respect CODADevoicing3).

The strongest argument for prespecification is its explicability of morphemes with mixed behavior. Exceptions to coda devoicing are often unsystematic. /ed3dad/ ‘ancestors (nominative)’ has two coda obstruents, but only the second is devoiced (i.e., [ed3.dat]). Underapplication of coda devoicing is not a characteristic of a whole morpheme. The prespecification analysis is straightforward. The first coda consonant is specified as voiced lexically. High ranked IDENT[voice] compels faithful parsing of the voiced obstruent. The same observation applies to intervocalic velar deletion. Inkelas et al. (1997: 406) note that reference to morpheme edges is not a solution. They demonstrate an example where only one morpheme-final velar is deleted when two such velars are available within a word (i.e., /birik- ed3ek-i/-[birik ed3eki] ‘accumulate-future-3possessive’). No positional difference is detected here. Spanish diphthongization is analogous in this respect. Stressed mid vowels are diphthongized (Cressey 1978, Harris 1985). In some roots with two mid vowels, one mid vowel undergoes diphthongization whereas the other resists diphthongization even under stress. Again, positional consideration is of no use.

As discussed below, cophonology and lexical indexation interpret exceptionality as a property of individual morphemes or a certain class of items. In these two theories, the loci of exceptions are not directly encoded. Examples such as Turkish intervocalic velar deletion are problematic for them since they predict homogeneous behavior of multiple tokens of the same element. Prespecification theory is capable of localizing where exceptions come up. The mixture of regularity and exceptionality within a morpheme strongly favors prespecification.

Prespecification has weaknesses as well. A major problem is its inexplicability of the regularity in exceptions discussed in the previous section. Inkelas et al. (1997) explicitly declare that richness of the base (Prince and Smolensky 2004) makes prespecification compatible with OT. In Sino-Japanese, for instance, richness of the base tolerates /(C)V\text{ki}/ stems. A high ranked faithfulness constraint ensures faithful parsing of lexically specified V, so /(C)V\text{ki}/ wrongly maps onto [[(C)V\text{ki}]]. Prespecification theory needs to appeal to the accidental absence of /(C)V\text{ki}/ in the underlying representation, but this assumption is antithetical to richness of the base. This suggests that systematic gaps are intractable to prespecification6).

Another problem with prespecification is its prediction that the phonological element that exhibits some exceptional pattern in an example behaves exceptionally throughout the same phonological and morphological environment. This prediction is refuted by Kurisu (to appear-b). Sino-Japanese t-stems usually undergo gemination before a stem with an initial voiceless obstruent (e.g., [betu] ‘separate’ vs. [bek-keN] ‘different matter’) (see Itō and Mester 1996, Kurisu 2000, and studies cited therein).2 A word boundary usually prevents this gemination process (e.g., [betu-[koo-doo]] ‘separate behavior’) (Martin 1952, McCawley 1968, Vance 1987, Itō and Mester 1996, Kurisu to appear-b), but counter-examples exist (e.g., [bes-[se-kai]] ‘different world’). Prespecification theory must assume /(C)VC/ in order to explain them. However, this analysis is not able to explain cases where the same morpheme behaves regularly elsewhere, as in [betu-[koo-doo]]. A morpheme should have one lexical form irrespective of the complex compound that it is embedded in. The morpheme-internal inconsistency is inexplicable.

3.2. Cophonology

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Conflicting surface forms emerge to optimize output against different constraint rankings. In the current context, regular and exceptional forms are evaluated by distinct sub-grammars. A cursory look at literature reveals that cophonology is not designed to deal with exceptionality specifically. Cophonology is often applied to morphologically conditioned phonological phenomena and lexical variation. This section reviews Kurisu (to appear-a) that defends cophonology in the context of exceptionality.

The theoretical goal of Kurisu (to appear-a) is to achieve a unified understanding of a whole range of V2 variation in disyllabic Sino-Japanese stems. The basic descriptive generalization was provided in section 2. The entire pattern is encapsulated in (2), where Vf and Vb stand for front and back vowels, respectively. No stem has the shape of [(C)Vb ki].

(2)

<table>
<thead>
<tr>
<th>Regular stems</th>
<th>Exceptional stems</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-stems</td>
<td></td>
</tr>
<tr>
<td>(C)Vftu</td>
<td>(C)Vfti</td>
</tr>
<tr>
<td>(C)Vbtu</td>
<td>(C)Vbti</td>
</tr>
<tr>
<td>k-stems</td>
<td></td>
</tr>
<tr>
<td>(C)Vfki</td>
<td>*(C)Vfki</td>
</tr>
<tr>
<td>*(C)Vbku</td>
<td>*(C)Vbku</td>
</tr>
</tbody>
</table>

Three assumptions are made. First, front vowels are specified for coronal (Hume 1990, 1992, 1996) whereas back vowels are dorsal segments. Second, AGREE requires backness harmony between V1 and V2. Finally, harmony is strictly local such that C2 participates in the backness harmony process (Gafos 1996, Ní Chiosáin and Padgett 1997). All candidates that disregard this strict locality are ruled out by undominated NoGAp (Archangeli and Pulleyblank 1994, Itô et al. 1995, Walker 1998).

These assumptions imply that only two types of harmony are possible: VfVf and VbVb. Regular t-stems and k-stems are evaluated by different constraint hierarchies provided in (3).³)

(3) a. Regular t-stems: *[i] » AGREE » *[u]
   b. Regular k-stems: AGREE » *[u] » *[i]

*MID/LOW-V » *HIGH-V restricts V1 to high vowels. The underlying quality of V1 is protected by FAITH-σ1 (Beckman 1997, 1998). In t-stems, high *[i] penalizes [i] in V2, so *[u] is chosen. In k-stems, backness harmony is compelled by AGREE when V1 is a back vowel. A caveat is necessary concerning k-stems with a front vowel in V1. As shown in (4), AGREE is necessarily violated by all candidates that satisfy NoGAp. *[u] outranks *[i], so *[i] is chosen. Harmony is ostensible in k-stems with front V1.

(4)

<table>
<thead>
<tr>
<th>/((C)Vfki,i,u)/</th>
<th>AGREE</th>
<th>*[u]</th>
<th>*[i]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ≠≠ (C)Vfki</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>b. *(C)Vfku</td>
<td>*</td>
<td></td>
<td>*</td>
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</table>

Exceptional stems are regulated by the different rankings in (5).⁶) Exceptional t-stems are associated with the same ranking as regular k-stems, meaning that backness harmony is required when V1 is front. Backness harmony is impossible if V1 is back, as in (1b). [i] appears in V2 because *[u] outranks *[i]. In (1c), AGREE is violated by all candidates respecting NoGAp. *[u] is selected for V2 due to *[i] » *[u].

(5) a. Exceptional t-stems: AGREE » *[u] » *[i]
   b. Exceptional k-stems: AGREE, *[i] » *[u]

The empirical merit of this analysis lies in its explicability of the lack of [(C)Vb ki] stems. As shown in (6), the proposed analysis does not generate [i] for V2. Harmonized segments are italicized in (6b). Furthermore, (3b) requires backness harmony in k-stems with back V1 because AGREE is high ranked. Neither (3b) nor (5b) generates [(C)Vb ki] since all k-stem inputs with back V1 converge on [(C)Vb ku]. The systematic gap of [(C)Vb ki] follows from the analysis of existing Sino-Japanese stems.

(6)

<table>
<thead>
<tr>
<th>/((C)Vb k[i,u])/</th>
<th>AGREE</th>
<th>*[i]</th>
<th>*[u]</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. *(C)Vb ki</td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. ≠≠ (C)Vb ku</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

Prespecification is not suitable for explicating systematic exceptional patterns because the source of exceptionality is lexical encoding and high ranked faithfulness constraints. This problem is resolved in cophonology by endowing markedness constraints with more weight.

One problem with cophonology is that it is unable to identify loci of exceptions when some element exhibits irregular behavior while the same element in the same structural description behaves regularly elsewhere in one morpheme, especially if no positional constraint is
operative. Cases like intervocalic velar deletion in Turkish and diphthongization in Spanish present a serious challenge to cophono1 ogy because each ranking is associated with a morpheme or a class of items. One and the same element is expected to pattern alike within a morpheme.

There is also a conceptual issue to be considered. The analysis sketched above does not explain why Sino-Japanese stems are as they are. The rankings in (3) do not find any independent justification, so the opposite pattern would be equally plausible (i.e., harmony in regular r-stems and non-harmony in regular k-stems). This problem is nothing special to the case here. In order to account for both regular and exceptional patterns, two constraint rankings are necessary. However, the theory has no principled mechanism for explaining why the two rankings are associated with regular and exceptional examples as they are. Kurisu (to appear-b) points this out as a general problem with cophono1 ogy theory.

3.3. Lexical Indexation

Lexical indexation defended by Pater (2000, 2007) and Kurisu (to appear-b) maintains that exceptional items and part of the universal constraints are lexically marked. The well-formedness of candidates for indexed inputs is evaluated by indexed constraints as well as by non-indexed general constraints. Non-indexed forms vacuously satisfy indexed constraints. Unlike cophono1 ogy theory, lexical indexation presupposes one constraint hierarchy in a language grammar. I base my discussion in this section upon Pater (2007).

Piro syncopates a vowel before certain suffixes (Matteson 1965, Kissberth 1970). Syncope occurs immediately before nominalizing suffixes /-lu, -nu/, the indirective suffix /-ya/, and the third person singular pronominal suffix /-/wa/. This is exemplified in (7a). Syncope does not apply before the verbal theme formative /-ta/, the anticipatory suffix /-nu/, and the intransitive verb theme suffix /-/wa/, as shown in (7b). Finally, (7c) shows that the suffix /-/wa/ ‘still, yet’ neither triggers nor receives syncope.

(7) Underlying Surface Gloss

a. yimaka-lu yimaklu teaching
hata-nu hatnu light/shining
heta-ya hetya see there
heta-lu selu it
b. hata-ta hatata to illuminate
heta-nu hetanu going to see
meyi-wa-ta meyiwata to celebrate
c. heta-wa-lu hetawalu going to see
   n-hišinika-wa-lu nušinikawalu I’m still thinking about it

The occurrence of syncope is phonologically unpredictable. Pater (2007) analyzes this set of data as follows. (7b) shows that MAX is more important than ALIGN(Suffix,L,C,R) that requires that a suffix follow a consonant. The suffixes in (7a) have a lexical index L1, and ALIGN-SuffixL1 outranks MAX. This generates syncope, as presented in (8). The fact in (7c) is explained by assigning another index L2 to /-/wa/ ‘still, yet’ and MAX. MAXL2 is undominated, so no syncope takes effect, as illustrated in (9).

(8) /yimaka-luL1/ | ALIGNL1 | MAX | ALIGN
   a. yimakalu  */!
   b. */! yimaklu

(9) /heta-waL2-L1/ | MAXL2 | ALIGNL1 | MAX | ALIGN
   a. */! hetawalu
   b. hetawlu  */!
   c. hetwalu  */!

A strength of this analysis is its explicable of the default pattern. General MAX outranks general ALIGN, meaning that syncope normally does not take place in Piro. This lexical indexation analysis is undesirable if the default and exceptional patterns are actually the other way round. However, lexical indexation still overcomes a problem with cophono1 ogy that it does not explain why a certain pattern is canonical. Lexical indexation is more restrictive than cophono1 ogy in this regard. Kurisu (to appear-b) develops an argument for lexical indexation along this line.

Ironically, this strength is a disadvantage of lexical indexation as well. Let us consider only (7a) and (7b) for simplicity. Without independent evidence for MAX » ALIGN, MAX » ALIGN » MAX is also a possible analysis under the assumption that examples as in (7a) are the default and that the suffixes as in (7b) are lexically marked. This is what Inkelas and Zoll (2007) call ‘too-many-solutions problem’. This problem may or may not be a real problem, depending on the availability of numerical evidence for the default status of a particular
pattern. Language learners exposed to a large amount of data will avoid this problem by assessing the frequency of syncope. But arbitrariness of analyses is a worry to analysts who attempt to uncover the organization of language. Analysts appealing to lexical indexation theory potentially submit an arbitrary analysis.

In addition, lexical indexation does not elucidate cases where an element behaves canonically while another token of the same element behaves exceptionally in a morpheme. Pater (2007: 290) recognizes this issue. He maintains that examples like /ed3dad/ → [ed3, dat] ‘ancestors (nominative)’ in Turkish are captured by an independent positional markedness constraint punishing a word-final voiced consonant. However, positional consideration fails in intervocalic velar deletion in Turkish and diphthongization in Spanish. Not all cases are resolved by appealing to positional consideration.

4. Representational versus Non-representational Approaches

Prespecification is representational in that irregularity is directly encoded in the lexical representation. By contrast, cophonology and lexical indexation are non-representational since the explanatory burden is put on constraint interaction. This fundamental difference leads to an important empirical difference of the representational and non-representational approaches, a point unnoticed in earlier literature.

In prespecification theory, exceptional items are permitted to deploy only representation or structure admitted elsewhere in a given language. For a hypothetical case, suppose that [?] is not tolerated in non-exceptional items in some language. In this language, *[?] dominates all faithfulness constraints, including positional faithfulness constraints. This ranking sweeps away all /?/ even if it is supplied in the input due to richness of the base. The grammar does not make any distinction of exceptional and non-exceptional forms. In prespecification theory, a single constraint hierarchy is assumed, and there is no constraint specialized to exceptional forms. As a consequence, elements not admitted elsewhere in the language are eradicated from exceptional items as well. All exceptional elements are a subset of elements licit elsewhere in the language.

Cophonology and lexical indexation theories make a different prediction. In cophonology, nothing forecloses the possibility of FAITH > *[?] along with *[?] > FAITH. Lexical indexation theory allows for indexed FAITH over *[?] (i.e., FAITHA > *[?] > FAITH). In these theories, [?] may appear exceptionally in spite of its absence in non-exceptional items.

A potential example for the correctness of cophonology and lexical indexation theories is discussed by Inkelas and Zoll (2007). In Yir-Yoront, a language spoken in the Cape York Peninsula of Australia, ideophones permit certain onsets that are disallowed elsewhere. It is indeterminable here whether this is a real example of interest. We need to know first of all whether ideophones are exceptional items. If they are very small in number and they conform to other phonological restrictions that the other items do, the Yir-Yoront case may be taken as evidence against prespecification. By contrast, it would prefer neither the representational nor non-representational approach if ideophones do occupy a fair amount of the Yir-Yoront lexicon and hence they are nothing exceptional. In addition, we have to consider the possibility that Yir-Yoront ideophones constitute their own lexical stratum like the Japanese mimetic vocabulary (Itô and Mester 1999). In this case, no particular approach is supported by examples from Yir-Yoront ideophones.

In any case, the consideration above shows that prespecification is in a sense more restrictive than cophonology and lexical indexation. This restrictive nature of prespecification may appear surprising at first since anything can be posited as an exceptional property in principle, including subsegmental, segmental, and prosodic properties. This difference between the two types of theories is a good test for distinguishing them on the empirical ground.

5. Remaining Issues

Even the brief sketch of the three previous approaches reveals that evidence is in conflict. Certain evidence favors a particular approach while other favors some other approach. This disagreement is a clear indication that we have not reached a satisfactory understanding of exceptional phenomena yet. There are many remaining issues. I focus upon three major ones: typology, reconciliation of competing theories, and influences of functional factors. They are a priori independent of theories.

First, a thorough typological research is a large gap. This gap is true not only in OT but throughout generative research on exceptions. Every language has more or less exceptions, so exceptional data are virtually countless. It is certainly beyond any individual’s capacity to work on all exceptional data, but broad data collection is indispensable for attaining a deeper understanding of exceptions. To the best of my knowledge,
virtually no typological argument is provided for or against a particular theory of exceptions. We need to examine the possible range of exceptions, if any. Once possible exceptions are delimited, our analytical task is to construct a theory. The theory of exceptions should be restrictive enough to preclude all impossible patterns but loose enough to incorporate all possible ones. Research on this question contributes to projects on universal grammar. Also, this typological question is useful in light of the discussion in section 4. OT is inherently typological. Like crosslinguistic inventories of syllable structure (Prince and Smolensky 2004), exceptions are amenable to typological testing in OT.

Second, we must consider how to reconcile conflicting theories. Previous studies are satisfied with choosing the best theory for a very limited set of data. We need to discuss whether there is a universal mechanism that governs all exceptions across languages. It may turn out that no integration is possible such that multiple theories of exceptions are required. Even in this case, it remains a good question why language has multiple formal mechanisms of exceptions.

Finally, it is also of interest whether functional factors enhance or detain exceptional phonological changes. Bybee (2001) declares that usage frequency can affect phonological processes. Reduction phenomena are especially more likely to take place as the frequency of a given item increases. Kurisu (to appear-b) takes up this issue. Given that disyllabic Sino-Japanese stems may be /(C)VCV/ (Kurisu 2000), gemination referred to in section 3.1 can be viewed as a reduction process since vowel deletion is involved. My survey of usage frequencies of Sino-Japanese complex compounds with and without exceptional gemination revealed no identifiable tendency. Complex compounds exhibiting exceptional gemination across a word boundary may or may not be more frequent than non-exceptional ones. This finding is contrary to the claim of Bybee. My survey was preliminary. More systematic research will illuminate effects of usage frequency and other functional factors on exceptional phenomena.

6. Conclusion

This article offered a quick review of previous research on exceptions. Language exhibits various exceptions indeed, so we know very little about their nature. Exceptionality calls for continuing work at both descriptive and theoretical levels. Besides the large scaled questions addressed in the previous section, there is a basic unanswered question: How much proportional smallness of a particular pattern is sufficient for language users to deal with it as an exception? The lack of our answer to even this fundamental question suggests that we do not know much about exceptions. I hope that future rigorous descriptive and theoretical research will deepen our understanding of exceptions.

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Notes

1) Front [e] and [i] do not obey the same phonotactic restriction. While the appearance of [e] is confined to word-final syllables, [i] can appear anywhere. Consequently, free variation is frequently found in word-final syllables (e.g., *pante=pani ‘dragonet’).

2) One potential strategy for differentiating systematic and accidental gaps would be to take advantage of Moreton’s (2002) finding. He observes that speech perception is heavily affected by grammatical knowledge. Were this true, native speakers of Japanese will not perceive [(C)\(V\)\(b\)ki] as a Sino-Japanese stem if the gap is systematic. They will judge [(C)\(V\)\(\delta\)ki] as an item affiliated with other lexical classes.

3) This underspecification has a serious problem. We incorrectly expect that underspecified obstruents do not alternate. In onsets, IDENT[voice] and CODA[devoicing] are both satisfied vacuously regardless of the voicing value of underspecified obstruents in the surface representation. Voiced obstruents are more marked than voiceless ones. Underspecified obstruents in onsets erroneously surface as voiceless consonants to respect *[-son, +vol] (see Kurisu 2009 for discussion).

4) Ito and Mester (2001) provide a slightly similar argument against prespecification theory. Loanword nativization is systematic in German such that feasible patterns are in implicational relations. They are never expected in prespecification theory in which local irregular information is encoded individually and independently. Ito and Mester’s point of argument is analogous to the systematic gap of [(C)\(V\)\(\delta\)ki] stems in Sino-Japanese that prespecification is incapable of differentiating possible and impossible patterns. See Ito and Mester (1999) for loanword nativization in Japanese.

5) Evidence does not prove Agree » *\([u]\) in (3a). [u] is selected for V\(\delta\), as long as *(i) is undominated. Agree » *(u) is assumed here for maximizing the ranking uniformity between regular t-stems and k-stems. This ranking is justified by k-stems.
6) In (5a), AGREE » *[u] is not motivated by empirical evidence. In the spirit of minimal reranking, I assumed AGREE » *[u] for exceptional t-stems as well as for regular t-stems. In effect, the ranking of the two constraints is not crucial in t-stems in general.

References


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