

## **Chapter 1: Introduction and background**

### **1.1 Introduction**

In this dissertation, I am concerned with when a certain phonological process is blocked, and particularly when this process is blocked in order to avoid homophony created by neutralization of distinct inputs, even in the cases where the alternation conditions are perfectly met.<sup>1</sup> This dissertation examines such blocking, which here I will call “anti-homophony blocking.” Previous research has shown that anti-homophony blocking occurs only within an inflectional paradigm and often it has assumed that anti-homophony blocking is productive, without concrete evidence. Anti-homophony blocking between lexical items is not usually considered strong enough to block inflectional morphology as claimed by Albright (2003). In this dissertation, I will claim that anti-homophony blocking occurs even in transparadigmatic (or nonparadigmatic) relations, that is, between words which belong to a different paradigm. To support my claim that anti-homophony blocking in transparadigmatic relations is a productive process as part of the phonological grammar of the native speakers, I will provide evidence using Japanese data and conduct an experiment.

Previous research on anti-homophony blocking concerns primarily this phenomenon within an inflectional paradigm (Kisseberth and Abasheikh 1974, Mitchell 1993, Crosswhite 1999, 2001, Kenstowicz 2002, Morrill 2002, Kawahara 2003, Itô and

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<sup>1</sup>Note that the word ‘neutralization’ is often used to refer to a situation in which two distinct sounds merge (Kenstowicz 1994 and Gussenhoven and Jacobs 1998, among others). However, “neutralization” is used here to refer to the neutralization of inputs through the creation of homophonous outputs by the phonology.

Mester 2004b, Blevins 2004, Gessner and Hansson, to appear). I, however, will claim that anti-homophony blocking can occur between, rather than within, individual inflectional paradigms, in other words, between words that are seemingly morphologically unrelated. The main data in this dissertation comes from *shukuyakukei* or “contracted forms” (Kikuzawa 1935, Toki 1975) in derived environments in Japanese, derived by syncope along with lenition or deletion of the adjacent consonant. Among several contracted forms, I will discuss three types of contracted forms, which I will refer to as “nasal assimilation,” that is, *r* in a syllable at a morpheme boundary assimilates to *n* before *n* in a suffix as a result of syncope of the vowel following *r*, “labial contraction,” i.e. the deletion of a labial and the vowel that precedes it, and “gerund /te/ contraction,” which is the syncope of one vowel in two consecutive vowels between the gerund /te/ and an auxiliary verb.

This research is set in the framework of Optimality Theory (Prince and Smolensky 1993), in which a finite set of universal but violable constraints are ranked in a specific order in a given language. I claim that the contracted forms and anti-homophony blocking are the results of synchronic grammar which consists of specific constraints, such as anti-homophony constraint and their rankings in “contraction grammar.” I will assume that the anti-homophony constraint also exists in “full-form grammar,” - in which the underlying form is realized in the full form, without contraction. However, homophony is sometimes allowed in both grammars, especially in the full-form grammar, due to a ranking in which the anti-homophony constraint is ranked lower than the phonotactic and faithfulness constraints.

Past research has not provided concrete evidence that such blocking is productive, even in paradigmatic relations. In order to gather more clear results on that matter, I carried out a production experiment, designed to test the extent to which the anti-homophony principle in transparadigmatic relations in nasal assimilation is part of synchronic grammar of Japanese, which provided certain evidence in support of my claim.

## **1.2 Relevant previous research**

In the following section, I will review previous research on blocking in general, and anti-homophony blocking in particular, and address issues and questions concerning anti-homophony blocking.

### **1.2.1 Anti-homophony blocking**

Aronoff defines *blocking* as “the nonoccurrence of one form due to the simple existence of another” (Aronoff 1976:43). Blocking is triggered by a threat of the occurrence of an “identical element” which is either an “identical meaning,” the traditional notion of blocking, or an “identical form.”

One of the well-known examples of avoidance of creation of “identical meaning” in different forms is lexical blocking. For example, although the English agentive nominal suffix *-er* applies productively, as in *swim ~ swimmer*, its application to *steal* is blocked,

\**stealer*, due to the existence of *thief*.<sup>2</sup> Similarly, \**goed*, the application of past formation rule to *go*, is blocked due to the existence of irregular form *went*. Also, it is a fairly productive process to form +*ity* derivatives from adjectives in *ous*, such as *curious* ~ *curiosity*. However, whenever there exists for a given root both an adjective of the form *Xous* and a semantically related but underived abstract noun, then it is not possible to form the +*ity* derivatives of the *Xous* adjective. The already existing noun blocks the new +*ity* derivative (Aronoff 1976:43).

|     |             |             |                |                   |
|-----|-------------|-------------|----------------|-------------------|
| (1) | <u>Xous</u> | <u>+ity</u> | <u>Nominal</u> |                   |
|     | curious     | curiosity   | *              |                   |
|     | precious    | preciosity  | *              |                   |
|     | glorious    | *gloriosity | glory          |                   |
|     | gracious    | *graciosity | grace          | (Aronoff 1976:44) |

Aronoff argues that the lexicon avoids complete synonymy between its entries as much as possible. In other words, there cannot be more than one item in each “slot” in the dictionary for the noun corresponding to, for example *glorious*, since this slot is preempted by *glory*, there is no room for *gloriosity*. *Gloriosity* is blocked in order not to create a synonym to *glory*.

Clark and Clark (1979) demonstrate “preemption by synonymy” in denominal verbs, whereby an innovative denominal verb formation is blocked when it would create synonymy with an already established form. They identify three types of preemption by synonymy for denominal verb: suppletion, entrenchment and ancestry. In suppletion, for example, the noun/verb paradigm such as *helicopter/helicopter* and *bicycle/bicycle* is

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<sup>2</sup> *Stealer* could be grammatical in a specific context but is ungrammatical as general meaning of ‘somebody who steals something’.

created as a result of a denominal verb formation which means ‘to go by [vehicle]’ from the unadorned name of the vehicle. However, the following cases are ruled out.

- (2) \*Jack *carred* downtown.  
       \*Connie *airplaned* to London. (Clark and Clark 1979:798)

Such blocking is due to the presence of the suppletive forms *drive* and *fly*, which in context would mean precisely ‘to go by car’ and ‘to go by airplane’. Thus, \**carred* and \**airplaned* are blocked due to the potential synonymy with *drove* and *flew* respectively.

In past literature, blocking of the creation of “identical form” is also discussed. Clark (1987:2) explains “the homonymy assumption” as - “every two meanings contrast in form.” Holding to this view, two different meanings would never be carried by the same form. However, this assumption does not hold in general because as Clark points out, homonymy occurs in any language such as lexical homonymy *bank* (of a river) vs. *bank* (financial institution). Furthermore, this assumption may not play an important role in either adult language use or in child language acquisition. There is no evidence that children avoid homonyms during acquisition, moreover, they appear to understand and use them at an early age (Clark 1993). However, there are cases where the *creation* of homonymy by a phonological process is avoided. Clark and Clark (1979) argue that a case, where a potential innovative denominal verb formation is blocked when it would be homophonous with a well-established verb, exists because the innovative verb is normally preempted by the well-established verb. This notion is called “preemption by homonymy.”

- (3) a. to \*spring/\*fall in France  
       b. to summer/autumn/winter in France (Clark and Clark 1979:800)

(3a) meaning ‘to spend spring/fall in France’ is unacceptable as being preempted by the homonymous verbs *spring* and *fall* while (3b) is acceptable.<sup>3</sup>

My focus is “anti-homophony blocking,” which is a particular type of blocking, blocking in order to avoid the creation of identical forms by the application of a phonological process under a homophony threat. Recent research on anti-homophony blocking, for example Crosswhite (1999, 2001), Kenstowicz (2002) and Itô and Mester (2004b), discusses blocking in an inflectional paradigm, claiming that the application of a given phonological process is partially or completely blocked when it would create a homophonous output with another item in a paradigm. They call such blocking “intra-paradigmatic homophony blocking” (Crosswhite) or “paradigmatic contrast” (Kenstowicz). Anti-homophony blocking within a paradigm has been reported in several languages.

(4) Anti-homophony blocking in paradigmatic relations

- a. Trigrad dialect of Bulgarian (Crosswhite 1999, 2001, Kenstowicz 2002)  
Vowel *o*, for example neuter singular ending noun *-o*, in the unstressed position is reduced to *a*: *kapito* → *kapita*. This vowel reduction is blocked when it would produce an output form that is homophonous with the input form of a morphologically related item. For example, if *blágo* ‘good, blessing’ singular underwent the vowel reduction, the resulting *blága* would be homophonous with the plural form as no stress shift occurs, unlike other nouns such as *varzála* ‘mooring point, SG’ to *varzála* (PL). Thus, the vowel reduction is blocked (Crosswhite 2001).
- b. Russian (Crosswhite 1999, 2001, Kenstowicz 2002)  
Unstressed nonhigh vowels /o, a/ are reduced to high and unround after “soft” (palatalized or palatal) consonants (so-called *ikan’e*): *-of* ‘2-SG’ → *-if*, *\*-əf* but this reduction is blocked in inflectional endings when it obliterates the distinction between the singular and plural forms of the third person. In the 3<sup>rd</sup> plural nonpast

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<sup>3</sup>For some English speakers, *to autumn in France* seems questionable as well, but I will not go into details here.

verbal desinence, /-at/, does not undergo reduction to [it] when unstressed. Instead, it is reduced to [ət]: *stávʲat*, \**stávʲit* < /stávʲ-at/ ‘place’. The expected 3<sup>rd</sup> plural *stávʲit* is replaced by *stávʲət* because if the expected forms occurred, they would consequently become homophonous to the 3<sup>rd</sup> person singular form (Crosswhite 2001).

- c. Chi-Mwi:ni (Kisseberth and Abasheikh 1974, Kenstowicz 2002)  
 “Ablaut” is a morphophonemic process which avoids three successive laterals by deleting the middle one and contracting the resultant vowel sequence: *pułl:te* ‘shell corn’ < /pułł-I:l-e/. This process is blocked if a verb with applied suffix /-It/ and perfect suffix /-I:l/ did ablaut, the resultant form would be identical to the corresponding perfect: \**sul-I:l-e* < /sul-il-I:l-e/ as it is homophonous to *sul-I:l-e* ‘want, Perfect’ (Kenstowicz 2002).
- d. Modern Arabic (Mitchell 1993, Kenstowicz 2002)  
 In the Damascus dialect of Syrian Arabic, stress appears on the rightmost heavy syllable (long vowel or closed with final CVC counting as light) and otherwise on the antepenult. Schwa gets deleted from an unstressed open syllable. When the object suffix starts with a vowel (/ -et/ ‘she’ for example), a HLLL sequence should produce antepenultimate stress with syncope of the suffixal vowel: /9allam-et-o/ ‘taught, she, him’ → /9allám-et-o/ → \*9allám-t-o. But the stress shift and consequent syncope are blocked because this would otherwise merge this form of the paradigm with the 1-SG/2-SG masc. /9allam-t-o/ → 9allám-t-o (Kenstowicz 2002).
- e. Finnish (Morrill 2002)  
 In colloquial Finnish, some verbs show consonant deletion and vowel lengthening: *tulen* ‘to come’ → *tuun*. For the verb *olla* ‘to be’, for example, its colloquial version of the 3<sup>rd</sup> person singular *on* would presumably be either *oo* or *oon*, but both are blocked because the consonant deletion and vowel lengthening would lead to homophony with the colloquial 2<sup>nd</sup> person imperative *oo* or the colloquial form of the 1<sup>st</sup> person singular *oon*.
- f. Zoque (Kawahara 2003)  
 In Zoque, it is typical that root faithfulness takes precedence over affix faithfulness. For example, stem nasals resist nasal place assimilation (*man* + *ba* ‘he goes’ → *manba*) whereas affix nasals undergo nasal place assimilation (*tih* + *tam* + *pa* ‘we/you arrive’ → *tihtamba*). However, for example, when the nasal affix /N/ is attached before root /wenu/, and /N/ and /w/ are fused, the nasality of this root is not preserved: /N + wenu/ → [wẽenu] ‘my breaking’ (1<sup>st</sup> person progressive). The expected form [wenu], as a result of nasality faithfulness of the root, would be homophonous to [wenu], the output form /wen+u/ ‘it broke’ (3<sup>rd</sup>

person perfective). This nonpreservation of nasality in the root is due to the constraint \*MERGE which demands that underlyingly distinct forms within a paradigm receive different phonological exponence.

- g. Dakelh (Carrier) (Gessner and Hansson, to appear)  
 In Dakelh (Carrier), as in many other Athapaskan languages, valence prefixes (traditionally known as “identifiers”), which are a set of voice, and “inner subject” prefixes interact resulting in deletion and/or fusion and, in one case, what resembles epenthesis. From a diachronic-evolutionary point of view, Gessner and Hansson argues that this “epenthesis” of [ʌ] in [lʌ-] (</s-/ ‘1-SG’ + intransitive valence /l-/) and in [ʔʌ-] (< /h-/ ‘2Du/PL’ + /l-/) is in fact a failure of syncope in order to maintain a surface distinction from the affixation forms of the transitive valence suffix /ʔ-/ to “inner subject”: /-s-l-CV(C)/ → -ʔʌCV(C), \*-sCV(C) (because this would be homophonous with -sCV(C) (< /-s-ʔ-CV(C)/)), and /-h-l-CV(C)/ → -ʔʌCV(C), \*-ʔCV(C) (because this would be homophonous with -ʔCV(C) (< /-h-ʔCV(C)/)).
- h. Japanese (Itô and Mester, 2004b)  
 In the verbal Japanese suffix paradigm, the potential suffix after vowel-final verbs *-rare* is alternatively realized in a reduced form as *-re* by deleting the syllable *ra* (*ra-nuki*, or “ra-dropping,” *tabe-re-ru* instead of *tabe-rare-ru* ‘can eat’, for example). The passive suffix after V-stems, *-rare*, is homophonous with the potential after V-stem but there is no *ra-nuki* in the passive. This avoidance of homophony is motivated by a constraint called “Paradigmatic Contrast” which assigns one mark per pair of paradigm members that are not phonologically distinct.
- i. Tonkawa (Blevins 2004)  
 Syncope in Tonkawa, for example in *notxo?* (< /notoxo-o?/ ‘he does it’), is blocked in stem-internal  $C_iVC_i$  where CV-reduplication is involved, as in *hewawo?* (< /hewawa-o?/ ‘he is dead’, base /hewa-/). Rather than interpreting this phenomenon as antigemination of the consonant, Blevins argues that this is paradigmatic homophony avoidance. Regular degemination is active in Tonkawa. Such syncope combined with degemination, which syncope feeds, would result in a merger of a reduplicated and nonreduplicated stem: /hewawa-/ > *hewwa-* > \**hewa* (cf. base /hewa-/). As a result, the syncope is blocked and the degemination does not occur.

In the next four sections, I will review in detail Crosswhite (1999, 2000), Kawahara (2003), and Itô and Mester (2004b), who analyze anti-homophony blocking within

Optimality Theory (Prince and Smolensky 1993) using an anti-homophony constraint, as well as my preliminary work on anti-homophony blocking in Japanese contracted forms (Ichimura 2001).

### **1.2.2 Crosswhite (1999, 2001)**

Crosswhite (1999, 2001) is concerned with vowel reduction in Trigrad Bulgarian and Russian and “homophony-blocking” of the vowel reduction process. She claims that homophony blocking must be intra-paradigmatic and “(i)f vowel reduction would cause two underlyingly distinct lexical items to become homophonous, and if those two items are morphologically related, vowel reduction can be blocked” (Crosswhite 2001:153). More specifically, she claims that vowel reduction in Trigrad Bulgarian is blocked if it produces an output form that is homophonous with the input form of a morphologically related item, although vowel reduction is not blocked by homophony with a morphologically unrelated item (Crosswhite 1999).

In the Trigrad dialect of Bulgarian, unstressed /o, ɔ/ reduce to *a* as this dialect disprefers unstressed mid-vowels. However, this process is completely blocked if the application of this process produces homophones in a morphologically related word. Neuter singular nouns, for example, are marked with the ending *o* and the plural is formed from neuter nouns by replacing the *o* suffix with *a*.

**Table 1**  
Homophony blocking in Trigrad Bulgarian  
(Stoikov 1963, cited from Crosswhite 2001:154)

|   | singular        | plural    | gloss             |
|---|-----------------|-----------|-------------------|
| underlying singular<br><i>o</i> undergoes<br>reduction to [a] | varzá <b>a</b>  | varzalá   | mooring point     |
|   | vlatʃí <b>a</b> | vlatʃílá  | [gloss not given] |
|   | kapí <b>a</b>   | kapitá    | hoof              |
|   | kló <b>a</b>    | klabá     | globe             |
|   | pé <b>a</b>     | perá      | pen               |
|   | ré <b>a</b>     | rebrá     | rib               |
| underlying singular<br><i>o</i> does not reduce               | zórno           | zórna     | grain             |
|   | pétalo          | pétala    | horseshoe         |
|   | blágo           | blága     | good, blessing    |
|   | tsigarílo       | tsigaríla | cigarette         |

In the first six forms listed above, the singular forms undergo vowel reduction to *a* as well as a lexically specified stress shift. Due to this stress shift, singular and plural forms retain the distinction even after the reduction of /o/ to *a*. On the other hand, in the last four forms, there is no stress shift and the vowel reduction is blocked because if *-o* did reduce, it would cause two underlyingly distinct forms to become homophonous. Thus, the reduction is blocked.

Crosswhite proposes a constraint ANTI-IDENT based on the familiar IDENT constraints of McCarthy and Prince's Correspondence Theory (1993a, 1995). This constraint states that a correspondence  $\mathfrak{R}$  is established between  $S_1$  and  $S_2$  such that underlyingly distinct  $S_1$  and  $S_2$  must possess some segment that is a member of  $S_1$  such that  $\alpha$  is not identical to its correspondent  $S_2$ .

- (5) ANTI-IDENT:  
For two forms,  $S_1$  and  $S_2$ , where  $/S_1/ \neq /S_2/$ ,  $\exists \alpha, \alpha \in [S_1]$ , such that  $\alpha \neq \mathfrak{R}(\alpha)$ .  
(Crosswhite 2001:155)

In combination with other constraints and their ranking within the framework of Optimality Theory, Crosswhite analyzes the blocking of vowel reduction as follows.

**Tableau 1**

Use of ANTI-IDENT constraint in Trigrad Bulgarian (Crosswhite 2001:156)

| /zórno/ ‘grain’ | ANTI-IDENT | Dep[+high] | Lic-Nonperiph |
|-----------------|------------|------------|---------------|
| ☞ zórno         |            |            | *             |
| zórnu           |            | *!         |               |
| zórna           | *!         |            |               |

cf. plural: zórna ‘grains’

Dep[+high]: No [+high] vowel should be inserted.

Lic-Nonperiph: Nonperipheral vowels are licensed only in stressed positions.

In this tableau, the third candidate output \*[zórna] violates the ANTI-IDENT constraint because it is homophonous with the morphologically related plural form. The second candidate [zórnu] makes a fatal violation of the second highest-ranking constraint Dep[+high]. As a result, the first candidate [zórno] wins out even though it violates the lowest ranked constraint Lic-Nonperiph. Crosswhite (1999) claims that the ANTI-IDENT constraint indicates that each candidate output could be compared with any number of other inputs that occur in the language, and that could determine whether there is homophony or not. However, I argue that the tableau above does not explicitly express the speaker’s knowledge of potentially completing paradigmatic items, in this case plural [zórna] ‘grains’, simply because plural [zórna] is part of tableau 1. Her analysis would encounter a problem, for example when analyzing a type of homophony creation where two distinct underlying forms undergo a phonological process simultaneously, and result in the identical forms. From this tableau, we cannot tell where the morphologically

related form fits. Crosswhite’s analysis raises an issue when analyzing cases where the interaction of two alternations needs to be evaluated because an individual analysis of each alternation does not capture such an interaction. This calls for a more complex system which would allow an output candidate to be compared with potential homophonous counterparts. In chapter 3, I will propose a “Minimal Pair Analysis” within OT analysis in order to account for such the case where a phonological process is applied to multiple inputs.

Furthermore, Crosswhite argues that in the Trigrad dialect of Bulgarian, the forms involved in homophonous blocking must be morphologically related, since vowel reduction cannot be blocked to avoid nonmorphologically-related homophones. For this argument, she provides an example that lexical homophones *blágo* ‘benefit’ and *blágo* ‘sweet’ (two words that are pronounced *blágo*) coexist without blocking each other. Both *blágo* forms are blocked in vowel reduction as the application of vowel reduction would create homophony with paradigmatic item [blága].

- (6) Lexical homophones in Trigrad Bulgarian
- |                  |                             |                       |
|------------------|-----------------------------|-----------------------|
| <u>noun</u>      | <u>adjective</u>            |                       |
| blágo ‘benefit’  | blágo ‘sweet’ (predictive)  |                       |
| blága ‘benefits’ | blága ‘sweet’ (attributive) | (Crosswhite 2001:155) |

However, this reasoning is not very convincing. ANTI-IDENT cannot compare morphologically unrelated items, however, as Crosswhite mentions, ANTI-IDENT does not apply to forms that share an underlying form such as syncretism or lexical homonym.<sup>4</sup>

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<sup>4</sup>In fact, as Jonathan Barnes (personal communication) points out, neuter adjectives in Bulgarian can be used as abstract nouns without direction affixation like *blago* (adjective) and *blago* (noun). This is another example of the problem in Crosswhite’s account. Also, in Russian, feminine dative and locative singular

Her claim that the homophony blocking only applies to morphologically-related homophones can only be proven successfully when there is evidence that the reduction of underlyingly distinct morphologically unrelated words is not blocked. Crosswhite does not provide such example.

### 1.2.3 Kawahara (2003)

Kawahara (2003) demonstrates another example of blocking of contrast neutralization using a constraint within OT. He argues that precedence of root faithfulness over affix precedence on fusion in Zoque is suspended in the case that it would result in the surface neutralization of a distinction between underlyingly distinct forms within a paradigm.

In Zoque, it is typical that root faithfulness takes precedence over affix faithfulness. In the following examples of affixation (not to be confused with fusion which I will examine later), stem-final nasals do not undergo nasal place assimilation whereas affix-final nasals do undergo this process.

- (7) a. Stem nasal resisting nasal place assimilation
- |                |           |                     |
|----------------|-----------|---------------------|
| /maŋ + ba/     | [maŋba]   | ‘he goes’           |
| /maŋ +jah + u/ | [maŋjahu] | ‘they went’         |
| /maŋ + tu/ +u/ | [maŋdu/u] | ‘he intended to go’ |
- (Kawahara 2003:3)
- b. Affix nasals undergoes nasal place assimilation
- |                                   |                            |                               |
|-----------------------------------|----------------------------|-------------------------------|
| /ti <sup>h</sup> + tam + u/       | [ti <sup>h</sup> tamu]     | ‘we/you arrived’              |
| /ti <sup>h</sup> + tam + pa/      | [ti <sup>h</sup> tamba]    | ‘we/you arrive’               |
| /ti <sup>h</sup> + tam + tu/ +u/  | [ti <sup>h</sup> tandu/u]  | ‘we/you were about to arrive’ |
| /ti <sup>h</sup> + tam + ke/t +u/ | [ti <sup>h</sup> tange/tu] | ‘we/you arrived also’         |
- (Kawahara 2003:4)

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are always identical, but any anti-homophony principle in the grammar is careless because these simply share an underlying form.

Kawahara argues that this precedence of root in Zoque fusion is evidence of universal ranking of root faithfulness higher than affix faithfulness, Faith root >> Faith affix.

- (8) Agree (Place): Two adjacent segments agree in place specification  
 Faith (Place) root: Input place specifications of roots are faithfully mapped to output  
 Faith (Place) affix: Input place specifications of affixes are faithfully mapped to output

The ranking for this analysis is Faith (Place) root >> Agree (Place) >> Faith (Place) affix, where the constraint which triggers nasal assimilation Agree (Place) is sandwiched between the faithfulness constraints.

**Tableau 2**

/maŋ + ba/ → [maŋba]

| <u>/maŋ</u> + ba/   | Faith (Place) root | Agree (Place) | Faith (Place) affix |
|---------------------|--------------------|---------------|---------------------|
| a. <u>[maŋ</u> ba]  |                    | *             |                     |
| b. [ <u>mamb</u> a] | *!                 |               |                     |

**Tableau 3**

/tih + tam + ke/t +u/ → [tihtaŋge/tu]

| <u>/ti</u> h + tam + ke/t +u/      | Faith (Place) root | Agree (Place) | Faith (Place) affix |
|------------------------------------|--------------------|---------------|---------------------|
| a. [ <u>ti</u> h <u>ta</u> mge/tu] |                    | *!            |                     |
| b. [ <u>ti</u> h <u>ta</u> ŋge/tu] |                    |               | *                   |

The following is an example of root-controlledness of a fusion, where coronal and glide fuse into one segment (roots are underlined). Sonority and voice in the root are unchanged after fusion. In Kawahara's analysis, a series of IDENT constraints in sonority, vowel, nasality in the root and the affix are used, for example IDENT F is defined as satisfied just when input and output correspondents agree in the specification F.

- (9) a. /put + jah + u/ → [pu.ca.hu], \*[pu.ja.hu] ‘they emerged’  
 IDENT (Son) root >> IDENT (Son) affix  
 b. /sohs + jah + u/ → [soh.ʃa.hu], \*[soh.ʒa.hu] ‘they cooked’  
 IDENT (Voi) root >> IDENT (Voi) affix

However, there is a fusion case where root-controlledness fails and nasality of an affix takes precedence over orality of a root. For example, when the nasal affix /N/ is attached before root /wenu/, and /N/ and /w/ are fused, the nasality of this root is not preserved.

- (10) /N + wenu/ → [w̃enu] ‘my breaking’ (1<sup>st</sup> person progressive)

Such evidence goes against the universal ranking, IDENT (Nas) root >> IDENT (Nas) affix. Kawahara accounts for this by explaining that this case is due to the requirement that every distinct word within a paradigm assumes a distinct phonological shape. This requirement is the constraint \*MERGE. \*MERGE is a relativized version of \*MERGE which is proposed in Padgett (2003a,b,c) to argue contrast preservation within Dispersion Theory (Flemming 1995, Ní Chiosáin and Padgett 1997 among others).

- (11) \*MERGE: Underlyingly distinct forms within a paradigm must receive different phonological exponence. (Kawahara 2003:13)

The expected form [wenu], as a result of nasality faithfulness of the root, would be homophonous to [wenu], the output form of /wen+u/ ‘it broke’ (3<sup>rd</sup> person perfective). This is exactly the case that \*MERGE penalizes.

#### Tableau 4

Anti-homophony blocking with \*MERGE

| /N + wenu/ <sub>1</sub> /wen+u/ <sub>2</sub>  | *MERGE | IDENT (Nas) root | IDENT (Nas) affix |
|---|--------|------------------|-------------------|
| a. [wenu] <sub>12</sub>                       | *!     |                  | *                 |
| b. ☞ [w̃enu] <sub>1</sub> [wenu] <sub>2</sub> |        | *                |                   |

The candidate a) violates \*MERGE because [wenu] has two underlying correspondents. Due to the violation of \*MERGE, root-controlledness on nasality is suspended. If there had been no violation of \*MERGE, the candidate a), without any change in nasality of the root, would be optimal.<sup>5</sup>

The Zoque case is not a blocking of the application of a phonological process, but a blocking of root faithfulness precedence over the affix faithfulness. However, this is also a type of anti-homophony blocking.

#### 1.2.4 Itô and Mester (2004b)

This paper discusses *ra-nuki* (ra-dropping) in the potential form of vowel-final verbs in Japanese. The potential suffix *-rare* is alternatively realized in a reduced form as *-re* by deleting the syllable *ra*.

- (12) kinoo      -wa yoku ne-  $\left\{ \begin{array}{l} \text{rare} \\ \text{Øre} \end{array} \right\}$  -ta  
           yesterday -TOP well sleep -POTEN -PAST  
           ‘(I) was able to sleep well last night.’

The verbal suffixes have different allomorphs as shown below.

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<sup>5</sup>It appears that RM (Realize Morpheme), a constraint which requires some phonological exponence to each morpheme, can account for /N + wenu/ → \*[wenu] but Kawahara argues that \*MERGE is more appropriate to account for this fusion in Zoque. See Kawahara (2003) for a discussion of the advantage of \*MERGE over RM.

**Table 2**  
Suffix allomorphy for V-stems and C-stems<sup>6</sup>

| Verbal stem         | V-stem (vowel-final verb)<br>e.g., <i>tabe-</i> ‘eat’ | C-stem (consonant-final verb)<br>e.g., <i>nom-</i> ‘drink’ |
|---------------------|---|--|
| a. present negative | ...V-nai  | ...C-anai  |
| b. plain present    | ...V-ru   | ...C-u   |
| c. inchoative       | ...V-joo  | ...C-oo  |
| d. conditional      | ...V-reba   | ...C-eba   |
| e. causative        | ...V-sase-  | ...C-ase-  |
| f. passive          | ...V-rare-  | ...C-are-  |
| g. imperative       | ...V-ro   | ...C-e   |
| h. potential        | ...V-rare-  | ...C-e-  |

The passive suffix after V-stems, *-rare*, is homophonous with the potential after V-stem, but there is no *ra-nuki* in the passive.

- (13) sensei -ni yoku home { -rare } -ta  
 teacher-DAT often praise-PASS -PAST  
 { \*Øre }  
 ‘(He) was often praised by the teacher.’

Itô and Mester take a systemic approach in OT and propose the paradigmatic constraint ParadigmaticContrast.

- (14) ParadigmaticContrast (PARCONTRAST)

The cells of a paradigm are pair-wise phonologically distinct. Assign one mark for each pair of paradigm members that are not phonologically distinct.

Adopting the position that the ranking of constraints is only partial in order to explain variation of outputs in OT, Itô and Mester propose that MAX-IO and PARCONTRAST are not ranked.

<sup>6</sup>See Appendix A for an argument on how this verbal suffix allomorphy is in fact lexical allomorphy, not synchronic deletion or epenthesis, not only for the imperative whose allomorphs have very different shape but also for other suffixes.

**Tableau 5**

Contrast in paradigm selection

|              | Candidate paradigms<br>for /tabe-/ ‘eat’  | (i) MAX-IO | (ii) PARCONTRAST |
|--------------|---|------------|------------------|
| ☞ (i) » (ii) | potential<rare>: tabe-rare-<br>passive<rare>: tabe-rare-<br>causative<sase>: tabe-sase-<br>.... |            | *                |
| ☞ (ii) » (i) | potential<rare>: tabe-re-<br>passive<rare>: tabe-rare-<br>causative<sase>: tabe-sase-....       | **         |                  |

In the first output candidate, the potential and passive forms are identical and thus violate PARCONTRAST. The second candidate violates MAX-IO twice since two segments, *ra*, are dropped, but there is no violation of PARCONTRAST. The ranking of PARCONTRAST and MAX-IO are variably ranked, and the potential form is realized as either *rare* or *re*.

The question that raises is why the potential suffix, not the passive suffix, is reduced to *re* in order to satisfy PARCONTRAST. They generalize “paradigm uniformity” to include (inflectional) stem and affix allomorphy, and propose the Allomorph Correspondence Constraint.

(15) Allomorph Correspondence Constraint (ALLCORR)

Let R be an allomorph correspondence relation between the segments of  $m_1$  and those of  $m_2$ . Then one violation of ALLCORR is incurred for each segment in  $m_1$  or  $m_2$  that is not included in R, i.e., has no correspondence in the other form.

The Japanese verbal suffixes violate ALLCORR as below.

**Table 3**

ALLCORR violations in the Japanese verbal suffixes

|                                 | ALLCORR violations |
|---------------------------------|--------------------|
| present negative: <-nai, -anai> | *                  |
| Plain present: <-ru, -u>        | *                  |
| inchoative: <-joo, -oo>         | *                  |
| causative: <-sase-, -ase->      | *                  |
| passive: <-rare-, -are->        | *                  |
| potential: <-rare-, -e->        | ***                |

The potential suffix has three violations for the segments *rar*. It is now logical to delete two segments *ra* in the potential, rather than in the passive, in order to minimize the violation of ALLOCORR. An OT analysis using ALLOCORR, which is unranked relative to MAX-IO (protecting segments from being deleted) and PARCONTRAST, is shown below.

**Tableau 6**

Contrast in paradigm selection with ALLOCORR

|   | potential: /<-e, -rare>/<br>passive: /<-are, -rare>/<br>.... | (i)<br>MAX-IO | (ii)<br>PARCONT<br>RAST | (iii)<br>ALLOCOR<br>R |
|---|--|---------------|-------------------------|-----------------------|
| a. faithful candidate<br>☞ (i) » (ii)         | potential: <-e, -rare><br>passive: <-are, -rare><br>....     |               | *                       | ***<br>*              |
| b. <i>ra-nuki</i> (potential)<br>☞ (ii) » (i) | potential: <-e, -re><br>passive: <-are, -rare><br>....       | **            |                         | *<br>*                |
| c. <i>ra-nuki</i> (passive)                   | potential: <-e, -rare><br>passive: <-are, -re><br>....       | **            |                         | ***<br>*              |

The candidate with the *ra-nuki* passive in c) incurs four total violations of ALLOCORR while the candidate with the *ra-nuki* potential in b) has two violations. Thus, the paradigm with *ra-nuki* in the passive in c) will never win.

Itô and Mester assume that the anti-homophony constraint PARCONTRAST only applies within the paradigm of a single lexical item, and is not applicable across paradigms, for example the homophony of *ki-re-ru* ‘wear, POTEN, PRES’ and *kir-e-ru* ‘cut, POTEN, PRES’. In Ichimura (2001), however, which will be reviewed below, I argued that the anti-homophony principle is also applicable to transparadigmatic relations.

### 1.2.5 Ichimura (2001)

The past research, as reviewed above, focuses on anti-homophony blocking within an inflectional paradigm (in other words, morphological contrast), not between morphologically unrelated words or in non-paradigmatic relations (lexical contrast). Crosswhite (1999, 2001) claims the anti-homophony ANTI-IDENT applies only to homophones in paradigmatic relations. Itô and Mester (2004b) claim that PARCONTRAST only applies within the paradigm of a single lexical item, and is not applicable across paradigms, because there are cases of homophony creation across paradigms, for example, *ki-re-ru* ‘can wear’ and *kir-eru* ‘can cut’. Albright (2003) notes in his discussion on Spanish paradigm gaps that avoidance of homophony between lexical items is not usually considered strong enough to block inflectional morphology.

Ichimura (2001), however, argues that homophony avoidance can occur between lexical items. This paper is concerned with what I call “nasal assimilation,” one of the contracted forms in Japanese.<sup>7</sup> I argue that nasal assimilation is blocked in order to avoid

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<sup>7</sup>In Ichimura (2001), the term “casual speech” is used to refer to contracted forms such as nasal assimilation. However, this term will not be used in this dissertation, as to avoid confusion with fast speech.

ambiguity by the loss of lexical distinctiveness when it is applied to two separate lexical items, in other words, in a transparadigmatic context.

In nasal assimilation, the vowel preceding the negative suffix /nai/ or /a/ in its allomorph /anai/) is syncope after /r/, and /r/ assimilates to *n*.<sup>8</sup>

- (16) **kure**      -nai → **kunnai**  
       give (me)    NEG  
       **wakar**    -anai → **wakannai**  
       understand    NEG

However, when nasal assimilation in /...r-anai/ and /...re-nai/ (or /...ri-nai/) potentially creates homophony, nasal assimilation occurs only in /...r-anai/. The nasal assimilation of /...re-nai/ (or /...ri-nai/) is blocked.

- (17) **nare**      -nai → \***nannai**  
       get used to    NEG  
       **nar**       -anai → **nannai**  
       become        NEG

In Ichimura (2001), an anti-homophony constraint called CONTRAST is introduced. CONTRAST demands that lexical contrast be maintained, and thereby prohibits the cooccurrence of nasal assimilation of distinct underlying forms if nasal assimilation causes loss of lexical contrast and creates neutralization.

- (18) CONTRAST: Maintain lexical contrast<sup>9</sup>

CONTRAST interacts with the constraint \*NUC ('Nucleus is not allowed') which drives

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<sup>8</sup>See Appendix A for a discussion of my claim that /nai/ and /anai/ are examples of lexical allomorphy.

<sup>9</sup>Although I did not explain specifically in Ichimura (2001), I used "lexical contrast" here as "contrast of lexeme."

the syncope.<sup>10</sup> In section 3.5, I will discuss the formal status of this constraint within OT. CONTRAST is ranked higher than \*NUC to encode the fact that the maintenance of lexical distinctiveness is more important than syncope.

(19) CONTRAST >> \*NUC

By differentiating the importance of vowel faithfulness at a morpheme boundary between the stem (/e/ and /i/), and the suffix (/a/), the following constraint orders are posited.

(20) MAX [m-V-stem] >> MAX [m-V-suffix]

MAX [m-V-stem]: Do not delete a vowel in a stem at a morpheme boundary.  
MAX [m-V-suffix]: Do not delete a vowel in a suffix at a morpheme boundary.

In order for CONTRAST to work in evaluating the interaction between nasal assimilation of a pair in a transparadigmatic relation, a “systemic” approach in OT analysis, called a “Minimal Pair Analysis,”<sup>11</sup> is proposed. In the Minimal Pair Analysis, a set (two or more) of inputs is evaluated simultaneously and a set of output candidates, which has fewer fatal violations, is chosen as the optimal output.

### Tableau 7

Minimal Pair Analysis: Anti-homophony blocking with CONTRAST

|                                    | CONTRA<br>ST | *NUC     | MAX<br>[m-V-stem] | MAX<br>[m-V-suffix] |
|------------------------------------|--------------|----------|-------------------|---------------------|
| a. <i>naranai</i> : <i>narenai</i> |              | ***.***! |                   |                     |
| b. <i>nannai</i> : <i>narenai</i>  |              | **.***   |                   | *.                  |
| c. <i>naranai</i> : <i>nannai</i>  |              | ***.**   | .*!               |                     |
| d. <i>nannai</i> : <i>nannai</i>   | *!           | **.***   | .*                | *.                  |

<sup>10</sup>In the analysis of nasal assimilation in section 3.2, new constraints INITIAL-C (Every suffix is consonant initial) and FINAL-C (Every stem is consonant final) will be proposed as a driving force of syncope, instead of \*NUC.

<sup>11</sup>The term “minimal pair” is not used in a strict sense in Ichimura (2001). A question is naturally raised whether or not /nar-anai/ and /nare-nai/ are truly a “minimal pair.” In this dissertation, “minimal pair” refers to a set of inputs which are evaluated for potential homophony including a pair or triplet, which is not a minimal pair in a strict sense.

In the Minimal Pair Analysis, we add the number of violations of each pair as the total number of violations. In order to show which output is responsible for the violations, asterisks are divided into the left or right side of the colon. Note that candidate d) has fewer violations of \*NUC as both inputs undergo nasal assimilation, but incurs a fatal violation of CONTRAST as the two inputs become homophonous. Between candidates b) and c) which incur the same number of violations of \*NUC, b) wins out because c) violates MAX [m-V-stem] but b) does not: /e/ in /nare-nai/ is part of the stem, while /a/ in /nar-anai/ is part of the suffix. Thus, /nar-anai/ undergoes nasal assimilation but the nasal assimilation in /nare-nai/ is blocked.

### 1.2.6 Questions and plans

Whether anti-homophony blocking is limited to application within an inflectional paradigm is an important question. If it is, apparent cases of blocking in a transparadigmatic relation must be analyzed as merely lexical exceptions for particular lexical items.

Albright (2003) discusses paradigm gaps in Spanish, for example, for the verb *abolir* ‘abolish’, speakers are typically unsatisfied with any possible 1sg form (\**abol-o*, \**abeul-o*). There are at least three logically possible foci of such failure: 1) the underlying forms of certain words may be defective, 2) the grammar itself may be indeterminate or 3) some external mechanism blocks the output being pronounced at the surface. Following Albright, we will assume that, in the discussion to anti-homophony blocking at hand, the three logically possible foci are: 1) the underlying forms of certain

words are lexically marked as simply not undergoing contraction, 2) the grammar itself incorporates some anti-homophony principle and 3) some unknown external mechanism blocks the output from being pronounced in the surface form.

Under the second possibility, there is a further question of where the anti-homophony blocking resides in the grammar. Crosswhite (1999, 2001), Kawahara (2003) and Itô and Mester (2004b) consider that the anti-homophony principle to be part of the phonological grammar, using particular constraints, ANTI-IDENT, \*MERGE and PARCONTRAST, respectively. If anti-homophony blocking is part of the synchronic/phonological grammar, it should be productive. How do we know that homophony blocking is in fact part of the grammar? What type of evidence can we provide? In the past research, productivity of anti-homophony blocking is not explicitly addressed, but presumably, it was assumed to be productive. If anti-homophony as part of grammar is not limited to the inflectional paradigm, its productivity also needs to be demonstrated. Furthermore, if there is a constraint against homophony, how can one account for the many exceptions, especially concerning inflectional morphology, for example, *kaw -ta* ‘buy, PAST’ → *katta*, *kar -ta* ‘clip, PAST’ → *katta*, despite this anti-homophony principle? How do we account for such possible counterevidence to anti-homophony blocking?

In this dissertation, I will demonstrate that contraction in Japanese is blocked due to the potential for homophony creation in transparadigmatic relations. I will also show that the anti-homophony constraint CONTRAST is not limited to applying within paradigms. I take the position that anti-homophony constraint resides within the “contraction grammar.” This thesis compares the contraction grammar to the noncontraction grammar

(called “full-form grammar”). It will be demonstrated that homophony creation is often allowed in spite of the anti-homophony constraint CONTRAST because the effect of CONTRAST does not always emerge due to the violation of constraints ranked higher than CONTRAST. I will show that the anti-homophony principle must be a phonology-internal process, deeply embedded in the phonology, and that it must be so in order to account for anti-homophony blocking and homophony creation.

Since past research has simply assumed that anti-homophony blocking is a productive process without providing clear examples for these assumptions, I will discuss a production experiment of nasal assimilation, which provides evidence that anti-homophony blocking is in fact a productive process.

### **1.3 Method of data collection and analysis**

#### **1.3.1 Data collection**

I have collected data of contracted forms in Japanese from the relevant literature, Toki (1975), Hasegawa (1979), Otsubo (1982), Makino and Tsutsui (1986), Saito (1986), Horiguchi (1989), Shibatani (1990), Toki (1990), Saito (1991), Kawase (1992), Minegishi (1999), Umemura (2003), Nakamura et al. (2003), as well as from elicitations from native speakers of Japanese. I also collected contracted forms in written form children’s books, popular music, and politicians’ speeches, in order to show that contracted forms in Japanese, which mostly appears verbally in casual setting, are also described in writing and even occur in a formal speech.

### **1.3.2 Analysis**

The collected data will be analyzed using constraints and their rankings within the framework of Optimality Theory (OT) by Prince and Smolensky (1993). In OT, it is assumed that there is a finite set of constraints which are universal among all languages, and that these constraints are ranked in a specific order in a given language. For a set of competitive outputs for the same underlying input, only the output which violates the more high ranked constraint the least wins. Thus, language universality and language specificity are captured. OT is an appropriate method to analyze contracted forms and their anti-homophony blocking.

### **1.3.3 Experiment**

To exemplify the question of whether contraction and anti-homophony blocking are productive processes as they are part of synchronic/phonological grammar, I conducted a production experiment involving nasal assimilation, one of the processes subject to anti-homophony blocking. The subjects are 15 native Japanese speakers living in Japan and the U.S. with age ranging from 19 to 45. In the production experiment, both existent and nonce verbs are used to check the occurrence of nasal assimilation. If contraction and the anti-homophony principle are applied not only to the existent verbs but also nonce verbs, this reveals that contraction and anti-homophony must be part of the phonological grammar.

Nonce words used in this experiment are a) the ones, which are not ambiguous upon nasal assimilation because there is no homophony threat, and b) the ones which

would create homophony if these words and their counterparts both undergo nasal assimilation. The former tells us whether or not the contraction really occurs, and the latter confirms anti-homophony blocking is at work. For statistical analysis, Chi-square is used of data obtained by the experiment to check statistical significance in distribution in the data.

#### **1.4 Significance of the study**

This dissertation is a part of an increasing body of literature on anti-homophony blocking, a phenomenon in natural languages which has received much attention in recent theoretical literature (Kisseberth and Abasheikh 1974, Mitchell 1993, Crosswhite 1999, 2001, Kenstowicz 2002, Morrill 2002, Kawahara 2003, Itô and Mester 2004b, Blevins 2004, Gessner and Hansson, to appear). The dissertation contributes in identifying new aspects of anti-homophony blocking. All past research in this area demonstrated only anti-homophony within an inflectional paradigm. This thesis sheds light on an expanded notion of this phenomenon by claiming that transparadigmatic contexts are also subject to anti-homophony blocking. In other words, it can occur with lexically unrelated words, if a phonological process would produce homophony. The past research simply assumes that anti-homophony blocking is a productive process by claiming an anti-homophony constraint in the grammar. I will demonstrate that contractions and anti-homophony blocking in Japanese are productive processes and that the anti-homophony principle is embedded into the phonology as a phonology-internal constraint.

The thesis also makes a significant contribution to the study of phonological aspects of Japanese contracted forms for which sufficient phonological analyses have not been provided by the researchers on Japanese in recent years (a phonological analysis on contracted forms is limited to Saito 1986). I provide a closer look at nasal assimilation, labial contraction and gerund /te/ contraction in a derived environment. I offer full-phonological analyses of nasal assimilation.

In addition, this dissertation contributes to a body of literature on variation in OT by demonstrating that the variation of the contraction and full-form grammars is a result of a relativized faithfulness constraint. In these grammars, the markedness constraints have a single ranking but the relativized faithfulness constraint can be ranked in one of two positions in the hierarchy to provide different surface results by different grammars.

### **1.5 Outline of the dissertation**

The rest of this dissertation is organized as follows. Chapter 2 introduces nasal assimilation, labial contraction and gerund /te/ contraction in derived environments in Japanese and demonstrates that there is anti-homophony blocking in the first two contracted forms.

Chapter 3 contains analyses of each contracted form and the anti-homophony blocking within the framework of Optimality Theory (Prince and Smolensky 1993) and propose the anti-homophony constraint CONTRAST in a “Minimal Pair Analysis,” a technique used to allow a set of inputs under evaluation for a homophony threat and a set

of output candidates, in order to capture the interaction between words in transparadigmatic relations.

In chapter 4, I will tackle several cases of homophony creation, which could be counterevidence to my claim that the anti-homophony principle exists in transparadigmatic relations. Proper explanations are given for such homophony cases in the full-form grammar, which the noncontracted forms (full forms) derive from, as well as in the contraction grammar, which the contracted forms derive from. It also discusses the variation of between the two grammars by created by the ranking of a relativized constraint. This chapter also demonstrates that the anti-homophony principle is a phonology-internal device, which is embedded in the phonological grammar.

Chapter 5 examines the productivity of contracted forms and the anti-homophony blocking by conducting a production experiment involving nasal assimilation. In order to eliminate a possibility that contraction is positively influenced by word frequency and word familiarity, a Japanese corpus is examined to check the word frequency and word familiarity of the words that undergo contraction, and that of the words whose contraction is blocked.

Chapter 6 offers conclusions of this dissertation.