Chapter 3: Analysis of nasal assimilation and its anti-homophony blocking

3.1 Introduction

In this chapter, I will examine nasal assimilation as an example of contracted forms in Japanese and analyze nasal assimilation and anti-homophony blocking phenomenon within the framework of Optimality Theory (Prince and Smolensky 1993). I will propose a constraint which prohibits the neutralization of multiple inputs and claim that this constraint is a driving force for anti-homophony blocking, and argue for specific ranking of constraints for the contracted forms which I will call "contraction grammar" as opposed to "full-form grammar" from which a full form (without contraction) is derived.

3.2 Nonderived environment blocking in nasal assimilation

Recall that in nasal assimilation with a negative suffix, the vowel preceding the negative suffix *-nai* drops after *r* in a verb stem, and the resulting sequence *rn* undergoes assimilation to *nn* as follows. Three patterns of nasal assimilation with negative suffix are in (28), repeated below as (66).

(66) a. waka**r** -**a**nai → waka**n**nai
CVCV**C** (consonant-final verb) (Umemura 2003:133)
understand NEG

b. ta**ri** -nai → ta**n**nai
CVC**V** (vowel-final verb) (Otsubo 1982:51)
suffice NEG

c. ku**re** -nai → ku**n**nai
CVC**V** (vowel-final verb) (Toki 1990:231)
give (me) NEG

/-nai/ and /-anai/ are allomorphs of the negative suffix. A verb stem ends with a vowel, either /e/ or /i/ (vowel-final verb), or a consonant (consonant-final verb). /-nai/ attaches to a vowel-final verb and its allomorph /-anai/ attaches to a consonant-final verb. I will argue in Appendix A that the selection of the negative suffix is lexical allomorphy conditioned by phonology, and I will provide an alternative analysis using lexical allomorphy, including combinations of a vowel-final verb + /anai/ and a consonant-final verb + /nai/.

The syncope in nasal assimilation as well as in the other contracted forms also occurs only at the morpheme boundary, in other words, nasal assimilation is blocked in nonderived environment. This blocking is clearly shown in (22a,b), repeated below.

(67)	a.	ku**re** **-**nai give (me) NEG	→	ku**n**nai
		ku**re**nai crimson	→	*ku**n**nai
	b.	u**r** **-a**nai sell NEG	→	u**n**nai
		u**ra**nai fortune telling	→	*u**n**nai

First, we analyze the nasal assimilation of a vowel-final verb. The driving force of nasal assimilation is syncope at the morpheme boundary, either syncope of the final vowel of a base of affixation or the initial vowel of a suffix. In order to account for the former syncope, I propose a new constraint following McCarthy and Prince (1994). They propose an alignment constraint, which demands that every prosodic word be consonant-final. This constraint was first introduced in McCarthy (1993) to account for the intrusive *r* in the Eastern Massachusetts dialect, where the *r* is limited to lexical-word-final position.

(68) FINAL-C: Align(PrWd, Right, Consonant, Right)
"Every PrWd is consonant-final."

This alignment constraint is one example of Generalized Alignment by McCarthy and Prince (1993b). Generalized Alignment is formulated as below.

(69) Generalized Alignment
Align(Cat1, Edge1, Cat2, Edge2) $=_{def}$
$\forall$ Cat1 $\exists$ Cat2 such that Edge1 of Cat1 and Edge2 of Cat2 coincide,
where
Cat1, Cat2 $\in$ Pcat $\cup$ GCat (**P**rosodic and **G**rammatical categories)
Edge1, Edge2 $\in$ {Right, Left}

Generalized Alignment demands that a designated edge of each prosodic or morphological constituent of type Cat1 coincide with a designated edge of some other prosodic or morphological constituent Cat2.

I extend the notion of this constraint to the base of affixation. I define the "base" as 'a form that immediately precedes a suffix morpheme' in a similar way as McCarthy and Prince (1993a) define the base in their discussion of reduplication. The base of affixation, thus, includes not only a root such as *tabe-nai* 'eat, NEG' but also a root plus a suffix which precedes another suffix such as *tabe-rare-nai* 'eat, POTEN, NEG'

(70) FINAL-C: Align(Base of Affixation, Right, Consonant, Right)
"Every base of affixation is consonant final."

A possible effect of FINAL-C is vowel deletion. I use MAX-IO which demands "every segment of the input has a correspondent in the output" (McCarthy and Prince 1995), specifically MAX-V which prohibits syncope.

(71) MAX-V: Every vowel in the input has a correspondent in the output.
"No deletion of vowels"

We examine two ranking orders: FINAL-C >> MAX-V and MAX-V >> FINAL-C. In the analyses below, I will exclude the potential output candidate with simple syncope *kurnai* (< /kure-nai/) as I will address this issue later.

Tableau 8
FINAL-C >> MAX-V

/kure-nai/	FINAL-C	MAX-V
a. kurenai	*!	
b. ☞ kunnai		*
/kurenai/		
c. ☞ kurenai		
d. kunnai		*!

Between candidates a) and b), a) violates FINAL-C which is ranked higher than MAX-V. Candidate b) is the optimal candidate although it violates MAX-V. Between candidates c) and d), c) does not violate FINAL-C because the /e/ is not a vowel in base-final position and it is selected as optimal. The next tableau shows ranking MAX-V >> FINAL-C selects an undesirable output.

Tableau 9
MAX-V >> FINAL-C

/kure-nai/	MAX-V	FINAL-C
a. 💣 kurenai		*!
b. kunnai	*	
/kurenai/		
c. ☞ kurenai		
d. kunnai	*!	

As indicated by the bomb above, *kurenai* (< /kure-nai/) should not be chosen as optimal in the contraction grammar. FINAL-C is a driving force of the syncope of /e/. FINAL-C must rank higher than MAX-V because the opposite order MAX-V >> FINAL-C does not allow the nasal assimilation *kunnai* to occur.

(72) Ranking of the contraction grammar
FINAL-C >> MAX-V

I will argue in chapter 4 that MAX-V outranks FINAL-C in the full-form grammar in which nasal assimilation does not occur.

We now analyze nasal assimilation of a consonant-final verb with the negative suffix *-anai*. I propose an alignment constraint which demands that every suffix be consonant-initial.

(73) INITIAL-C: Align(Suffix, Left, Consonant, Left)
"Every suffix is consonant initial."

This constraint acts as a driving force of syncope for a consonant-final verb (See section 4.2 for how a consonant-initial suffix surfaces despite a violation of this constraint in the full-form grammar, because this constraint is uniquely ranked lower than MAX-V.). In the tableau below, I exclude potential output candidates with syncope alone such as *urnai* (</u**r**-**a**nai/) as these types of candidates will be discussed later.

Tableau 10
INITIAL-C >> MAX-V

/ur-anai/	INITIAL-C	MAX-V
a. uranai	*!	
b. ☞ unnai		*
/uranai/		
c. ☞ uranai		
d. unnai		*!

Between candidates a) and b), a) violates INITIAL-C which is ranked higher than MAX-V. Candidate b) is the optimal candidate, despite the fact that it violates MAX-V. Between candidates c) and d), c) does not violate INITIAL-C because the first /a/ is not suffix initial. d) violates MAX-V and therefore, c) is a winner. INITIAL-C also must outrank MAX-V because the opposite order MAX-V >> INITIAL-C does not allow the nasal assimilation *unnai* to occur.

(74) Ranking of the contraction grammar
INITIAL-C >> MAX-V

FINAL-C, along with INITIAL-C, which are ranked higher than MAX-V, demand that morpheme boundaries be without a vowel. Syncope does not apply to morpheme-internal vowels. Thus, we can account for the blocking of nasal assimilation in a nonderived environment.[38]

In the analyses above, it is assumed that FINAL-C and INITIAL-C result in syncope, not consonant epenthesis. Why doesn't consonant epenthesis take place instead of syncope in order to satisfy FINAL-C and INITIAL-C? The constraint that prohibits consonant epenthesis is DEP-C, one form of DEP-IO which demands "every segment of the output has a correspondent in the input" (McCarthy and Prince 1995).

(75) DEP-C: Every consonant of the output has a correspondent in the input.
"No epenthesis of consonants."

DEP-C must be ranked higher than MAX-V in order for syncope to be better solution to satisfy FINAL-C than epenthesizing a consonant in the case of a vowel-final verb.

[38] Different researchers approach nonderived environment blocking in different ways. See Lubowicz (2002) for the local conjunction of a markedness and faithfulness constraint and Inkelas (1998) for the Structural Immunity approach, proposed by Kiparsky (1993).

(76) DEP-C >> MAX-V

There is no ranking motivation between FINAL-C and DEP-C.

Tableau 11
Consonant epenthesis: DEP-C >> MAX-V

/kure-nai/	FINAL-C	DEP-C	MAX-V
a. kurenai	*!		
b. kare**n**nai		*!	
c. ☞ kunnai			*

Note that DEP-C can be replaced with DEP-Mora, which is defined as "no epenthesis of mora": ku•re•na•i (4 moras) vs. ku•re•n•na•i (5 moras).

In the case of a consonant-final verb, ranking DEP-C >> MAX-V also accounts for nonoccurence of consonant epenthesis.

Tableau 12
Consonant epenthesis: DEP-C >> MAX-V

/ur-anai/	INITIAL-C	DEP-C	MAX-V
a. uranai	*!		
b. urranai		*!	
c. ☞ unnai			*

In this section, I have analyzed nasal assimilation of the vowel-final verb with the negative suffix /nai/ and the consonant-final verb with the allomorph /anai/ as a basic analysis. However, the opposite combinations, the vowel-final verb with the negative suffix /anai/ and the consonant-final verb with the allomorph /nai/, have not been discussed. /kure-anai/ → *kunnai* and /wakar-nai/ → *wakannai* also satisfy both INITIAL-C and FINAL-C. In other words, the possibility that both allomorphs are available for vowel-final and consonant final verbs has not been pursued. Such a possibility will be examined in Appendix A. In the remainder of this chapter and the next chapter, I will assume combinations of a vowel-final verb + /nai/ and a consonant-final verb + /anai/ to demonstrate the basics of the analysis.

3.3 SYLLSTRUC: Basic syllable canons in Japanese

Recall that in the OT analyses in the previous section, we excluded a potential output candidate with simple syncope such as *waka**r**nai* (</waka**r**-**a**nai/) and *ku**r**nai* (< /kur**e**-nai/). In this section, I will introduce a group of constraints which derive the basic syllable canon in Japanese. Furthermore, I will demonstrate that because of these constraints, candidates with syncope alone are disqualified.

There is a potential conflict between contraction, which is driven by syncope at a morpheme boundary, and phonotactic well-formedness constraints on the surface forms. Contraction can only apply insofar as well-formedness constraints are respected. This set of well-formedness constraints will be subsumed in a cover constraint called SYLLSTRUC (Itô 1989, Itô and Mester 1995b, among others). The SYLLSTRUC constraints are the basic syllable canon of Japanese and must be respected for all syllables. It consists of three constraints (Itô and Mester 1995b). The details of the component constraints of SYLLSTRUC are not crucial here and will not be explored further.

(77) SYLLSTRUC: Constraints defining the basic syllable canons of Japanese, including:

a. NOCOMPLEXONSET: Complex onset is not allowed. *$_\sigma$*[tr*, *$_\sigma$*[pl*

b. NOCOMPLEXCODA: Complex coda is not allowed. **nd]*$_\sigma$, **pt]*$_\sigma$

c. CODACOND: Coda cannot license place features unless it is licensed by the onset of the following syllable, *Place]$_\sigma$ (Itô 1989, among others). **ka**<u>t</u>**.**<u>p</u>**a*, *ka**<u>t</u>**.**<u>t</u>**a*

In Japanese, regardless of the stratum, /r/, /y/ and /w/ do not create gemination: **rr*, **yy*, **ww* (Kawahara 2005). This means that these segments do not occur in coda position because they are not licensed as a coda by the same segment as the onset of the following syllable: *$r]_\sigma$, *$y]_\sigma$, *$w]_\sigma$. Thus, *r*, *y* and *w* in a coda position are a violation of SYLLSTRUC. If /a/ in /wakar-anai/ underwent syncope without /r/ assimilating to *n* as below, it would violate one of the three constraints, NOCOMPLEXONSET, NOCOMPLEXCODA or CODACOND, no matter what syllable structure *r* and *n* belong to.

(78) wakar anai → wakannai (Nasal assimilation)
understand NEG
→ *wa.ka.rnai. (violation of NOCOMPLEXONSET)
→ *wa.karn.ai. (violation of NOCOMPLEXCODA)
→ *wa.kar.nai. (violation of CODACOND)

The ranking of SYLLSTRUC in relation to INITIAL-C is motivated as shown below using a verb ending with a consonant other than /r/ which does not undergo nasal assimilation.

Tableau 13
Syncope of /a/ of /yom-anai/ 'read, NEG': SYLLSTRUC >> INITIAL-C

/yom-**a**nai/	SYLLSTRUC	INITIAL-C
a. ☞ yom**a**nai		*!
b. yomnai	*!	

From this tableau, it is evident that SYLLSTRUC is ranked higher than INITIAL-C. Similarly, /tabe-nai/ below does not undergo nasal assimilation despite the fact it violates FINAL-C.

Tableau 14
Syncope of /e/ of /tabe-nai/ 'eat, NEG': SYLLSTRUC >> FINAL-C

/tab**e**-nai/	SYLLSTRUC	FINAL-C
a. ☞ tab**e**nai		*!
b. tabnai	*!	

Thus, the ranking between SYLLSTRUC and INITIAL-C/FINAL-C is as follows:

(79) SYLLSTRUC >> INITIAL-C
SYLLSTRUC >> FINAL-C

At this point, the ranking between INITIAL-C and FINAL-C is not established (but it will be in tableau 50). Now, the total ranking of the major constraints in the contraction grammar is as follows:

(80) SYLLSTRUC >> INITIAL-C, FINAL-C >> MAX-V

Using this ranking, I analyze nasal assimilation of a consonant-final verb and a vowel-final verb.

Tableau 15
Nasal assimilation of /wakar-anai/ 'understand, NEG': SYLLSTRUC >> INITIAL-C

/waka**r**-**a**nai/	SYLLSTRUC	INITIAL-C	MAX-V
a. waka**ra**nai		*!	
b. waka**r**nai	*!		*
c. ☞waka**n**nai			*

Candidate b) violates SYLLSTRUC because *r* is not allowed in the coda position, as it is not licensed (violation of CODACOND).

Tableau 16
Nasal assimilation of /kure-nai/ 'give (me), NEG': SYLLSTRUC >> FINAL-C

/kur**e**-nai/	SYLLSTRUC	FINAL-C	MAX-V
a. ku**re**nai		*!	
b. ku**r**nai	*!		*
c. ☞ ku**n**nai			*

Thus, SYLLSTRUC plays an important role in the analyses.

There is a question/issue we need to solve here. That is, why do syncope and assimilation occur when in Japanese vowel epenthesis usually occurs to fix syllable structure violations? For example, the English word *strike* is adopted into Japanese as ***s**u**t**o**r**aik**u*** with vowel epenthesis in order to avoid potential violations of SYLLSTRUC. I will examine this issue using consonant-final /r/ verb formation, a productive process in creation of a new verb, especially by adopting a foreign word. One of the recent examples of this type (Junko Ando, personal communication) is:

(81) sutaba-r-u > sutabar-anai
Starbu(cks)-r, PRES 'go to Starbucks Coffee'

Kitahara (1990) and Iwanami (1999) have 11 listings of verbs which are adopted from foreign words ((82 a-e) from Kitahara, (82 a-c, f-k) from Iwanami). All the listings are the same formation pattern: /r/-stem ending (consonant-final verbs) which takes /r-anai/ for negative.

(82)
a. azi -r -u (> azir-anai, *azi-nai)
agi(tation) -r PRES 'to agitate'
b. demo -r -u (> demor-anai, *demo-nai)
demo(nstration) -r PRES 'to demonstrate'
c. negu -r -u (> negur-anai, *negu-nai)
neg(lect) -r PRES 'to neglect'
d. dabu -r -u (> dabur-anai, *dabu-nai)
doub(le) -r PRES 'to duplicate'
e. posya -r -u (> posyar-anai, *posya-nai)
peaucha -r PRES (peaucha: reverse of *cha-peau* 'hat' in French)
'(a plan) to discontinue'
f. paniku -r -u (> panikur-anai, *paniku-nai)
panic -r PRES 'to become panicky'
g. dema -r -u (> demar-anai, *dema-nai)
dema(gogie) -r PRES (German) 'to start a false rumor'
h. hamo -r -u (> hamor-anai, *hamo-nai)
harmo(ny) -r PRES 'to harmonize'
i. memo -r -u (> memor-anai, *memo-nai)
memo(random) -r PRES 'to take a memo'
j. misu -r -u (> misur-anai, *misu-nai)
mis (take) -r PRES 'to make a mistake'
k. gasu -r -u (> gasur-anai, *gasu-nai)
gas -r PRES 'to get foggy'

In this verb formation, the verb-final consonant /r/ and the present suffix /u/ are attached to a truncated root adopted from a foreign word. Note that /u/ is epenthesized in the case of *pani**ku**-r-u*, for example, because otherwise, SYLLSTRUC would be violated.

(83) panic -r -u → pani**ku**ru
panic -r, PRES → *pa.ni.kru. (violation of NOCOMPLEXONSET)
→ *pa.nikr.u. (violation of NOCOMPLEXCODA)
→ *pa.nik.ru. (violation of CODACOND)

All of these verbs can undergo nasal assimilation.

(84) nasal assimilation
panic -r -anai → pani**ku**nnai
panic -r NEG

A conflict arises when a vowel is epenthesized in order to respect SYLLSTRUC on one hand, and on the other hand, the deletion of the initial vowel of /anai/ triggers nasal assimilation in order to respect SYLLSTRUC. I use the constraint DEP-V, one of DEP-IO constraints (McCarthy and Prince 1995).

(85) DEP-V Do not epenthesize a vowel

The tableau below shows that DEP-V must be ranked lower than SYLLSTRUC.

Tableau 17
Nasal assimilation of /panic-r-anai/: SYLLSTRUC >> DEP-V

/panic-**r**-**a**nai/	SYLLSTRUC	DEP-V
a. pani**kn**nai	*!	
b. ☞ pani**kun**nai		*

There are two potential positions for DEP-V in relation to INITIAL-C. One is that DEP-V is unranked with INITIAL-C as in tableau 18, and the other is that DEP-V is ranked lower than INITIAL-C in tableau 19.

Tableau 18
Nasal assimilation of /panic-r-anai/: INITIAL-C, DEP-V

/panic-**r**-**a**nai/	INITIAL-C	DEP-V
a. pani**kura**nai	*!	*
b. ☞ pani**kun**nai		*

Tableau 19
Nasal assimilation of /panic-r-anai/: INITIAL-C >> DEP-V

/panic-**r**-**a**nai/	INITIAL-C	DEP-V
a. panik**ura**nai	*!	*
b. ☞ panik**un**nai		*

In both tableaux, vowel epenthesis and vowel deletion coexist in the contraction grammar. The vowel *a* at the morpheme boundary is underlying, and it is deleted because of INITIAL-C, not by any need to fix the syllable structure. Vowel *u* is inserted to satisfy SYLLSTRUC as shown in tableau 17. Thus, epenthesis and syncope are driven by completely different types of processes. At this point, I will not go into detail on the precise ranking of DEP-V since my purpose here is to demonstrate how vowel epenthesis and syncope coexist.

What if the consonant cluster of the original word is morpheme internal? Let us create a nonce verb which means 'eat at McDonald's': *mak**u**do-r-u* (< /McDo-r-u/). In this case, *u* would be inserted morpheme-internally in order to avoid a consonant cluster. Again, DEP-V must be ranked lower than SYLLSTRUC.

Tableau 20
Nasal assimilation of /McDo-r-anai/: SYLLSTRUC >> DEP-V

/McDo-**r**-**a**nai/	SYLLSTRUC	DEP-V
a. makdo**n**nai	*!	
b. ☞ mak**u**do**n**nai		*

Again, there are two possible rankings for DEP-V in relation to INITIAL-C and FINAL-C, which drive syncope.

Tableau 21
Nasal assimilation of /McDo-r-anai/: INITIAL-C, FINAL-C, DEP-V

/McDo-**r**-**a**nai/	INITIAL-C	FINAL-C	DEP-V
a. mak**u**do**ra**nai	*!	*	*
b. ☞ mak**u**do**n**nai		*	*

Candidate a) violates INITIAL-C due to *a*. Both candidates violate FINAL-C or INITIAL-C by *o*, but there are no additional violations of FINAL-C by *u* because *u* is inserted morpheme-internally. The expected winner b) is selected as optimal. The other possible ranking of DEP-V also leads to the optimal output.

Tableau 22
Nasal assimilation of /McDo-r-anai/: INITIAL-C, FINAL-C >> DEP-V

/McDo-**r**-**a**nai/	INITIAL-C	FINAL-C	DEP-V
a. mak**u**do**ra**nai	*!	*	*
c. ☞ mak**u**do**n**nai		*	*

Thus, again vowel epenthesis and vowel deletion coexist in the contraction grammar. Epenthesis and syncope are driven by completely different types of processes.

3.4 Special relation between /r/ and /n/

In this section, I will give an explanation as to why only /r/ undergoes nasal assimilation before /n/. Nasal assimilation only occurs in the *r-V-n* sequence at a morpheme boundary. Other consonants, as indicated in boldfaced letters in (29) repeated below, do not behave the same way as /r/.

(86) a. sa**s** -anai → *sannai (sannai < sar-anai 'leave, NEG')
sting NEG
b. ka**t** -anai → *kannai
win NEG

c. na**k** -anai → *nannai (nannai < nar-anai 'ring, NEG')
cry NEG

d. yo**m** -anai → *yonnai
read NEG

e. so**w** -anai → *sonnai (sonnai < sor-anai 'shave, NEG')
satisfy NEG

Also, *rV* does not assimilate to *n* before coronal other than *n*. Coronal *t* and *d* in the desiderative /tai/ and suffix /dasu/ 'to start', for example, do not trigger the change of *rV* to *n* in (30), repeated below. Another nasal *m* does not trigger nasal assimilation.

(87) a. wakar -i**t**ai → *wakantai
understand DESI
wakar -i**m**asu → *wakanmasu, *wakammasu
understand POL-PRES
wakar -i**d**asu → *wakandasu
understand start

b. araware -**t**ai → *arawantai
appear DESI
araware -**m**asu → *arawanmasu, *arawammasu
appear POL-PRES
araware -**d**asu → *arawandasu
appear start

There is something about the combination of /r/ and /n/ which triggers nasal assimilation. I will explore the reason for this below.

In analyzing several combinations of possible nasal assimilation, the following consonant features in Japanese are used. Note that the table only shows partial feature system.

Table 5
Consonant features in Japanese

	p	b	t	d	k	h	s	m	n	r	w	y
[son]								√	√	√	√	√
[cor]			√	√			√		√	√		√
[cont]							√				√	√
[nas]								√	√			
[labial]	√	√						√			√	
[dorsal]					√							

Instead of binary features, I use univalent features across the board following the claim that some features are monovalent (e.g. Ewen 1995). Treatment of flap /r/, whether it be continuant or not, is somewhat controversial. I assume that the Japanese /r/ does not have a [continuant] feature.

I will examine verbs which end with a coronal (voiceless coronal /t/), a labial (labial nasal /m/), and a glide (/w/), as to why these consonants do not undergo nasal assimilation or progressive assimilation. First, it is shown that syncope without assimilation of a vowel between different consonants is ruled out due to the ranking of SyllStruc being higher than Initial-C.

Tableau 23
Nonoccurrence of nasal assimilation of /kat-anai/ 'win, neg':
SyllStruc >> Initial-C

/ka**t**-**an**ai/	SyllStruc	Initial-C
a. ☞ ka**tan**ai		*
b. ka**tn**ai	*!	

In the tableaux that follow, I will exclude candidates of such simple syncope, as it is obvious that the simple syncope, which results in the sequence of two different consonants, violates SyllStruc. Nasal assimilation *kannai* (< *kat-nai*) does not occur.

Assuming the first *n* (< *t*) is a plain geminate, it appears that a constraint, prohibiting insertion of a [son] feature to *t*, would account for this nonoccurrence of nasal assimilation. However, the tableau below shows that DEP [son] does not rule out candidate b).

(88) DEP [son]: Do not add a [son] feature.

"F" in the tableau below refers to any autosegmental feature.

Tableau 24
Nonoccurrence of nasal assimilation of /kat-anai/:
DEP [son] >> INITIAL-C

/kat-anai/	DEP [son]	INITIAL-C
a. k a t_1 a n_2 a i | | F_1 F_2 $[son]_2$ $[nas]_2$		*
b. 💣 k a n_1 n_2 a i F_{12} $[son]_2$ $[nas]_2$		

Undesirable candidate b) is chosen as it does not violate DEP [son] (the [son] feature as well as the [nas] feature simply spread to t_1). There is no insertion of a [son] feature. DEPLINK [son], on the other hand, is violated by candidate b) because t_1 becomes associated with [son]. I adopt the notion of DEPLINK from Morén (2001), where he discusses underlying moraicity. I expand it to feature specification.

(89) DEPLINK [son] Let ζ_j be segments, S_k phonological representations,
S_1 R S_2,
ζ_1 is an element of S_1,
ζ_2 is an element of S_2,
ζ_1 R ζ_2, and
ζ_1 belongs to a specific segment,
if ζ_2 is associated with [son] feature,
then, ζ_1 is associated with [son] feature

"Do not add a [son] feature to a segment that it did not have underlyingly"

This constraint is crucially different from DEP [son]. DEP [son] prohibits a [son] feature from being added to the output but it is not violated by association of an underlying [son] feature to another segment on the surface. In other words, it does not prevent a [son] feature on one segment from spreading to the other segment as shown in tableau 24. DEPLINK [son], on the other hand, does not allow such spreading as reassociation of a [son] feature to another segment is prohibited as shown in the tableau below.

Tableau 25
Nonoccurrence of nasal assimilation of /kat-anai/:
DEPLINK [son] >> INITIAL-C

/kat-anai/	DEPLINK [son]	INITIAL-C
a. ☞ k a t_1 a n_2 a i | | F_1 F_2 $[son]_2$ $[nas]_2$		*
b. k a n_1 n_2 a i \\ | F_{12} $[son]_2$ $[nas]_2$	*!	

The next tableau shows that MAX [son] must be ranked higher than INITIAL-C. Here I use simply MAX [son] constraint because as MAXLINK [son] is not necessary.

(90) MAX [son]: Do not delete [sonorancy] feature

Tableau 26
Nonoccurrence of nasal assimilation of /kat-anai/:
MAX [son] >> INITIAL-C

/ka**t-an**ai/	MAX [son]	INITIAL-C
a. ☞ ka**tan**ai		*
b. ka**tt**ai	*!	

In the analyses of nonoccurrence of nasal assimilation that follow, several faithfulness constraints, including MAX [son] and DEPLINK [son] which were introduced above, will be used.

(91) MAX [son]: Do not delete [sonorancy] feature
MAX [cont]: Do not delete [continuancy] feature
MAX [lab]: Do not delete [labial] feature
DEPLINK [son]: Do not add a [sonorancy] feature to a segment that it did not have underlyingly
DEPLINK [cont]: Do not add a [continuancy] feature to a segment that it did not have underlyingly
DEPLINK [lab]: Do not add a [labial] feature to a segment that it did not have underlyingly

I have demonstrated that MAX [son] and DEPLINK [son] are ranked higher than INITIAL-C and I will do the same for the other faithfulness constraints.

The /m/-final verb does not undergo nasal assimilation or *m*-gemination due to a violation of MAX [lab] and DEPLINK [lab]. These constraints should be ranked higher than INITIAL-C.

Tableau 27
Nonoccurrence of nasal assimilation of /yom-anai/ 'read, NEG':
MAX [lab], DEPLINK [lab] >> INITIAL-C

/yo**m-an**ai/	MAX [lab]	DEPLINK [lab]	INITIAL-C
a. ☞ yo**man**ai			*
b. yo**nn**ai	*!		
c. yo**mm**ai		*!	

The /w/-final verb does not undergo nasal assimilation or *w*-gemination due to a violation of MAX [lab] and SYLLSTRUC.

Tableau 28
Nonoccurrence of nasal assimilation of /sow-anai/ ‘satisfy, NEG’:
SYLLSTRUC, MAX [lab] >> INITIAL-C

/so**w**-**an**ai/	SYLLSTRUC	MAX [lab]	INITIAL-C
a. ☞ so**wan**ai			*
b. so**nn**ai		*!	
c. so**ww**ai	*!		

As shown above, verbs ending with a consonant other than /r/ do not undergo nasal assimilation before /nai/ because the other verbs fatally violates SYLLSTRUC and several faithfulness constraints when /a/ is syncopated.

Next, we move on to an analysis of suffixes with a consonant other than /n/ after a vowel to see why these suffixes fail to trigger progressive or regressive assimilation. The first is a suffix with voiceless coronal, the desiderative /-itai/.

Tableau 29
Nonoccurrence of nasal assimilation of /wakar-itai/ ‘understand, DESI’:
SYLLSTRUC, MAX [son] >> INITIAL-C

/waka**r**-**it**ai/	SYLLSTRUC	MAX [son]	INITIAL-C
a. ☞ waka**rit**ai			*
b. waka**tt**ai		*!	
c. waka**rr**ai	*!		

/-itai/ does not trigger progressive or regressive assimilation due to violations of SYLLSTRUC and MAX [son] that would result. A suffix with labial nasal, the polite present /-imasu/, behaves in the same manner.

Tableau 30
Nonoccurrence of nasal assimilation of /wakar-imasu/ 'understand, POL-PRES':
SYLLSTRUC, DEPLINK [lab] >> INITIAL-C

/waka**r-im**asu/	SYLLSTRUC	DEPLINK [lab]	INITIAL-C
a. ☞ waka**rim**asu			*
b. waka**mm**asu		*!	
c. waka**rr**asu	*!		

/waka**r-im**asu/ does not trigger progressive or regressive assimilation. Next, two combinations of consonants other than /r/ and /n/ will be reviewed.

Tableau 31
Nonoccurrence of nasal assimilation of /kas-itai/ 'lend, DESI':
MAX [cont], DEPLINK [cont] >> INITIAL-C

/ka**s-it**ai/	MAX [cont]	DEPLINK [cont]	INITIAL-C
a. ☞ ka**sit**ai			*
b. ka**tt**ai	*!		
c. ka**ss**ai		*!	

Syncope of /i/ does not occur. The /b/-/m/ combination is the same.

Tableau 32
Nonoccurrence of nasal assimilation of /tob-imasu/ 'fly, POL-PRES':
MAX [son], DEPLINK [son] >> INITIAL-C

/to**b-im**asu/	MAX [son]	DEPLINK [son]	INITIAL-C
a. ☞ to**bim**asu			*
b. to**mm**asu		*!	
c. to**bb**asu	*!		

Progressive or regressive assimilation does not occur. Then, why is the /r/-/n/ combination so special? Returning to nasal assimilation of *wakar-anai* → *wakannai*, none of faithfulness constraints in (91) are violated. Neither is SYLLSTRUC violated.

Tableau 33
Nasal assimilation of /wakar-anai/

/waka**r**-**a**nai/	SYLLSTRUC	MAX [son], DEPLINK [son], MAX [lab], DEPLINK [lab], MAX [cont], DEPLINK [cont]	INITIAL-C	MAX-V
a. waka**ra**nai			*!	
b. ☞ waka**n**nai				*
c. waka**rr**ai	*!			*

In nasal assimilation where /r/ assimilates to *n*, the nasality is added. A faithfulness constraint, which prohibits epenthesis of nasality, needs to be added to the analysis.

(92) DEPLINK [nas]: Do not add a [nasality] feature to a segment that it did not have underlyingly

Where is this constraint ranked? If DEPLINK [nas] outranks INITIAL-C, *waka**nn**ai* would not surface.

Tableau 34
Nasal assimilation of /wakar-anai/

/waka**r**-**a**nai/	DEPLINK [nas]	INITIAL-C
a. 💣 waka**ra**nai		*
b. waka**n**nai	*!	

DEPLINK [nas] must be ranked lower than INITIAL-C.

Tableau 35
Nasal assimilation of /wakar-anai/: INITIAL-C >> DEPLINK [nas]

/waka**r**-**a**nai/	INITIAL-C	DEPLINK [nas]
a. waka**ra**nai	*!	
b. ☞ waka**n**nai		*

DEPLINK [nas] must also be ranked lower than FINAL-C to account for nasal assimilation of a vowel-final verb because otherwise, *ku**n**nai* would not surface as shown below.

Tableau 36
Nasal assimilation of /kure-nai/: FINAL-C >> DEPLINK [nas]

/ku**re**-nai/	FINAL-C	DEPLINK [nas]
a. ku**re**nai	*!	
b. ☞ ku**n**nai		*

There is no motivation for the ranking between DEPLINK [nas] and MAX-V, which is ranked lower than INITIAL-C and FINAL-C. Thus, the total ranking of the main constraints so far is as follows:

(93) SYLLSTRUC >> INITIAL-C, FINAL-C >> MAX-V, DEPLINK [nas]

However, the discussions and analyses above are not enough to capture all of the facts. In the case where consonants before and after the vowel under possible syncope are identical, the vowel does not get syncopated.

(94) a. sin -anai → *sinnai
die NEG
b. tom -imasu → *tommasu
prosper POL-PRES
c. tob -eba → *tobba
win HYP
d. kat -itai → *kattai
win DESI
e. kas -ase → *kasse
lend CAUS

In these cases, there will be no violation of the faithfulness constraints in (91) or any faithfulness constraints not mentioned here. The syncope would violate fewer constraints, compared with nasal assimilation of a verb ending with /r/ where /r/ assimilates to *n*. Why, then, can't the vowel be syncopated? The pair below clearly shows that it is preferred that the /r/ assimilates to *n* in (95b) over the simple syncope in (95a).

(95) a. sin -anai → *sinnai
die NEG
b. sir -anai → sinnai
know NEG

In order to account for this, I will show several scenarios of feature association using /kat-anai/ 'win, NEG' which does not undergo nasal assimilation. /t/ does not assimilate to /n/ in the contraction environment.

(96) kat -anai → *kannai
win NEG

There would be feature "association" changes in order for /t/ to surface as *n*. I use the term "association" here because as we saw already, this is not feature addition, but rather feature reassociation where [son] and [nas] features spread from the nasal *n* which follows *t* after syncope of /a/ is syncopated.

(97) Feature association changes from /t/ to *n*

t	→	n
∅	→	[son]
∅	→	[nas]

The ranking SYLLSTRUC >> INITIAL-C was already established. This tableau shows that simple syncope without changing any features will violate SYLLSTRUC.

Tableau 37
Nonoccurrence of nasal assimilation of /kat-anai/:
SYLLSTRUC >> INITIAL-C

/kat-anai/	SYLLSTRUC	INITIAL-C
a. ☞ k a t_1 a n_2 a i (| | F_1 F_2)		*
b. k a t_1 n_2 a i (| | F_1 F_2)	*!	

Tableau 25, repeated below as tableau 38, showed that spreading [son] feature to t_1 is prohibited by DEPLINK [son]. DEPLINK [nas] is not included in the tableau below but as motivated in tableau 35, it is ranked lower than INITIAL-C.

Tableau 38
Nonoccurrence of nasal assimilation of /kat-anai/ (reassociation of [son] and [nas]): DEPLINK [son] >> INITIAL-C

/kat-anai/	DEPLINK [son]	INITIAL-C
a. ☞ k a t_1 a n_2 a i | | F_1 F_2		*
b. k a n_1 n_2 a i \ | F_{12} $[son]_2$ $[nas]_2$	*!	

The next tableau shows that full merger of root nodes from /t/ to *n* also violates DEPLINK [son].

Tableau 39
Nonoccurrence of nasal assimilation of /kat-anai/ (full merger): DEPLINK [son] >> INITIAL-C

/kat-anai/	DEPLINK [son]	INITIAL-C
a. ☞ k a t_1 a n_2 a i | | F_1 F_2		*
b. k a n_{12} a i | F_{12} $[son]_2$ $[nas]_2$	*!	

Next, I return to (95b), repeated below, where /r/ does assimilate to *n* in the contraction environment.

(98) sir -anai → sinnai
know NEG

There are some features association changes in order for /r/ to surface as *n*.

(99) Feature association changes from /r/ to *n*

r	→	n
∅	→	[nas]

With the ranking already established, we get an ambiguous result.

Tableau 40

Nasal assimilation of /sir-anai/:

/sir-anai/	SYLLSTRUC	DEPLINK [son]	INITIAL-C	MAX-V
a. s i r_1 a n_2 a i | | F_1 F_2			*!	
b. s i r_1 n_2 a i | | F_1 F_2	*!			*
c. 💣 s i n_{12} a i | F_{12} $[nas]_2$				*
d. ☞ s i n_1 n_2 a i \\ | F_{12} $[nas]_2$				*

Candidates b) and c) violate SYLLSTRUC and they are ruled out. Candidates c) and d) do not violate DEPLINK [son] because /r/ has the [son] feature as well. We have an undesirable winner c) which is a full merger of the root nodes. To prohibit the full merger, UNIFORMITY, which prohibits coalescence, must be ranked somewhere in the grammar.

(100) UNIFORMITY: No element of the output has multiple correspondents in the input ('No coalescence') (McCarthy and Prince 1995)

Using this constraint, an analysis between candidates c) and d) above is again conducted. There is probably evidence elsewhere in the language for a more precise ranking, particularly since Japanese does not allow merger as a regular phonological process, however, for now, ranking between Uniformity and Max-V is not motivated.

Tableau 41
Nasal assimilation of /sir-anai/ using Uniformity

/sir-anai/	Max-V	Uniformity
a. s i n_{12} a i | F_{12} $[nas]_2$	*	*!
b. ☞ s i n_1 n_2 a i \ | F_{12} $[nas]_2$	*	

Both candidates violate Max-V but only candidate a), the full merger, violates Uniformity. Finally, the winning candidate gains a nasal feature. Therefore, we know that Initial-C is ranker higher than DepLink [nas], the ranking which was also established in tableau 35.

Tableau 42
Nasal assimilation of /sir-anai/: Initial-C >> DepLink [nas]

/sir-anai/	Initial-C	DepLink [nas]
a. s i r_1 a n_2 a i | | F_1 F_2	*!	
b. ☞ s i n_1 n_2 a i \ | F_{12} $[nas]_2$		*

Nasal assimilation does not occur when the verb root ends in a nasal as we saw in (95a), repeated below.

(101) sin -anai → *sinnai
die NEG

This is somewhat of a dilemma since this contraction does not involve feature association changes, but the nasal assimilation of a flap *r*, s*ir-nai* → *sinnai*, involves feature association changes. One possibility is that UNIFORMITY must be relativized to features, not just root nodes. For example, if UNIFORMITY [nas] is ranked higher than INITIAL-C, the merger of [nas] feature is ruled out.

Tableau 43
Nonocurrence of nasal assimilation of /sin-anai/:
UNIFORMITY [nas] >> INITIAL-C

/sin-anai/	UNIFORMITY [nas]	INITIAL-C
a. ☞ s i n_1 a n_2 a i | | F_1 F_2		*
b. s i n_1 n_2 a i \\ | F_{12} $[nas]_{12}$	*!	

This must be combined with OCP (Leben 1973, McCarthy 1986), a constraint against two adjacent identical segments, in this case nasals.

(102) OCP [nas]: No identical nasal adjacent segments

Candidate b), simple deletion pf /a/ without a merger of [nas], is ruled out due to its OCP [nas] violation.

Tableau 44
Nonocurrence of nasal assimilation of /sin-anai/: OCP [nas] >> Initial-C

/sin-anai/	Uniformity [nas]	OCP [nas]	Initial-C
a. ☞ s i n_1 a n_2 a i | | F_1 F_2			*
b. s i n_1 n_2 a i | | F_1 F_2 $[nas]_1$ $[nas]_2$		*!	

OCP [nas] must be ranked higher than Initial-C. Note that the Uniformity [nas] does not prohibit the flap-nasal assimilation because Uniformity [nas] is violated only if two input nasal features merge in the output.

Tableau 45
Nasal assimilation of /sir-anai/ using Uniformity [nas]

/sir-anai/	Uniformity [nas]	Initial-C	DepLink [nas]
a. s i r_1 a n_2 a i | | F_1 F_2		*!	
b. ☞ s i n_1 n_2 a i \ | F_{12} $[nas]_2$			*

The other cases of nonoccurrence of syncope between identical consonants in (94b-f), repeated below, can be accounted for in the same way using Uniformity [feature] and OCP [feature], for example, Uniformity [cor] and OCP [cor] for **kattai* and **kasse*.

(103) a. tom -imasu → *tommasu
prosper POL-PRES
b. tob -eba → *tobba
win HYP
c. kat -itai → *kattai
win DESI
d. kas -ase → *kasse
lend CAUS

In conclusion, only /r/ assimilates to *n* by syncope and no other combinations, even the identical segments, undergo syncope. It is because the /r/-/n/ combination, upon syncope and assimilation of one consonant to the other, is the only one which does not violate the constraints ranked higher than INITIAL-C such as SYLLSTRUC, the faithfulness constraints, UNIFORMITY [feature] and OCP [feature].

In the next section, anti-homophony blocking of nasal assimilation is analyzed.

3.5 Blocking of nasal assimilation and the anti-homophony constraint

Now we turn to an analysis of anti-homophony blocking of nasal assimilation of /wakare-nai/ which forms a pair with /wakar-anai/.

(104) waka**r** -**a**nai → waka**n**nai
understand NEG
waka**re** -nai → *waka**n**nai
get separated NEG

The tableaux show a single analysis of /wakar-anai/ and /wakare-nai/. For the sake of simplicity, I will post only two candidates, one is completely faithful to the input, and the other is nasal assimilation (thus, SYLLSTRUC is not necessary). There is no motivation to rank INITIAL-C and FINAL-C at this point (In a later discussion, I will argue that in fact, INITIAL-C outranks FINAL-C).

Tableau 46
Single analysis of /wakar-anai/ and /wakare-nai/:
INITIAL-C, FINAL-C >> MAX-V

a. /waka**r**-**a**nai/	INITIAL-C	FINAL-C	MAX-V
waka**ra**nai	*!		
☞ waka**n**nai			*
b. /waka**re**-nai/			
waka**re**nai		*!	
💣 waka**n**nai			*

The problem in this analysis is that *wakare-nai* undergoes nasal assimilation (indicated by the bomb), which should be blocked due to the potential creation of homophony. I argue that blocking is motivated by avoidance of homophony creation in an inter-paradigmatic relationship, and the blocking of nasal assimilation of a word is sensitive to whether another word, which would create homophony when nasal assimilation occurs, exists. We need a monitoring system between outputs (nasal assimilation) of the two words in a transparadigmatic relation in order to avoid neutralization of the underlying forms on the surface.

(105) Input: /wakar-anai/ → Output: [wakannai]

↕ *monitoring system*

Input: /wakare-nai/ → Output: [wakannai]

This monitoring system is one type of correspondence between the two outputs, but it is different from the conventional output-output correspondence (McCarthy and Prince 1995, Benua 1995). For example, in the model of BT-Identity below (Benua 1995), the truncated form (output) is derived from the base (output), which in fact surfaces from the input.

(106) *BT-Identity*

Base ⟷ **T**runcated Form

IO-Faith ↕

Input (Benua 1995;129)

In the model in (105), on the other hand, the two outputs are the result of independent phonological phenomena. This monitoring system only checks if one output is appropriate for the other. I propose that such a monitoring system that blocks contrast neutralization of the underlying distinct inputs is realized as a constraint to prohibit homophony and this constraint is embedded in the phonological grammar. Below, I define the anti-homophony constraint CONTRAST.

(107) CONTRAST: *Contrastiveness* in underlying forms between words with the same *major lexical category* must be maintained in surface forms.

Contrastiveness: Given two strings S_1 and S_2, *contrastiveness* is a relation from the elements of S_1 to those of S_2 whereby the relation of correspondence is less than perfect, i.e. such that evaluation finds a violation of at least one of the constraints in Correspondence Theory (McCarthy and Prince 1995), such as MAXIMALITY, DEPENDENCE, IDENTITY [F], CONTIGUITY, LINEARITY, and ANCHORING.

Major lexical categories: noun, verb, adjective and adverb

The brief definitions of the constraints of Correspondence Theory are below:

(108) MAXIMALITY: No deletion
DEPENDENCE: No epenthesis
IDENTITY [F]: No feature changes
CONTIGUITY : No medial epenthesis or deletion of segments
LINEARITY : No metathesis
ANCHORING: No epenthesis or deletion at edges

Take minimal pair *ore-ru* 'break, PRES' vs. *ori-ru* 'get off, PRES' for example, to see how we determine these words are "contrastive." I provide a meta-linguistic analysis of what it means to be "contrastive." The table below evaluates if /ore-ru/ → /ori-ru/ violates any of the constraints. Note that this table is not a tableau evaluating the phonology of the language, and that the constraints and their violations have nothing to do with a synchronic morpho-phonological "online" evaluation. It is simply a means for us to access whether two input forms contrast with one another. Therefore, there is no need to rank the constraints. If there is a violation of any of these constraints, these two words are "contrastive."

Table 6
"Contrastiveness" evaluation: /ore-ru/ and /ori-ru/

/ore-ru/	MAX	DEP	IDENT	CONTIG	LINEAR	ANCHOR
/ori-ru/		*				

Comparing /e/ in /ore-ru/ which has [V-cor] feature with /i/ in /ori-ru/ which has [high] and [V-cor] features, this input pair violates DEP because the change from /e/ to /i/ is a epenthesis of [high] feature. One may argue that there are more violations, but I will not go into detail because one violation of the correspondence constraints is sufficient for this pair to be "contrastive." If we switch the positions of the two inputs in the table, at least MAX is violated by deleting [high] feature of /i/. Thus, the position of /ore-ru/ and /ori-ru/ in the table do not have any meaning because if the result reveals that the pair is contrastive in one position, the opposite position will be also contrastive, meaning there is at least one violation. Here is another example.

(109) ka**r** -**i**nasai → ka**n**nasai
clip POL-IMP
ka**ri** -nasai → *ka**n**nasai
borrow POL-IMP

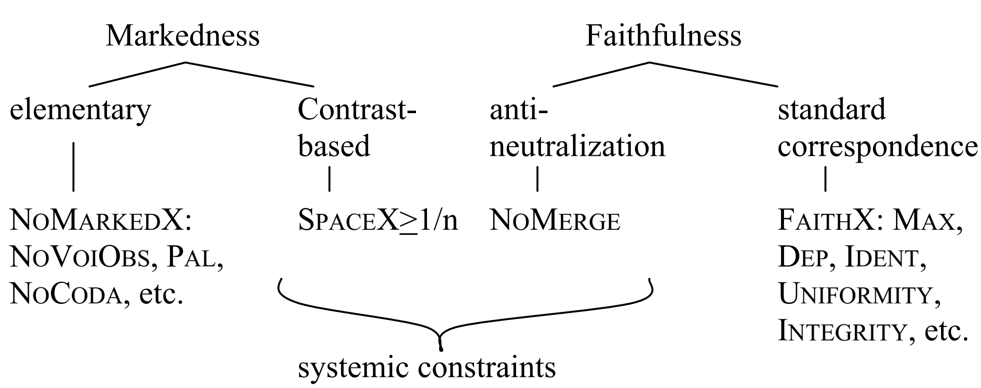
Table 7
"Contrastiveness" evaluation: /kar-inasai/ and /kari-nasai/

/kar-inasai/	MAX	DEP	IDENT	CONTIG	LINEAR	ANCHOR
/kari-nasai/	*	*				*

MAX and DEP are violated because *i* is deleted and epenthesized. ANCHORING is violated because the deletion and epenthesis occur at the edge. In this case, the same result will be obtained if we switch the positions of the two inputs in the table. Again, there is at least one violation of the correspondence constraints. Thus, this pair is "contrastive." What's not contrastive, therefore, is a pair which has the same segmental sequences and morphological structure.

Now where does this constraint stand among other OT constraints? CONTRAST penalizes a merger of two distinct inputs to surface in the same way as ANTI-IDENT in Crosswhite (1999, 2001) and *MERGE in Kawahara (2003), except that I do not limit CONTRAST within paradigmatic relations. Referring to Itô and Mester (2004a,b), I discuss here the formal status of CONTRAST (or any other anti-homophony constraints) within OT. Itô and Mester discuss that there are "systemic" markedness and faithfulness constraints which are new addition to conventional markedness and faithfulness.

(110) The contrast-based version of OT (Itô and Mester 2004a,b)



(111) Systemic constraints

SPACEX≥1/n: Potential minimal pairs differing in property X must differ in X by at least 1/nth of the available space.

NOMERGE: No output word has multiple correspondents in the input.

See Padgett (2003b) for details on SPACEX≥1/n. In the discussion of anti-homophony blocking at hand, the primary focus is "anti-neutralization" under the faithfulness constraint group to which CONTRAST belongs in (110). It looks that "systemic constraints" are either relevant to nonphonological modules (such as phonetics and lexicon) and/or phonetics-phonology and lexicon/morphology-phonology interfaces. One may think that CONTRAST is a phonology-external device. In section 4.4**,** I will demonstrate that CONTRAST is not outside of the phonology proper, but in fact embedded in the phonological grammar of Japanese.

How, then, do we utilize this CONTRAST in a tableau? If we simply apply CONTRAST to tableau 46, CONTRAST does not make any contribution as shown below, no matter which of the two possible rankings of CONTRAST we use, simply because these tableaux are not suitable to evaluate an interaction between the outputs of /wakar-anai/ and /wakare-nai/.

Tableau 47

Single analysis of /wakar-anai/ and /wakare-nai/ with CONTRAST, ranking 1

a. /waka**r**-**a**nai/	CONTRAST	INITIAL-C	FINAL-C	MAX-V
waka**ra**nai		*!		
☞ waka**n**nai				*
b. /waka**re**-nai/				
waka**re**nai			*!	
💣 waka**n**nai				*

Tableau 48
Single analysis of /wakar-anai/ and /wakare-nai/ with CONTRAST, ranking 2

a. /waka**r**-**a**nai/	INITIAL-C	FINAL-C	MAX-V	CONTRAST
waka**ra**nai	*!			
☞ waka**n**nai			*	
b. /waka**re**-nai/				
waka**re**nai		*!		
💣 waka**n**nai			*	

In Ichimura 2001, I proposed a "Minimal Pair Analysis" (henceforth, MPA)[39] within OT in order to see how two outputs interact. MPA is a technique used to allow a pair or triplet to be considered as a set of inputs and to evaluate a set of outputs in order to see the interaction of phonological process of two or more words. I will use this technique in this dissertation as well. In order to utilize an "anti-neutralization" constraint in (110), Itô and Mester (2004a) discuss that a whole group of related forms is needed to constitute an input and a candidate. This is the basic concept of MPA that I propose here and in Ichimura (2001). The important difference between Itô and Mester's "anti-neutralization" and the anti-homophony constraint CONTRAST in MPA is that the former is limited to a "group of related forms" (in the paradigm), whereas the latter covers the entire lexicon (transparadigmatic). In the analysis of nasal assimilation at hand, how are these constraints ranked? Nasal assimilation is a process driven by syncope, which triggers the assimilation of *r* to *n*. The blocking of contraction of the /re-nai/ word indicates that the anti-homophony requirement is more important than contraction by syncope of the base-final vowel /e/.

[39] Again, "minimal pair" refers to a set of inputs which are evaluation for potential homophony including a pair or triplet, which is not a minimal pair in a strict sense.

(112) CONTRAST >> FINAL-C

In the tableau below, in order to show which output, the left or the right, is violated, asterisks are divided into the left or right side of the colon. We can see the interaction between the two outputs. A colon is not used for violation of CONTRAST because it takes a pair of the outputs to violate this contraint.

Tableau 49
Minimal Pair Analysis: /wakar-anai/ and /wakare-nai/ with CONTRAST
CONTRAST >> FINAL-C

/waka**r**-**a**nai : waka**re**-nai/	CONTRAST	FINAL-C
a. ☞ waka**n**nai : waka**re**nai		:*
b. waka**n**nai : waka**n**nai	*!	

The table below, with the addition of INITIAL-C and candidate *waka**ra**nai : waka**n**nai*, shows that INITIAL-C must also outrank FINAL-C. The ranking between INITIAL-C and CONTRAST has not yet been determined

(113) INITIAL-C >> FINAL-C

Tableau 50
Minimal Pair Analysis: INITIAL-C >> FINAL-C

/waka**r**-**a**nai : waka**re**-nai/	INITIAL-C	CONTRAST	FINAL-C
a. ☞ waka**n**nai : waka**re**nai			:*
b. waka**ra**nai : waka**n**nai	*!:		
c. waka**n**nai : waka**n**nai		*!	

Thus, the total ranking is as follows:

(114) INITIAL-C, CONTRAST >> FINAL-C >> MAX-V

Below the full analysis of anti-homophony blocking between /wakar-anai/ and /wakare-nai/ is shown.

Tableau 51

Minimal Pair Analysis: INITIAL-C, CONTRAST >> FINAL-C >> MAX-V

/waka**r**-**a**nai : waka**re**-nai/	INITIAL-C	CONTRAST	FINAL-C	MAX-V
a. waka**ra**nai : waka**re**nai	*!:		:*	
b. ☞ waka**n**nai : waka**re**nai			:*	*:
c. waka**ra**nai : waka**n**nai	*!:			:*
d. waka**n**nai : waka**n**nai		*!		*:*

Candidate d) in ruled out as it violates CONTRAST. Candidates a) and c) fatally violate INITIAL-C whereas candidate b) does not violate INITIAL-C. The desirable candidate b) wins. MPA is a useful technique to account for homophony avoidance, as it analyzes the interaction in application of a phonological process to two or more inputs, which could cause potential homophony if the process applies to both inputs. Conventional "single analysis" or an evaluation in "isolated" forms, which only allows one input and output at a time, cannot capture anti-homophony blocking. Crosswhite's OT analysis, reviewed in section 1.2.2, has trouble accounting for this type of neutralization because her analysis cannot account for interaction of two or more outputs. MPA shares the similar concept with Dispersion Theory (Flemming 1995, Ní Chiosáin and Padgett 1997, 2001, Padgett 2003b) in which a "systemic" approach directly appeal to neutralization avoidance or anti-homophony.[40]

[40]Another possible approach is to divide MAX-V into MAX-V_{root} and MAX-V_{affix} instead of using ranking INITIAL-C >> FINAL-C. I will not take this approach in this dissertation because it will require one constraint more than the approach I have adopted here does. Nevertheless, I will show this approach also works. McCarthy and Prince's (1995) claim that root faithfulness takes precedence over affix faithfulness: "(B)ecause roots are never unmarked relative to affixes, the ranking of Root-faithfulness and Affix-faithfulness must be fixed universally" (McCarthy and Prince 1995:364).

(i) Root-Affix Faithfulness Metaconstraint
Root-Faith >> Affix-Faith (McCarthy and Prince 1995)

Adopting this constraint ranking to the current discussion, I break MAX-V into two constraints and rank them as below.

The ranking in (114) also explains homophony blocking of a <u>triplet</u> (I will continue to use the term "Minimal <u>Pair</u> Analysis" since the technique itself remains the same no matter which we analyze, a pair or a triplet).

(115) ka**r** -**a**nai → ka**n**nai
clip NEG
ka**re** -nai → *ka**n**nai
wither NEG
ka**ri** -nai → *ka**n**nai
borrow NEG

Tableau 52
MPA: Nasal assimilation of a minimal triplet

/ka**r**-**a**nai/ : /ka**ri**-nai/ : /ka**re**-nai/	INITIAL-C	CONTRAST	FINAL-C	MAX-V
a. ka**ra**nai : ka**ri**nai : ka**re**nai	*!::		:*:*	
b. ☞ ka**n**nai : ka**ri**nai : ka**re**nai			:*:*	*::
c. ka**ra**nai : ka**n**nai : ka**re**nai	*!::		::*	:*:
d. ka**ra**nai : ka**ri**nai : ka**n**nai	*!::		:*:	::*
e. ka**n**nai : ka**n**nai : ka**re**nai		*!	::*	*:*:
f. ka**ra**nai : ka**n**nai : ka**n**nai	*!::	*		:*:*
g. ka**n**nai : ka**ri**nai : ka**n**nai		*!	:*:	*::*
h. ka**n**nai : ka**n**nai : ka**n**nai		*!		*:*:*

(ii) MAX-V_{root} >> MAX-V_{affix}
MAX-V_{root}: Every vowel in root in input has a correspondent in output.
MAX-V_{affix}: Every vowel in affix in input has a correspondent in output
Now, we go back to tableau 51 and conduct the analysis one more time using MAX-V_{root} >> MAX-V_{affix}.

/waka**r**-**a**nai : waka**re**-nai/	INITIAL-C	CONTRAST	FINAL-C	MAX-V_{root}	MAX-V_{affix}
a. waka**ra**nai : waka**re**nai	*:		:*!		
b. ☞ waka**n**nai : waka**re**nai			:*		*:
c. waka**ra**nai : waka**n**nai	*:			:*!	
d. waka**n**nai : waka**n**nai		*		:*!	*:

Candidate a) is ruled out due to its two violations of the three high ranked constraints. Among the rest of the candidates, c) and d) violate MAX-V_{root} fatally as MAX-V_{root} is ranked higher than MAX-V_{affix}. As a result, b) wins. Candidate d) is successfully ruled out due to its violation of CONTRAST without which d) would win.

Candidates a), c), d) and f) fatally violate INITIAL-C as /a/ in /kar-anai/ remains in the outputs. Candidates e), f), g) and h) violate CONTRAST as two or three words surface as homophones. As a result, candidate b) is optimal despite its violation of FINAL-C.

Next we return to (109), repeated below as (116), to see how CONTRAST works on this contrastive pair in which the only difference between the members of the pair is the affiliation of the segments on the edges of the morpheme.

(116) ka**r** -**i**nasai → ka**n**nasai
clip POL-IMP
ka**ri** -nasai → *ka**n**nasai
borrow POL-IMP

Tableau 53
MPA: /kar-inasai/ vs. /kari-nasai/

/ka**r**-**i**nasai : ka**ri**-nasai/	INITIAL-C	CONTRAST	FINAL-C	MAX-V
a. ka**ri**nasai : ka**ri**nasai	*!:	*	:*	
b. ☞ ka**n**nasai : ka**ri**nasai			:*	*:
c. ka**ri**nasai : ka**n**nasai	*!:			:*
d. ka**n**nasai : ka**n**nasai		*!		*:*

Both candidates a) and d) violate CONTRAST because contrast between the two inputs is not maintained due to the neutralization in the output. Candidate c) violates INITIAL-C. As a result, candidate b) wins.[41]

---

[41] In the full-form grammar, no contraction occurs and homophony is allowed
(i) kar -inasai → karinasai
clip POL-IMP
kari -nasai → karinasai
borrow POL-IMP
I will discuss this homophony creation in the full-form grammar by different constraint ranking from the contraction grammar in chapter 4, namely MAX-V outranks CONTRAST. Also, theoretically it would be possible to get homophony in nasal assimilation between *C_1V_1-rare-nai* 'C_1V_1, PASS, NEG' and *C_1V_1r-are-nai* 'C_1V_1r, PASS, NEG'. However, to my knowledge, there is no such pair. The closet pair is the following but the accent is different. This pair cannot be considered as homophony.

Recall that CONTRAST does not apply to a pair in which the members of the pair are not contrastive. Syncretism and the homophones are such cases.

(117) Syncretism
a. tome -rare -nai → tomerannai
stop POTEN NEG
b. tome -rare -nai → tomerannai
stop PASS NEG (Ichimura 2001:12)
Homophones
c. okor -anai → okonnai
get upset NEG
d. okor -anai → okonnai
occur NEG (Ichimura 2001:12)

/tome-rare-nai/ 'stop, POTEN, NEG' and /tome-rare-nai/ 'stop, PASS, NEG' are not "contrastive" because the two forms are identical underlyingly and there is no violation of any of the correspondence constraints as shown below.

Table 8
"Contrastiveness" evaluation:
/tome-rare-nai/ 'stop, POTEN, NEG' and /tome-rare-nai/ 'stop, PASS, NEG'

/tome-rare-nai/ 'stop, POTEN, NEG'	MAX	DEP	IDENT	CONTIG	LINEAR	ANCHOR
/tome-rare-nai/ 'stop, PASS, NEG'						

Since the two inputs are not "contrastive," the creation of homophony in output in candidate a) (with no nasal assimilation) and candidate d) (with nasal assimilation) does not violate CONTRAST in the OT analysis below.

(ii) ki -rare -nai → kirannai
wear, PASS, NEG
kir -aré -nai → kiránnai
cut, PASS, NEG

Tableau 54
MPA: Syncretism

/tome-ra**re**-nai/ : /tome-ra**re**-nai/ 'stop, POTEN, NEG': 'stop, PASS, NEG'	CONTRAST	FINAL-C	MAX-V
a. tomera**re**nai : tomera**re**nai		**:*!*	
b. tomera**n**nai : tomera**re**nai		*:**!	*:
c. tomera**re**nai : tomera**n**nai		**:*!	:*
d. ☞ tomera**n**nai : tomera**n**nai		*:*	*:*

Candidate d) has the smallest number of FINAL-C violations and therefore, it wins. Thus, both inputs undergo nasal assimilation. The analysis of lexical homonym is the same.

Tableau 55
MPA: Lexical homonym

/oko**r**-**a**nai/ : /oko**r**-**a**nai/ 'get upset, NEG' : 'occur, NEG'	INITIAL-C	CONTRAST	MAX-V
a. oko**ra**nai : oko**ra**nai	*!:*		
b. oko**n**nai : oko**ra**nai	:*!		*:
c. oko**ra**nai : oko**n**nai	*!:		:*
d. ☞ oko**n**nai : oko**n**nai			*:*

Again, candidate d), as well as candidate a), do not violate CONTRAST. Since d) has no INITIAL-C violation, it is selected as optimal. Note that CONTRAST is crucially different from PARCONTRAST (Itô and Mester 2004b) that PARCONTRAST penalizes a case when underlyingly identical inputs surface as identical outputs, such as in the case of syncretism, including the potential /rare/ and the passive /rare/ in their discussion of /ra/-dropping, but CONTRAST does not. It is important to notice that the potential scope of CONTRAST may not cover all of the paradigm contract effects described in the literature.

I will show two more cases to which CONTRAST is not applied. In these cases, CONTRAST is not violated because two forms do not belong to the same major lexical category and homophony is created by nasal assimilation. In the first case, verb with imperative /-ina/ undergo nasal assimilation resulting the same outputs as nouns.

(118) a. /kar -ina/$_V$ → [kanna]$_V$
clip, IMP
/kanna/$_N$ → [kanna]$_N$
plane
b. /or -ina/$_V$ → [onna]$_V$
bend, IMP
/onna/$_N$ → [onna]$_N$
woman

CONTRAST does not apply to these pairs because the two forms belong to different lexical categories. In the second case, adjectives ending with /ranai/ undergo nasal assimilation and it creates homophony with their verbal counterparts.

(119) a. /tuma**r**-**a**nai/$_{ADJ}$ → [tsuma**n**nai]$_{ADJ}$
boring
/tuma**r** -**a**nai/$_V$ → [tsuma**n**nai]$_V$
fill NEG
b. /tama**r**-**a**nai/$_{ADJ}$ → [tama**n**nai]$_{ADJ}$
unbearable
/tama**r** -**a**nai/$_V$ → [tama**n**nai]$_V$
accumulate NEG

Following Nishio et al. (1981), I assume that /tumar-anai/$_{ADJ}$, for example, is derived from a verb *tumar-anai*. Therefore, I argue that although it is an adjective, a morpheme boundary still exists underlyingly. Then, /kudar-anai/$_{ADJ}$ and /kudar-anai/$_V$ are not contrastive underlyingly and CONTRAST does not apply to this pair. If we took the position that there is no morpheme boundary in the adjectives such as /tumaranai/$_{ADJ}$ and

/tamaranai/$_{ADJ}$, CONTRAST still does not apply to these pairs because the two forms are in different lexical categories.[42]

Readers might argue that there is a dilemma of using CONTRAST in MPA in transparadigmatic relations that we need to go through all possible pairs, even ones that we are not analyzing at the moment because MPA does not prevent us from picking any input pairs as a comparison set. For example, CONTRAST in MPA allows analyzing not only an input pair like (120a,b) and but also allows a pair like (120c).

(120) a. /nar -anai/ : /nare -nai/ → ☞ nannai : narenai
become, NEG get used to, NEG
b. /war -anai/ : /ware -nai/ → ☞ wannai : warenai
break (trans.), NEG break (intrans.), NEG
c. /nare -nai/ : /ware -nai/ → 💣 nannai : wannai
get used to, NEG break (intrans.), NEG

Then, in (120c), *nannai : wannai* is selected because it satisfies CONTRAST. However, this selection is incorrect, indicated by the bomb, because neither *nare-nai* nor *ware-nai* should undergo nasal assimilation as shown in (120a,b). One possible explanation to account for this dilemma is a condition for MPA.

---

[42]Although the focus in this chapter has been nasal assimilation, there is a clear case that two forms do not belong in the same lexical category in labial contraction, one of the contracted forms in Japanese. Kawase (1992) points out that in the following case of labial contraction in consonant-final verbs, homophony is created.

(i) a. /kak -i -wa/$_N$ → [kak^{j}a]$_N$
write NOMI TOP
/kak -eba/$_V$ → [kak^{j}a]$_V$
write HYP
b. /asob -i -wa/$_N$ → [asob^{j}a]$_N$
play NOMI TOP
/asob -eba/$_V$ → [asob^{j}a]$_V$
play HYP

Note that *kak-i* and *sob-i* are not verbs because *kak* and *sob* are nominalized by the nominalizer *i*. I assume that a similar OT analysis can be applied to labial contraction, but CONTRAST is not applicable to these pairs because they do not belong to the same lexical category, and homophony is allowed.

(121) Minimal Pair Analysis condition

Minimal Pair Analysis must be exhaustive – all possible comparison sets must be analyzed, and in order to determine the winning output set, each member of the winning output set must be the winner in all the analyses.

Since MPA has to be exhaustive, we cannot just pick an arbitrary pair for evaluation. We have to be sure that all the appropriate other forms are being considered. The full combinations of the lexicon need to be checked to make sure that none could wind up producing something homophonous. In order for *nannai* (< nare-nai) to win, it must undergo nasal assimilation with all possible comparison pairs. Failure of even one will block nasal assimilation. This condition is not met because *nare-nai* does not undergo nasal assimilation in (120a), even though it does (120c).

A challenge to the Minimal Pair Analysis condition how it is possible to exhaust MPA in transparadigmatic relations, as the number of comparison pairs may be very big. The definition of CONTRAST in (107) specifies what a comparison pair should be, to some degree, namely, the members of the comparison pair must be contrastive and belong to the same major lexical category. However, it does not reduce the number of possible comparison sets significantly as the entire set of combinatory possibilities that can be generated from the lexicon is still a huge number. If we assume that CONTRAST is a universal constraint, there is nothing, which hinders this condition to be applied to analyses of anti-homophony blocking in paradigmatic relations. If we apply the Minimal Pair Analysis condition to paradigmatic relations, anti-homophony blocking evaluation within paradigms does not seem to have such computational issue since there are fairly limited numbers of pair which an be chosen as a comparison set. How, then, do we account for this dilemma in transparadigmatic relations? Although MPA must be exhaustive, we do not need to go through all the possible input pairs in order to exhaust. Pairing up first the options that are most closely related, we are more likely to arrive at a failure of meeting the MPA condition relatively at the early stage of the research. For example, in the evaluation of nasal assimilation of /nare-nai/, we select a comparison pair with /rV/, /nar-anai/ : /nare-nai/, rather than very different pair such as /tabe-nai/ : /nare-nai/, and test it out. As shown in (120a), nasal assimilation of /nare-nai/ is blocked. Since only one failure is needed to block nasal assimilation, we do not need to evaluate other comparison pairs and thus, the task usually ends soon. Then, how is /kure-nai/ 'give (me), NEG' → *kunnai* justified? *kur-anai,* which is only the potential blocking factor of nasal assimilation, does not exist simply because it is not in the lexicon of the native speaker. Thus, without analyzing other pairs such as /kure-nai/ : /fure-nai/ 'touch, NEG', finding out that *kunnai* is never pursed as /kur-anai/ due to the fact that the blocker of nasal assimilation of /kure-nai/ does not exist is enough to make the judgment that /kure-nai/ undergoes nasal assimilation. In some cases, a minimum triplet for example, /kar-anai/ 'clip, NEG': /kare-nai/ 'wither, NEG': /kari-nai/ 'borrow, NEG' in (115), exists. In this case, three pair-wise evaluations, /kar-anai/ : /kare-nai/, /kar-anai/ : /kari-nai/, and /kare-nai/ : /kari-nai/, are not enough because an evaluation between /kare-nai/ : /kari-nai/, using the constraint proposed earlier, would not able to determine a winner since both /e/ and /i/ are a final vowel of the base of affixation (in fact, as commented in section 2.4.2, there is no pair solely between /re-nai/ and /ri-nai/ in the Japanese lexicon). We, then, need a triple pair analysis as demonstrated in tableau 52.

Thus far in this section, I have focused nasal assimilation of simply negative affixation where the negative morpheme is attached directly to a verb such as *wakar-nai*. As shown in (27), there are cases where the negative morpheme is attached to another suffix and nasal assimilation occurs: *tabe-tagar-anai* 'eat, show signs of, NEG' → *tabetagannai*, *ake-rare-nai* 'open, POTEN, NEG' → *akerannai* and *okos-are-nai* 'wake up, PASS, NEG' → *okosannai*. I will analyze nasal assimilation of the potential morpheme and the passive morpheme. The potential suffix has two allomorphs, /rare/ and /e/. Both are suffixes ending with /e/ (in the latter case, it is a suffix starting with /e/ as well since it consist of a single segment). However, only /rare/ undergoes nasal assimilation and nasal assimilation of /e/ is blocked.

(122) Two potential morphemes

a. tabe -ra**re** -nai → tabera**n**nai
eat POTEN NEG
'cannot eat'

b. to**r** -**e** -nai → *to**n**nai
take POTEN NEG
'cannot take'

I will analyze (122b) first. As shown below, this potential /e/ affixation to a consonant-final verb as in (123a) always has a /r-anai/ counterpart as in (123b), that is, affixation of the negative morpheme directly to the consonant-final verb.

(123) a. to**r** -**e** -nai → *to**n**nai
take POTEN NEG
'cannot take'

b. to**r** -**a**nai → to**n**nai
take NEG
'does not take'

In the OT analysis below, the constraints and their order we have established earlier are applied.

Tableau 56
MPA: /tor-e-nai/ vs. /tor-anai/

/to**r**-**e**-nai : to**r**-**a**nai/	INITIAL-C	CONTRAST	FINAL-C	MAX-V
a. to**re**nai : to**ra**nai	*:*!		*:	
b. 💣 to**n**nai : to**ra**nai	:*			*:
c. to**re**nai : to**n**nai	*:		*!:	:*
d. to**n**nai : to**n**nai		*		*:*!

Recall in (70), FINAL-C was defined such a way that a root plus suffix which precedes another suffix, like /tor-e/ in this case, is also considered as a base of affixation. Note that /-e-/ is considered not only the right edge of the base of affixation but also the initial vowel of a suffix. Thus, *torenai* in candidates a) and c) violates both INITIAL-C and FINAL-C. This OT analysis is a problematic as the undesirable candidate b) is selected. Candidate c) should be optimal. Note that /e/ is a whole morpheme which carries the entire meaning of 'potential'. Deleting /e/ is very costly because once it gets deleted, the whole morpheme would disappear. Following Kurisu (2000) among others, I argue that a constraint, which requires realization of a morpheme on the output, is at work here.

(124) Realize Morpheme constraint (RM):
Every morpheme in the input must receive a phonological realization in the output. (Kurisu 2000)

In other words, not having any phonological exponent of a morpheme in the output is a violation of this constraint. I argue that RM is ranked higher than I NITIAL-C and FINAL-C, motivated by the tableau below.

Tableau 57
Nasal assimilation of the potential morpheme /-e/:
RM >> INITIAL-C >> FINAL-C

/to**r**-**e**-nai/	RM	INITIAL-C	FINAL-C
a. ☞ to**re**nai		*	*
b. to**n**nai	*!		

Candidate b) violates RM fatally as /e/ is completely eliminated.[43] The MPA analysis with CONTRAST below shows that candidates b) and d) are ruled out by RM as /e/ is eliminated. As a result, nasal assimilation of /tor-e-nai/ is blocked.

Tableau 58
MPA: /tor-e-nai/ vs. /tor-anai/ with RM

/to**r**-**e**-nai : to**r**-**a**nai/	RM	INITIAL-C	CONTRAST	FINAL-C	MAX-V
a. to**re**nai : to**ra**nai		*:*!		*:	
b. to**n**nai : to**ra**nai	*!:	:*			*:
c. ☞ to**re**nai : to**n**nai		*:		*:	:*
d. to**n**nai : to**n**nai	*!:		*		*:*

To use RM is not an *ad hoc* fix to the problem of the violation of INITIAL-C in candidate c). In a) and c), *e* violates INITIAL-C and FINAL-C because it is a vowel-initial suffix as well as a vowel-final suffix. Its deletion violates RM in candidates b) and d).

Now we move onto the analysis of (122a). In the case of /rare/, there is no homophony threat simply because there is no potential for homophony.

43 A question arises whether maintaining /e/ as a whole is the only option for its preservation in the output. In section 2.5.2, it was shown that labial contraction by syncope of front vowels *e* and *i* results in palatalization of the consonant before the vowel: *kore -wa* 'this, TOP' → *kor*^{j}*aa*, *kor*^{j}*a*. It is possible to posit a constraint that demands that [coronal] feature in vowel be maintained between input and output: MAX-V [cor]. However, palatalization of *r* in the case of nasal assimilation of the potential morpheme /e/ at hand is not an option as the resultant *r*^{j}*n* violates SYLLSTRUC: *tor-e-nai* → **tor*^{j}*nai.*

(125) tabe -ra**re** -nai → tabera**n**nai
eat POTEN NEG
'cannot eat'
*tabe -ra**r** -**a**nai → N/A
*tabera**r** -**a**nai → N/A
*tabe -ra**ri** -nai → N/A

/tabe-rare/ is considered as a base of affixation because the negative suffix is attached. Thus, maintaining /e/ in /rare/ is a violation of FINAL-C.

Tableau 59
Nasal assimilation of /tabe-rare-nai/

/tabe-ra**re**-nai/	RM	FINAL-C	MAX-V
a. tabera**re**nai		**!	
b. ☞ tabera**n**nai		*	*

Candidate a) does not violate RM because deleted *e* in /rare/ is only one segment of the potential morpheme. Note that candidate a) violates FINAL-C twice, by *e* in *tabe* and *e* in *rare*. b) is selected as optimal. I won't discuss the possibility of syncope of *e* in *tabe*, as this was already addressed in tableau 14 in section 3.3.

Now we move on to the analysis of nasal assimilation of the passive morpheme /are/. In the case of *okos-are-nai* 'wake up, PASS, NEG' → *okosannai*, a similar analysis is applied.

Tableau 60
Nasal assimilation of / okos-are-nai /

/okos-a**re**-nai/	RM	INITIAL-C	FINAL-C	MAX-V
a. okosa**re**nai		*	*!	
b. ☞ okosa**n**nai		*		*

There is no violation of RM for candidate b). However, there are some cases where nasal assimilation of the passive morpheme is blocked.

(126) a. kak -a**re** -nai → *kaka**n**nai
write PASS NEG
'is not written'
kaka**r** -**a**nai → kaka**n**nai
hang (intransitive) NEG
'does not hang'

b. sas -a**re** -nai → *sasa**n**nai
sting (transitive) PASS NEG
'is not stung'
sasa**r** -**a**nai → sasa**n**nai
sting (intransitive) NEG
'does not sting'

The same constraints and its ranking account for the blocking of nasal assimilation of *kak-are-nai* in (126a).

Tableau 61
MPA: /kak-are-nai/ vs./kakar-anai/

/kak-a**re**-nai : kaka**r**-**a**nai/	RM	INITIAL-C	CONTRAST	FINAL-C	MAX-V
a. kaka**re**nai : kaka**ra**nai		*:*!		*:	
b. kaka**n**nai : kaka**ra**nai		*:*!			*:
c. ☞ kaka**re**nai : kaka**n**nai		*:		*:	:*
d. kaka**n**nai : kaka**n**nai		*:	*!		*:*

The rankings in (80) and (114), repeated below as (127), indicate that SYLLSTRUC is ranked higher than INITIAL-C, but the ranking between INITIAL-C and CONTRAST is not motivated.

(127) SYLLSTRUC >> INITIAL-C, FINAL-C >> MAX-V
INITIAL-C, CONTRAST >> FINAL-C >> MAX-V

The total ranking, thus far, is as follows:

(128) Ranking of main constraints in the contraction grammar
SYLLSTRUC >> INITIAL-C, CONTRAST >> FINAL-C >> MAX-V

In this section, I have argued that nasal assimilation is blocked when the contrast in underlying forms is neutralized, in order to maintain distinction of the underlying forms. I have proposed a constraint CONTRAST that penalizes the contrast neutralization and MPA (Minimal Pair Analysis) which allows transparadigmatic words to interact in terms of the occurrence of nasal assimilation as such occurrence is a potential threat for the creation of homophony. CONTRAST is not applied to a pair which are identical underlyingly such as syncretism and homophones, or to a pair which belongs to different lexical categories.[44]

3.6 Summary

In this chapter, by using nasal assimilation as an example, I have presented an analysis of the contracted form and its anti-homophony blocking. I have demonstrated that nasal assimilation is accounted for by certain constraints and ranking specific to the contraction grammar: SYLLSTRUC >> INITIAL-C >> FINAL-C >> MAX-V. Nasal assimilation is driven by syncope, which is motivated by INITIAL-C and FINAL-C without a violation of SYLLSTRUC.

(129) Nasal assimilation
r-Vn *or* rV-n → n <V> n
→*r <V> n (SYLLSTRUC violation)

In order to account for anti-homophony blocking of nasal assimilation in a pair under homophony threat, I have posited the anti-homophony constraint CONTRAST. It has been shown that CONTRAST is crucially ranked higher than FINAL-C and it blocks nasal assimilation of the vowel-final verb. Thus, homophony creation is avoided.

---

[44] Pertsova (2004) claims that anti-homophony constraint is harder to learn than constraints with local dependencies due to its nonlocal, intraparadigmatic dependent nature. She arrived to this conclusion after doing a study of genitive plural allomorph choice in Russian. Although learnability of a systemic constraint, such as the anti-homophony constraint, vs. a conventional nonsystemic constraint is an interesting topic, it is out of the scope of this dissertation.

(130) SYLLSTRUC >> INITIAL-C, CONTRAST >> FINAL-C >> MAX-V

In order to utilize CONTRAST in OT analysis, I have proposed a Minimal Pair Analysis (MPA) in which multiple competing inputs are evaluated simultaneously to see how the outputs candidates interact in terms of the occurrence of the contraction. Such an analysis can easily be extended to account for other contracted forms and the anti-homophony blocking.