

Walikan: Segmental Reversal and Phonotactic Repair

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1 Introduction

Walikan ([wa.li.ʔan] ‘flip’) is a reversed form of Javanese, e.g., *aku* ‘I (1SG)’ is converted to *uka*. Historically, it functioned as a secret language in East Java and is now predominantly used by young men in informal contexts, closely associated with their Malang identity (Yannuar, 2019; Yannuar et al., 2022). In essence, *Walikan* is an intentional language manipulation involving phonemic reversal at the lexical level, applied word-by-word without altering meaning (Yannuar & Kadarisman, 2019). In most cases, only a few words in a sentence are reversed. However, some idiomatic expressions feature a complete reversal of all words, as demonstrated in (1)¹.

- (1) a. *panas-panas senden tembok* [Original sentence]
RED-hot lean wall
‘It’s so hot. We need to take a rest (lit. leaning against the wall).’
- b. *sanap-sanap nendes kombet* [Reversed sentence]
RED_W-hot_W lean_W wall_W
‘It’s so hot. We need to take a rest (lit. leaning against the wall).’

Language games provide external evidence for phonological representations and rules (e.g., Bagemihl, 1989, 1995; Vaux, 2011). For instance, the Japanese language game *sakasa kotoba*, which involves total mora reversal, offers support for the mora as a prosodic constituent and sheds light on the representations of coda nasals, geminates, and long vowels (Kitaoka & Mackenzie, 2021). Similarly, *Walikan* conforms to Javanese phonotactics, such as the (C)(C)(C)V(C) syllable structure, in which consonant clusters are permitted syllable-initially, while complex codas are strictly prohibited. Given that total segmental reversal can shift initial clusters to syllable-final position, certain repair strategies are necessary. Prenasalized stops (^NC), consonant clusters (CC), and heterosyllabic consonant sequences (C.C) behave differently in *Walikan*, reflecting their distinct underlying representations in Javanese. This study² provides an Optimality Theory (OT) analysis to account for these fundamental differences, aiming to clarify the general mechanism of reversal and repair operations.

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¹ The subscript “*W*” in the gloss denotes *Walikan* forms. RED = reduplicant.

² The corpus for this paper draws from Yannuar (2019), Yannuar et al. (2022), and elicitation data collected during the Field Methods II class (Winter 2025) at the University of Chicago. Unless otherwise noted, our consultant’s productions match those described by Yannuar and others.

2 Phonemes as the unit of reversal

The reversal process operates on underlying phonemes rather than surface phonetic representations, as noted by Yannuar (2019) and Yannuar et al. (2022). For instance, in Javanese, /k/ is realized as [ʔ] in syllable-final positions but remains [k] elsewhere. In (2), the coda /k/ is pronounced as a glottal stop in the original words. After reversal, since /k/ no longer occurs in syllable-final positions, it changes to [k]. This example demonstrates that *Walikan* is not simply the backward repetition of surface forms but involves the manipulation of underlying representations.

- (2) a. *arek* (/a.rɛk/) [a.rɛʔ] ‘child’ → *kerā* (/kɛ.ra/) [kɛ.ra] (*[ʔɛ.ra])
 b. *walik* (/wa.lik/) [wa.lɪʔ] ‘to reverse’ → *kiwal* (/ki.wal/) [ki.wal] (*[ʔi.wal])
 c. *bakso* (/bak.sɔ/) [baʔ.sɔ] ‘meatball’ → *oskab* (/o.skab/) [o.skap] (*[os.ʔab])

Walikan adheres to the phonotactic restrictions and phonological alternations in Javanese, such as word-final obstruent devoicing shown in (3). In the reversed forms, phonemes /d/ and /g/ are devoiced because they shift from word-initial to word-final positions. Notably, the orthography also mirrors phonological categories: the flipped form of *dodol* ‘to sell’ is spelled *lodod* instead of *lodot*, even though native speakers can be aware of the voicing alternation.

- (3) a. *bodo* (/bɔ.dɔ/) [bɔ.dɔ] ‘stupid’ → *odob* (/ɔ.dɔb/) [ɔ.dɔp] (*[ɔ.dɔb])
 b. *dodol* (/dɔ.dɔl/) [dɔ.dɔl] ‘to sell’ → *lodod* (/lɔ.dɔd/) [lɔ.dɔt] (*[lɔ.dɔd])
 c. *gelem* (/gɛ.lɛm/) [gɛ.lɛm] ‘to want’ → *meleg* (/mɛ.lɛg/) [mɛ.lɛk] (*[mɛ.lɛg])

To some extent, *Walikan* can be analyzed with reference to its orthography. However, the current written form does not map exactly onto the underlying representations of Javanese. Notably, diacritics have largely been abandoned as Javanese is increasingly used in casual contexts (Apriadsa et al., 2018). Our consultant learned these diacritics only when translating ancient Javanese texts at school and rarely uses them in daily life, and neither do the elders. For example, *arek* ‘child’ is traditionally spelled as *aréḱ* to distinguish /ɛ/ from /ə/, and *bodo* ‘stupid’ was written as *bòdò* to prevent confusion between /ɔ/ and /o/. Even without these distinctions in orthography, as in *moto* in (4a) and (4b), speakers can still reliably identify the relevant phonemes when producing both regular and reversed forms. In this paper, modern-style no-diacritic graphs are adopted, with narrow transcriptions provided for analytical clarity.

- (4) a. *moto* (/mɔ.tɔ/) [mɔ.tɔ] ‘eye’ → *otom* (/ɔ.tɔm/) [ɔ.tɔm]
 b. *moto* (/mo.to/) [mo.to] ‘to take pictures’ → *otom* (/o.tom/) [o.tom]

3 Consonant clusters and sequences in Malang Javanese

The syllable structure of Malang Javanese is (C)(C)(C)V(C), as summarized by Yannuar (2019: 94). Consonant clusters and complex segments can appear in syllable-initial positions but are forbidden syllable-finally. The well-formed types of consonant onsets are listed in (5) and (6).

- (5) Two-consonant onsets in Javanese (Yannuar et al. 2022: 572)

Cluster type	Example	Root-initial position	Root-medial position
Fricative-stop	/sp/	[ˈspir.tʊs] ‘burning fuel for lamps’ (< Dutch)	[ˈka.spe] ‘cassava’ (< Portuguese)
Fricative-liquid	/sl/	[ˈsli.moŋ] ‘blanket’	[ˈʔa.sli] ‘origin, original’ (< Arabic)
Fricative-stop	/st/	[st̪an] ‘handlebar of bike’ (< Dutch)	[ˈŋas.t̪] ‘to bring (polite)’ (< Sanskrit)
Glide-liquid	/wr/	[wrɔ.ˈnɔ] ‘color’ (< Sanskrit)	[ˈka.wroh] ‘knowledge’
Nasal-liquid	/mr/	[ˈmri.paŋ] ‘eye’ (HON)	[ˈʔa.mrm] ‘lover’
Nasal-stop	/mb/	[mbah] ‘grandparent’	[ˈt̪o.mbɔ] ‘medicine’
Stop-glide	/bj/	[ˈbj̥a.jaʔ] ‘careless’	[g̚.ˈbj̥k] ‘wooden wall’

(6) Three-consonant onsets in Javanese (Yannuar et al. 2022: 573)

Cluster type	Example	Root-initial position	Root-medial position
Nasal-stop-liquid	/ɲɺl/	no data [†]	[ʔa.ɲɺlɔk̄] ‘plummeted’
Nasal-stop-glide	/mbj/	no data	[ʔa.mbjar] ‘shattered’
Nasal-fricative-liquid	/ɲsl/	no data	[me.ɲslɛ] ‘not straight’
Fricative-stop-liquid	/str/	[s̄t̄rɪp̄] ‘stripe’ (< Dutch)	[ʔi.s̄t̄rɪ] ‘wife’ (< Sanskrit)

While Yannuar et al. (2022) referred to all these onsets as consonant clusters, pre-nasalized stops are essentially complex segments, as argued in Section 4. For convenience of reference, we posit a set of $\{C_1C_2(C_3)\}$ to represent the legitimate cluster/segment patterns in Javanese.

Since *Walikan* is generated through total segment reversal, it gives rise to two potential sources of ill-formedness. On the one hand, syllable-initial complex onsets may be shifted to syllable-final position, but complex codas are illicit in Javanese. On the other hand, reversing $C_1C_2(C_3)$ to $(C_3)C_2C_1$ may yield consonant clusters that violate phonotactic constraints. None of the reversed consonant sequences in (5) and (6) are permitted in Javanese without resyllabification, which demonstrates that cluster well-formedness is highly directional. Consequently, certain repair operations such as reordering and deletion are required. These processes are discussed in detail in the following section.

4 Phonotactic repair strategies in *Walikan*

4.1 Word-medial CC and ^NC: unreversed Word-medial syllable-initial consonant clusters and pre-nasalized stops are not reversed and retain their syllable-initial positions, as illustrated in (7). The syllabification adopted in this paper follows Yannuar’s metrics, in line with the Maximal Onset Principle (Hayes, 2009:252), according to which syllable onsets should contain the largest cluster permissible word-initially. The observed reversal patterns provide independent support for this analysis. For example, in (7a), if *sandal* were parsed as [san.dal], it would be expected to invert as *lad.nas*, given that word-medial heterosyllabic consonant sequences are mechanically reversed in *Walikan* (see Section 4.2). Additionally, since most Javanese root words consist of two syllables (Oakes, 2009), the majority of examples discussed in this paper are disyllabic.

- (7) a. *sandal* [sa.ⁿdal] ‘sandal (loanword)’ → *landas* [la.ⁿdas]
 b. *mambu* [ma.^mbu] ‘smelly’ → *u.mbam* [u.^mbam]
 c. *muklis* [mu.klɪs] ‘(a name)’ → *siklum* [si.klɔm]
 d. *listrik* [li.strɪk³] ‘electricity (loanword)’ → *kistril* [ki.strɪl]

To account for this type of case, several OT constraints are proposed below, ranked as $\{C_1C_2(C_3)\}$, MAX-IO, NOCODA » REVERSE-LIN. Constraints (8a-c) are adapted from Kager (1999), Sanders (1999, 2000), and Kitaoka & Mackenzie (2021) with minor modifications. (8d) offers a tentative formalization of the phonotactic restrictions on consonant clusters, as their patterns cannot be fully captured by a single factor such as the sonority sequencing principle.

- (8) a. **REVERSE-LIN** (Reverse linearity)
 If α precedes β in the input, β' precedes α' in the output.
 b. **MAX-IO**
 Input phonemes must have output correspondents. (‘No deletion.’)
 c. **NOCODA**
 *C]_σ (‘Syllables are open.’)
 d. $\{C_1C_2(C_3)\}$
 Consonant clusters in the output must belong to the well-formed phonotactic set.

An example tableau of (7c) is presented in (9). Candidate (b) [si.lkɔm] fatally breaches $\{C_1C_2(C_3)\}$, since liquid-stop clusters such as /lk/ are illicit in Javanese. Candidate (c) [sɪl.kɔm] obeys this phonotactic

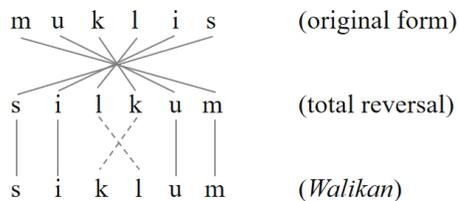
³ The word-final /k/ is realized [k̄] rather than [ʔ] due to phonetic approximation in loanword adaptation.

restriction through re-syllabification but is eliminated by NOCODA, which penalizes closed syllables. Segmental deletion is also disfavored, so candidates such as [si.kòm] and [si.lòm] are ruled out by MAX-IO. Although candidate (a) [si.klòm] fails to fully satisfy REVERSE-LIN, with /k/ and /l/ not completely flipped, it emerges as optimal because this constraint is ranked relatively low.

(9) Example tableau: *muklis* [mu.klis] ‘(a name)’ → *siklum* [si.klòm]

/muklis/	{C ₁ C ₂ (C ₃)}	MAX-IO	NOCODA	REVERSE-LIN
a. si.klòm			*	*({k,l})
b. si.lkòm	*!		*	
c. sɪ.lkòm			**!	
d. si.kòm		*!	*	

A straightforward way to determine the number of violations of REVERSE-LIN is to count association line crossings. Bagemihl (1989) classifies *Walikan* as a case of segment-level maximal crossing. Under the definition in (8a), full satisfaction of this constraint entails complete segmental reversal (e.g., *muklis* → **silkum*). Comparison of the optimal candidate [si.klum] with the fully reversed form reveals that the relative order of /k/ and /l/ is preserved exactly as in the original representation. This failure to reverse the segment pair therefore incurs a single violation of REVERSE-LIN.



Though not reflected in the analysis above, vowel epenthesis is also dispreferred and is rarely employed as a repair strategy. Our consultant does not insert vowels between consonants following reversal. For example, *muklis* cannot be realized as [si.lə.kòm] in *Walikan*. Correspondingly, the number of syllables generally remains unchanged after reversal and resyllabification.

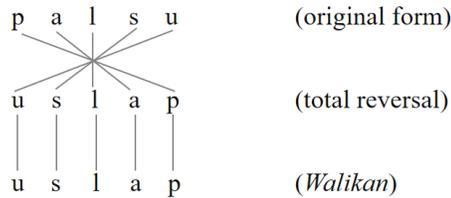
4.2 Word-medial C.C: reversed Word-medial heterosyllabic consonant sequence C₁.C₂ is reversed, often with concomitant resyllabification when the resulting C₂C₁ constitutes a well-formed cluster, as illustrated in (10a–c). When C₂C₁ is unattested in Javanese, however, the syllable boundary is preserved between C₂.C₁, as in (10d).

- (10) a. *bakso* [baʔ.so] ‘meatball’ → *o.skab* [ɔ.skap]
 b. *kerdi* [kəɾ.di] ‘to work hard’ → *idrek* [i.drək]
 c. *palsu* [pal.su] ‘fake’ → *uslap* [u.slap]
 d. *sabtu* [sap.tu] ‘Saturday’ → *utpas* [ʊt.pas]

The constraint ranking remains unchanged in (11). Candidates (b) [us.lap] and (d) [ul.sap] are eliminated due to their greater violations of NOCODA. Because /s/ is not a licit cluster, candidate (c) [u.lsap] is ruled out by {C₁C₂(C₃)}. In this case, where no consonant cluster is involved in the input, repair proceeds solely via resyllabification, rather than through segmental reordering or other operations.

- (11) Example tableau:
- palsu*
- [pal.su] ‘fake’ →
- uslap*
- [u.slap]

/palsu/	{C ₁ C ₂ (C ₃)}	NOCODA	REVERSE-LIN
☞ a. u.slap		*	
b. us.lap		**!	
c. u.lsap	*!	*	*({l,s})
d. ul.sap		**!	*({l,s})



4.3 Word-initial CC: reordering Word-initial consonant clusters are frequently reordered after reversal in order to avoid complex codas and to comply with Javanese phonotactic constraints, as illustrated in (12). This pattern is most commonly attested in disyllabic words of the shape C₁C₂VC₃V, where C₂ is typically a liquid such as /l/, and C₃ is often an obstruent or ^NC. As a result, the sequence C₃C₂ yields a legitimate CL (consonant–liquid) cluster.

- (12) a. *mlebu* [mlə.bu] ‘to enter’ → *ublem* [u.bləm]
 b. *mlaku* [mla.ku] ‘to walk’ → *uklam* [u.klam]
 c. *blonjo* [blɔ.ʲɔ] ‘to shop’ → *onjlob* [ɔ.ʲlɔp]
 d. *klambi* [kla.ᵐbi] ‘clothing’ → *imblak* [i.ᵐblaʔ]

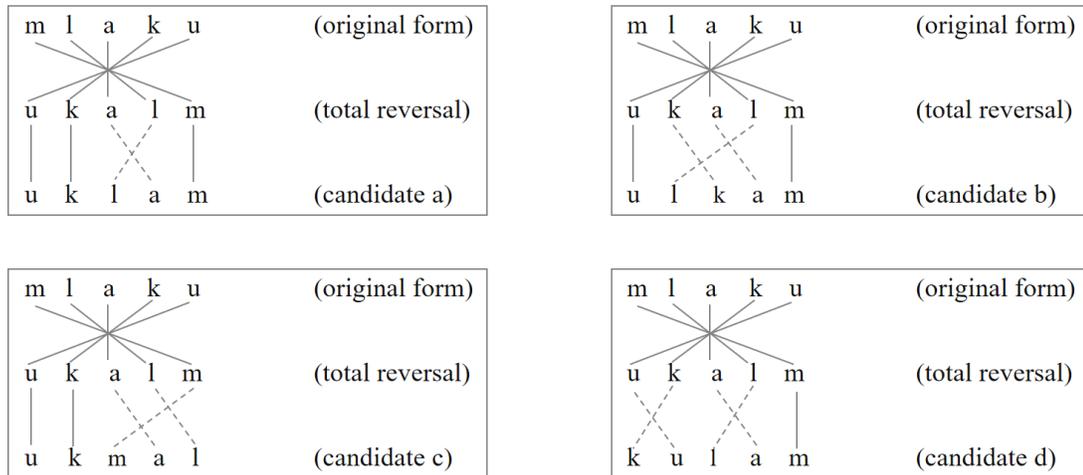
Consonant reordering is driven by the highly-ranked well-formedness constraint *COMPLEX^{COD}, specified in (13), which dominates REVERSE-LIN. In other words, avoiding consonant cluster codas takes priority over maintaining the complete reversed segment order.

- (13) *COMPLEX^{COD} (Kager, 1999:97)
 *CC]_σ (‘Codas are simple’)

In tableau (14), candidates (e) [u.kaml] and (f) [u.kalm], which end with consonant clusters, are excluded by *COMPLEX^{COD}. As in other cases, segmental deletion is penalized by MAX-IO, and Candidate (g) [u.kal] thereby fails to surface. The remaining candidates (a-d) break the /ml/ cluster through distinct reordering strategies. Among these alternatives, (b) [ul.kam] and (c) [u?.mal] introduce additional codas and are therefore eliminated by NOCODA. Although (d) [ku.lam] does not create a new coda and conforms to Javanese phonotactics, it is rejected because of its greater violation of REVERSE-LIN compared to (a) [u.klam]. Taken together, these patterns indicate that, in the premise of satisfying Javanese phonotactic restrictions, *Walikan* pursues the maximal segment reversal with minimal ordering adjustment afterwards.

- (14) Example tableau:
- mlaku*
- [mla.ku] ‘to walk’ →
- uklam*
- [u.klam]

/mlaku/	*COMPLEX ^{COD}	MAX-IO	NOCODA	REVERSE-LIN
☞ a. u.klam			*	*({l,a})
b. ul.kam			**!	*({l,k})*({l,a})
c. u?.mal			**!	*({m,a})*({m,l})
d. ku.lam			*	*({k,u})*!({l,a})
e. u.kaml	*!		*	*({m,l})
f. u.kalm	*!		*	
g. u.kal		*!	*	



When both adjacent syllables begin with complex onsets, such words typically exhibit the pattern $C_1C_2V^NC_3V$, where C_2 is usually a liquid (e.g., /l/), as illustrated in (12c–d). The repair operation in these cases involves preserving the word-medial NC sequence intact while reordering C_2 , which remains compatible with the OT ranking proposed above. Consider *klambi* in (15). Candidates (b) [im.blaʔ] and (c) [ib.mlaʔ] incur fatal violations of NOCODA, indicating that the word-medial NC sequence cannot be split or reordered. If the word-initial /k/ cluster is reversed directly into a word-final /lk/ sequence (realized as [lʔ]), as in candidate (d), the resulting form is excluded by $\{C_1C_2(C_3)\}$ and also violates $*COMPLEX^{COD}$. Similarly, candidate (e) [i.^mbakl] ends in a consonant cluster and is therefore excluded.

(15) Example tableau: *klambi* [kla.^mbi] ‘clothing’ → *imblak* [i.^mblaʔ]

/kla ^m bi/	$\{C_1C_2(C_3)\}$	$*COMPLEX^{COD}$	MAX-IO	NOCODA
☞ a. i. ^m blaʔ				*
b. im.blaʔ				**!
c. ib.mlaʔ				**!
d. i. ^m balʔ	*!	*		*
e. i. ^m bakl		*!		*
f. i. ^m baʔ			*!	*

Additionally, Yannuar et al. (2022) reported only a single instance of vowel epenthesis used to repair a complex coda arising from the reversal of a word-initial consonant cluster, as shown in (16). This strategy is adopted because /yl/ ([jl]) is illicit in Javanese phonology. Consequently, the reordering repair that would otherwise yield $*[u.jlam]$ is unavailable. Our consultant, however, considered this lexical item to be irreversible. It is also worth noting that words in (12) disallow schwa insertion, e.g., *mlaku* cannot surface as [u.ka.ləm] in *Walikan*.

(16) *mlayu* [mla.ju] ‘to run’ → *ulayem* [u.la.jəm] ([u.ja.ləm] not attested)

4.4 Word-initial NC : prenasal deletion However, word-initial prenasalized stops [^mb] and [ⁿd] undergo nasal deletion, rather than reordering (Yannuar et al., 2022). For example, in (17a), *mbois* is reversed as *siob* [si.^jɔp], while forms generated from reordering, such as [si.bom] and [si.mop], are unattested. Our consultant had great difficulty generating these forms and described such words as not reversible.

(17) a. *mbois* [^mbɔ.is] ‘trendy/cool people’ → *siob* [si.^jɔp]
 b. *ndeso* [ⁿdɛ.sɔ] ‘provincial, rural’ → *osed* [ɔ.sɛt]

The inapplicability of reordering in this case can be attributed to the distinctive phonological properties of ^NC segments. Prenasalized obstruents have been widely described as homorganic and phonologically unitary across languages (Maddieson, 1989; Tak et al., 2011; Ratliff, 2015). As noted above, the unit of reversal is defined over phonemes (see Section 2). Consequently, a segment may not be further decomposed into subparts for the purposes of reordering. To capture this restriction, a new constraint, INTEGRITY-Q, where Q denotes a segment, is proposed in (18). Under Q-Theory (Shih & Inkelas, 2013; Inkelas & Shih, 2015), prenasalized stops such as /^mb/ are analyzed as complex segments, i.e., single phonological units composed of featurally non-uniform subsegments (Browman & Goldstein, 1989; Garvin et al., 2018). By contrast, consonant clusters such as /ml/ consist of two independently manipulable segments.

(18) **INTEGRITY-Q**

No segment (Q) in the input has multiple correspondents in the output.

The following question lies in why the nasal subparts, rather than the stops, are omitted. From a temporal perspective, within a prenasalized voiced stop in Javanese, the nasal portion is substantially longer than the following oral stop, as illustrated in Figures 1 and 2. This pattern is consistent with previous findings from other Austronesian languages (Cohn & Riehl, 2008). Despite their shorter relative duration, stops nevertheless persist, plausibly due to their greater perceptual salience. This hypothesis, however, requires further empirical verification. Moreover, although Garvin et al. (2018) analyzes prenasalized stops in Panará as [^mp] ($m^1 p^2 p^3$), based on their observations regarding nasality proportion and Q-Theory's central claim that each segment Q decomposes into three subsegments ($q^1 q^2 q^3$), the internal structure of ^NC sequences may vary depending on voicing and language-specific factors.

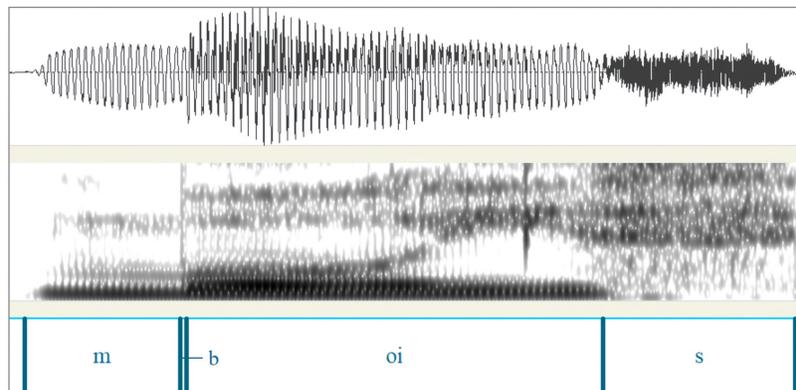


Figure 1: Spectrogram of *mbois*

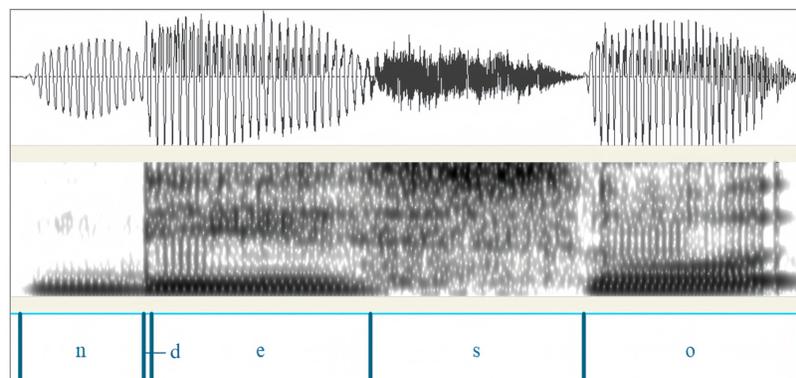


Figure 2: Spectrogram of *ndeso*

To account for nasal deletion, the faithfulness constraint MAX-IO([-sonorant]) in (19a) is adopted,

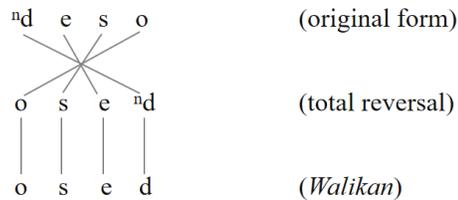
penalizing the omission of obstruents. Additionally, because prenasalized stops cannot occur syllable-finally, the definition of *COMPLEX^{COD} is revised as shown in (19b). In Javanese, only simple segments, which have internally uniform features across subsegments, can serve as codas in closed syllables.

- (19) a. **MAX-IO([-son])**
Input obstruents must have output correspondents.
- b. *COMPLEX^{COD} (revised)
*CC]_σ, *^NC]_σ ('Codas are simple')

An example tableau is provided in (20). Candidate (c) [ɔ.sɔɛn] fatally violates INTEGRITY-Q, as the complex segment /ⁿd/ is split and reordered. Candidates (d) [ɔ.sɛɛn] and (e) [ɔ.sɛⁿd] end with either a CC cluster or a ^NC sequence and are therefore eliminated by COMPLEX^{COD}. Candidates (a) and (b) differ in which subpart of /ⁿd/ is deleted. To satisfy MAX-IO([-son]), (a) [ɔ.sɛt] is selected as the optimal output, with denasalization and the underlying /d/ devoiced word-finally in the surface form. The more general faithfulness constraint, MAX-IO, is ranked relatively lower to permit deletion in this case.

- (20) Example tableau: *ndɛso* [n^dɛ.sɔ] 'provincial, rural' → *oséd* [ɔ.sɛt]

/ ⁿ dɛsɔ/	*COMPLEX ^{COD}	INTEGRITY-Q	MAX-IO([-son])	MAX-IO
a. ɔ.sɛt			*	*
b. ɔ.sɛn			**!	*
c. ɔ.sɔɛn		*!		
d. ɔ.sɛɛn	*!			
e. ɔ.sɛ ⁿ d	*!			



In summary, the OT ranking manifests as *Complex^{COD}, {C₁C₂(C₃)}, NOCODA, INTEGRITY-Q, MAX-IO([-son]) » MAX-IO » REVERSE-LIN. Among these constraints, REVERSE-LIN and MAX-IO([-son]) are more specific to *Walikan*, and their relative rankings may change in regular Javanese contexts.

5 Conclusion and discussion

Walikan is derived through total segmental reversal. To comply with Javanese phonotactics, certain consonant clusters and segments must be repaired after reversal to avoid illicit complex codas. Word-medial CC and ^NC sequences retain their internal order, whereas word-medial heterosyllabic C.C sequences are typically reversed, often triggering resyllabification. Word-initial CC clusters are usually split and reordered when the second consonant is a liquid, while word-initial ^NC sequences do not undergo reordering; instead, the nasal component is deleted.

The OT analysis sheds light on the mechanisms behind these operations. In particular, a full phonemic reversal is preferred, with repair strategies invoked only when necessary. Certain phonological restrictions are relatively rigid, e.g., complex codas are prohibited, and any resulting consonant clusters must conform to Javanese phonotactics. These restrictions collectively favor outputs with fewer closed syllables. Moreover, unlike consonant clusters, ^NC constitutes a unitary segment and therefore cannot be separated or reordered.

One remaining issue concerns individual differences in *Walikan* production. Male speakers have been reported to use reversed forms more frequently than female speakers, particularly in expressions carrying socially negative connotations (Hoogervorst, 2014). Generational differences have also been observed: older

speakers tend to conform more closely to Javanese phonotactic constraints than younger speakers (Yannuar, 2019). In addition, speakers may differ in their judgments regarding the reversibility of particular lexical items. For instance, the consultant consulted here rejects forms beginning with ^NC as unattested in *Walikan*. Future research may investigate these sources of variation from a sociolinguistic perspective and examine their relationship to ongoing sound change and language contact.

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