WEIGHTLESSNESS PRESERVATION IN JORDANIAN ARABIC VARIETIES: A STRATAL OT ANALYSIS

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Abstract

This research explores the morphological form of 2nd person possessive clitics in Jordanian Arabic varieties within Stratal OT. It assumes that possessive clitics formation in these varieties undergoes two levels of constraint interaction, namely the stem level and the word level. Additionally, it argues that the surface differences between these varieties regarding formation of 2nd person possessive clitics is reducible to the relevant ranking of one constraint that bans weightless consonants of the input to have moraic weight in the output, at the word level where inputs can be constrained. This constraint is coined as NONFINAL(c)-IO. The argument is that in Mainstream Jordanian Arabic, NONFINAL(c)-IO outranks LINEARITY-IO, hence the possibility for metathesis as a repair strategy when the input of level 2 includes a weightless consonant (yielding, as a result, the surface form –ik). On the other hand, in the so-called Karaki Arabic, the order between NONFINAL(c)-IO and LINEARITY-IO is reversed (LINEARITY-IO >> NONFINAL(c)-IO), the matter which excludes metathesis as a repair strategy (yielding, as a result, the surface form –ki). The study shows that other repair strategies, including deletion and insertion, are blocked in Karaki Arabic, given that NONFINAL(c)-IO is outranked by *COMPLEX$_{ONS,}$ *COMPLEX$_{COD}$, MAX-IO, and DEP-IO.

1. Introduction

Jordanian Arabic (JA) is a blanket term that covers several sub-varieties, including Bani Hassan Arabic, Rural Jordanian Arabic, and Ma'ani Arabic, to name just a few (see, Suleiman 1985; Zawaydeh 1998; De Jong and Zawaydeh 1999; Zuraiq and Zhang 2006; and Rakhieh 2009). Between these sub-varieties there are a number of phonological differences that involve a range of phonological constructions, i.e., syllables, words, etc. One of these differences lies in the formation of the 2nd Feminine Singular (2FS) possessive clitic, which is the principal concern of the current research. For the purposes of the present study, I divide JA varieties into two sub-varieties. The first variety is what I call Mainstream Jordanian Arabic (MJA), and the second variety is Karaki Arabic (KA), spoken in Al-Karak City.[1]

In MJA, the 2FS possessive clitic is in most cases *–ik*, whereas it is always *–ki* in KA. It is the ultimate aim of the current research to investigate this discrepancy in the order of the segments that form the 2FS possessive clitic between these varieties. Consider table 1 that shows the paradigm of 2nd person possessive clitics used in MJA and KA in addition to their corresponding forms in Modern Standard Arabic (MSA) to the noun *daftar* 'a note book' (possessive clitics are bold-faced).

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[1] Al-Karak city is 140 kms to the south of Amman, the capital city of Jordan.

Table 1: 2nd possessive clitics in MJA, KA and MSA (P: Person; N: number; G: Gender)[2]

P	N	G	MJA	KA	SA
2nd	S	M	daf.ta.**rak**	daf.ta.**rak**	daf.ta.r**u.ka**
		F	daf.ta.**rik**	daf.tar.**ki**	daf.ta.r**u.ki**
	P	M	daf.tar.**kum**	daf.tar.**kum**	daf.ta.ru.**kum**
		F	daf.tar.**kin**	daf.tar.**kin**	daf.ta.r**u**.**kunna**

As clear from table 1, 2nd possessive clitics in Arabic varieties under discussion do not have an invariant morphological form. Rather, they display overt morphological agreement with the possessor. For instance, if the possessor is 2SM, the possessive clitic used is different from what is used with a 2PM possessor. A closer look at table 1 reveals that MJA and KA have the same paradigm of possessive clitics except for 2SF. The immediate question that arises is whether this difference boils down to some phonological principle/condition. Using the current generative phonological enterprise, namely Stratal Optimality Theory (Kiparsky 2000 and 2003, and subsequent work), the current research argues that this difference is in essence attributed to some constraint that demands extra-metrical material, in the sense of Hayes (1995), to remain weightless in the output, the state of affairs I label as *Weightlessness Preservation.*

All below discussion is dedicated to defend this hypothesis. Section 2 provides some preliminary observations and analysis. Section 3 explores the cases where all varieties have the same form of the 2SF, i.e. -ki, namely when the base ends with a vowel. Here I focus on the ensuing vowel lengthening, assuming it is forced by stress assignment. Section 4 includes the main analysis, postulating that the switch between the segments forming the 2FS possessive clitic occurs in MJA grammar, demanded by one constraint I coin as NONFINAL(c)-IO (weightless consonants of the input remain weightless in the output). I argue that NONFINAL(c)-IO is a highly ranked constraint in MJA grammar, outranking LINEARITY-IO. The switch in the segments forming the 2FS possessive clitic is taken as a repair strategy against the violation of NONFINAL(c)-IO (NONFINAL(c)-IO >> LINEARITY-IO). On the other hand, in KA, NONFINAL(c)-IO is outranked by LINEARITY-IO, hence no switch in the segments forming the 2FS possessive clitic follows (LINEARITY-IO >> NONFINAL(c)-IO). Section 5 concludes the discussion with some pointers to further research.

2. Preliminary observations and analysis

Before addressing the main core of my hypothesis (the existence of a constraint that demands weightlessness preservation), let us first explore the segmental make-up of 2nd possessive clitics in MSA. A closer look at table 1 reveals that both MSA and KA have the same order of the segments that form the 2SF possessive clitic. In both varieties, -ki is used. On the other hand, they are different with respect to two facts. Firstly, in MSA the possessive clitic used is preceded by the vowel [u]. Secondly, there is a switch between the segments that form the 2SM possessive clitic in KA, if we take MSA as a departure point. Consider table 2:

Table 2: 2nd person possessive clitics in KA and MSA

KA	MSA
ak	uka
ki	uki
kum	ukum
kin	ukin

Regarding the first fact (the possessive clitic in MSA is preceded by the vowel [u]). Much evidence can be adduced for the assumption that this vowel [u] is not a genuine part of the possessive clitic, but a morphological reflection of the overt Case MSA enjoys. It is widely known that one of the main syntactic differences between MSA and other Arabic varieties, including KA and MJA, is the lack of overt morphological Case on the part of the latter, where Case is abstractly expressed. No overt Case markers are used in vernacular Arabic varieties, a result broadly assumed by many works on Arabic (see, e.g. Holes 2004; Ryding 2005; and Fassi Fehri 2012). Compelling evidence that [u] is a morphological realization of (nominative) Case rather than an underlying part of the possessive clitic comes from the fact that it changes to [a] or [i], depending on the structural position that the respective word occupies in the associated sentence. Consider the following examples:

(1) a. marar-tu   bi-baab-i-ki
      Passed-1S   with-door-GEN-your.2SF
      'I passed along your door.'

  b. ʕaraf.tu   baab-a-ki
      knew1S   door-ACC-your.2SF
      'I knew your door.'

In (1a), the vowel preceding the possessive clitic is [i] instead of Nominative [u]; the word *baabiki* 'your book' is the object of the preposition *bi* 'in', hence the environment of Genitive Case assignment. In (1b), the vowel changes to [a], since the word *baabaki* 'your book' is the direct object whose Case must be Accusative in Arabic grammar (Holes 2004 and Wright and Caspari 2011). Examples in (1) demonstrate clearly that the vowel preceding –ki in MSA is a Case-sensitive form rather than a part of the underlying make-up of the possessive clitics.

Concerning the second fact pertaining to the switch between the segments forming 2SM possessive clitic (the possessive clitic is VC in KA, while it is CV in MSA), one might entertain the possibility that the underlying form of 2SM possessive clitic in MSA is different from that of KA, hence the difference in the surface form. This possibility must be ruled out, though. As indicated in table 2, the switch of the segments forming 2nd possessive clitics in KA is only related to the 2SM clitic, as compared to MSA. There is no conceptual ground or actual motivation to single out this clitic with a different underlying form, namely VC. Pertinently, the 2SF possessive clitic in MJA is VC (-ik), while it is CV in KA and MSA (-ki). It is hardly plausible to suggest that MSA and KA share the same underlying form for the 2SF possessive clitic, while they are at odds as far as the 2SM possessive clitic is concerned. It will become clear that the underlying form of possessive clitics in all Arabic varieties under discussion is the same and any surface differences must come down to some phonological reasons.

3. Possessive clitics and vowel lengthening
Table 2 indicates that MJA maintains a different order of the segments that form the 2SF possessive clitic. However, this difference falls when words ending with a vowel are taken into account. Consider the following examples from MJA:

(2)
        /dawa/ 'medicine' → *[da.'waa.ki] 'your medicine'*
        /sama/ 'sky' → *[sa.'maa.ki] 'your sky'*
        /mawla/ 'leader' → *[maw.'laa.ki] 'your leader'*
        /ʔabu/ 'father' → *[ʔa.'buu.ki] 'your father'*

In (2), the 2SF possessive clitic has the form CV rather than VC. With this being the case, the following observation can be made, capturing the morphological form of the 2FS in MJA:

(3) In MJA, when the word ends with a vowel, the form of 2SF is –ik; otherwise the form is -ki.

Though the observation in (3) might account for all cases in my MJA data, the question remaining unanswered is why this must be the case. The observation in (3) is descriptive in character without any explanatory value. Additionally, the observation in (3) says nothing about KA and MSA, where the 2SF possessive clitic has an invariant form (i.e. CV), regardless of the value of the final segment of the base (vocalic vs. consonantal).

Of note here is the fact that the final vowel of all examples in (2) must undergo vowel lengthening in MJA and KA. One possibility is that the underlying form of the 2SF possessive clitic in MJA is VCV, where the consonant and the final vowel have an already determined value as –ki. The value of the initiating vowel is determined by context (i.e., phonological environment) when suffixation of the possessive clitic to the base occurs. This possibility might, at face value, account for vowel lengthening occurring to the final vowel of the base. However, it must be eliminated since no vowel lengthening occurs when the base ends with a consonant (Consider table 1). Even if we grant that the initiating vowel of the putative VCV might be any phonological material (e.g. a consonant), no gemination to the final consonant is demanded, implying the inescapable conclusion that vowel lengthening must be ascribed to a different factor rather than the underlying make-up of the possessive clitic.

A promising possibility is that vowel lengthening under such cases is forced by stress assignment (rules). According to Jordanian Arabic assignment rules (Btoosh 2006 and Abbas 2012), the penultimate syllable is typically the locus of the primary stress unless the final syllable is superheavy. When the possessive clitic is attached to the end of the base, the penultimate syllable is what precedes the possessive clitic. If we assume that in MJA and KA grammars, the vowel in the syllable with CV shape gets lengthening when assigned primary stress (CV → CVV/ V'), vowel lengthening forced by suffixation of the possessive clitic follows. Several works argue convincingly that the syllable with primary stress tends to be heavy (cf. Crosswhite 2001; De Jong 2004; and Fudge 2015). This tendency is formulated within the OT-theoretical account by Prince and Smolensky (1993) as a markedness constraint that requires heavy syllables to be stressed:

(4) WSP (Weight-To-Stress-Principle)
        Heavy syllables are prominent both on the grid and foot structure.

If the base forms in all examples in (2) are used, primary stress falls on the first syllable. On the other hand, when the possessive clitic is attached to the base, primary stress migrates to lodge on the penultimate syllable, CV, which feeds the ensuing vowel lengthening. The question now is as why no vowel lengthening is required when the base ends with a consonant. Following WSP, it can be advanced that the existence of a coda (i.e., the consonant) suffices for rendering the penultimate syllable heavy when the possessive clitic is attached to the base. This argument fits KA, given that the final consonant of the base remains a coda to the same syllable when suffixation of the possessive clitic applies (daf.tar → daf.tar.ki). On the other hand, in MJA, the final consonant of the penultimate syllable becomes an onset to the following syllable (daf.tar → daf.ta.rik), the matter which makes the stress fall on the anti-penultimate syllable (daf.tar → 'daf.ta.rik). It seems that stress does not fall on a syllable whose code is annexed to the following syllable. Anyway, I leave this issue open pending further research.

4   Main analysis

We are left with the main question which is as why there is a switch in the segments that form the 2SF possessive clitic in MJA. One might raise the preliminary interrogation as what is the evidence that the morphological switch happens in MJA not in KA or MSA? Put it a different way, is –ki the underlying form, and –ik is the variant? Above, I treated MSA as the departure point but revealing the actual underlying form is of paramount importance for any sound generalization we need reach. Contingent on the available data, it can be advanced that our departure point is right; KA and MSA display the unaffected cases regarding the morphological form of the 2SF possessive clitic, and the switch thus occurs in MJA grammar. Support for this contention comes from the full paradigm of possessive clitics in the three varieties under discussion. Consider table 3.

Table 3: The full paradigm of the possessive clitics in MJA, KA, and MSA

P	N	G	MJA	KA	MSA
1st	S	M	-i	-i	-i
		F	-i	-i	-i
	P	M	-na	-na	-na
		F	-na	-na	-na
2nd	S	M	-ak	-ak	-ka
		F	-ik	-ki	-ki
	P	M	-kum	-kum	-kum
		F	-kin	-kin	-kun.na
3rd	S	M	-uh	-uh	-hu
		F	-ha	-ha	-ha
	P	M	-hum	-hum	-hum
		F	-hin	-hin	-hun.na

A closer look at table 3 implies that the morphological make-up of the possessive clitics can be decomposed. [k] appears only with possessive clitics whose person value is fixed as [2nd], whereas [h] with those with person valued as [3rd]. As such, [k] and [h] are the morphological realizations of 2nd and 3rd person values, respectively. The question here is as what is about the possessive clitics with 1st person value? There are two possibilities. The first one is that these clitics do not have person feature, hence the appearance of such clitics without a segment dedicated for person. [3] However, this possibility blocks a unified account of possessive clitics in Arabic varieties, given that possessive clitics with 2nd and 3rd person values show overt realization of person feature. This gives rise to the second possibility that 1st person is marked with zero morpheme. In other words, 1st person feature is present with no phonetic spell-out. Let us assume the second possibility to be the case, the morphological paradigm of person in Arabic varieties is summarized in table 4.

Table 4: the morphological paradigm of person in Arabic varieties

PERSON	1st	2nd	3rd
Lexically valued as	Ø	k	h

An important point here is the fact that in almost all cases the segment showing the person feature initiates the possessive clitic, a part from the 2SF possessive clitic in MJA and 3SM in MJA and KA. Following this observation, *-ki* is the base whereas *-ik* is the form with

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[3] We cannot assume that [n] is the morphological realization of 1st person because 1st singular cases lack it and [n] co-occur with 2nd and 3rd person with feminine gender.

switched segments. Accordingly, our main question is now crystalized as why the segments that form the 2SF possessive clitic undergo metathesis in MJA.

I argue that the answer for this question lies in extrametricality (Liberman and Prince 1977; McCarthy 1979; Hayes 1982; Hayes 1995; Hammond 1999; Kiparsky 2003; Watson 2007). Following Hayes (1995), the final consonant in the word *daftar* 'a note book' is extrametrical being a coda of a CVC syllable that appears word-finally. In order to form a word with a possessive clitic in Arabic grammar, the possessive clitic must be suffixed to the base, which is here the noun. On the basis of the MJA data and as far as the 2SF possessive clitic is concerned, the assumption is that the switch in the possessive clitic segments follows from the demand that the final consonant in the base must be weightless in the output even when the possessive clitic is attached to it. Everything else is equal, what is common between the base *daftar* 'a note book' and the output *daf.ta.rik* 'your book' is that [r] remains weightless in both of them. On the other hand, while [r] in the base *daf.tar* is weightless in KA, it has weight in the output *daf.tar.ki*; [r] is not an onset nor an extrametrical element because it loses its peripherality once the possessive clitic is attached to the base. Empirical evidence for that [r] contributes to the syllable weight in KA but not in MJA is that the primary stress falls on the penultimate stress *daf.'tar.ki*, while it falls on the antepenultimate syllable in MJA *'daf.ta.rik*.

In the OT-theoretical account, extrametricality is reformulated as NONFINALITY Constraint, though NONFINALITY has been slightly different from extrametricality in the sense that its focus is stress peaks (Prince and Smolensky 2008). NONFINAL, the OT successor of extrametricality, is formulated as follows:

(5) NONFINAL: The prosodic head of the word does not fall on the word-final syllable

In her turn, Crowhurst (1996: 415) defines NONFINAL as:

(6) NONFINAL: The final syllable of a PrWr is not stressed[4]

With other formulations of NONFINAL, Hyde (2003) assumes that NONFINAL is a general mechanism for achieving descriptive invisibility through focusing on the parsability of the final segment (be it the final foot, syllable or mora)

(7) NONFINAL-SEG (μ, σ, F, PR): The final (mora, syllable, foot or prosodic word) is not parsed into a higher prosodic structure

Accordingly, the NONFINALITY constraint has different permutations depending on the final 'material' intended. The following constraints can be thus noted (cf. Al-Jarrah 2011: 5):
(8)
NONFINAL(c): The final consonant is not parsed into the next higher prosodic constituent (i.e. the syllable)
NONFINAL(v): The final vowel is not parsed into the next higher prosodic constituent (i.e. the syllable)
NONFINAL(σ): The final syllable is not parsed into the next higher prosodic constituent (i.e. the foot)
NONFINAL(F): The final foot is not parsed into the next higher prosodic constituent (i.e. the prosodic word)
NONFINAL(PR): The final prosodic word is not parsed into the next higher constituent (i.e. the lexical word)

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[4] PrWr stands for Phonological Word.

The main concern of the current research is the first version, NONFINAL(c). Crucial here is that weightlessness preservation (i.e. weightless material of the input remains weightless in the output) cannot be pursed utilizing the full strict parallel OT theory (Prince and Smolensky 1993, McCarthy and Prince 1993a, b). Firstly, weightlessness preservation cannot be reformulated as a faithfulness constraint. That is because strict parallel OT has no mechanism to allow inputs to be constrained. Assuming that weightless segments of the input remain weightless in the output leaves us with the serious problem of constraining the input, and hence violating *Richness of the Base Principle*. Secondly, if weightlessness preservation is formulated as a markedness constraint, we must do away with the identity relation, which is nonetheless required to keep weightless segments of the base/input as such in the output. I argue that the puzzle of accommodating weightlessness preservation within OT can be resolved if we appeal to the Stratal OT (Kiparsky 2000 and 2003, and subsequent work).

Stratal OT consists of several serially ordered mappings from input to output. Consider figure (1) which shows how Stratal OT works (Kager 1999: 382).
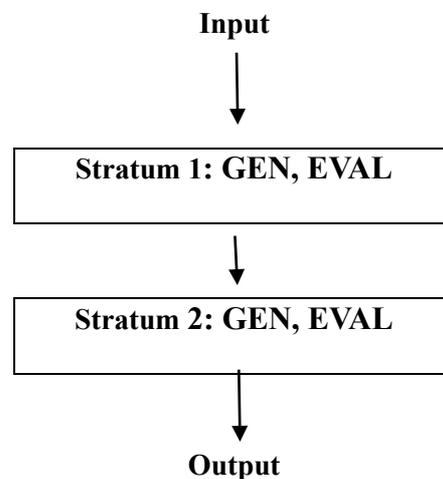
Input

Stratum 1: GEN, EVAL

Stratum 2: GEN, EVAL

Output
Figure 1: Stratal OT Design

In Stratal OT, the output of each stratum serves as the input of the following one (cf. Rakhieh 2009: 41). Following Kiparsky (2003), there are three levels of constraint interaction, namely stem level, work level and post-lexical level. Let us assume that the possessive clitics are adjoined to the given noun in the second level (word level) whose input is originally the output of the stem level. Additionally, since the input of level 2 is actually an output of level 1, it can be advanced that this input (of level 2) is subject to constraints: the structure of the output of Level 1 can stand in an identity relation with a candidate at Level 2.[5] Said this, it can be now suggested that weightless consonants of the input of level 2 must remain weightless in the output of level 2. Weightlessness preservation can be translated into the following faithfulness constraint which I name as NONFINAL(c)-IO:

(9) NONFINAL(c)-IO: weightless consonants of the input remain weightless in the output.

Let us now explore how NONFINAL(c)-IO can provide us with an account of the behaviour of the 2nd possessive clitic in Arabic varieties under discussion. When the input of level 2 ends with an extrametrical consonant and the possessive clitic is suffixed to the noun, peripherality is no longer a possible option to keep the extra-metrical consonant of the base.

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[5] Thanks for the NNWPL anonymous reviewer for pointing this to me.

One direct way is through re-syllabification. The extra-metrical consonant of the base changes to an onset of the following syllable rather than remaining a coda of a word-medial syllable whose coda must be parsed. When the extra-metrical consonant of the input of level 2 becomes an onset, it has no metrical value, the wanted result.

(10)/*daftar* + ki/ → [*daf.ta.rki*]

What appears however, problematic at this point is that the re-syllabification process leads to a complex onset, the matter which is totally prohibited in MJA grammar. *COMPLEX_{ONS} is a highly ranked constraint.

(11)*COMPLEX_{ONS} (Prince and Smolensky 1993):
                    A syllable must not have more than one onset segment.

If we assume that the two NONFINAL(c)-IO and *COMPLEX_{ONS} are highly ranked whose violations incur fatal violations in MJA grammar, repair strategies must be invoked. One of these strategies is to delete /k/.

(12)/*daftar* + ki/ → [*daf.ta.ri*]

When /k/ is deleted, the two NONFINAL(c)-IO and *COMPLEX_{ONS} are satisfied given that /k/ is weightless and is not part of a complex onset, respectively. However, this repair strategy must be eliminated given that MAX-IO is highly–ranked constraint in MJA grammar as well, thereby the impossibility to delete /k/.

(13)MAX-IO (McCarthy & Prince 1995):
                    Every segment of S_1 has a correspondent in S_2.

Another possibility is to undo the consonant cluster resulted from the re-syllabification process by an epenthetic vowel, inserted between the members of the consonant cluster:

(14)/*daftar* + ki/ → [*daf.ta.ri.ki*]

However, this output seems less-harmonic for violating the highly-ranked DEP-IO.

(15)DEP-IO (McCarthy & Prince 1995):
                    Every segment of S_2 has a correspondent in S_1 (S_2 is "dependent on" S_1).

A promising possibility is to undergo metathesis between the second part of the consonant cluster and the vowel, resulting in the most-harmonic candidate.

(16)/*daftar* + ki/ → [*daf.ta.rik*]

Even if the candidate in (16) violates LINEARITY-IO, it shows up as the optimal output.

(17)LINEARITY-IO (Pater 1995):
                    S_1 reflects the precedence structure of S_2, and vice versa.

This option turns out to be economic, given no deletion nor addition is required. All of these observations can be schematically shown in the following Level 2 constraints interaction tableau:

Base: *daftar* Input: /*daftarki*/	*COMPLEX_ONS	NONFINAL (c)-IO	DEP-IO	MAX-IO	LINEARITY
a- *daf.tar.ki*		*!			
b- *daf.ta.rki*	*!				
c- ☞ *daf.ta.rik*					*
d- *daf.tar.i*				*!	
e- *daf.ta.ri.ki*			*!		

Up to this point, the interim ranking of the relevant constraint in MJA is as follows:

(18) *COMPLEX_ONS, NONFINAL(c)-IO, DEP-IO, MAX-IO >> LINEARITY-IO

Back to the observation that in MJA, there is no segmental switching of the make-up of 2SF possessive clitic when the input of level 2 ends with a vowel. Consider the following examples from MJA in (2), reproduced below for convenience:

(19)
/dawa/ 'medicine' → [da.'waa.ki] 'your medicine'
/sama/ 'sky' → [sa.'maa.ki] 'your sky'
/mawla/ 'leader' → [maw.'laa.ki] 'your leader'
/ʔabu/ 'father' → [ʔa.'buu.ki] 'your father'

The answer should be simple. Under such cases, no extrametrical material is involved, given that the last syllable is a vowel rather than a consonant. No violation for NONFINAL(c)-IO is invoked, and, hence no syllabification of any type (repair strategies) is required. This reasoning extends to MSA where the base ends with a vowel (a reflection of overt Case), yielding no trigger to NONFINAL(c)-IO.

Let us now consider how this reasoning helps us account for cases in KA. I argue that the difference between MJA and KA in terms of the order of the segments forming the 2SF possessive clitic is the ranking of NONFINAL(c)-IO in relation to other constraints. In KA, NONFINAL(c)-IO is a low-ranking constraint, which is outranked by LINEARITY-IO. Therefore, no syllabification is required. /r/ is not forced to remain extrametrical and hence the possibility for it to be a coda with a moraic weight contributing to the metrical structure of the given word. Consider the following Level 2 constraints interaction in KA grammar.

Base: *daftar* Input: /*daftarki*/	*COMPLEX_ONS	LINEARITY	DEP-IO	MAX-IO	NONFINAL(c)-IO
a. ☞ *daf.tar.ki*					*
b. *daf.ta.rki*	*!				
c. *daf.ta.rik*		*!			
d. *daf.tar.i*				*!	
e. *daf.ta.ri.ki*			*!		

The question promptly arises here as why there is a switch targeting the 2SM possessive clitic in KA. A closer look at table 1 above, which I reproduce below, indicates that the segmental switch is also exhibited in KA regarding 2SM possessive clitic despite the assumption that NONFINAL(c)-IO is outranked by LINEARITY-IO in KA grammar.

Table 1: 2nd possessive clitics in MJA, KA and MSA (P: Person; N: number; G: Gender)

P	N	G	MJA	KA	SA
2nd	S	M	daf.ta.r**ak**	daf.ta.r**ak**	daf.ta.r**u.ka**
		F	daf.ta.rik	daf.ter.ki	daf.ta.ru.ki
	P	M	daf.tar.kum	daf.tar.kum	daf.ta.ru.kum
		F	daf.tar.kin	daf.tar.kin	daf.ta.ru.kin

One way round this apparent problem is to assume that the underlying structure of the 2SM in Arabic varieties is C instead of CV. The vowel preceding –k in both MJA and KA is an epenthetic vowel demanded by the interaction of the high-ranking constraints. Evidence for this assumption comes from some varieties of Najdi Arabic (spoken in Arabian Peninsula) (Ingham 1994 and Al-Essa 2009). In these varieties where *COMPLEX$_{COD}$ is low-ranking, no vowel preceding the 2SM is exhibited (cf. AlAmro 2015). Consider the following examples:
(20)

        ʔu.ladk 'your son'
        raask   'your head'
        ʕabaatk 'your dress'

Further evidence can be adduced from KA and MJA themselves. When the 2SM possessive clitic is suffixed to nouns ending with a vowel, the only change is the vowel lengthening which, as we have seen above, is ascribed to stress assignment. Unlike the cases with the 2SF (-ki), only –k is used. Consider the following table:

Table 5: 2SF forms vs. 2SM forms

Base	Meaning	3SF	3SM
/dawa/	'medicine'	*da.'waa.ki*	*da.'waak*
/sama/	'sky'	*sa.'maa.ki*	*sa.'maak*
/mawla/	'leader'	*maw.'laa.ki*	*maw.'laak*
/ʔabu/	*'father'*	*ʔa.'buu.ki*	*ʔa.'buuk*
/gafa/	*'back'*	*ga.'faa.ki*	*ga.'faak*

Data in table 5 indicate that the underlying form of the 2SM in both MJA and KA is /k/ rather than –ak. Following this line of analysis, it can be advanced that when the 2SM possessive clitic is suffixed to the base that ends with a consonant (*daftar + k),* a complex coda is formed (*daftark).* As a result, violation for the high-ranking constraint *COMPLEX$_{COD}$ in both KA and MJA grammars incurs. The optimal repair strategy followed in such cases is insert an epenthetic vowel that breaks down the resulting cluster. What this means is that DEP-IO can be violated for the sake of MAX-IO which bans deletion. As such, DEP-IO is relegated a step down in MJA and KA constraints hierarchy. For the case in hand, consider the relevant constraints interaction:

Base: *daftar* Input: /*daftark*/	*COMPLEX_{COD}	MAX-IO	DEP-IO
a. ☞*daf.ta.rak*			*
b. *daf.tark*	*!		
c. *daf.ta.ra.ka*			**!
d. *daf.tar*		*!	
e. *daf.tak*		*!	

NONFINAL(c)-IO plays no role in determining the optimal candidate in such cases.

The relevant question here is as why weightless consonants are forced to parse in 2P possessive clitics, both in masculine and feminine forms. For instance, the extrametrical consonant in the base *daftar* is forced to be a coda in the output *daftarkum* or *daftarkin*, contributing to the syllable weight where it shows up. This state of affairs is not problematic for KA grammar, given that NONFINAL(c)-IO is low-ranking. As for MJA, I argue that the violation of NONFINAL(c)-IO in MJA grammar is tolerated in favor of not incurring violation of the higher-ranking constraints, including *COMPLEX_{ONS}, *COMPLEX_{COD} and MAX-IO. Consider the following tableau that shows the Level 2 constraint interaction of the input *daftarkum* in MJA grammar:

Input: /*daftarkum*/	*COMPLEX_{ONS}	*COMPLEX_{COD}	MAX-IO	DEP-IO	NONFINAL(c)-IO
a. *daf.ta.rkum*	*!				
b. *daf.ta.ra.kum*				*!	
c. ☞ *daf.tar.kum*					*
d. *daf.ta.rum*			*!		
e. *daf.ta.kum*			*!		
f. *daf.ta.rukm*		*!			
g. *daf.ta.ru.kam*				*!	

In the suboptimal candidate, *daf.ta.rkum,* *COMPLEX_{ONS} is violated, requiring a repair strategy if NONFINAL(c)- IO is not to be violated. An epenthetic vowel is inserted between the parts of the consonant cluster so as to undo the resulting cluster. However, DEP-IO is violated, yielding to the sub-optimal *daf.ta.ra.kum*. This indicates that DEP-IO outranks NONFINAL(c)- IO, as we referred to above. Candidates in (d and e) violate the high-ranking MAX-IO, whereas the candidate *daf.ta.rukm* incurs violation of *COMPLEX_{COD}. As a result, the most harmonic candidate is the one violating NONFINAL(c)-IO. Accordingly, the constrains ranking in (18) above must be modified as follows as far as MJA is concerned:

(21) *COMPLEX_{ONS}, *COMPLEX_{COD}, MAX-IO >> DEP-IO >> NONFINAL(c)-IO >> LINEARITY-IO

In KA, the following hierarchy is maintained:

(22) *COMPLEX_{ONS}, *COMPLEX_{COD}, MAX-IO, LINEARITY-IO >> DEP-IO >> NONFINAL(c)-IO

5   Conclusion

This research argues that the difference in the morphological forms of some 2 possessive clitics in Jordanian Arabic varieties is not arbitrary, but rather follows from interaction of the relevant constraints. Using Statral OT, this research advocates a unique constraint banning weightless

consonants of the input (of level 2) to be moraic in the output. This constraint is coined as NONFINAL(c)-IO. I base my discussion that NONFINAL(c)-IO outranks LINEARITY-IO in MJA grammar, resulting in the switch in the segments forming the 2SF possessive clitic. Differently, NONFINAL(c)-IO is outranked by LINEARITY-IO in KA, hence the appearance of the relevant possessive clitics safe without any metathesis. All other relevant issues of 2nd person possessive clitics were addressed, resulting in a unified analysis for all of them. Furthermore, this research brings further evidence in favor of necessity of distinguishing between different levels, and hence superiority of stratal OT over Parallel OT. On the other hand, this research opens up questions more than it solves, such as the morphological form of other possessive clitics with (1st and 3rd) person value. Additionally, NONFINAL(c)-IO is to be examined in other languages so as to validate its theoretical and empirical ground or even decline it in favor of a more promising mechanism. At first inspection, it is plausible to assume that weightlessness preservation follows naturally since faithfulness need not be restricted to the segmental structure but extends to metrical structure of a given word.

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