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Phonetic-Form constraints in Arabic coordination

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This paper explores the use of bound forms in coordination constructions and ʔi*jjā* and ʔi*jja* in Modern Standard Arabic (MSA) and Jordanian Arabic (JA), respectively. Using the Minimalist Program (Chomsky 1995, 2000, 2005) as a theoretical framework, the paper proposes that the use of bound forms in such constructions is ruled by a Phonetic-Form constraint that prohibits cliticization of a bound form onto another bound form, i.e. the combination of two bound forms does not result in a free form; hence it is blocked. The paper demonstrates that the use of *ʔijjā* and *ʔijja* in MSA and JA, respectively, is a direct consequence of this constraint, so that ʔijjā/ʔijj*a* is a Phonetic-Form object used to serve as a lexical host of bound forms (cf. Fassi Fehri 1993). The use of ʔijjā/ʔijj*a* is also shown to be prosodically ruled; it is prosodically dependent so that ʔijjā/ʔijj*a* should be a member of the prosodic unit which also includes the preceding word.

Keywords: Modern Standard Arabic; Jordanian Arabic; bound forms; coordination; syntax; Phonetic Form

1. Introduction

The syntax of coordination has received much attention, especially in the past few decades (see Munn 1993; Aoun et al. 1994; Johannessen 1998; Haspelmath 2004, 2007; Camacho 2003; Mauri 2007, 2008a,b; Zhang 2008; Paperno 2012; Preminger 2014; Al-Khalaf 2015, among many others).[1] A key question regarding coordination revolved around its inner structure and syntactic derivation. For example, many grammarians and linguists first opted for a flat analysis of coordination structures (see Chomsky 1965: 12-3, 196; Dik 1968; Gazdar et al. 1985: 170; Goodall 1987; Muadz 1991; Phillips 2003; Takano 2004; Peterson 2004; Wurmbrand 2008; Johnson 2008). In this analysis, the two

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conjuncts and the coordinator share the same mother. Other linguists, including Thiersch (1985), Munn (1987), Aoun et al. (1994), Kayne (1994), Zoerner (1995), and Johannessen (1996) proposed a binary-branching analysis where the coordinator shares the same mother with one conjunct, while the other conjunct serves as a specifier of Conjunction Phrase (ConjP/&P) whose head is the coordinator (see Zhang 2009 for discussion).

Another issue that has been the focus of extensive research in the area of coordination is morphological agreement. This issue is much investigated in Arabic (both in Modern Standard Arabic and the Arabic vernaculars) where the interplay between morphological agreement and coordination appears clearer than other languages, which exhibit impoverished morphological agreement. For instance, the verb agrees with the overall conjunction in SVO clauses but just in the first conjunct in VSO clauses. This discrepancy has been linked to several factors, including the presence of ellipsis, feature computation and demerge of conjuncts (see Munn 1993; Aoun et al. 1994; Johannessen 1998; van Koppen et al. 2008; Larson 2013). Moreover, the related literature reveals that the research of coordination in world's languages in general, and Arabic in particular, focuses on the syntactic aspects of coordination. However, less attention is paid to coordination from a post spell-out point, a gap the present paper aims to bridge.

In all varieties of Arabic, the coordinator *w* 'and' is a bound form that is attached to the following word, which should not be another bound form; otherwise, the sentence would be ungrammatical. One way to salvage the grammaticality of relevant sentences is through the use of *ʔijja*, a Phonetic-Form (PF) insertion that only serves as a lexical host of bound forms.[2] Yet, *ʔijja* is constrained, as it is only used with the second conjunct and never introduces a sentence. Thus, this paper examines the use of bound forms in coordination, with special focus on their interaction with the coordinator *w* 'and'. Although the following discussion focuses on data from Arabic, it provides insights into the main conditions that rule the use of PF words (which have no semantic value) in other languages. It also explores the underlying relation between PF conditions and prosodic constraints whose interaction captures the distribution of PF words including *ʔijja*. Doing this may add credence to proposals where PF is viewed as a distinct level of representation that is fed by syntax not LF, the Logical Form, which is responsible for semantic computation (see Chomsky 1995 and related works). This paper shows that *ʔijja* is a PF word and therefore has no semantic value (from a minimalist point of view), the paper shows that *ʔijja* is inserted in the PF components where links to semantic interpretation are impossible, as regarded in the Minimalist Program.

To this end, the paper is structured as follows. Section 2 introduces the main relevant assumptions of the Minimalist Program (Chomsky 1995, 2000 and related works by other researchers), which is used as a theoretical framework of the current paper. This section also provides a general description of Jordanian Arabic (JA), which is the main Arabic dialect investigated in the paper. Section 3 discusses the status of the Arabic coordinator *w-,* being a clitic that cannot stand alone. This section introduces Cliticization

[2] *ʔijja* is pronounced in MSA as *ʔijjā*. We use the latter pronunciation when referring to MSA in particular. However, we use the form *ʔijja* in the general description. Likewise, *w* is pronounced in MSA as *wa-*. We use *w-* in the general description.

Constraint (CliC) that blocks the cliticization of two bound forms. Section 4 investigates the use of *ʔijja*, which is viewed as a direct consequence of CliC. The insertion of *ʔijja* makes the clitic a free word, hence the possibility of cliticizing *ʔijja* with another clitic. Section 5 explores the distribution of *ʔijja*, as a prosodically governed form. Section 6 concludes the paper and points out directions for further research.

2. The theoretical framework and Jordanian Arabic

This section provides a general introduction of the Minimalist Program, which is used as a theoretical framework of the entire paper. It also provides an overview of Jordanian Arabic.

2.1. The Minimalist Program[3]

The present work uses the Minimalist Program (MP) (Chomsky 1995, 2000, 2013, et seq.) as the theoretical framework through which the relevant data is analysed. One main assumption of MP is that phrases and sentences are derived through sequential steps, starting from the lexicon and ending with the actual pronunciation of the phrase/sentence. The first step is called numeration, where the main lexical elements that form a sentence are selected from the lexicon. Afterwards, the selected items enter the syntactic derivation (i.e. narrow syntax), where the operation (external/internal) Merge is applied. Through the operation Merge, two lexical/functional elements are merged, forming a larger syntactic object that is headed by either element (see Chomsky 2013 for a relevant discussion). The resulted syntactic object is merged with another functional/lexical element, forming a larger syntactic object and so on. The Merge operation continues until the sentence derivation reaches a Spell-out point where the sentence derivation is shipped into phonetic and semantic levels, called Phonetic Form (PF) and Logical Form (LF), "which [both] constitute the interface levels to other cognitive systems ('bare output conditions')." (Fuß 2005: 24). Figure 1 shows the model of sentence derivation in the MP.

[3] Our description of the Minimalist Program is meant to be minimal, aiming to providing a general picture of how a sentence is derived in this syntactic model. Readers who are interested in more detail about this model are invited to consult works by Chomsky (1993, 1995, 2000, 2005, 2013, among others, and pertinent work by other researchers).

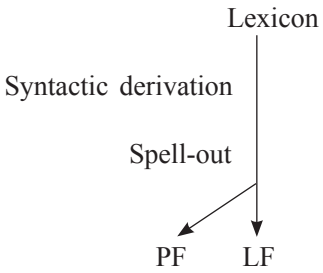


Figure 1. The model of sentence derivation in the MP

Taking into consideration that further operations might apply within these two levels (PF and LF), any syntactic operation that is applied within the MP before the spell-out point is said to have both semantic and phonetic impact on the relevant derivation. On the other hand, any operation that is only applied at LF has no PF consequences. Similarly, any operation that takes place at the PF level of representation has no LF consequences. This is because PF and LF are separate levels that are not directly connected to each other.

2.2. Jordanian Arabic

Jordanian Arabic (JA) is an Arabic variety spoken in the Hashemite Kingdom of Jordan, with approximately 9 million speakers.[4] As is the case in many Arabic dialects, JA is an SVO language that "has lost its overt case and mood markings from nouns and verbs, respectively." (Jarrah 2017a: 5). Unlike the case in Modern Standard Arabic (MSA), verbs in JA display full agreement (in PERSON, NUMBER and GENDER) with the subject, irrespective of the word order utilized, as shown in the following examples:[5,6]

(1) a. *ʔakal-u* *li-wlād*
eat.PST-3PL.M DEF-boys
'The boys ate.'

[4] Arabic with its many varieties, including JA, belongs to the Semitic language family.

[5] In this paper, we use the Leipzig Glossing Rules.

[6] In MSA, the verb shows full agreement with its subject in the SVO word order; however, it shows impoverished agreement (only in PERSON and GENDER) with its (non-pronominal) subject in the VSO word order. Consider the following examples:

(i) a. *ʔakal-a* *l-ʔawlād*.
eat.PST.3SG.M-IND DEF-boys
'The boys ate.'

b. *l-ʔawlād-u* *ʔakal-ū*
DEF-boys eat.PST-3PL.M
'The boys ate.'

b. *li-wlād* *ʔakal-u*
DEF-boys eat.PST-3PL.M
'The boys ate.'

Like other Arabic varieties, JA is a pro-drop language, where the (pronominal) subject can be dropped (Al-Shawashreh 2016; Jarrah 2017a,b; Jarrah & Alshamari 2017). The featural (phi-)content of the dropped subject (in terms of PERSON, NUMBER and GENDER) can be identified through the rich agreement markers on the verb, as shown in the following examples:

(2) a. *(humm)* *ʔakal-u*
they.M eat.PST-3PL.M
'They ate.'

b. *(hinn)* *ʔakal-in*
they.F eat.PST-3PL.F
'They ate.'

The identity of the subject in (2a) is a masculine plural entity, revealed by virtue of the [3PL.M] bound form *-ū* that appears on the verb. Likewise, the identity of the feminine, plural subject is revealed through the [3PL.F] bound form *-in* that is suffixed to the verb (see also Jarrah 2019a, b, for more discussion on bound forms in JA).

In the following discussion, we investigate the use of bound forms used in JA coordination.[7] We also refer to some examples from MSA, which is used as a departure point with respect to some issues discussed below.

3. Pro-cliticization of *w* 'and'

In MSA, the coordinator *w* 'and' appears as a proclitic that is attached to the following conjunct, as shown in the following MSA examples.[8]

(3) a. *raʔaj-tu* *xālid-an* *wa-jūsuf*
see.PST-1SG Khalid-ACC and-Yousef
'I saw Khalid and Yousuf.'

[7] The main reason for using the data of JA is that all authors of this paper are native speakers of JA. Additionally, the relevant data of JA are actually representative of many Arabic vernaculars that exhibit the same phenomenon.

[8] In this paper, we use the IPA system in transliteration for Arabic examples. Note that we use the macron diacritic (ˉ) to indicate vowel lengthening. An important point to mention here is that in MSA, the final word in a sentence occurs normally in a pausal form, from which case markings are dropped. This is why case markings are dropped from the final words in all MSA examples mentioned in this paper.

b. *ʔiftarā* *ʔar-radʒul-u* *badlat-an* *wa-qubbaʕah*
buy.PST.3SG.M DEF-man-NOM suit-ACC and-hat
'The man bought a suit and a hat.'

This situation (that *w* is pro-cliticized onto the following word) is also manifested in JA (and actually in all other Arabic dialects), as shown in the following JA examples:[9]

(4) a. *ʃuf-it* *xālid* *w-jūsuf*
see.PST-1SG Khalid and-Yousef
'I saw Khalid and Yousef.'

b. *ʔiz-zalameh* *ʔiftara* *badleh* *w-tˁāgijjeh*
DEF-man buy.PST.3SG.M suit and-hat
'The man bought a suit and a hat.'

This morphological attachment also holds when *w* conjoins two adjectives or verbs, as evidenced in the following examples:

(5) a. *l-marah* *ħilwah* *w-ʃātˁreh* (JA)
DEF-woman beautiful and-smart
'The woman is beautiful and smart.'

b. *l-binit* *sˁarrax-at* *w-bak-at* (JA)
DEF-girl scream.PST-3SG.F and-cry.PST-3SG.F
'The girl screamed and cried.'

c. *s-sajjidat-u* *dʒamīlat-un* *wa-mudʒtahidah* (MSA)
DEF-lady-NOM beautiful-NOM and-hardworking
'The lady is beautiful and hardworking.'

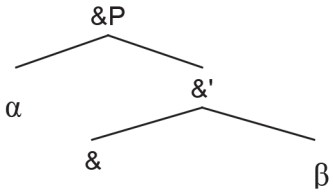
d. *ʔakal-at* *wa-ʃarib-at* *l-fatāt* (MSA)
eat.PST-3SG.F and-drink.PST-3SG.F DEF-girl
'The girl ate and drank.'

In (5a), *w* conjoins two adjectives, whereas it conjoins two verbs in (5b) in JA. (5c) and (5d) are corresponding examples from MSA. Following the related literature where coordinators are categorically treated as a zero-level element, i.e. a head (see, e.g., Johannessen 1996, 1998; Heycock & Zamparelli 2002; Yuasa & Sadock 2002; Zhang 2009), it can be assumed that *w* is an affixal head that should be hosted at PF. Also, it can be suggested that *w* procliticizes onto the following word (β) (rather than the preceding word (α)) because both of them (*w* + β) form one syntactic constituent, which, in turn, merges with α, forming a bigger syntactic constituent, i.e. &P, as shown in the following tree.[10]

[9] It is noteworthy that *w* can be pronounced without procliticization under emphasis. However, this particular pronunciation of *w* is rare; therefore, we do not focus on its discussion in the analysis presented here.

[10] For simplicity, we only deal with instances of two conjuncts.

(6)



One direct consequence of this analysis is that morphological pro-cliticization of co-ordinator *w* onto the following word is syntactically ruled in JA and MSA grammars. *w* does not form one constituent with the preceding conjunct, but it does so with the following one.

One piece of empirical evidence that indicates the plausibility of this analysis comes from binding facts (Chomsky 1981) in Arabic. For example, β can be a DP[11] that contains a (possessive) pronoun that refers to α, not vice versa. This condition holds true in both JA and MSA, as evidenced below:

(7) a. *ʃuf-it* *l-marah*$_i$ *w-uxit-**ha***$_i$ (JA)
see.PST-1SG DEF-woman and-sister-her.POSS
'I saw the woman and her sister.'

b. **ʃuf-it* *uxit-**ha***$_i$ *w-l-marah*$_i$ (JA)
see.PST-1SG sister-her.POSS and-DEF-woman
Intended: 'I saw the woman and her sister.'

c. *saraq-a* *l-binājat-a*$_i$
steal.PST.3SG.M-IND DEF-building-ACC
*wa-mustawdaʕat-a-**hā***$_i$ (MSA)
and-store-ACC-its.POSS
'He stole the building and its store.'

d. **saraq-a* *mustawdaʕa-ta-**hā***$_i$
steal.PST.3SG.M-IND store-ACC-its.POSS
wa-l-binājah$_i$ (MSA)
and-DEF-building
Intended: 'He stole the building and its store.'

[11] DP stands for Determiner Phrase which is a functional projection that normally contains nouns.

The examples in (7) are straightforwardly accounted for, assuming the tree diagram in (6). α c-commands β; hence no violation of Principle C is yielded.[12,13]

This line of analysis also provides us with underlying clues to another related observation that the second conjunct (onto which *w* is procliticized) in JA and MSA should not be affixal (i.e. needing a morphological host). For instance, the second conjunct should not be a bound pronoun, as shown in the following ill-formed examples:

(8) a. **ʃuf-it l-binit w-ha* (JA)
see.PST-1SG DEF-girl and-her
'I saw the girl and her.'

b. **raʔaj-tu l-fatāt-a wa-ha* (MSA)
see.PST-1SG DEF-girl-ACC and-her
'I saw the girl and her.'

The clitic *-ha* is a bound (oblique) pronoun [3FSG] in Arabic dialects; it is attached to the preceding word which is either a verb or a preposition, as shown below.[14]

(9) a. *ʃuf-t-**ha*** (JA)
see.PST-1SG-**her**
'I saw her.'

b. *bī-**ha*** (JA)
in-**it/her**
'In it.'

c. *ʃāhad-tu-**hā*** (MSA)
see.PST-1SG-**her**
'I saw her.'

d. *fī-**hā*** (MSA)
in-**it/her**
'In it.'

[12] *C-command* is a structural relation. α c-commands β iff the first branching node that dominates α dominates β (see Reinhart 1976). For instance, α in the tree diagram in (6) c-commands &', & and β because the first branching node that dominates α, i.e. &P, dominates &', & and β.

Principle C of the Binding Theory states that R(eferring)-expressions should be free (i.e. not c-commanded by a co-indexed element) (Chomsky 1981).

Principle B of the Binding Theory states that pronouns should be free in their binding domain (i.e. which almost stands for minimal TP) (Chomsky 1981).

[13] However, examples in (7a,c) are apparent cases of Principle B violations; however, they are grammatical. This may imply that the effects of Principle B violations are tolerated in Arabic grammar (at least at PF), whereas the effects of Principle C are not. See Lebeaux (2009) on a proposal that binding principles may not apply at the same point of derivation.

[14] All oblique pronouns in Arabic varieties are bound forms. The clitic *-ha* is used here as a working example. See Ryding (2005) for detail.

The clitic *-ha*, is a bound pronoun in JA and MSA (i.e. an enclitic) that requires a lexical host in order to be permitted at PF; otherwise, the resulting sentence/phrase becomes ungrammatical, as is demonstrably shown below:

(10) a. **ʃuf-it* ***ha*** (JA)
see.PST-1SG **her**
'I saw here.'

b. **bī* ***ha*** (JA)
In **it/her**
'In it.'

c. **ʃāhad-tu* ***hā*** (MSA)
see.PST-1SG **it/her**
'I saw her.'

d. **fī* ***hā*** (MSA)
in **it/her**
'In it.'

With this being the case, both *w/wa-* and *-ha* are bound forms that each needs a lexical host. Given the ungrammatical examples in (10), it turns out that neither one can function as a lexical host for the other. Cliticization of two bound forms still results in a bound form that cannot stand alone. The PF deficiency (of being not able to stand alone) does not disappear if a bound form is cliticized onto another form that is also PF deficient. This state of affairs is forced by the effect of one general PF constraint that prohibits any (pro- or -en) cliticization process to apply between two bound forms. This principle can be formulated as follows:

(11) *Cliticization constraint (CliC)*
Cliticization occurs only between one bound form and one free form.

If CliC is right, the examples (9-10) are a direct consequence of its effects. Both *w* and *ha* are bound forms; hence each one should be attached to a free form, not a bound form. One piece of evidence that supports the presence of CliC in JA/MSA grammar comes from the observation that when the bound forms in (9-10) are replaced by strong pronouns (that can stand alone, e.g., subject (nominative) pronouns), the relevant examples become grammatical, as shown below.[15]

[15] One point to mention here is that strong pronominal forms (normally subject pronouns) are used in the examples in (12) although they appear in (accusative) positions (direct object here). The grammaticality of these two examples might be accounted for, suggesting that violations of case assignment in Arabic can be lessened in order to make sure that CliC is met. Another possibility is that such pronouns appear in their default forms; hence they are not assigned with nominative case (derivationally). It is widely suggested in Arabic literature that nominative case (the case of strong pronouns in Arabic) is the default (see Mohammad 1988 and Ouhalla 1994).

(12) a. *ʃuf-it* *l-walad* *hū* *w-hīh* (JA)
see.PST-1SG DEF-boy him and-her
'I saw the boy, him and her.'

b. *qābal-tu-humā* *huwa* *wa-hija* *fi-s-sūq* (MSA)
meet.PST-1SG-them him and-her in-DEF-market
'I met them, him and her, in the market.'

The pronouns *hīh/hija* are strong pronouns in JA and MSA, respectively, in the sense that they can stand alone. This is also supported by the following examples where *hīh/hija* do not require a lexical host to occur.

(13) a. *rāh-at* *hīh* *la-s-sūg* (JA)
go.PST-3SG.F she to-DEF-market
'She went to the market.'

b. *hija* *qāl-at* *hāða* (MSA)
she said-3SG.F this
'She said this.'

Sentences (12-13) indicate that *hīh/hija*, as free pronouns, can function as a lexical host for bound forms, including *w/wa*.[16]

Against this background, it can be suggested that the cliticization operation does not apply randomly but is constrained as it occurs between two PF objects, which are different with respect to PF deficiency. One form should be PF deficient, while the other should be PF non-deficient. Otherwise cliticization results in the ungrammaticality of the sentence.

In this section, we have ascribed this condition of cliticization to CliC, a PF constraint whose effects make sure of a proper application of the cliticization operation. Relying on this, the next section shows how *ʔijja* is used in JA/MSA to serve as a PF host of bound forms, such as *wa-* and *-ha*. We argue that *ʔijja* comes out as a strategy that is essentially deployed to meet the requirements of CliC and consequently enables bound forms to be coordinated.

4. The use of *ʔijja*

The discussion in the preceding section shows that *w* cannot be attached to another bound form, due to the effects of CliC, which requires some type of hosting support.

[16] One possible violation of CliC comes from the behaviour of the discontinuous negation morpheme *mā…ʃ* in JA. In verbal sentences, the verb appears between the two parts of the negation morpheme; e.g., [*mā rāħiʃ* (He didn't go)]. When there is no verb, the two parts of the negation morpheme are attached to each other, resulting in the form *mūʃ*. However, if we consider *mā* as a free form, there will be no violation of CliC, *ʃ* is encliticized onto *mā*, resulting in *mūʃ*. Note that *mā* does not affect re-syllabication of the following word; however, *ʃ* affects that. Compare: *rāħ* vs. *mā rāħ* vs. *mā rā.ħiʃ*. This means that *mā* is not encliticized, whereas *ʃ* is, something that may affect the syllabification of the host word.

The question that arises here is how JA/MSA meets the requirements of CliC when the second conjunct is a clitic in coordination structures (i.e. *wa-* is also a clitic). The answer to this question lies in the use of the word *ʔijja*. When the second conjunct is a clitic, it should be attached to the word *ʔijja*, in which case coordination is allowed, as shown in the following examples:[17]

(14) a. *ruħit* *ʔana* *w-ʔijja-ha* (JA)
go.PST.1SG 1SG and-LH.PRT-her
'She and I went.'

b. *ʃāf-ni* *ʔana* *w-ʔijja-humm* (JA)
see.PST.3SG.M-me 1SG and-LH.PRT-them.
'He saw me and them.'

c. *l-walad* *zˁarab-uh*
DEF-boy hit.PST.3SG.M-him
hū *w-ʔijja-ha* (JA)
him and- LH.PRT-her
'The boy hit him, him and her.'

d. *ðahab-tu* *ʔana* *wa-ʔijjā-hum* (MSA)
go.PST-1SG 1SG and-LH.PRT-them
ʔila s-sūq
to DEF-market
'They and I went to the market.'

Following the observation that *ʔijja* does not contribute to the meaning of the sentence, it can be proposed that it works as a lexical host that supports the presence of bound forms (non-nominative forms). In this regard, Fassi Fehri (1993: 100) mentions:

> An examination of the lists of non-nominative forms provides straightforward support for this view. It is striking that independent non-nominative forms consist of bound forms plus the *ʔiyyā* support. The latter, which has no (synchronic) meaning, combines with the bound pronoun just in case the pronoun finds no governor to support it.

Under our analysis, *ʔijja* is used as a lexical host for the bound forms, which are not attached to another lexical host. The complex *ʔijja* + bound pronoun is phonologically turned into an independent word that can stand alone, as shown in the following example from JA, where the clitic *-ha* is attached to *ʔijja*, thus resulting in a phonologically independent form.

(15) *ʔiʕṭī-ni* *ʔijja-ha* (JA)
give.IMP.2SG-me LH.PRT-it
'Give me it/her.'

[17] Hereinafter, *ʔijja* is glossed as LH.PRT standing for a lexical-host particle.

The presence (and insertion) of *ʔijja* implies the presence of a PF constraint whose effects are strong and cannot be obviated, especially with the abandonment of the notion of government on which Fassi Fehri (1993) builds his account of *ʔijja*. A point that supports our analysis of *ʔijja* comes from the observation that *ʔijja* cannot be found in JA or MSA as a single word that is not attached to a bound form. This observation strongly suggests that *ʔijja* is phonologically used to satisfy the effects of some PF requirement, which we propose is CliC; otherwise, the fact that *ʔijja* does not appear bare (devoid of any bound form attached onto it) and becomes hard to account for.

A question that can be raised at this point is why *-ha* in the previous example (15) does not encliticize in JA onto the verb (see (16) below), in which case there is no need for *ʔijja*-insertion.

(16) **ʔiʕṭī-ni-ha* (JA)
Give.IMP.2SG-me-it/her
'Give it/her' to me

On the other hand, the corresponding sentence of (16) is grammatical in MSA where the direct object bound form (*-ha*) and the indirect object clitic (*-ni*) can be hosted by the same lexical host (i.e. the verb here). Note in either cases, there is no violation of CliC as bound forms are attached to free occurring forms. This difference between JA and MSA might come down to the synthetic nature of MSA where more than one bound form can be attached to a free form (see Mohammad 1989; Fassi Fehri 1993, 2012). On the other hand, JA is a more analytic language where cliticization of more than one bound form onto the same free form is not preferred (see Fassi Fehri 2012 for discussion that Arabic dialects are more analytic, whereas MSA is synthetic).

The structure *ʔijja* + bound pronoun is now a free word (after enclitiziation of the bound form onto *ʔijja* occurs). The resulting free word can function as a lexical host of bound *w* in JA and MSA, giving rise to the presence of the examples in (14), which are reproduced below as (17):

(17) a. *ruħit* *ʔana* *w-ʔijja-ha* (JA)
go.PST.1SG 1SG and-LH.PRT-her
'She and I went.'

b. *ʃāf-ni* *ʔana* *w-ʔijja-humm* (JA)
see.PST.3SG.M-me 1SG and-LH.PRT-them.
'He saw me and them.'

c. *l-walad* *zˤarab-uh*
DEF-boy hit.PST.3SG.M-him
hū *w-ʔijja-ha* (JA)
him and- LH.PRT-her
'The boy hit him, him and her.'

d. *ðahab-tu* *ʔana* *wa-ʔijjā-hum* (MSA)
go.PST-1SG 1SG and-LH.PRT-them

ʔila *s-sūq*
to DEF-market
'They and I went to the market.'

The use of *ʔijja* is a (repair) strategy through which CliC is satisfied. This accounts for why *ʔijja* does not have any synchronic meaning because it is inserted at PF which, according to the Minimalist Program, is not linked to LF components (where meaning is processed) (Chomsky 1995). This analysis also implies that *ʔijja* does not figure in the syntactic derivation of the respective expression as PF is fed by syntax, not vice versa.

Against this analysis, this paper provides evidence for a multi-strata model of sentence derivation and processing (Chomsky 2001, 2004). It essentially proposes that the use of ʔijja is PF-motivated, implying that its computation is processed at PF where recourse to syntax or LF is impossible (syntax feeds PF, not vice versa). This proposal is consistent with other proposals in the related literature which argue for exclusively PF objects or operations (see Richards 2008; Trotzke & Zwart 2014; and Landau 2016, among many others). Sentence building is not a one step process; rather it is subject to several constraints which apply at different points in the derivation.

In the next section, we discuss prosodic constraints on the distribution of *ʔijja*. For instance, *ʔijja* does not appear sentence initially in JA, even if there is a bound form attached onto it. We elaborate more on this point, demonstrating that the use of *ʔijja* is prosodially ruled.

5. Prosodic constraints on the use of *ʔijja*

Inspecting the relevant data, it is evident that the insertion of *ʔijja* is constrained; it is not inserted to host bound forms anywhere. First, *ʔijja* + XP should not appear at the beginning of &P (as a first conjunct), even if *w* is encliticized onto the second free conjunct, as shown in the following example.

(18) **ʔijja-ha* *w-ʔimħammad* *rāħ-ū* (JA)
LH.PRT-3SG.F and-Muhammad leave.PST-3PL.M
'She and Mohammad had left'

Also, *ʔijja* occurs only with the coordinator *w* not with any other coordinator, even if the second conjunct is a bound form that demands a host, given CliC.

(19) **hūh* *ʔaw* *ʔijja-ha* (JA)
he or LH.PRT-she
'He or she'

The only way to salvage the sentence in (19) is through the use of a strong pronoun in place of the bound form:

(20) *Hūh ʔaw hīh* (JA)
He or she
'He or she'

Sentences (18-19) reveal that *ʔijja* is not sufficient to act independently as a lexical host of bound forms in JA; otherwise, the ungrammaticality of (19) is hard to account for. As it appears, the insertion of *ʔijja* is only allowed when it precedes and follows (at the same time) a bound form; hence it provides a lexical host for two elements in JA grammar. In fact, both *w-* and *-ha*, on the one hand, are bound forms, whence the use of *ʔijja* between them. On the other hand, *ʔaw* 'or' is not a bound form, bleeding as such the environment where *ʔijja* is used.

One direct piece of supporting evidence in favour of this analysis comes from the use of *ʔijja* outside &P. It is possible to use *ʔijja* as a lexical host for the direct-object bound pronoun in double object constructions (where the indirect object is also a pronoun that is attached to the verb).

(21) *ʔiʕṭ^{ʕ}ī-**ha** **ʔijja-hin** ʔibsurʕah* (JA)
give.IMP.2SG-it/her LH.PRT-them.F quickly
'Give them to her quickly.'

Here, *ʔijja* occurs between *-ha* and *-hin* which are both bound forms so that *ʔijja* functions as a host for *-hin*; however, the presence of *-ha* before it is a necessity; otherwise, the resulting sentence would become ungrammatical, as shown below where the adverbial *ʔibsurʕah* 'quickly' intervenes between *ʔijja* and *ha*:

(22) **ʔiʕṭī-ha ʔibsurʕah ʔijja-hin* (JA)
give.IMP.2SG-it/her quickly LH.PRT -them.F
'Give her them quickly.'

Sentence (22) is ungrammatical although an adverbial, in double object constructions (where the two objects are full DPs), can occur between the two objects:

(23) *ʔiʕ-ṭī l-binit ʔibsurʕah ʔir-risāleh* (JA)
give.IMP-2SG DEF-girl quickly DEF-letter.
'Give the girl quickly the letter.'

This discussion reveals that the use of *ʔijja* is only allowed when it is sandwiched between two bound forms.

This description provides an answer to another related question, which is why a bound form does not occur &P initially:

(24) a. **(ʔijja-)humm w-l-walad* (JA)
*(LH.PRT-) they.M and-DEF-boy

b. **(ʔijja-)humm w-hummuh* (JA)
*(LH.PRT-) they.M and-them.M

The examples in (24) remain ungrammatical even if *-hum* is cliticized onto the preceding word (which is part of XP that precedes &P), as shown below:[18]

(25) **ʃuf-it-hum w-l-walad* (JA)
See.PST-1SG-them.M and-DEF-boy
'I saw them and the boy.'

The first conjunct does not form a constituent with the preceding word; hence no (en) cliticization is possible given that cliticization in JA is syntactically ruled.

Another constraint on the use of *ʔijja* is that *ʔijja* + pronoun should be conjoined with a pronoun not a full DP. When *ʔijja* is used in coordination constructions, the first member of &P should be a strong pronoun, as shown below:

(26) a. *ʃuf-it ʕali *(hū) w-ʔijja-hum* (JA)
see.PST-1SG Ali. *(he) and-LH.PRT-them.M
'I saw Ali, him and them.'

b. *l-zalameh sarag s-sijjarah*
DEF-man steal.PST.3SG.M DEF-car
**(hū) w-ʔijja-humm* (JA)
*(he) and-LH.PRT-them.M
'The man stole the car, he and they.'

These two examples indicate that when *ʔijja* is used to host the second bound conjunct, the first conjunct should be a strong pronoun not a DP; otherwise, the sentence would become ungrammatical. The possibility that this situation is caused by the so-called Williams's (1978) Law of Coordination of Likes (a constraint that demands the conjuncts be of the same syntactic category) (given that when the second conjunct is a (bound) pronoun, the first should be a pronoun) should be ruled out. That is because there are many examples where a strong pronoun can be coordinated with a full DP, as shown in the following examples:

(27) a. *hū w-ʔimħammad rāħ-* (JA)
he and-Muhammad leave.PST-3PL.M
'He and Muhammad left.'

b. *sˁall-at hī w-l-binit* (JA)
pray.PST-3SG.F she and-DEF-girl
'She and the girl prayed.'

The strong pronoun should also co-refer with a preceding word (see (28a)) or a bound form that appears on the verb (see (28)).

[18] The sentence in (25) is grammatical under a comitative reading; here the direct-object bound pronoun forms a constituent with the verb, whereas a comitative Phrase wa+DP are adjuncts (see McNally 1993; Progovac 1997; Al Khalaf 2015).

(28) a. *ʃufit ʕali$_i$ hū$_i$ w-ʔijja-humm* (JA)
see.PST.1SG Ali him and-LH.PRT-them.M
'I saw Ali; him and them.'

b. *ʃāf-ni$_i$ ʔana$_i$ w-ʔijja-ha* (JA)
see.PST.3SG.M-me 1SG and-LH.PRT-her
'He saw me and her.'

However, there are some cases where this co-reference is not manifested, especially when &P appears sentence-initially:

(29) *hū w-ʔijja-humm bi-d-dār* (JA)
he and-LH.PRT-them.M in-DEF-house
'He and they are in the house.'

We ascribe this constraint on the use of *ʔijja* to prosodic considerations. According to the fact that *ʔijja* should not be prosodically separated from the preceding free words with which a bound form is suffixed (see (28-29)), we propose that *ʔijja* and the preceding free word constitute one prosodic unit whose integrity should not be interrupted at PF. When *ʔijja* is preceded by a strong pronoun (which is the first conjunct), the strong pronoun + *ʔijja* + the clitic constitute one prosodic unit. Evidence supporting this assumption can be offered by the fact that the strong pronoun + *ʔijja* + the clitic can be separated from other members of the relevant sentence by an adverbial (see (30b)) or it can be displaced to another position within the same sentence (see (30c)) ((30a) is the original sentence).

(30) *a. ʃuf-it-humm hīh w-ʔijja-h* (JA)
see.PST-1SG-them.M her and-LH.PRT-him
'I saw them; her and him.'

b. *ʃuf-it-humm ʔimbrāriḥ hīh w-ʔijja-h* (JA)
see.PST-1SG-them.M yesterday her and-LH.PRT-him
'I saw them yesterday; her and him.'

c. *Hīh w-ʔijja-h ʃufit-humm* (JA)
her and-LH.PRT-him see.PST-1SG-them.M
'I saw them, her and him.'

The prosodic structure of (30a) is formed as follows:

(31) *[ʃuf-it-humm] [hīh w-ʔijja-h]*
[see.PST-1SG-them.M] [her and-LH.PRT-him]

When the first conjunct is a full DP, *ʔijja* fails to constitute one prosodic unit with it because the DP is itself an independent prosodic unit, even if it is contained in the same &P.

(32) **ʃuf-it ʕali w-ʔijja-humm* (JA)
see.PST-1SG Ali and-LH.PRT-them.M
'I saw Ali and them.'

The prosodic structure of (32) is formed as follows:

(33) *[ʃuf-it] [ʕali] w-ʔijja-humm]*
[see.PST-1SG] [Ali and-LH.PRT-them.M]

The structure in (33) is ungrammatical because *w-ʔijja-hum* does not by itself form one prosodic constituent; hence it is incomplete, thus resulting in sentence ungrammaticality at PF.

The question to answer here is why *ʔijja* constitutes a prosodic unit with the preceding free word. We propose that a prosodic unit in JA should at least contain a free word that can stand alone. The combination of *w+ʔijja+* bound pronoun does not satisfy this requirement, given that *w* and the bound pronoun cannot stand alone, and *ʔijja* is a pure PF object that cannot be used alone, as well. This forces that w+*ʔijja+* bound pronoun should prosodically be part of the preceding word with which one independent prosodic unit is formed.

This discussion reveals the important role of prosody with respect to sentence derivation, which is shown to be affected by non-syntactic constraints. According to Mathieu (2016), prosody is a significant component that delimits (and even determines in some cases) the output forms of sentences. Prosody figures in linearization (how words/phrases are ordered (i.e., linearized) for pronunciation) and the distribution of (PF-) phrases (see also Richards 2010 for an engaging discussion that prosody is an important component of grammar). The fact that the distribution of *ʔijja* is prosodically determined is amenable to its categorical status being a PF object which is inserted at PF, where the effects of prosody are apparent.

6. Conclusion

In this paper, we have examined PF constraints that rule the formation of coordination in Arabic grammar with special focus on JA and MSA data. We first proposed the presence of CliC, a PF constraint that bans cliticization of one bound form onto another bound form. Cliticization should apply on two elements that are different with respect to PF deficiency. One element should be phonologically non-deficient, i.e. does not need a PF support. We have shown that the use of *ʔijja* is a direct application of this constraint. Additionally, we show that *ʔijja* should be part of the preceding free word prosodically. This condition is caused by the assumption that an independent prosodic unit in JA (and MSA) should at least have one word that can stand alone in other environments. It is not possible for *ʔijja* to stand alone because it never occurs free of cliticization. This paper is more generally a contribution to the empirical effects of PF as a distinct level of computation where prosody is an operative factor in determining the distribution of elements, most notably PF-objects.

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