Feature Deletion by Head Movement – A New Solution to Agreement Asymmetries in Modern Standard Arabic

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Abstract

In this paper, I present a new approach to agreement asymmetries in Modern Standard Arabic. In Arabic clauses with a VS word order– unlike clauses with SV order –, the verb is not marked for number agreement. I argue against previous approaches that suggest that this lack of number agreement is due to the absence of syntactic Agree in these configuration. I further propose a new account that is based on the assumption that the lack of number agreement arises from feature deletion triggered by head movement in cases where the verb satisfies the EPP property. I show that this approach does not face the same problems as previous approaches and I discuss some implications that the theory has for EPP movement.

1. Introduction

Verb-subject agreement in Arabic marks up to three categories on the verb: person, gender, and number. In Modern Standard Arabic (MSA), number agreement depends on the position (and the form) of the subject: Preverbal subjects agree in number with the verb (1a), while postverbal subjects do not agree in number (1b). Person and gender agreement are not affected by the position (and the form) of the subject.

(1)   a.   aṭ-ṭaalibaat-u   ʔakal-*at/na
           the-students.F.PL-NOM eat.PST-*3F.SG/3F.PL
           'The students ate.'

                                          SV (Benmamoun 2000:121)

b.   ʔakal-at/*na   aṭ-ṭaalibaat-u
     eat.PST-3F.SG/*3F.PL the-students.F.PL-NOM
     'The students ate.'

VS (Benmamoun 2000:121)

This agreement asymmetry poses quite a puzzle for current syntactic and morphological theories. The reason is that the empirical generalization combines linearity – a concept usually not or only partially associated with syntax – with grammatical function – something that is in most frameworks associated with a certain syntactic position. Put differently, the question for linguistic theories is what kind of theoretical operation agreement asymmetries arise from.

Despite the large number of different analyses proposed so far for the data in (1), the full pattern of agreement asymmetries in MSA has not been derived. The accounts in the literature can be classified according to two assumptions: The first type of account assumes that the agreement asymmetry is due to an early syntactic process: Number agreement only ever applies in certain syntactic configurations. The second type of account assumes that the agreement asymmetry is due to some late morphological process: Number agreement is unrestricted in the syntax, but postsyntactic operations lead to the loss of the number marker in certain configurations.

In this paper, I show that syntactic accounts overgenerate because they depend on the presence of both a postverbal and a preverbal subject position. I discuss structures with the past progressive auxiliary showing that full agreement can occur without there being a postverbal subject position. As for morphological accounts, I show that they undergenerate because they depend on some form of adjacency. I discuss examples which show that the agreement asymmetry does not depend on the adjacency of the subject and the verb. Ultimately, this paper introduces a "hybrid" approach that overcomes both the overgeneration and the undergeneration problem. The new approach is itself entirely syntactic, but shares with the morphological approach that number agreement applies in all configurations, but is ultimately lost in the derivations which result in VS orders.

The account is based on the old idea formulated in Alexiadou & Anagnostopoulou (1998) that verb movement in pro-drop languages can check the EPP-property. In contrast to Alexiadou & Anagnostopoulou (1998), I argue that the agreement asymmetry in MSA is directly linked to this assumption: First, I suggest a head movement operation that results in the deletion of both

the head movement triggering feature on the higher head as well as the goal feature of the lower, moving head. Second, I assume that the EPP-feature in MSA is not a D feature but a number feature. Finally, if the verb checks the EPP-property as part of head movement (leading to a VS word order), the verb will lose its number feature that it has received from an earlier application of agreement with the subject. If the subject checks the EPP-feature (leading to a SV word order), the number feature stays on the verb since it is not involved in head movement.

The paper is organized as follows. In section 2, I introduce the data and empirical generalization about agreement asymmetries in MSA. Section 3 presents the new "hybrid" approach and shows detailed derivations of the examples introduced in section 2. In section 4, I discuss previous analyses and compare them to the new approach. Finally, section 5 provides a conclusion and an outlook on future research.

2. Data

This section summarizes and exemplifies all the empirical observations that any analysis of agreement asymmetries in MSA should be able to account for. The section starts with some examples that illustrate the main points (section 2.1). Afterwards, in section 2.2, I introduce some standard assumptions about clause structure in MSA. Finally, section 2.3 addresses the empirical generalization that can be derived from the data. This generalization will be the starting point for the new approach.

2.1. The Agreement Asymmetry in Modern Standard Arabic

The data in (2) show that verbs do not show number agreement if the subject linearly follows the verb.

(2)   a.   ʔakal-at/*na   aṭ-ṭaalibaat-u[1,2]
             eat.PST-3F.SG/*3F.PL the-students.F.PL-NOM
             'The female students ate.'

                                             VS (Benmamoun 2000:121)

b.   wašal-a   l-raʔiis-aani   ʔilaa dimashqa
      arrive.PST-3M.SG the-president.M.DU-NOM in   Damascus
      ʔamsi.
      yesterday
      'The two presidents arrived in Damascus yesterday.'
                                                    VS (Ryding 2005:66)

c.   al-ʔawlaad-u raʔ-at   bint-un
      the-boys-NOM saw-3SG.F girl-NOM
      'The boys, a girl saw them.'   *OVS* (Mohammad 2000:50)

d.   ʔakala   at-tuffaaɦatu al-ʔawlaadu
      eat.PST.3M.SG the-apple   the-children
      'The children ate the apple.'
                                            VOS (Benmamoun 2000:132)

In all the examples in (2), the verb has to show up with a number marker for singular, which is the default marker. It cannot bear the plural marker (2a,c,d) or the dual marker (2b). Furthermore, (2c) shows that number agreement cannot target the object instead of the subject. Finally, (2d) illustrates that default agreement also shows up if the object is scrambled in front of the subject.

Moving on to cases with preverbal subjects, it can be observed from the examples in (3) that preverbal subjects require number agreement with the verb.

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[1]All the examples from the literature that appear in this paper have been checked with at least one speaker of MSA. If needed, the examples where corrected. Thanks to Nassim Saleh Obeid for pointing out mistakes. Any remaining errors are my own.

[2]The original examples for (2a,c-d) are given in (i).

(i)   a.   ʔakal-at/*na   ṭ-ṭaalibaat-u
            eat.PST-3F.SG/*3F.PL the-students.F.PL-NOM
            'The students ate.'   (Benmamoun 2000:121)
      b.   ʔal-ʔawlaad-u raʔ-at-hum   bint-un[3]
            the-boys-NOM saw-3SG.F-them the-girl-NOM
            'The boys, a girl saw them.'   (Mohammad 2000:50)
      c.   ʔakala   t-tuffaaɦatu l-ʔawlaadu
            eat.PST.3M.SG the-apple   the-children
            'The children ate the apple.'   (Benmamoun 2000:132)

(3) a. aṭ-ṭaalibaat-u   ʔakal-*at/na⁴
the-students.F.PL-NOM eat.PST-*3F.SG/3F.PL
'The female students ate.'

SV (Benmamoun 2000:121)

b. ʔay   aṭ-ṭullaab   ʕaraf-uu/*ʕarafa
which.NOM the-students knew-3M.PL/knew.3M.SG
l-ʔijaabat-a?
the-answer-ACC
'Which students knew the answer?'

S_wh VO (Alotaibi & Borsley 2013:10)

In (3a), we see the counterpart to (2a) with a preverbal subject and obligatory plural agreement. It can furthermore be observed that gender agreement is not affected by the position of the subject (compare (2a) and (3a)). (3b) shows that if the subject is wh-moved, number agreement shows up as well.

Next, cases like (4) show what happens in clauses that have two verbal elements: an auxiliary and a lexical verb.

(4) a. kaanat/*kunna   aṭ-ṭaalibaat-u   ya-ʔkulna⁵
be.PST.3F.SG/*be.PST-3F.PL the-students.F.PL-NOM 3-eat.F.PL
'The female students were eating.'

Aux SV (Benmamoun 2000:121)

b. aṭ-ṭaalibaat-u   *kaanat/kunna   ya-ʔkulna
the-students.F.PL-NOM *be.PST.3F.SG/be.PST-3F.PL 3-eat.F.PL
'The female students were eating.'

S Aux V (Benmamoun 2000:121)

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⁴The original examples for (3a-b) are given in (i).

(i) a. ṭ-ṭaalibaat-u   ʔakal-*at/na
the-students.F.PL-NOM eat.PST-*3F.SG/3F.PL
'The students ate.'   (Benmamoun 2000:121)

b. ʔayyu   ṭullaab-in   ʕaraf-uu/*ʕarafa   l-ʔijaabat-a?
which-NOM students-GEN knew-3M.PL/knew.3M.SG the-answer-ACC
'Which students knew the answer?'

(Alotaibi & Borsley 2013:10)

c.   *kaan-at/*kun-na   ya-ʔkul-*at/*na aṭ-ṭaalibaat-u
    *was-3SG.F/*was-3PL.F 3-eat.*SG.F/*PL.F the-students.F-NOM
    'The female students were eating.'

<div align="right">**Aux V S* (Aya Al-Ghanem, p.c.)</div>

The first observation we can make from (4) is that both the auxiliary and the lexical verb are marked for number agreement. Furthermore, we see that the auxiliary and the lexical verb can differ in number agreement: In (4a), where the subject occurs in between both verbs, the auxiliary bears default singular agreement, while the lexical verb shows plural agreement. In (4b), with the subject in the clause-initial position, both verbs show number agreement. Finally, (4c) shows that the subject cannot appear after the lexical verb in constructions with an auxiliary. We can conclude from the pattern in (4) that both verbs independently agree with the subject and that agreement asymmetries also occur with auxiliaries.

The final set of data concerns the type of the subject. As shown in (5), the verb obligatorily bears number agreement if the subject is a pronoun.

(5)   a.   *kaanat/kunna   ya-ʔkulna
        *be.PST.3F.SG/be.PST-3F.PL 3-eat.F.PL
        'They (female) were eating.'

<div align="right">*Aux V* (Benmamoun 2000:126)</div>

    b.   (hum) qaraʔ-u   ad-dars-a
        they   read-3.pl.m the-lesson-acc
        'They read the lessons.' $S_{pro}V$ (Soltan 2006)

    c.   qaraʔ-u/*qaraʔ-a   (hum-u) d-dars-a
        read-3.pl.m/read-3.sg.m they-EV the-lesson-acc
        'They read the lessons.'

<div align="right">VS_{pro} (Soltan 2006)</div>

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[5]The original examples for (4a–b) are given in (i).

(i)   a.   kaanat/*kunna   ṭ-ṭaalibaat-u   ya-ʔkulna
        be.PST.3F.SG/*be.PST-3F.PL the-students.F.PL-NOM 3-eat.F.PL
        'The female students were eating.'   *Aux SV* (Benmamoun 2000:121)

    b.   ṭ-ṭaalibaat-u   *kaanat/kunna   ya-ʔkulna
        the-students.F.PL-NOM *be.PST.3F.SG/be.PST-3F.PL 3-eat.F.PL
        'The female students were eating.'   *S Aux V* (Benmamoun 2000:121)

(5a) illustrates that MSA is a pro-drop language. Under the reading of a plural pronominal subject, plural agreement on both the auxiliary and the lexical verb is obligatory. In (5b-c), the pronominal subject is overt, which is possible but requires a special context. (5c) shows that, even with the pronominal subject in postverbal position, number agreement is obligatory. This is a complication for nearly all theories of agreement asymmetries since (5c) is a counterexample to the simple generalization that verb do not show number agreement if they precede the subject.

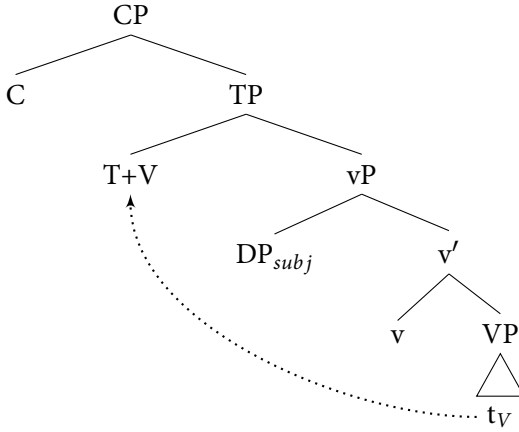In the next subsection, some standard assumptions about clause structure in MSA are introduced.

2.2. Basic Clause Structure in Arabic

Having introduced the basic facts about agreement asymmetries, this subsection addresses standard assumptions about clause structure in MSA. In accounts couched in a derivational minimalist framework, it is often assumed that verb-initial word orders come about by movement of the verb to the functional head T. Subject-initial word orders are often assumed to be due to EPP movement of the subject to Spec-TP.[6]
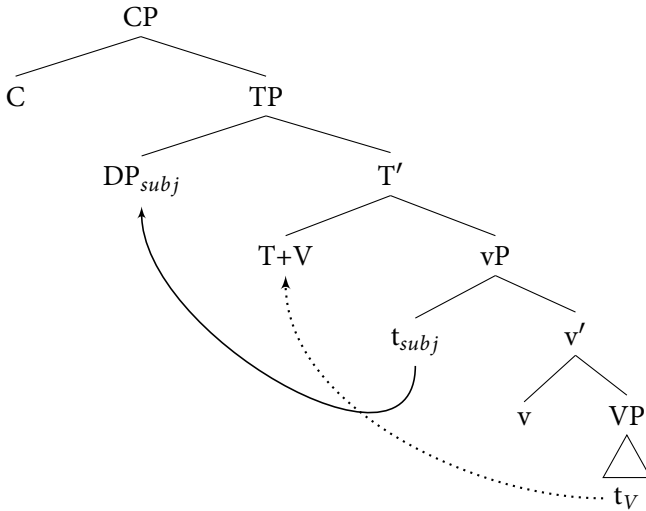
In order to get a better understanding of what the data in section 2.1 mean for a derivational theory, I adopt the structures in (6) for a verb-initial word order and (7) for a subject-initial word order:

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[6] See Aoun et al. (1994) for an analysis where the verb is in C and Wurmbrand & Haddad (2014) for an analysis where the verb may stay in the vP. See Alotaibi & Borsley (2013) for an analysis where subject movement is not linked to EPP movement. This issue is discussed in more detail in section 4.3.

(6)   *Clauses with Postverbal Subjects* (adapted from Benmamoun 2000:128):

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                      CP
                 ┌─────┴─────┐
                 C          TP
                       ┌─────┴─────┐
                     T+V          vP
                            ┌──────┴──────┐
                          DP_subj        v′
                                     ┌────┴────┐
                                     v        VP
                                              △
                                              t_V
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(7)   *Clauses with Preverbal Subjects* (adapted from Benmamoun 2000:129):

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                      CP
                 ┌─────┴─────┐
                 C          TP
                       ┌─────┴─────┐
                     DP_subj       T′
                               ┌─────┴─────┐
                             T+V          vP
                                     ┌─────┴─────┐
                                   t_subj        v′
                                            ┌────┴────┐
                                            v        VP
                                                     △
                                                     t_V
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The structures in (6) and (7) show that verb movement to T is obligatory while subject movement to Spec-TP is optional. This optionality eventually results in different word orders. Relating these assumptions to the data above, the pattern summarized in the table in (8) emerges.

(8)

Ex.	CP	TP		vP			
(2a)			V-sg		S_{pl}		
(2b)			V-sg		S_{du}		
(2c)	O_{pl}		V-sg		S_{sg}		
(2d)			V-sg	O_{sg}	S_{pl}		
(3a)		S_{pl}	V-pl				
(3b)	S_{pl}		V-pl				
(4a)			Aux-sg		S_{pl}	V-pl	
(4b)		S_{pl}	Aux-sg			V-pl	
*(4c)			Aux-sg			V-sg	S_{pl}
(5a)			Aux-pl			V-pl	
(5c)			V-pl		$S_{pro\text{-}pl}$		
(5b)		$S_{pro\text{-}pl}$	V-pl				

The next subsection briefly discusses the empirical generalization that can be drawn from the table in (8).

2.3. Empirical Generalizations about the Agreement Asymmetry

Benmamoun (2000:128) summarizes the pattern of agreement asymmetries as in (9) (henceforth 'Benmamoun's Generalization'):

(9) *Number-Suffix Generalization (Benmamoun's Generalization)*
     The number suffix is obligatory whenever the postverbal subject position
     is phonologically null.

Except for the case of (5c), where an overt pronominal plural subject appears after a verb marked for plural agreement, this generalization is true. Theoretically, however, this generalization poses a challenge as there are at least four different types of phonologically null postverbal subject positions: The absence of a postverbal subject position (10a), a dropped pronominal subject (10b), nullness derived by A-movement (10c), and nullness derived by Ā-movement (10d).

(10) a. *Null due to absence of a position*
          [$_{TP}$ T+Aux [$_{vP}$ Subject ... V __]]
      b. *Base-generated null*
          [$_{TP}$ T+V [$_{vP}$ *pro* ...]]

    c.   *Null derived by A-movement*
        [$_{TP}$ Subject T+V [$_{vP}$ t$_{Subj}$ ...]]

    d.   *Null derived by Ā-movement*
        [$_{CP}$ wh-Subject [$_{TP}$ T+V [$_{vP}$ t$_{wh-Subj}$ ...]]

Furthermore, Benmamoun's Generalization in (9) comprises various factors that affect number agreement in MSA into one generalization. In order to stress the complexity of the agreement asymmetry in MSA, (11) breaks his generalization down into five smaller observations. Additionally, (11) serves as a summary of the data discussed in this section.

(11)   a.   Number agreement is different from gender and person agreement.

        b.   Number agreement is dependent on the linear order of subject and verb.

        c.   Number agreement does not require surface adjacency between subject and verb.

        d.   Agreement is dependent on the grammatical function of the agreement target: Only subjects can agree.

        e.   Number agreement is dependent on whether the subject is a full nominal phrase or a pronoun.

In section 3, I develop a new approach to the agreement asymmetry with the goal to account for all the observations in (11).

3. Analysis

The main idea of the new "hybrid" approach is that number agreement itself is not constrained by any syntactic configuration. Instead, the feature encoding number agreement on the verb can get lost throughout the syntactic derivation. That is, in all the cases in the table in (8), the verb agrees with the subject in number. The special assumption, however, is that number agreement applies early in the derivation in the vP domain before the verb moves to its final position in the TP. If the verb moves to T, it is able to check the EPP property of T (cf. Alexiadou & Anagnostopoulou (1998). If it does, the subject has to remain in the vP, which results in a VS order on the surface. But this derivation comes at a price: The number feature on the verb is deleted. On the other hand, no deletion applies if the subject checks the EPP property.

This section is structured as follows: In section 3.1 I will lay out the main assumptions of the new analysis. Section 3.2 puts the assumptions together and shows how the basic pattern in (1) is derived. Finally, section 3.3 shows how the more complex cases with auxiliaries, wh-subjects, and pronominal subjects can be accounted for.

3.1. Assumptions

The present account is couched within a derivational minimalist framework (Chomsky 1995 et. seq.). Features that trigger the structure-building operations Merge or Move will appear in bullets below [•F•], while features triggering Agree will appear with an underlined value [F:__]. There are four processes that are essential for the new approach: head movement, EPP movement, agreement, and morphological realization of features. I discuss each of these four points below.

3.1.1. *Head Movement*

Starting with head movement, I assume that it is syntactic movement that forms a complex head (Baker 1988, Chomsky 1993, 1995). Head movement is triggered by a feature $[_H F_H]$ on the higher head. The head movement configuration is schematized in (12).

(12)   *Head Movement*:
$$[_{XP} \ldots X_{[X, \, _H Y_H, \, \ldots \,]} \, [_{YP} \ldots Y_{[Y, \, \ldots]} \ldots \,]] \Rightarrow$$
$$[_{XP} \ldots [X_{[X, \, _H Y_H, \, \ldots \,]} \, Y_{[Y, \, \ldots]}] \, [_{YP} \ldots \,]]$$

Before head movement applies, both the higher head X and the lower head Y are independent. After Y undergoes head movement to X, X and Y form a complex head in the position of Y.

Crucially, I assume that in these configurations, the movement triggering feature as well as the targeted feature are deleted. This deletion operation is defined in (13).

(13)   *Complex Head Feature Deletion (CoHFeD)*:
In a complex head [X Y], if X bears an operation-triggering feature [F] and Y bears a matching feature [F], delete [F] on both X and Y.

Going back to our abstract schema in (12), Complex Head Feature Deletion leads to the following structure.

(14)   *Application of CoHFeD I*:
$[_{XP} \dots [X_{[X, \, _HY_H, \, \dots]} \; Y_{[Y, \, \dots]}] \; [_{YP} \dots]] \Rightarrow$
$[_{XP} \dots [X_{[X, \, \cancel{_HY_H}, \, \dots]} \; Y_{[\cancel{Y}, \, \dots]}] \; [_{YP} \dots]]$

As shown in (14), CoHFeD is responsible for the deletion of the categorial feature of the moved head, which is the feature that has been targeted by head movement. This formalizes the idea that the moved head incorporates into the higher head. In other words, the moved head is impoverished and loses its ability to project further (see also Lahne 2009, Keine 2010 for instances of syntactic impoverishment). This solves a potential labeling conflict between the two heads, by creating an asymmetry. After deletion, only the higher head that triggered movement (X in (14)) can project further. Note further that CoHFeD enforces the deletion of as many features as possible. In this sense, it is an instance of a "Maximize Satisfaction" principle (see Müller 2016, Driemel & Stojković 2017 for the opposite concept of "Minimize Satisfaction".) Thus, if X were to have another operation-triggering feature that Y could check, Y would lose this feature as well. This scenario is shown in (15).

(15)   *Application of CoHFeD II*:
$[_{XP} \dots [X_{[X, \, _HY_H, \, \bullet F \bullet, \, \dots]} \; Y_{[Y, \, F, \, \dots]}] \; [_{YP} \dots]] \Rightarrow$
$[_{XP} \dots [X_{[X, \, \cancel{_HY_H}, \, \cancel{\bullet F \bullet}, \, \dots]} \; Y_{[\cancel{Y}, \, \cancel{F} \dots]}] \; [_{YP} \dots]]$

As we will see below, this is exactly how the number feature on the verb is lost.

3.1.2.   *EPP Movement*

I assume that the SV order in MSA comes about by EPP movement. The EPP feature on T in MSA is, however, not a D feature, but a number feature ($[\bullet \# \bullet]$).[7] I argue that it is this property of MSA that allows the verb to check the EPP feature. If the EPP feature were simply a D feature, it would be unclear why the verb could satisfy it, assuming that inflected verbs in general do not have nominal properties (but see Alexiadou & Anagnostopoulou (1998) for this assumption). If the EPP feature can in principle be a ϕ-feature, the proposal

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[7]I discuss the implications of this assumption in section 5.

that verbs can satisfy the EPP property becomes more intuitive because both subject DPs and verbs bear ϕ-features.

Note that surface case does not seem to be connected to EPP movement in MSA, but is, most likely, an independent process. Evidence for this assumption comes from examples with postverbal subjects bearing nominative case (16a) and preverbal subjects bearing accusative case (16b).

(16)   a.   Ɂakal-at/*na   aṭ-ṭaalibaat-u
             eat.PST-3F.SG/*3F.PL the-students.F.PL-NOM
             'The students ate.'

                                            (Benmamoun 2000:121)

       b.   Ɂinna n-nisaaɁ-a   daxal-na   makatib-a-hunna
             that   the-women-ACC entered-FEM-PL office-PL.ACC-their.FEM
             'that the women entered their office'

                                            (Ackema & Neeleman 2003:726)

3.1.3. Agreement

As is standard in minimalist frameworks, I assume that agreement results from the application of the syntactic operation Agree (Chomsky 2000). In contrast to the standard definition of Agree, I assume that probe features on a head H can find a goal in the m-command domain of H (see e.g. Baker (2008)). Alternatively, Agree is allowed to probe upwards (see Wurmbrand 2012, Zeijlstra 2012, Himmelreich 2017, Bjorkman & Zeijlstra to appear). Importantly, I assume that a valued probe does not delete but is accessible to further operations (Legate 2005, Assmann 2012).

Regarding subject-verb agreement in MSA, I assume that Agree applies in the vP before head movement or EPP movement: v bears a ϕ-probe that finds matching ϕ-features on the subject. Importantly, I assume that the object is not accessible to this ϕ-probe, either because it is inactive due to abstract (not morphological, see page 397) accusative case or because v has a second ϕ-probe for the object.

3.1.4. Morphological realization

Finally, I assume that functional material (heads and features) is realized postsyntactically. For the sake of concreteness, I assume a standard version of Distributed Morphology (Halle & Marantz 1993). Throughout this paper,

nothing more will be said about the details of morphological realization as the agreement asymmetry is argued to arise in the syntax and does not seem to be influenced by any surface-related process.

3.2. Proposal

After having laid out the special assumptions about head movement, EPP movement, and agreement, this subsection puts the pieces together. The idea of the analysis is the following: Agree between v and the subject is always carried out in the vP. This step is shown in (17).

(17)
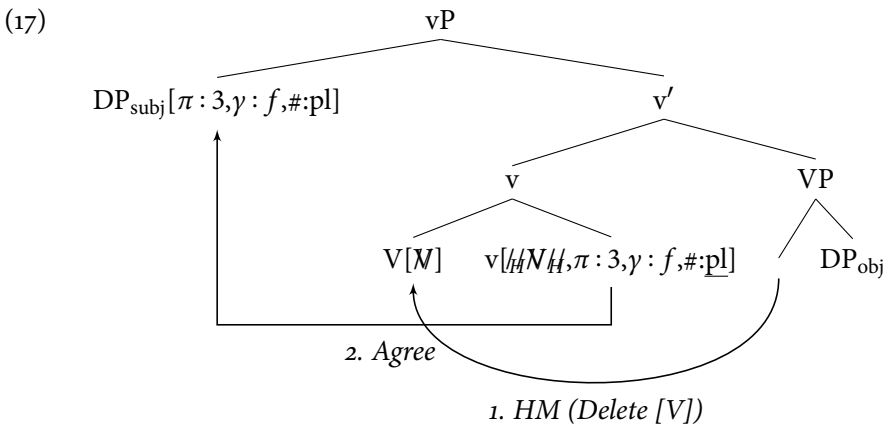
In (17), the verb has first head-moved to the functional head v. The complex V+v is built and V loses its V-feature due to an application of CoHFeD. Afterwards, v Agrees with the subject in gender, person, and number.

After Agree, both v and the subject bear a valued number feature that can be targeted by further operation-triggering features. When T is merged, it has a feature $[_H v_H]$ for head movement of v and an EPP feature $[\bullet\#\bullet]$. At this point, there are two options how the derivation could continue: Either head movement applies first or EPP movement applies first.

If head movement is carried out first, CoHFeD enforces the deletion not only of $[_H v_H]$ on T and $[v]$ on v, but also of $[\bullet\#\bullet]$ on T and $[\#]$ on v (see the discussion above (15)). This derivation is shown in (18).

(18)
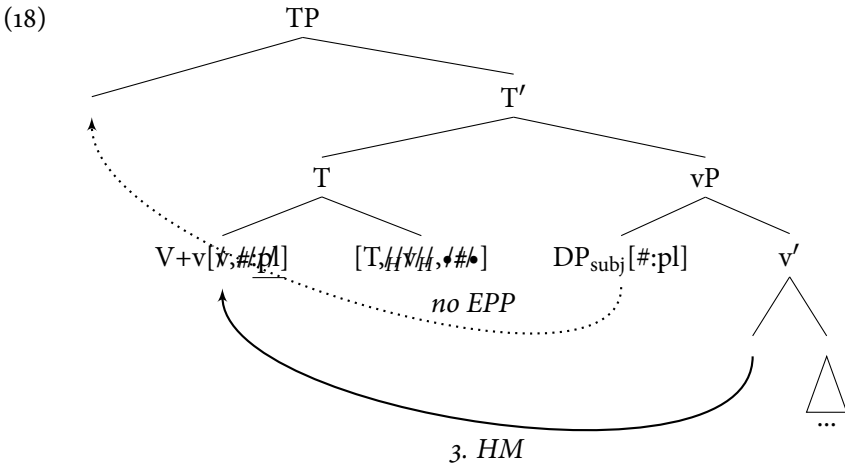
Since head movement of v to T checks the EPP feature in (18), the subject cannot move to Spec-TP anymore. Thus, early head movement results in a VS order. At the same time, because of CoHFeD, v loses its [v]-feature and its number feature. Consequently, the verb in a VS clause does not show number agreement because the absence of a number feature leads to the insertion of the default singular marker. This derivation derives the example in (1b).

The second option for a derivation is that EPP movement is carried out first. If this is the case, the subject, being closer to T than the v head, moves to Spec-TP. At this point, the number feature [•#•] on T is deleted. Head movement can apply afterwards, but only the v-features on v and T will be subject to CoHFeD. Thus, the number feature remains on v and will be realized post-syntactically. This derivation, which is the derivation for (1a) is shown in (19).

(19)
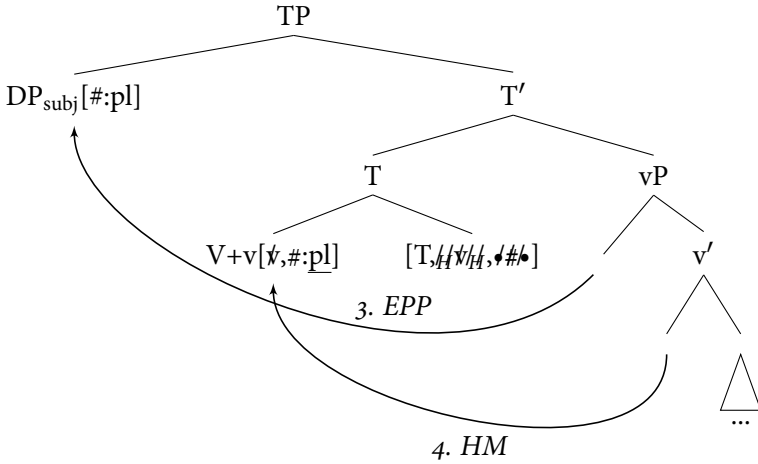
Note that in order to make the derivation in (19) compatible with the Strict Cycle Condition (SCC, Chomsky (1973)), one needs to assume a relaxed version of the SCC (cf. Richards (1997)), defining a cycle, for example, as a phrase.

Before moving on to the more complex cases of agreement asymmetries, I would like to briefly mention that scrambling of the object in front of the subject as in (2d), repeated in (20), does not necessarily pose a problem for the analysis. Similar to agreement in the vP, one has to assume that the object cannot be targeted by EPP movement. This might be due to the object being inactive because of abstract case or because of Criterial Freezing (Rizzi 2006).

(20)   ʔakala   at-tuffaaħatu al-ʔawlaadu
       eat.PST.3M.SG the-apple   the-children
       'The children ate the apple.'

3.3. Deriving the full pattern

So far, the analysis is able to derive cases where the postverbal subject position is null due to A-movement (see (10c)). In order to account for the other cases, a couple of minor assumptions need to be added. The main idea of the approach, however, will stay intact. The cases derived in this subsection are nullness due to the absence of a postverbal position (10a) in structures with auxiliaries, nullness do to Ā-movement (10d), and nullness due to a dropped pronominal subject (10b). This section provides detailed accounts for all of these cases. Additionally,

the exception to Benmamoun's Generalization (number agreement with a postverbal pronominal subject) is addressed.

3.3.1. *Two φ-Probes in Past Progressive*

Starting with the auxiliary case, I assume that the past progressive auxiliary *kaana* ('to be') realizes the complex head Prog+T (Bjorkman 2011). Prog is a functional head encoding progressive that is merged in between the vP and the TP. Furthermore, I assume that in cases where this additional functional projection ProgP is present, V only moves to v.[8]

In order to derive the two independent instances of agreement in past progressive configurations, a second φ-probe is needed. I assume that Prog introduces this additional φ-probe. Also, Prog hosts a kind of EPP feature [•D•] (or [•#•]), which attracts the subject to Spec-ProgP.

Finally, I assume that Prog moves to T. Thus, in all its properties regarding agreement, head movement and EPP movement, Prog has the same properties as v.[9]

Having established the assumptions about the syntax of the past progressive auxiliary, we can now turn to the derivations of the data in (4), repeated in (21).
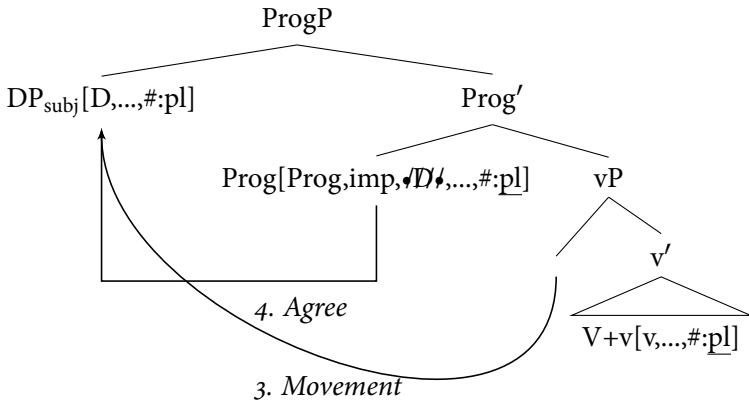
(21) a. kaanat/*kunna   aṭ-ṭaalibaat-u   ya-ʔkulna
          be.PST.3F.SG/*be.PST-3F.PL the-students.F.PL-NOM 3-eat.F.PL
          'The female students were eating.'
      b. aṭ-ṭaalibaat-u   *kaanat/kunna   ya-ʔkulna
          the-students.F.PL-NOM *be.PST.3F.SG/be.PST-3F.PL 3-eat.F.PL
          'The female students were eating.'
      c. *kaan-at/*kun-na   ya-ʔkul-*at/*na aṭ-ṭaalibaat-u
          *was-3SG.F/*was-3PL.F 3-eat.*SG.F/*PL.F the-students.F-NOM
          'The female students were eating.'

First, (22) shows how Agree between Prog and the subject applies in ProgP.

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[8]Note that this implies that the verb does not move to T in present progressive either. See Benmamoun (2000:57), Bjorkman (2011:68) for arguments that this might be true.

[9]That Prog can move to T means either that there are two types of T (one attracting Prog, the other attracting v) or that the head movement feature on T is a more general feature that is present on both Prog and v. The first option requires an additional assumption that filters out movement of v in the structure $[T[_H v_H]]$ [Prog[Prog] [v[v]]]], for instance a version of the Head Movement Constraint (Travis 1984) that bans non-local head movement.

(22)

$$\text{ProgP}$$

$$\text{DP}_{\text{subj}}[\text{D},...,\#:\text{pl}] \qquad \text{Prog}'$$

$$\text{Prog}[\text{Prog},\text{imp},\cancel{D},...,\#:\underline{\text{pl}}] \qquad \text{vP}$$

$$v'$$

$$\text{V+v}[v,...,\#:\underline{\text{pl}}]$$

4. Agree

3. Movement

Note that at the point shown in (22), v has already Agreed with the subject and now bears plural number. Since this feature cannot be deleted in the TP, the lexical verb must show up with plural agreement. Also, the structure in (22) straightforwardly accounts for the fact that the subject cannot follow the lexical verb in these structures (21c): The subject is simply base-merged higher than the final position of the lexical verb.

After Agree in ProgP has applied, Prog moves to T and checks the EPP feature. This is shown in (23). This derivation is exactly like (18), except that not v but Prog moves: The number feature on Prog is deleted due to CoHFeD and the auxiliary shows singular agreement on the surface. Thus, example (21a) follows without further ado.

(23)

5. HM (Delete [Prog], [#])
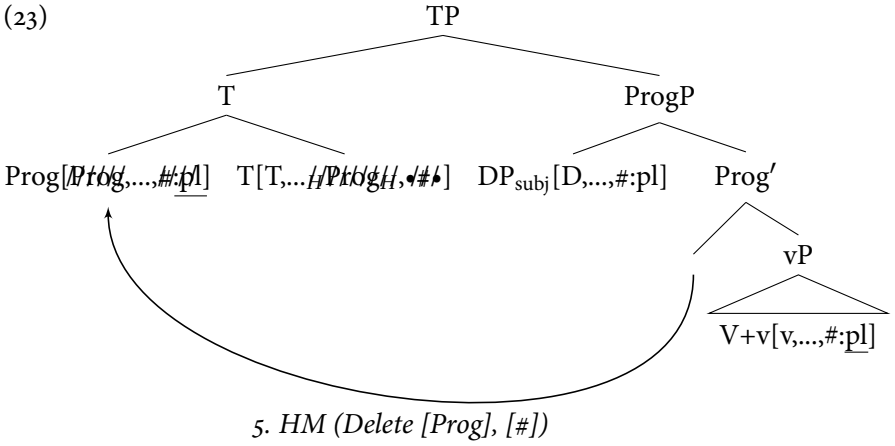
Finally, (24) shows the derivation of (21b). Similarly to the derivation in (19), the subject checks the EPP feature and number on Prog is retained.

(24)

5. EPP

6. HM (Delete [Prog])
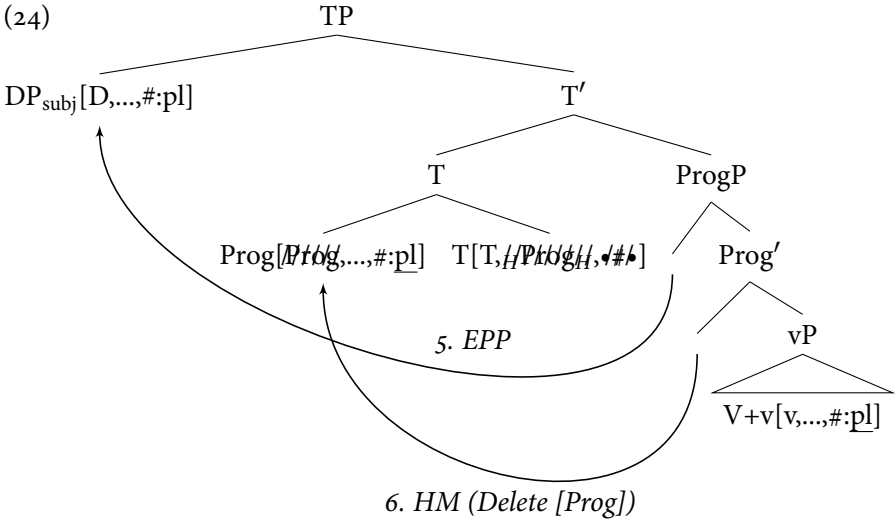
To sum up, this section has shown that the present approach to agreement asymmetries can easily be extended to capture the pattern with auxiliaries.

3.3.2. *wh-Subjects*

As shown in (3b), repeated in (25), a subject does not have to be in Spec-TP in order to trigger full agreement on the verb.

(25)   ʔay   aṭ-ṭullaab   ʕaraf-uu/*ʕarafa   l-ʔijaabat-a?
        which.NOM the-students knew-3M.PL/knew.3M.SG the-answer-ACC
        'Which students knew the answer?'

This, however, poses a potential problem for the present account: Assuming that movement to CP is triggered by some movement feature [•F•] on C, the derivation in (26) should be possible, contrary to fact.

(26)   a.   *Head movement of v to T: Deletion of the number feature*
              $[_{TP} [V+v[\#] T] [_{vP} DP_{wh}]]$
        b.   *movement to CP: SV order*
              $[_{CP} DP_{wh} C[\bullet wh \bullet] [_{TP} [V+v[\#] T] [_{vP} t_{DP}]]]$

In (26), the order VS and partial agreement is established in the TP, but later movement of the subject in the CP changes the word order to SV.

Assuming that the present account is in principle correct, the following assumptions need to be added in order to avoid the derivation in (26): First, movement to Spec-CP has to go through Spec-TP. This might be due to TP being a phase (cf. among others Sportiche 1989, Takahashi 1994, Agbayani 1998, Bošković 2002, Boeckx 2003, Müller 2004, Boeckx & Grohmann 2007, Chomsky 2005, 2008, Richards 2011, Assmann et al. 2015).
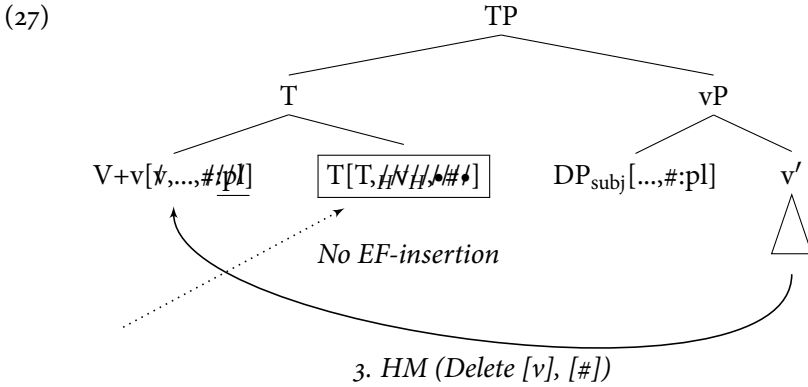
Second, I assume that the theory of edge feature insertion and deletion in Müller (2010, 2011) is correct. The theory is based on two important assumptions: Edge feature insertion on T must apply as long as T still has operation-triggering features and edge features must be discarded right after they are inserted. Consequently, edge feature movement must apply first, if a head has an edge feature.

Finally, I assume that elements that are moved to the specifier of a head H check as many features as possible on H.[10]

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[10]This is another instance of the "Maximize Satisfaction" Principle, see the discussion on page 396. Ultimately, it might be possible to define a general constraint for both head movement and phrasal movement. However, maximizing satisfaction leads to feature deletion (CoHFeD) on moved heads, while it does not lead to feature deletion on moved phrases. A way to reconcile

With these assumptions in place, a subject has to undergo movement to Spec-TP, if it has to stay accessible for processes outside of Spec-TP. Movement to Spec-TP, however, will result in full agreement on the verb.
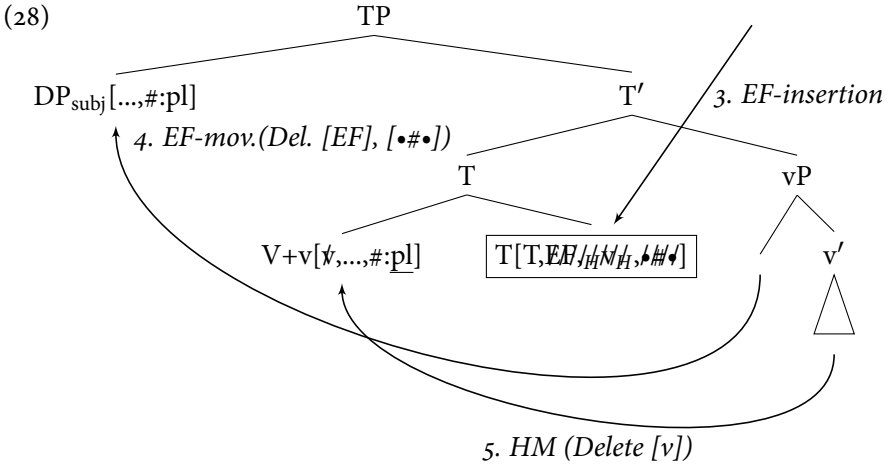
The tree in (27) illustrates why the derivation in (26) is ruled out by the assumptions above.

(27)

TP

T   vP

V+v[v̶,...,#t̶p̶l]   T[T,H̶v̶H̶,̶•̶#̶•̶]   DP$_{subj}$[...,#:pl]   v′

No EF-insertion

3. HM (Delete [v], [#])

If head movement is the first operation to apply in the TP, all operation-triggering features on T are deleted. In this case, no edge feature can be inserted and the subject stays in the vP. Then, however, it will not be accessible to the C head and the derivation crashes.

Thus, if a subject obligatorily has to move to a preverbal position, edge feature insertion must apply before head movement, as shown in (28). This, however, will result in full number agreement on the surface.

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both movement types might be to invoke the general mechanism of feature checking that is used Minimalist Grammars (Collins & Stabler 2016).

(28)

TP

DP_subj[...,#:pl]   T'   *3. EF-insertion*

4. EF-mov.(Del. [EF], [•#•])

T   vP

V+v[*v*,...,#:pl]   T[T,~~EF~~/~~H~~~~N~~/~~H~~,~~•#•~~]   v'

5. HM (Delete [v])

3.3.3. Pronominal Subjects

Finally, the last case that needs to be discussed involves pronominal subjects. Essentially, I assume that pronouns in MSA, whether they are null or overt, need to move to Spec-CP. Thus, the derivations for the examples in (5), repeated in (29), are equivalent to the derivation in (28) for wh-subjects.

(29)   a.   *kaanat/kunna   ya-ʔkulna
            *be.PST.3F.SG/be.PST-3F.PL 3-eat.F.PL
            'They (female) were eating.'
       b.   (hum) qaraʔ-u   al-dars-a
            they   read-3.pl.m the-lesson-acc
            'They read the lessons.'
       c.   qaraʔ-u/*qaraʔ-a   (hum-u) d-dars-a
            read-3.pl.m/read-3.sg.m they-EV the-lesson-acc
            'They read the lessons.'

As for null subjects (29a), I follow McFadden & Sundaresan (2016) and assume that *pro*s must be licensed by an aboutness topic that is in a projection above TP. Thus, *pro* has to move to Spec-TP because it has to stay visible for the aboutness topic.
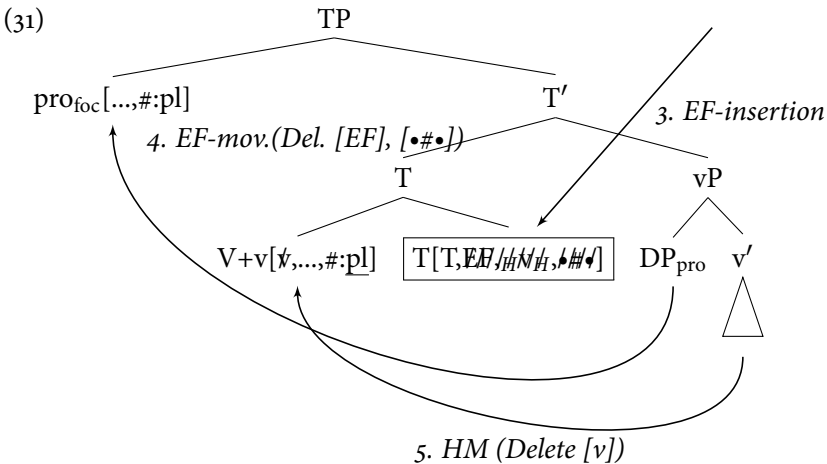
As for overt prounouns, I assume that they must move to a focus projection in the C-domain. As before, movement must go through Spec-TP, leading to

full agreement on the verb. Evidence for overt pronouns being related to focus comes from the fact that they must be emphasized and have contrastive focus (Soltan 2006, Al-Ghanem, p.c.).

A potential problem with this analysis is posed by (29c), where the pronoun follows the verb. Note that this is a problem that occurs in most other analyses as well since the generalization about the agreement asymmetry is violated. Following Ackema & Neeleman (2003), I assume that in contexts with an overt pronoun, the overt pronoun is just a tonic double for a null (preverbal) focused pronoun. A concrete implementation of this idea could be the following: Focused pronouns are complex, consisting of a null pronoun and an overt pronoun, as shown in (30).

(30)   DP$_{\text{pro}}$

      pro$_{\text{foc}}$ DP$_{\text{pro}}$
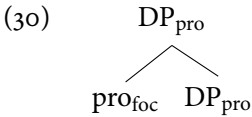
Now, either just the null pronoun or the entire complex moves to the C-Domain. If just the null pronoun moves, the overt pronoun is stranded in a postverbal position. Nevertheless, movement of the null pronoun suffices to involve edge feature insertion, which checks the EPP feature. Since the verb does not check the EPP feature on T, it can retain its number feature. This derivation is depicted in (31).

(31)   TP

pro$_{\text{foc}}$[...,#:pl]   T′   *3. EF-insertion*
      4. EF-mov.(Del. [EF], [•#•])

                  T   vP

      V+v[v,...,#:pl]   T[T,EF,#N#,•#•]   DP$_{\text{pro}}$ v′

                              5. HM (Delete [v])

3.4. Interim Summary

This section introduced the new "hybrid" approach, which is syntactic but has the spirit of a morphological approach. It has been shown how this new approach can derive the pattern generalized in section 2.3. The core idea of the approach is that number agreement itself is not constrained, but that the feature encoding number agreement on the verb can get lost throughout the syntactic derivation, namely in cases where the verb checks the EPP feature. If the subject checks the EPP feature, the number feature on the verb survives. The main observations are repeated in (32).

(32) a.   Number agreement is different from gender and person agreement.
      b.   Number agreement is dependent on the linear order of subject and verb.
      c.   Number agreement does not require surface adjacency between subject and verb.
      d.   Agreement is dependent on the grammatical function of the agreement target: Only subjects can agree.
      e.   Number agreement is dependent on whether the subject is a full nominal phrase or a pronoun.

All the observations in (32) are derived by the approach developed in this section: (32a) follows because the EPP feature in MSA is a number feature.[11] And because the EPP feature is a number feature, number on the verb is subject to CoHFeD in the TP. Gender and person, on the other hand, are not affected.

(32b) follows because subjects that end up in Spec-TP (or in Spec-CP) are linearized to the left of the verb. If the subject is in such a position, the number feature on the verb could not have been deleted.

(32c) follows because the approach is syntactic and does not make use of the concept of adjacency.

(32d) follows from the assumption that the object is inactive both for agreement with the verb and for satisfying the EPP feature.

Finally, (32e) follows since pronouns have to obligatorily move through Spec-TP. With these ideas in mind, we can now turn to the discussion of previous approaches.

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[11] This assumption will receive some discussion in section 5.

4. Previous Analyses

Agreement asymmetries in MSA have received a lot of attention over the last three decades. There are two types of accounts that have been proposed so far: First, there are syntactic analyses that assume that in certain configurations, number agreement does not arise to begin with. Second, there are morphological analyses, which argue that number agreement always applies, but that it is disguised by postsyntactic processes that rely on linear order and adjacency.

In section 3, I have developed a new approach that is in between both types: Like in morphological analyses, number agreement is modeled as a regular syntactic process, which applies early in the derivation, but is manipulated by later processes. And like in syntactic analyses, operations that affect number agreement are entirely syntactic. Morphological processes do not play a role at all. In this section, I will go into some detail about the range of theories proposed so far in the literature and compare them to the present theory with respect to their empirical coverage.

The section is structured as follows: Section 4.1 discusses previous syntactic analyses. Section 4.2 compares the new approach to morphological accounts. Finally in section 4.3, I address a more general question, namely whether preverbal subjects in MSA can be in Spec-TP at all.

4.1. Syntactic Analyses

Syntactic analyses can be further divided into two subtypes: Analyses that assume a derivational relation between SV and VS and analyses that do not assume such a relation. As for the first type, it has been proposed that either VS is derived from SV (Aoun et al. 1994, Wurmbrand & Haddad 2014) or that SV is derived from VS (Kobayashi 2013, Bjorkman & Zeijlstra (2014), Preminger & Polinsky (2015), Fakih (2016)). Each theory ultimately derives the agreement asymmetry from an interaction of movement and agreement processes in such a way that SV yields full agreement, while VS leads to partial agreement.

Theories that do not assume a derivational relation between SV and VS generally suggest that one of the two structures (VS or SV) involves a null pronoun (or a null expletive) which is the actual target of agreement. If *pro* is assumed to be in the preverbal position Mohammad (1990), it is defective for number agreement. If *pro* is in a postverbal position (Soltan 2006, Al-Horais

2009, 2012, Alotaibi & Borsley 2013) it is the only possible target for number agreement.

This brief summary suffices to identify a crucial problem of the syntactic approaches proposed so far: All of them rely on the presence of two subject positions: a postverbal one and a preverbal one. In cases where no postverbal position is available, as we have seen in the examples (4) with auxiliaries (see also the discussion in section 3.3.1), these accounts run into a problem: It is not clear how the plural agreement on the lexical verb comes about in these cases because all of these theories locate the single probe for number agreement on the T head. If one wants to maintain this idea, the only way out would be to assume a biclausal structure. While this is in principle possible (even though it is less than desirable), the question would be how the subject can be excluded from following the lexical verb. This would require additional assumptions, in those accounts, while it follows in a fairly straightforward way in the present account.[12]

4.2. Morphological Analysis

The first type of morphological analysis assumes that the number feature is deleted under adjacency of verb and subject in a VS order: After full syntactic agreement, the number feature is targeted for some deletion process in a VS order if the number feature on the respective verbal head is close enough to the subject (Benmamoun 2000, Ackema & Neeleman 2003).

The second type assumes that number agreement is not a syntactic operation to begin with: Number agreement is special and requires a postsyntactic matching process under adjacency (Walkow 2010).

While morphological analyses can in principle overcome the problem of syntactic accounts, they have another fairly obvious problem: In general, they cannot derive cases where number agreement is deleted (or comes about) and the verb and the subject are not adjacent. (33) illustrates that neither the

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[12]Note that Kobayashi (2013) does not have the same problem since movement of the subject is not a prerequisite for agreement in this approach. However, the theory has to assume that the number feature is not visible to the verb if the subject is postverbal (or c-commanded by the verb), while number is visible for agreement, if the subject is preverbal (see also Bahloul & Harbert (1992), Harbert & Bahloul (2002). Ultimately, such approaches have to ensure that agreement happens at the right point in the derivation, which is a difficulty, the present approach does not face.

postverbal subject (33a) nor the preverbal subject (33b) have to be adjacent to the verb.

(33) a. ʔakala   at-tuffaaħata al-ʔawlaadu
          eat.PST.3M.SG the-apple   the-children
          'The children ate the apple.'   (Benmamoun 2000:132)

      b. ʔal-walad-u lan   yasil-a
          the-boy-NOM will.not come.3M.SG.SUBJ
          'The boy will not come.'   (Mohammad 2000:30)

A second (minor) point is that, in general, it is more difficult to model the importance of the grammatical function under a morphological, surface-oriented approach.

To conclude, all types of previous approaches suffer from problems and difficulties that the present approach does not face.

4.3. EPP Movement in MSA?

One potential counterclaim that can be made against the present approach (as well as against all accounts locating the preverbal subject in Spec-TP) is that the subject in SV structures is not in TP, but actually in a higher position in the C-Domain. Approaches like Soltan (2006) and Alotaibi & Borsley (2013) try to show that a preverbal subject is a topic. Based on examples such as (34), they argue that the preverbal subject can only be definite.[13]

(34) a. al-ʔawlaad-u   jaaʔuu
          the-children-NOM came.3M.PL
          'The children came.'   (Alotaibi & Borsley 2013:9)

      b. *ʔawlaad-un   jaaʔuu
          children-NOM came.3M.PL
          'Children came.'   (Alotaibi & Borsley 2013:10)

However, the picture is more complex. An indefinite preverbal subject is possible if it is modified by an adjective (35a) or simply conjoined (35b), even if all conjuncts are non-specific. Also, sometimes preverbal subjects are out despite being definite (35c) (e.g. because there is no case and/or no pragmatic

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[13]Note that the sentence is only slightly marked for some speakers (Al-Ghanem, p.c.).

discrimination between object and subject). It is not obvious how all these configurations fall under the term "topic".

(35)   a.   walad-un tawiil-un jaaʔa
          boy-NOM tall-NOM came.3M.SG
          'A tall boy came.'   (Mohammad 2000:11)
       b.   walad-un wa-rajul-un   jaaʔaa
          boy-NOM and-man-NOM came.3M.DU
          'A boy and a man came.'   (Mohammad 2000:12)
       c.   *muusaa ʕiisaa qaabala
          Musa   Isa   met.3M.SG
          'Musa met Isa.'   (Mohammad 2000:4)

Furthermore, assuming that the complementizers ʔanna and ʔinna are in C, it is unclear why the subject appears to the right of these complementizers and not to left, as would be expected if the subject were in very high projection in the clause.

(36)   a.   qaala   ʔahmad-u   ʔinna ʕaliyy-an jaaʔa
          said.3M.SG Ahmed-NOM that   Ali-ACC   came.3M.SG
          'Ahmed said that Ali came.'
                                                      (Mohammad 2000:19)
       b.   *qaala   ʔahmad-u   ʔinna jaaʔa   ʕaliyy-an
          said.3M.SG Ahmed-NOM that   came.3M.SG Ali-ACC
          'Ahmed said that Ali came.'
                                                      (Mohammad 2000:20)

I conclude that since there seems to be no clear information-structural difference between preverbal and postverbal subjects, subjects in TP cannot be generally excluded. Given this, an approach that is based on EPP movement of the subject seems to be valid.

5.   Conclusion and Outlook

In this paper, I have argued for a new approach to the agreement asymmetry in Modern Standard Arabic. The data can be summarized into the five empirical observations repeated in (37).

(37)   a.   Number agreement is different from gender and person agreement.
     b.   Number agreement is dependent on the linear order of subject and verb.
     c.   Number agreement does not require surface adjacency between subject and verb.
     d.   Agreement is dependent on the grammatical function of the agreement target: Only subjects can agree.
     e.   Number agreement is dependent on whether the subject is a full nominal phrase or a pronoun.

In the present approach, these observations are derived by the following assumptions: Verbs in MSA undergo obligatory head movement to T and can in some cases check the EPP number feature on T. If they do, the subject remains in its base position in the vP and at the same time, the number feature on the verb (which has resulted from previous Agree with the subject) is deleted (because the verb undergoes Complex Head Feature Deletion). If the verb does not check the EPP feature, the subject can move to the preverbal position and the verb retains its number feature.

   (37a) is due to number, but not gender or person being the EPP feature in MSA. (37b) follows because every preverbal subject has to move through Spec-TP, which means that the number feature on the verb is not deleted. (37c) naturally falls out from the approach because there is no process that requires linear adjacency. (37d) follows from the assumption that the object is not an active goal either for agreement or for EPP movement. Finally, (37e) is due to the assumption that pronouns, in contrast to full noun phrases, undergo obligatory EPP movement.

   Even though, the new approach nicely captures the Arabic data, it makes an important prediction for the EPP property that still needs to be confirmed. The prediction is that there should be at least six different language types with respect to the EPP property. The typology predicted by the present account is summarized in (38).

(38)   a.   [D]: The verb is not able to check the EPP feature and any noun phrase might check the EPP property. There are no agreement asymmetries.
     b.   [#]: The verb is able to check the EPP feature and agreement asymmetries in number should occur.

c. $[\pi]$: The verb is able to check the EPP feature and agreement asymmetries in person should occur.
d. $[\gamma]$: The verb is able to check the EPP feature and agreement asymmetries in gender should occur.
e.   [case]: The verb is not able to check the EPP feature and only noun phrases with case might check the EPP property. There are no agreement asymmetries.
f.   no EPP: The language has no EPP property.

While MSA is a clear case of (38b), it is unclear at this point if the typology is correct. As for (38a) and (38e), these types should be easy to find, as they are not predicted to show agreement asymmetries. The difference between the two types should be which arguments can ultimately check the EPP. Regarding (38c), this type should comprise languages without pro-drop that show an agreement asymmetry in person. If there is a connection between verbs being able to check the EPP and pro-drop, as Alexiadou & Anagnostopoulou (1998) suggest, this type might not exist for independent reasons. (38d), i.e. languages that show an asymmetry in gender, are clearly predicted to exist (see Samek-Lodovici 2002 for potential evidence). And finally, languages without any EPP property should exist. I leave this typology to future research.

Lastly, it is important to mention that the agreement pattern in Arabic is even more complicated than described in this paper once coordination (Aoun et al. 1994) and raising (Wurmbrand & Haddad 2014) is taken into account. It is well known that MSA is a language that has left conjunct agreement and is a backward raising language. I again leave these issues to future research.

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