ISSN: 2278-4012, Volume:11, Issue:4, October 2022

The Phenomenon of Agreement through the Lens of HPSG in Modern Standard Arabic

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Abstract

The aim of this paper is to provide a syntactic analysis of the phenomenon of agreement in Modern Standard Arabic (MSA) under the umbrella of HPSG (Head-Driven Phrase Structure Grammar). Two types of agreement have been investigated: CONCORD agreement and INDEX agreement. The former covers the features of NUMBER, GENDER, and CASE while the latter covers PERSON, NUMBER, and GENDER. These agreement types are represented as features in HPSG. Different word orders in MSA can influence the way phrases are analyzed in HPSG called agreement asymmetry. Specifically, subject-verb agreement asymmetry. HPSG accounts for such asymmetry in MSA through the phenomenon of improvised agreement where Beller (2007) suggests a new constraint labeled Argument Structure Agreement Principle (ASAP). This particular constraint groups the features of PERSON and GENDER to be a single subtype (PG) of the feature AGR. Therefore, the verbs will be demanded to have the same PG feature as that of its first argument.

Keywords: HPSG, Agreement, MSA, Improvised agreement.

Introduction

The linguistic formalism known as HPSG is one of the few theories that has shed light on the phenomenon of agreement. Such a theory is very powerful since it can be used as a tool that can describe languages through predictive analysis. It can predict which linguistic expression belongs to which language minimally. This paper aims at presenting a syntactic description of the phenomenon of agreement in MSA from an HPSG point of view and how this particular theory accounts for agreement asymmetry in MSA. The reason behind choosing agreement is due to its importance in the syntactic field as a whole chapter is dedicated towards this subject in the framework of the HPSG theory (Pollard & Sag, 1994). Moreover, there have been different analyses when it comes to the different word orders in MSA. We will deal with these word orders when it comes to providing a syntactic analysis under the shadow of agreement.

The Theory of HPSG

We can characterize the theory of HPSG as a comprehensive, eclectic and generative linguistic formalism (Przepiórkowski & Kupść, 2006). In other words, it is a constraint-based approach

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that serves the establishment and implementation of languages' natural grammar. When we say formalism, we mean that this theory is a figure of formal tools that are utilized in order to formalize linguistic analyses of many phenomena. On the other hand, when we label HPSG as a theory we mean that it is a collection of analyses of these phenomena that are expressed in that formalism. These collections of analyses come from multiple languages and one of the phenomena that HPSG accounts for is agreement. This combination of formalism and theory has its own properties and elements and assumes only well-formed constraints to which linguistic objects must conform.

It is also considered to be a monostratal theory. It views the syntactic structure of whatever sentence there is to be a single, simple constituent that needs to adhere to a particular structure. It also assumes that if a linguistic object has a property, then it must have another property. Moreover, the grammar in HPSG consists of a set of many types of words and phrases along with a set of constraints to which these words and phrases are subjected to. These constraints can result in an accumulation of properties and elements of only a single linguistic object. Generally, this particular theory involves viewing the language as a system of signs that includes either words or phrases which are a buildup of constructions of meanings.

One thing to note about HPSG is that it has nothing to do with transformational grammar as such a theory does not involve the process of movement as with other transformational grammar theories. The reason behind this is that the values of the features must be the same as the other values of the features to be moved (Borsley & Jones, 2005). Nevertheless, we need to understand how the phenomenon of agreement is accounted for in HPSG and how this particular theory provides full syntactic analysis of sentences which will be discussed in the upcoming sections.

The Phenomenon of Agreement

It is mostly known, as discussed by Ravera (1992), that there are two identical types of agreement where each one of them deserves a separate treatment. These types include the morphosyntactic agreement along with the index agreement. She provided analyses of both agreement types that are supported by natural languages and developed within the framework of HPSG.

The first type of agreement can be labeled as internal agreement (Lehmann, 1988) or syntactic agreement which involves coverage of a number of categories. To be more specific, it involves the categories of NUMBER, GENDER, and CASE between the head noun and its modifier whether it was an article, an adjective, or a quantifier (Wechsler & Zlatic, 2001, 2003). In HPSG, this kind of agreement is termed as concord agreement which makes the values of the feature CONCORD (in other works, known as ARG). An example of concord agreement in MSA is shown in sentence (1):

(1) al-taalibaat-u al-raʔeʕaat-u
The-students.Pl.FEM.NOM the-great.Pl.FEM.NOM
'The great students.'

Another example of concord agreement is given in the language of Greek (Netter, forthcoming:30):

(2) der alie Bearnte.
The.NOM.SG.MASC.ST old. NOM.SG.MASC.WE official.NOM.SG.MASC.WE

'The old official.'

The second type of agreement that we have is index agreement, as termed by Pollard and Sag. This particular kind of agreement is prototypically known to revolve around the agreement between the pronoun and its antecedent. However, Ravera argues that subject-verb agreement can be considered as an instance of such a type. Index agreement features are the values of the feature INDEX that cover the categories or features of PERSON, NUMBER and GENDER since a pronoun and its antecedent share the same case, then there is no need to list it in INDEX. An example of index agreement in MSA would be the agreement between the possessive pronoun -*hu* and its antecedent *al-tiflu* as in (3)

(3) al-tiflu nasa luʕbata-hu
The-child.1SG.MAS nasa.PAS luʕbata-hu.1SG.MAS
'The child forgot his toy.'

Agreement Features Representation in HPSG

In the previous section, we have discussed the types of agreement. However, it is important to see how these agreements are represented as features in HPSG using the structure of attribute-value matrix (AVMs) which is a system of representation where the name of the type is located on the left-hand side. The features, written in upper case, are located below along towards the left with their values which are written in a small case, positioned towards the right (Abeillé & Borsley, 2021). The first type which is concord agreement has the value of a feature CONCORD and it is also considered to be a part of the feature CATEGORY (CAT).

The other type of agreement, index agreement, has the value of a feature INDEX that is a part of the feature CONTENT (CON). There have been multiple arguments regarding whether or not subject-verb agreement is considered as an example of INDEX agreement or CONCORD agreement. Wechsler sees it as an example of INDEX while Levine (2010) argues that it is an example of CONCORD. As mentioned before, CASE is not listed as a part of INDEX, yet PERSON could be a part of CONCORD as shown in figure (1).

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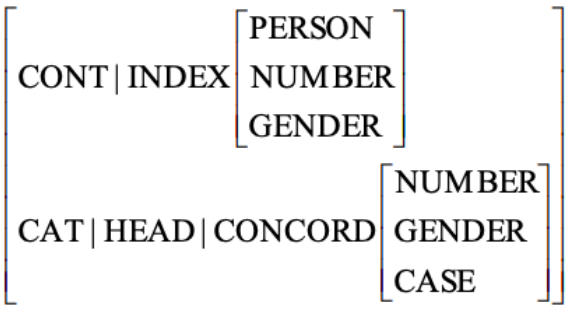
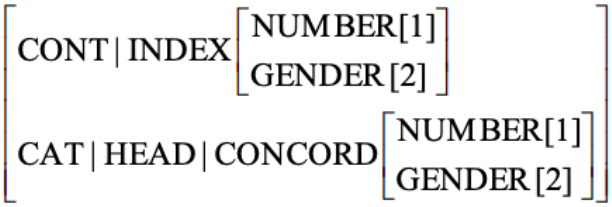
Figure: 1



In most cases, NUMBER and GENDER will have the same values both in CONCORD and INDEX as shown in figure (2).

Figure: 2



Yet, having the same value of number is not the case in MSA as the researcher observed that these values may not always be the same. To support such a claim, it is mentioned before that NP-internal agreement is the main example of concord agreement and that subject-verb could be an example of index agreement, regardless of the controversy. Now if we have the following sentence in MSA:

(4) Xarajat al-taalibaat-u al-raʔeʕaat-u
Left.SG.FEM.PAS students.PL.FEM great.PL.FEM
'The great students left.'

We will take the NP-internal which is the noun along with its modifier that is the adjective (*al-taalibaat-u al-raʔeʕaat-u*) and the subject-verb agreement (*Xarajat al-taalibaat-u*). We can see that with the CONCORD agreement the values are the same where the noun and the adjective share the same values for NUMBER and GENDER. However, when it comes to the INDEX agreement, the verb and the subject do not share the same number. Therefore, *al-taalibaat-u* will have the following value as shown in figure (3):

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Figure: 3

$$\begin{bmatrix} \text{CONT} \mid \text{INDEX} \begin{bmatrix} \text{NUMBER } \textit{plur} \\ \text{GENDER } \textit{fem} \end{bmatrix} \\ \text{CAT} \mid \text{HEAD} \mid \text{CONCORD} \begin{bmatrix} \text{NUMBER } \textit{sing} \\ \text{GENDER } \textit{fem} \end{bmatrix} \end{bmatrix}$$

We could tell that there is an issue when it comes to considering which phrases belong to which type of agreement. However, to be on the safe and logical side of analyzing MSA sentences when it comes to the agreement phenomenon, we will consider INDEX agreement in the following analysis of MSA sentences. Therefore, subject-verb agreement will be a type of INDEX agreement when it comes to this particular language.

MSA Word Order Effect on Agreement

It seems that the word order of any language there is can play a major role in the way we analyze the structure of a particular sentence when it comes to many syntactic theories. It is a considerable issue since it can trigger major changes in the analysis. We will account for both word orders in MSA which are SVO and VSO and how each word order has an influence on the way we analyze the phenomenon of syntactic agreement (Mohammad, 1990, 2000)

According to the traditional Arab grammarians Al-Khalil (786), Sibawayh (796) and Ibn Hisham (1360), the way we label Arabic sentences depends on their word order; more specifically, which constituent the sentence starts with. Those grammarians divided the Arabic sentence into two dominant types: verbal and nominal. If the sentence starts with a verb, then it is a verbal sentence and has the VSO order. However, if it starts with a noun phrase (NP), then it is a nominal sentence with the SVO order.

Word order, with respect to agreement, causes some alternations called agreement asymmetry; more specifically, subject-verb agreement asymmetry which has caught a considerable amount of attention from researchers and syntacticians in the last two decades (Bahluol & Harbert, 1992). It is with SVO word order where we would obtain the full agreement as we can see in the following examples:

(5) ɑl-ʔɑwlɑɑd-u nam-uu (SV, full agreement achieved)
The-boys.3.PL.MAS slept.3.PL.MAS
'The boys slept.'

(6) nam-a ɑl-ʔɑwlɑɑd-u (VS, partial agreement achieved)

Slept.3.SG.MAS the-boys.nom.3.PL.MAS

As we have seen with previous examples, we can observe that MSA depends on the placement or the position of the subject when it comes to the phenomenon of agreement. We can obtain a full agreement in the case of preverbal DPs as in (5). On the opposite side of the spectrum, partial agreement is obtained in the post-verbal DPs as in (6). The latter cannot achieve a full agreement as shown in (7) and the former cannot achieve a partial agreement as demonstrated in (8):

(7) *nam-uu ɑl-ʔɑwlɑɑd-u (VS, full agreement not achieved)
Slept.3.PL.MAS the.boys.nom.3.PL.MAS

(8) *ɑl-ʔɑwlɑɑd-u nam-aa (SV, partial agreement not achieved)
The-boys.3.PL.MAS slept.3.SG.MAS

To contrast MSA, there are other Arabic dialects that do not show such asymmetry in agreement or so-called subject-verb agreement asymmetry (SVAA). Lebanese Arabic (LA) along with Moroccan Arabic (MA) are perfect examples of the neglect of SVAA phenomenon. As shown in the following examples of MA taken from Aoun et al. (1994, p. 196):

(9) lə-wlaad nʕas-u (SV, full agreement achieved) (MA)
The-children slept.3p.pl
'The children slept.'

(10) nʕas-u lə-wlaad (VS, full agreement achieved)
Slept.3p.pl the-children

Najrani Arabic (NA), a dialect spoken in the Southern part of Saudi Arabia, shows a similar situation to that of MA and LA when it comes to the neglect of SVAA (Fakih & Al-Sharif, 2017) as in the following examples:

(11) el-ʕyaal jlesau (SV, full agreement achieved)
The-boys sat.3p.pl.m
'The boys sat down.'

(12) *el-ʕyaal jalas (SV, partial agreement)
The-boys sat.3p.sg.m

When it comes to asymmetry in agreement, MSA is not the only language that displays such a thing for number. French shows agreement asymmetry between the second person plural pronoun *êtes* and the predicative adjective *belle* which is singular in example (13):

(13) Vous êtes belle.
You-POL are-2ND.PL beautiful-SG.FEM
'You are beautiful.'

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However, Pollard and Sag assume that predicative adjectives in French do not introduce any specification for number, but only for gender. Therefore, we can see that there is a similarity between MSA and French when it comes to agreement asymmetry in number. The question here is how does HPSG account for this kind of agreement asymmetry in MSA. This question will be explored in the next section.

Impoverished Agreement

Agreement in MSA, generally, has been extensively studied in many syntactic models; especially, Transformational model presented by Chomsky (1995) which is the *Minimalist Program*. However, our concern here is how HPSG looks at such a phenomenon. We could benefit from Sag, Wasow and Bender's lens in their book *Syntactic theory* (2003) and how these researchers viewed agreement from an HPSG perspective. We know that in subject initial sentences, the verb agrees with the subject in GENDER, NUMBER and PERSON while in verb initial sentences the verb agrees with the subject only in PERSON and GENDER. Therefore, it remains singular, as a default whether dual or plural subjects were provided. This phenomenon is called impoverished agreement. Despite the difference in the word order, the meaning is the same.

Subject-verb agreement in the *Minimalist Program* is treated by checking the features in the Specifier-Head Relationship. Basically, this approach considers the property of the relationship of elements by their relative location in the tree structure. However, when it comes to HPSG, agreement is indicated by the process of tagging and the sharing of the AGR (Agreement) feature structure. Such a property; therefore, of words and lexical entities is nowhere dependent on their position in the tree structure as in the *Minimalist Program*. We have stated that HPSG is a constraint-based approach and poses many constraints. Thus, agreement is governed by the Specifier Head Agreement Constraint (SHAC) on inflectional lexemes (*infl-lxm*) as shown in figure (4):

Figure: 4

$$\begin{bmatrix} \text{HEAD} & [\text{AGR } \boxed{1}] \\ \text{VAL} & [\text{SPR} \langle [\text{AGR } \boxed{1}] \rangle] \end{bmatrix}$$

Infl-lxm is considered to be a subtype of lexeme which is the supertype dominating *cn-lxm* (common nouns) and *verb-lxm*. SHAC states that whatever AGR value an *infl-lxm* has, it will be tagged with the AGR value of that of its SPR feature. We should understand that possessors and determiners are analyzed as the value of the SPR feature for type *noun* elements. In our case, the first NP in subject-initial phrases is analyzed as the SPR of the head *verb*. Therefore, if we look

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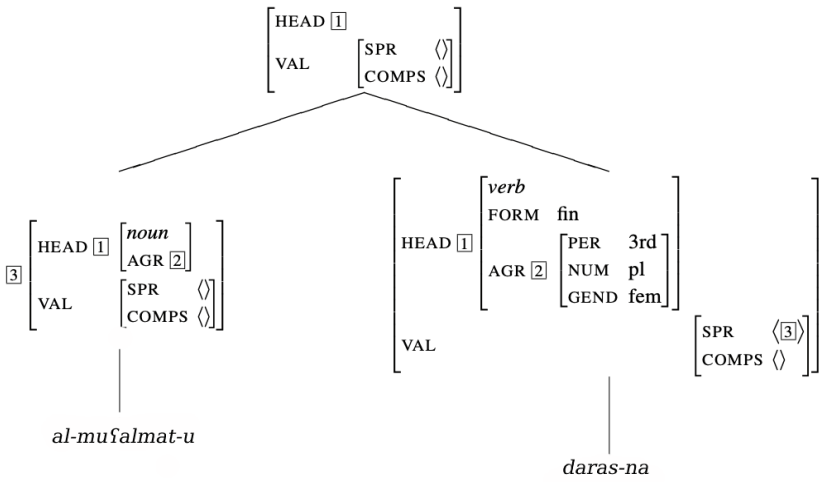
at example (14) which employs a transitive verb in MSA we will have the following analysis of this phrase shown in figure (5):

(14) al-muʕalmat-u daras-na al-taalibaat.
The-teachers.FEM.PL.NOM taught.PST.3.FEM.PL the-students.FEM.PL.ACC

'The teachers taught the students.'

Figure: 5



We could tell that SHAC demands the subject and the head to have the same AGR feature tagged in both analyses of the constituents. However, it only accounts for subject-initial sentences and fails to account for improvised agreement (VSO).

HPSG Account of Impoverished Agreement

In MSA, we need to account for three empirical observations when it comes to providing an analysis for the feature of AGR. These observations include the constraint that demands the subject complement to agree with the verb in PERSON and GENDER, the object complements need not to agree with the verb and subject and object complements need not to agree with each other (Beller, 2007). Unfortunately, the consideration of these empirical observations causes an issue when it comes to constraining the COMP value of the head verb since in SVO the head verb does not agree with its COMP. Therefore, the best way to deal with this is to constrain not the head verb's COMP but rather its ARG-ST.

It is a no-brainer that the subject is the first argument in the value of ARG-ST feature even for both word orders. Since Sag, Wasow, and Bender utilize the ARG-ST list in order to constrain

ISSN: 2278-4012, Volume:11, Issue:4, October 2022

the subject of finite verbs to be nominative and use the concept *outrank* to assign an accusative case, Beller (2007) suggested a new constraint, to which the researcher completely agrees with, and calls it the ASAP. This constraint is added in order to tag the AGR feature of a verb with its first argument and is considered as a type of *verb-lxm* which is a subtype of *infl-lxm*. The purpose of ASAP is to tag the AGR feature of PERSON and GENDER of a lexeme with the PERSON and GENDER of the first member in the ARG-ST of that lexeme's list as shown in figure (6):

Figure: 6

$$\begin{bmatrix} \text{SYN} & \left[\text{AGR}\ \left[\text{PG}\ \boxed{1}\right]\right] \\ \text{ARG-ST} & \left\langle\left[\text{AGR}\ \left[\text{PG}\ \boxed{1}\right]\right], \ldots\right\rangle \end{bmatrix}$$

The way this is done is that PERSON and GENDER are grouped together to create the feature PG which will be considered as a subcategory of the feature AGR to distinguish it from NUMBER. Therefore, we will have the following structure of the feature AGR shown in figure (7):

Figure: 7

$$\begin{bmatrix} \text{AGR} & \begin{bmatrix} \textit{agr-cat} \\ \text{NUM} \\ \text{PG} & \begin{bmatrix} \textit{pg-cat} \\ \text{PER} \\ \text{GEND} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

Let's try laying out this analysis on the same transitive verb given in example (14) reproduced in example (15):

(15) Daras-at al-muʕalmat-u al-taalibaat.
Taught.PST.3.FEM.SG the-teachers.FEM.PL.NOM the-students.FEM.PL.ACC

'The teachers taught the students.'

(16) *Darars-na al-muʕalmat-u al-taalibaat.
Taught.PST.3.FEM.PL the-teachers.FEM.PL.NOM the-students.FEM.PL.ACC

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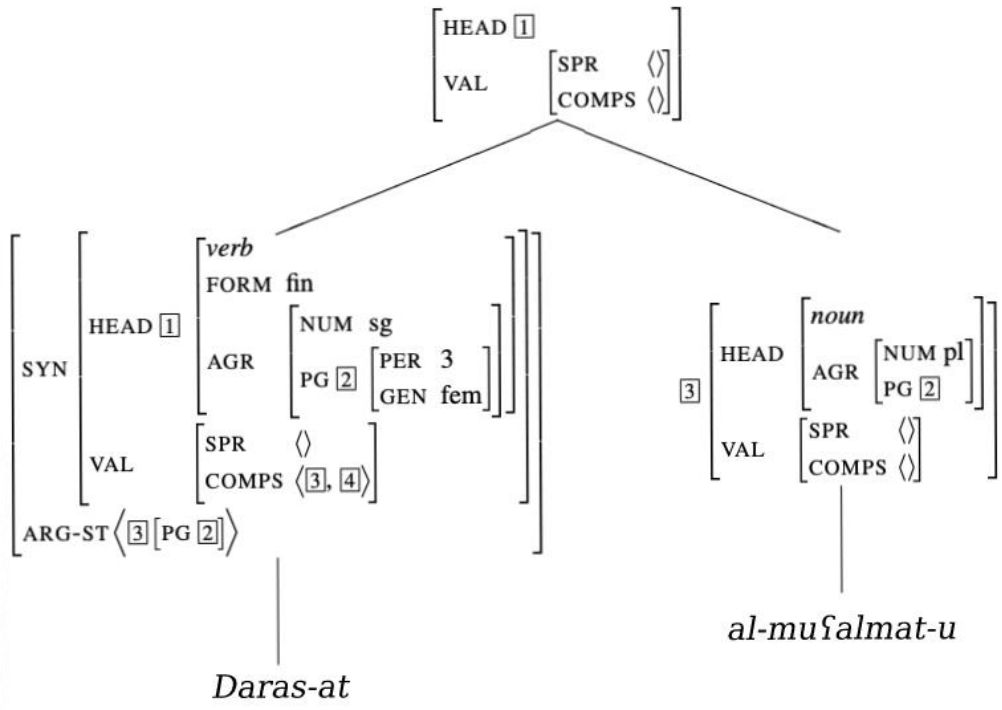
Figure: 8



From the above analysis, we can tell that the subject is tagged as the first argument in the ARG-ST of that of the head verb. Therefore, the argument will also inherit the same AGR values as that of the head verb; most importantly, the PG features since both the head and the subject differ in the value of NUM. The NUM feature is not constrained by the ASAP in MSA.

Of course, the mother nod does not provide any indication towards the AGR feature of its daughters nor does it have an ARG-ST since it is not a word in the first place. The COMP feature of the mother nod is omitted according to the Empty Complement Constraint (ECC) that requires all phrases to have the value of an empty list for the COMP feature. ASAP constraints all verbs that can head sentences along with the fact that ASAP is even in its effect on verbs in SVO phrases that are constrained by SHAC. However, we could tell that both constraints, SHAC and ASAP, divide the phenomenon of agreement in Arabic differently. From the above analysis, it was clear that ASAP constrained the feature of PG which included person and gender while SHAC minimally constrained number agreement, yet the latter does not really show if it constrains only number agreement or the full agreement. Nevertheless, full agreement analysis is obtained in both ways since it is a necessity to have the SPR as the first argument in the ARG-ST list of the head.

Conclusion

The purpose of this paper is to provide a syntactic analysis of the phenomenon of agreement in MSA. We have investigated two types of agreements which are CONCORD agreement along with INDEX agreement. Each feature covered different categories, yet our focus was towards

index agreement which covered the features of PERSON, NUMBER and GENDER. Agreement in MSA is influenced by which constituent the sentence starts with. Therefore, we would have subject-initial sentences and verb-initial sentences. The latter exhibits agreement asymmetry where the subject agrees with the head in person and gender but not number.

Beller proposed a constraint called ASAP that accounts for such an asymmetry where

person and gender were grouped together as PG which is treated as a subcategory feature of the AGR feature separated from number. This particular constraint demands the head verb to be tagged with the same PG values as that of its first member in the ARG-ST. ASAP was proposed since SHAC does not account for improvised agreement. Therefore, we can conclude that ASAP is a stronger constraint than SHAC in MSA since it accounts for person and gender while the latter only accounts for number.

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