Hybrid Agreement as a Conflict Resolution Strategy

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1   Introduction

Situations in which conflicting constraints clash can potentially provide linguists with insights into the architecture of grammar. This paper deals with such a case. When predicative modifiers of morphologically rich languages head relative clauses, they are involved in two agreement relationships. As modifiers, they are subject to agreement constraints between heads and their modifiers, while as predicates, the are required to engage in an agreement relationship with their subject.

The non-finite relative clause construction in Standard Arabic (SA) is such a case. Indeed, Doron & Reintges (2005:10) claim that the existence of this construction implies "that a linguistic structure is constructed procedurally rather than checked declaratively, in other words as a derivation rather than a representation". This paper examines the SA construction, as an example of one possible conflict resolution strategy, and considers alternative resolution strategies exhibited by Turkish, Older Egyptian, and Hebrew. In addition, it investigates whether Doron & Reintges's (2005) claim is correct, or whether this phenomenon can be accounted for in the declarative framework of HPSG.

After providing a detailed analysis of the phenomenon, the paper concludes that the HPSG theory of agreement (Pollard & Sag 1994, Kathol 1999, and Wechsler & Zlatić 2003), and in particular its analysis of hybrid agreement, provides a sophisticated mechanism for accounting for the challenging SA construction, as well as for other alternative conflict resolution strategies. Moreover, the proposed analysis extends the implications of the theory.

2   Participles and adjectives in Standard Arabic

Participles and adjectives as predicates and modifiers

Participles and adjectives in Standard Arabic (SA) can be used as predicates. In such case they agree in NUMBER and GENDER with their subject and are usually marked with nominative case.

(1) al-mara'a-tu   naa'im-a-tu   fi bayt-i-ha
     the-woman.**SF**-NOM sleeping.PTCP.**SF**-NOM in house-GEN-SF

     "The woman is sleeping in her house."

When used attributively, adjectives and participles agree in NUMBER, GENDER, DEFINITENESS, and CASE with the noun they modify.

(2) ra'aytu mara'a-t-an   naa'im-a-tan
    I.saw woman.**SF-ACC** sleeping.PTCP.**SF-ACC**

    "I saw a sleeping woman."

In addition, participles and adjectives can head non-finite relative clauses (NF-RCs). Similarly to reduced relative clauses, NF-RCs in SA are not headed by a relativizer of any sort. When the referent of the relative head is construed as the subject of the relative clause, the head of the RC, be it a participle or an adjective, exhibits full NUMBER-GENDER-CASE-DEFINITENESS agreement with the relative head.

(3) 'ijtama9tu bi-rajul-in   saariq-in   qalam-an
    I.met   with-man.**SM-GEN** stealing.PTCP.**SM-GEN** pen-ACC

    "I met a man (who is) stealing a pen."

Alternatively, the referent of the modified noun can be construed as a non-subject argument of the participle, similarly to a non-subject relative clause. In this case, the subject of the relative clause is assigned nominative case, and a resumptive pronoun obligatorily appears in the relativized position.

This constructions imposes two different agreement constraints on the head of the NF-RC. As a noun modifier, it is required to exhibit full agreement with its head. As a predicate, it is required to exhibit NUMBER-GENDER agreement with its subject. Thus, when the relative head and the RC-internal subject differ in their NUMBER and GENDER features, a conflict arises.

Resolving conflicting constraints

The strategy espoused by SA, as is illustrated in (4), it to split the agreement properties: the head of the RC agrees with the relative head in CASE and DEFINITENESS and with its subject in NUMBER and GENDER. This construction is referred to as *na't sababi* in the Arabic tradition (Elsaid Badawi & Gully 2004).

(4) a. 'ijtama9tu bi-l-marat-i   [l-jaalis-i   zawj-u-haa]
       I.met   with-the-woman-GEN the-sitting.PTCP.SM-GEN husband.SM-NOM-POSS.3SF

       "I met the woman whose husband is sitting."

    b. ra'aytu mra'a-t-an   jamil-an   wajh-u-haa
       I.saw   woman.SF-ACC beautiful.SM-ACC face.SM-NOM-POSS.3SF

       "I saw a woman with a beautiful face."

Nevertheless, this strategy is not necessarily the most obvious one for a language to take. Other strategies are (1) agreement only with the head noun, (2) agreement only with the subject, and (3) avoidance.

Examples of languages which adopt the first two strategies are discussed by Doron & Reintges (2005). In Older Egyptian participles do not agree with their subject. As heads of RCs, they do agree with the relative head in NUMBER and GENDER. CASE and DEFINITENESS are not marked. In Turkish, on the other hand, there is no overt head-modifier agreement, and consequently Turkish participles in non-subject relative clauses agree only with their subject.[1] Note, however, that there is no real conflict in these two languages. The interesting question, then, is whether languages that exhibit both subject-predicate and head-modifier agreement necessarily adopt the SA strategy.

Modern Hebrew (MH), which falls in this category, employs the third strategy listed above — avoidance. While subject NF-RCs are commonplace in MH, their non-subject counterparts are disallowed. Consider the examples in (5) of a subject NF-RC.

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[1]Examples are suppressed due to lack of space.

(5) (ha-)'anashim   ha-mexakim   ba-taxana
    (the-)people.PM HA-waiting.PTCP.PM in-the-station

    "(The) people waiting in the station"

The participle in MH exhibits full NUMBER-GENDER agreement with its subject, when it functions as
a predicate, and with the modified noun, when it functions as a modifier. Case is not morphologically
marked. Although the noun-adjective relation requires definiteness agreement (agreement is marked
with the prefix *ha-*), this is not the case with nouns modified by NF-RCs. Note, however, that the partici-
ple *mexakim* 'waiting' is prefixed with *ha-*, which is homophonous with, and diachronically related to
the definite prefix. While the exact category of this prefix glossed 'HA' is controversial, it is nevertheless
distinguished from the definiteness marker.[2] Moreover, note that the prefix HA appears, regardless of
the definiteness of the relative head.

Although MH adopts avoidance as its strategy, in Talmudic Hebrew and especially in Hebrew texts
from the middle ages there are examples of concurrent uses of the first two strategies (Perets 1967).
Thus, participles which agree only with their relative head (6a) appear alongside participles which agree
only with their subjects (6b).[3]

(6) a. ha-davar   ha-mevukash   yedi'a-to
       the-thing.SM HA-expected.PTCP.SM knowledge.SF-POSS.3SM

       "The think whose knowledge is expected"

    b. xovot   ha-kavua   la-hem   zman
       debts.PM HA-defined.PTCP.SM to-them.PM time.SM

       "Debts for which a time was defined"

The instability of the alternating strategies and the fact the neither survived the test of time suggest that
these strategies are not favorable in such circumstances. Naturally, this cannot be taken as hard evidence.
However, I have yet to find examples of other languages which employ either of the two strategies.

The phenomena described here poses challenges to theories of agreement. In what follows I outline a
theory of agreement which I later show provides an adequate framework in which to account for the split
agreement strategy of SA, as well as the other available strategies of resolving conflicting constraints on
agreement.

3   A theory of agreement

Two types of agreement

The theory of agreement developed by Pollard & Sag (1994), Kathol (1999), and Wechsler & Zlatić
(2003) in the HPSG framework, and within a descriptive approach by Corbett (1988), distinguishes
between two types of structural agreement: *morphosyntactic agreement* (also referred to as 'concord'),
and *index agreement* (also referred to as 'semantic agreement'). The two types are distinguished in terms
of the features sets that they involve and in their domain of application.

Morphosyntactic agreement generally involves the features: CASE, NUMBER, and GENDER and is
related to the formal properties of the elements involved. The domain of morphosyntactic agreement is
generally 'local', or 'NP-internal', that is agreement between nominals, determiners and adjectives. An
example of morphosyntactic agreement in Serbian/Croatian is given in (7) (Wechsler & Zlatić 2003:14).

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[2]See discussion in Doron & Reintges (2005).

[3]In this historical period Hebrew was only used as a written language. Thus, the authors of these texts were not native
speakers of the language.

(7) ov-a   star-a   knjig-a
    this-NOM.F.SG old-NOM.F.SG book-NOM.SG(F)

Index agreement, on the other hand, is determined by meaning, or more specifically reference. Thus, when two elements share referential indices they in fact refer to the same entity. The feature set which is generally involved in this type of agreement includes the features PERSON, NUMBER, and GENDER. These features are grammaticalizations of semantic anchoring conditions. Thus, for example, the English noun *boy* must refer to a single masculine entity. The domain of index agreement generally includes pronouns and finite verbs.

Hybrid agreement

The aforementioned approach to agreement is motivated by a phenomenon referred to in the literature as 'hybrid agreement' or 'mixed agreement'. A Serbian-Croatian example of such a case is given in (8).

(8) Ta   dobra   **deca**   su   doš-l-a
    that.SF good.SF children AUX.3P come.PPRT.PN

    "Those good children came." (Wechsler & Zlatić 2003:51)

The collective noun *deca* 'children' triggers feminine singular agreement on NP-internal items, neuter plural agreement on pronouns, finite verbs and finite auxiliaries, and an indeterminate form on participles. In considering such cases, Wechsler & Zlatić (2003) propose an analysis according to which nouns like *deca* are lexically specified as having hybrid agreement. A partial description is given below.

$$(9) \begin{bmatrix} \text{CONCORD} & \begin{bmatrix} \text{NUMBER} & sing \\ \text{GENDER} & fem \end{bmatrix} \\ \text{INDEX} & \begin{bmatrix} \text{NUMBER} & plur \\ \text{GENDER} & neuter \end{bmatrix} \end{bmatrix}$$

The different agreement properties triggered by *deca* are each related to a different agreement feature-bundle and agreement relation.

This bifurcation of agreement properties is used in the literature to account for similar complex agreement phenomena in various languages (e.g., English, Russian, and Spanish) in the HPSG framework (Pollard & Sag 1994; Kathol 1999) and other approaches (Corbett 1988). In what follows I will claim that this mechanism provides a key to the analysis of the conflict resolution strategies which are in the focus of this paper. Nevertheless, there is an important distinction that needs to be made between hybrid nouns, such as *deca* and the predicative modifiers discussed here.

The conflicts that need to be resolved by hybrid nouns are 'internal', or 'self-imposed'. They are the result of a mismatch between the formal properties of a noun and its semantic reference, which is a lexical property of a particular closed class of lexemes. The agreement conflict exhibited by non-subject NF-RCs, on the other hand, is an 'external' conflict imposed on the head by virtue of its function as both a predicate and a modifier in a completely regular and productive construction.

4   A constraint-based analysis of the non-finite relative clause

Participles, and adjectives have both nominal morphosyntactic (GENDER, NUMBER, CASE, DEFINITE-NESS) and semantic agreement properties. Moreover, they can can function as either predicates, modifiers, or predicative-modifiers. As predicates, they exhibit subject-predicate agreement which is realized

in the matching of the semantic INDEX properties of the NP subject with their corresponding CON-CORD properties on the predicate. Yet unlike finite verbs, participles and adjective are not marked for PERSON. Consequently subject-predicate agreement involves only the features NUMBER and GENDER.

As modifiers, participles and adjectives are subject to a number of constraints. First, modifiers structure-share the INDEX of the noun they modify (Pollard & Sag 1994:51). In addition, as was described earlier, modifiers in Standard Arabic exhibit full morphosyntactic agreement with the morphosyntactic agreement properties of the noun they modify. However, when participles or adjectives are predicative-modifiers they exhibit **partial morphosyntactic agreement** with the noun they modify — only in DEFINITENESS and CASE — and full semantic agreement. This property, a clear departure from 'standard' constraints in SA, is what enables the language to adopt its particular conflict resolution strategy. Moreover, an omission of this property results in the conflict resolution strategy adopted by MH, namely avoidance.

At the clausal level, NF-RCs are not headed by a relative pronoun or relativizer. This construction is similar to reduced relative clauses in English (e.g., *the man standing in the doorway*). Sag (1997) proposed that reduced relative clauses be licensed by a *reduced-rel-cl* type, in which the unexpressed subject (PRO) is co-indexed with the MOD value. The MOD value and the co-indexation are not lexical properties of the head of the RC, rather they are defined constructionally, as a property of the type *reduced-rel-cl*.

Sag's analysis cannot be applied to NF-RCs in SA. First, unlike reduced relative clauses in English, in which the relativized position is necessarily the subject, NF-RCs in SA are not restricted to the relativization of a particular grammatical function. Moreover, I claim that the MOD property of NF-RC is lexically specified for the participle. This captures the dual role of participles or adjectives as both predicates and modifiers. At the same time, the link between the indices of the relative head and the relativized position is defined constructionally, in order to account for the two variants: *subj-non-fin-rel-cl* and *non-subj-non-fin-rel-cl*. The appropriate type constraints are given in (10).[4]

$$
(10) \quad
\begin{bmatrix}
\textit{subject-non-fin-rel-cl} \\[4pt]
\text{HEAD}
\begin{bmatrix}
\textit{pred-mod} \\
\text{MOD}\ [...\text{INDEX}\ \boxed{1}]
\end{bmatrix} \\[10pt]
\text{SUBJ}\ \left\langle\, [...\text{INDEX}\ \boxed{1}]\, \right\rangle
\end{bmatrix}
\qquad
\begin{bmatrix}
\textit{non-subject-non-fin-rel-cl} \\[4pt]
\text{HEAD}
\begin{bmatrix}
\textit{pred-mod} \\
\text{MOD}\ [...\text{INDEX}\ \boxed{1}]
\end{bmatrix} \\[10pt]
\text{HD-DTR}\ [...\text{RESUMP}\ \boxed{1}]
\end{bmatrix}
$$

The proposed architecture provides a unified way of accounting for the split agreement strategy adopted by SA, without requiring major construction-specific stipulations. The morphosyntactic agreement properties of the head of the NF-RC are split into NUMBER-GENDER and DEFINITENESS-CASE, where the former are those properties which occur at the intersection of morphosyntactic and semantic agreement, while the latter are specific to morphosyntactic agreement. The heads of non-subject NF-RCs exhibit hybrid agreement, in that their morphosyntactic PERSON-NUMBER properties do not match their semantic counterparts. In subject-non-finite-RCs full agreement is attained as a consequence of the constructional constraint which matches the INDEX properties of the unrealized SUBJ with those of the relative head.[5]

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[4]Note that the exact HPSG analysis of resumptive pronouns is immaterial here. This representation is adopted from Vaillette (2002), where the nonlocal feature RESUMP stores the index of the resumptive pronoun and is propagated similarly to other nonlocal features.

[5]A completely fleshed out analysis of the two constructions appears in the full version of the paper and is currently in the process of being implemented computationally.

5 Conclusion

The conflict resolution strategy adopted by SA, whereby the agreement properties of the head of the non-subject NF-RC are split between those which agree with the relative head and those which agree with the subject, provides a serious challenge to any formal linguistic theory. An adequate theory should unquestionably provide an account for such a construction, as well as for other existing strategies. Moreover, a bigger challenge for a linguistic theory is to incorporate the account into a larger context.

The analysis provided here is couched in the HPSG framework. Although the SA construction is rare and 'exotic', the proposed analysis does not require extensive stipulations and ad-hoc machinery. Rather, it provides original supporting evidence for a theory of agreement which distinguishes between morphosyntactic and index agreement. Unlike previously studied cases, where hybrid agreement is a reflex of an 'internal' conflict, hybrid agreement in this case is used as a strategy to resolve 'external' conflicting constraints. Thus, the current analysis extends the implications of the theory.

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