

Hybrid Agreement as a Conflict Resolution Strategy

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1 Modifiers, predicates, and predicative modifiers in Standard Arabic

- Nouns, participles, and adjectives are inflected for NUMBER, GENDER, DEFINITENESS and CASE.
- When used attributively, adjectives and participles exhibit full agreement with the noun they modify.

(1) ra'aytu l-walad-a a-TTawiil-a
I.saw the-boy.SM-ACC the-tall.SM-ACC
“I saw the tall boy.”

(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.”

- When used as predicates, they agree in NUMBER and GENDER with their subject and are usually marked with nominative case.

(3) al-walad-u Tawiil-un
the-boy.SM-NOM tall.SM-NOM
“The boy is tall.”

(4) al-mara'a-tu naa'im-a-tun
the-woman.SF-NOM sleeping.PTCP.SF-NOM
“The woman is sleeping.”

- Adjectives and participles can head a non-finite relative clause (NF-RC).

Subject NF-RCs

- The referent of the relative head is construed as the subject of the participle/adjective, similarly to a (reduced) subject relative clause.

(5) 'ijtama9tu bi-l-rajul-i [a-ssaariq-i l-qalam-a]
I.met with-the-man.SM-GEN the-stealing.PTCP.SM-GEN the-pen-ACC
“I met the man (who is) stealing the pen.”

- The argument structure of the participle and the Case assigned to the arguments are identical to those of its finite counterpart.

(6) saraqa l-rajul-u l-qalam-a
stole.3SM the-man.SM-NOM the-pen-ACC
“The man stole the pen.”

Non-Subject NF-RCs

- The referent of the relative head can also be construed as a non-subject argument of the participle/adjective, similarly to a non-subject relative clause.
- This constructions imposes two different agreement constraints on the head of the NF-RC:
 - Subject-predicate agreement between it and its RC-internal subject
 - Head-modifier agreement between it and the relative head
- When the relative head and the NF-RC-internal subject differ in their NUMBER and GENDER features, **a conflict arises**.

2 Resolving conflicting constraints

There are four possible strategies for resolving the conflict:

1. Hybrid agreement
2. Avoidance
3. Agreement only with the relative head
4. Agreement only with the subject

Strategy 1: Hybrid Agreement in Standard Arabic

- The head of the NF-RC agrees with the relative head in CASE and DEFINITENESS and with its subject in NUMBER and GENDER.

- (7) a. 'ijtama9tu bi-l-marat-i [l-jaalis-i
 I.met with-the-woman.SF-GEN the-sitting.PTCP.SM-GEN
 zawj-u-haa]
 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."

- The subject of the RC is assigned nominative Case.
- A resumptive pronoun obligatorily appears in the relativized position.
- This construction is referred to as *na't sababi* in the Arabic tradition (Badawi *et al.* 2004).

Strategy 2: Avoidance in Modern Hebrew

- Non-finite predicates can appear in two types of relative clauses in Hebrew: *she*-RCs and *HA*-RCs.
- Relative clauses with the relativizer *she* license both subject and non-subject NF-RCs (as well as finite RCs).

- (8) a. ha-'anashim **she**-mexakim ba-taxana
 the-people.PM **that**-waiting.PTCP.PM in-the-station
 "The people waiting in the station"
 b. ha-'isha **she**-ba'al-a
 the-woman.SF **that**-husband.SM-POSS.3SF
 yoshev/yafe
 sitting.PTCP.SM/beautiful.SM
 "The woman whose husband is sitting/beautiful"

- Relative clauses with the relativizer *HA* are restricted to subject NF-RCs.

- (9) a. (ha-)'anashim **ha**-mexakim ba-taxana
 (the-)people.PM **HA**-waiting.PTCP.PM in-the-station
 "(The) people waiting in the station"
 b. *ha-'isha **ha**-yoshev/**ha**-yafe
 the-woman.SF **HA**-sitting.PTCP.SM/**HA**-beautiful.SM
 ba'ala
 husband.SM-POSS.3SF
 Intended meaning: "The woman whose husband is sitting/beautiful"

- The participle/adjective 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 marked morphologically.
- Similarly to Arabic, adjectival modification requires definiteness agreement.
- Definiteness in Modern Hebrew is marked by the prefix *ha-*
- The relativizer *HA* although homophonous with the definite prefix *ha-*, is distinct from it (Doron & Reintges 2005).
- The relativizer *HA* appears, regardless of the definiteness of the relative head (9a).

Strategy 3: Agreement with the relative head in Older Egyptian

(Doron & Reintges 2005:10)

- In Older Egyptian, participles do not agree with their subjects, and only agree with the relative head in number and gender.
- Case and definiteness are not morphologically realized.

- (10) mxʔt tw n(j)t rʕ [fʔ-ʔ(-w)-t mʔʕt jm-s rʕ nb]
 scale.FS this.FS of.FS Re carry-IMPF-PASS-PTCP.FS justice in-3FS day every
 “this scale of Re in which justice is carried very day”
 (Coffin Texts V 321:c-d/B1C)

Strategy 4: Agreement with the subject in Turkish

(Doron & Reintges 2005:10)

- The participle in Turkish carries possessive person agreement suffixes which correspond to its (genitive Case-marked) subject
- There is no concord between modifiers and head, so there are no conflicting constraints.

- (11) [ben-im söyle-diğ-im] söz-ler
 I-GEN say-PTCP.PRES/PAST-POSS.1S word/utterance-P
 “the words I said”

Alternating strategies in Talmudic Hebrew

- Strategies 3 & 4 are found in Talmudic Hebrew, especially in Hebrew texts from the Middle Ages (Perets 1967).
- 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.

- Participles which agree only with their relative head (12a) appear alongside participles which agree only with their subjects (12b).

- (12) 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”

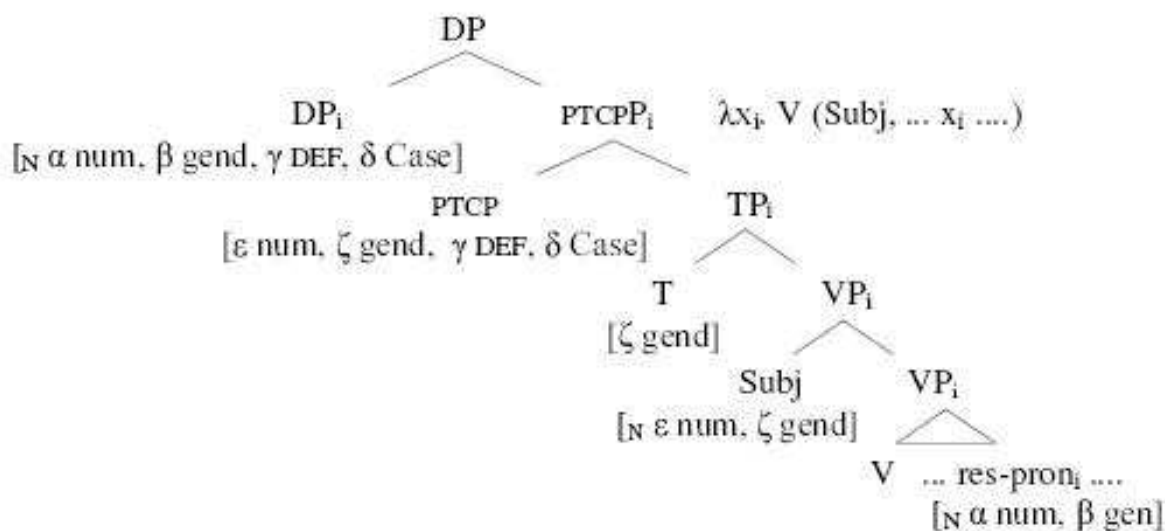
- Neither of the alternating strategies survived the test of time.

WANTED:

Examples of languages which exhibit both subject-predicate and head-modifier agreement and which employ either of the two strategies (3 & 4).

3 A derivational account of agreement mismatches in non-subject NF-RCs

Doron & Reintges’s (2005) analysis of non-subject NF-RCs in Standard Arabic:



- “In Arabic, agreement features that have been checked at one point in the derivation do not clash with non-matching features of a higher node in the derivation. This suggests that in Arabic, features are erased after they are checked” (p. 10).
- “More generally, these mismatches have implications for the overall architecture of linguistic structures. They imply that a linguistic structure is constructed procedurally rather than checked declaratively, in other words as a derivation rather than a representation” (p. 42).

- “Naturally we would expect that it is the erasure of checked features which is parameterized, rather than the procedural architecture of grammar, but we leave these questions to further research” (p. 42).
- Checked features are not erased in Modern Hebrew. Hence its avoidance of non-subject NF-RCs.

Doron & Reintges pose two challenges/questions:

1. Does the phenomena of agreement mismatch necessarily imply a procedural architecture of grammar?
2. Doron and Reintges’ account predicts that strategy 3 (agreement only with the relative head) is unavailable in principle; Subject-verb agreement is checked **before** head-modifier agreement. Is this prediction empirically valid?

4 A theory of agreement

Two types of agreement

(Pollard & Sag 1994); (Kathol 1999); (Corbett 1988, 2003); (Wechsler & Zlatić 2001,2003)

1. Morphosyntactic agreement

- Morphosyntactic agreement properties are associated with the formal realization of the word.
- Morphosyntactic agreement generally involves the features: CASE, NUMBER, and GENDER.
- The domain of morphosyntactic agreement is generally “more local” (NP-internal).

2. Semantic agreement

- Semantic agreement properties depend on the properties of the referent in the “real” world.
- Semantic agreement generally involves the features: PERSON, NUMBER, and GENDER.
- The domain of semantic agreement is generally pronouns and finite verbs.

Various terminologies:

(morpho-)syntactic agreement	semantic agreement
agreement <i>ad formam</i>	agreement <i>ad sensum</i>
formal agreement	loose agreement
strict agreement	logical agreement
grammatical agreement	index agreement
concord	

- Morphosyntactic agreement in Serbian-Croatian (Wechsler & Zlatić 2003:14)

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

- Semantic agreement in English (Pollard & Sag 1994:69)

(14) The hashbrowns at table nine is getting angry.

- ‘Hybrid agreement’ or ‘mixed agreement’ in Serbian-Croatian (Wechsler & Zlatić 2003)

(15) Ta dobra **deca** su doš-l-a
 that.SF good.SF children AUX.3P come.PPRT.PN
 “Those good children came.”

- “...collective nouns of the *deca* type triggers feminine singular agreement on NP-internal items, neuter plural agreement on pronouns, finite verbs and finite auxiliaries, and an indeterminate form (feminine singular or neuter plural) on participles” (p. 51).

5 A constraint-based analysis of non-finite relative clauses

Hybrid agreement in HPSG

- Nouns have two sets of agreement properties: morphosyntactic (CONCORD) and semantic (INDEX)
- Generally, the overlapping features in the two sets are identical.

(16)
$$\left[\begin{array}{l|l|l} \text{CAT} & \text{HEAD} & \text{CONCORD} \\ \hline & & \left[\begin{array}{l} \text{NUMBER} \quad \boxed{1} \\ \text{GENDER} \quad \boxed{2} \\ \text{CASE} \quad \textit{case} \end{array} \right] \\ \hline \text{CONT} & \text{INDEX} & \left[\begin{array}{l} \text{NUMBER} \quad \boxed{1} \\ \text{GENDER} \quad \boxed{2} \\ \text{PERSON} \quad \textit{pers} \end{array} \right] \end{array} \right]$$

- This is not the case with “hybrid nouns”, where the morphosyntactic NUMBER and GENDER features do not match their corresponding semantic features.
- A partial description of the agreement properties of the Serbian-Croatian hybrid noun *deca* ‘children’:

(17)
$$\left[\begin{array}{l} \dots \text{CONCORD} \left[\begin{array}{l} \text{NUMBER} \quad \textit{sing} \\ \text{GENDER} \quad \textit{fem} \end{array} \right] \\ \dots \text{INDEX} \left[\begin{array}{l} \text{NUMBER} \quad \textit{plur} \\ \text{GENDER} \quad \textit{neuter} \end{array} \right] \end{array} \right]$$

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

Two types of agreement conflicts: External and Internal

- **Hybrid nouns** exhibit an internal (or ‘self-imposed’) agreement conflict: The hybrid noun is an agreement controller with two targets.

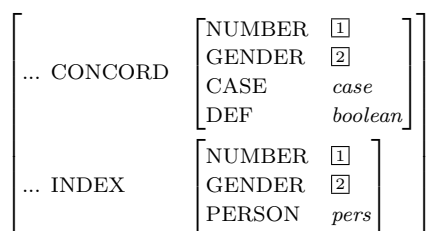


- **Non-subject NF-RCs** exhibit an external agreement conflict: The non-finite predicative modifier is an agreement target of two controllers.



Participles and adjectives in Standard Arabic

- Participles and finite verbs have the same argument structure and assign the same Case to their arguments.
- Participles, nouns, and adjectives have nominal agreement properties: PERSON, NUMBER, CASE, DEFINITENESS.
- Nouns have two agreement complexes: CONCORD and INDEX.
- **{A}** The NUMBER and GENDER features of ‘unmarked’ (i.e., not ‘hybrid’) nouns are identical in the two complexes.

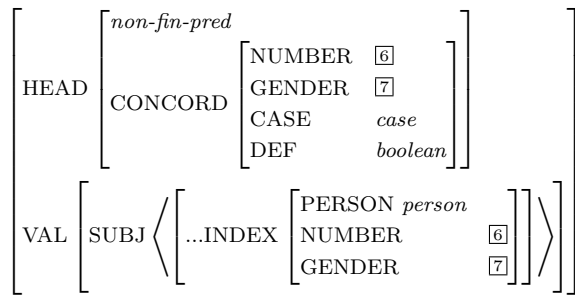


- Participles and adjectives
 - have two agreement complexes
 - can function as predicates
 - can function as modifiers
 - are predicative modifiers in NF-RCs

Participles as predicates in Standard Arabic

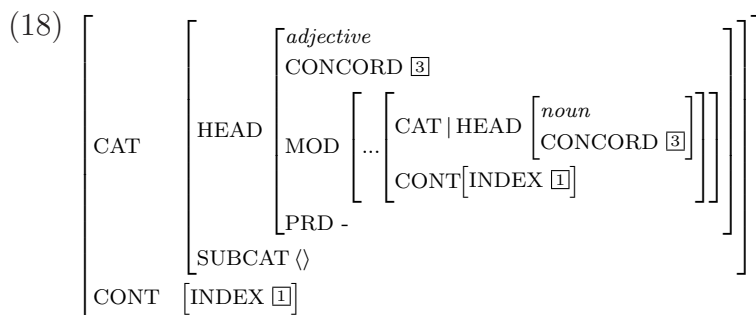
- Subject-verb agreement is the matching of the INDEX properties of the subject with their corresponding CONCORD properties on the verb.
- The agreement properties which are matched between finite verbs and their subjects are: PERSON, NUMBER and GENDER.

- **{B}** Subject-predicate agreement with predicative adjectives and participles involves the properties NUMBER and GENDER.

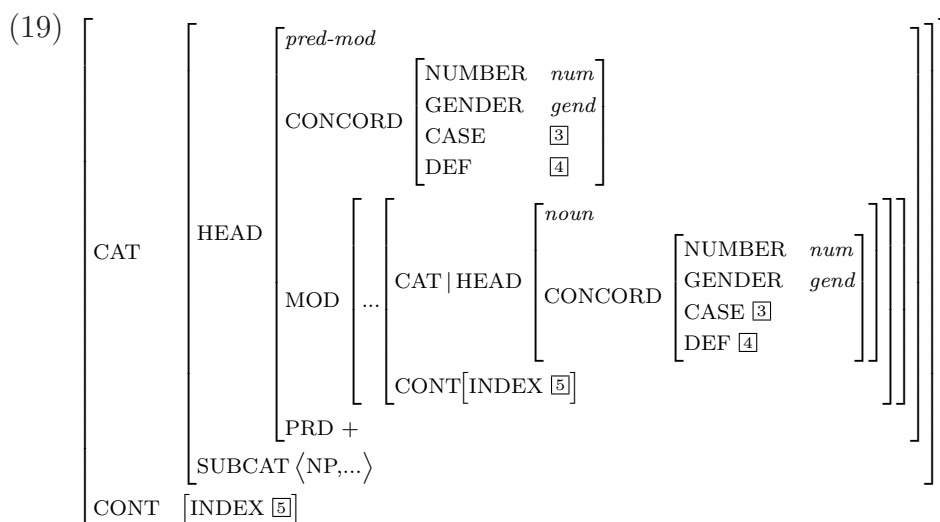


Participles as modifiers in Standard Arabic

- **{C}** Modifiers structure-share the INDEX features of the noun they modify. (Pollard & Sag 1994:51)
- Attributive modifiers in Standard Arabic exhibit full morphosyntactic/concord agreement (i.e., NUMBER, GENDER, DEFINITENESS, and CASE) with the noun they modify.



- **{D}** Predicative modifiers exhibit **partial morphosyntactic agreement** with the noun they modify — only in Case and definiteness — and full INDEX agreement.



Relative clauses in Standard Arabic

- Relative complementizers “link” the relative clause with the relative head and contribute the modification property.
- The relative complementizer of finite RCs in Standard Arabic has a NUMBER-GENDER-CASE inflectional paradigm and it exhibits full agreement with the relative head.

(20) al-walad-u alladhii ra'aythu-hu
 the-boy.SM-NOM REL.SM-NOM I.saw-him
 “the boy whom I saw”

(21) al-muqaabalat-u allatii HaDara-haa
 the-meeting.SF-NOM REL.SF-NOM attended.3SM-ACC.SF
 “the meeting that he attended” (Badawi *et al.* 2004)

- The relative complementizer is morphologically definite.
- When the relative head is indefinite the relative complementizer is absent.

(22) muqaabalat-un HaDara-haa
 meeting.SF-NOM attended.3SM-ACC.SF
 “a meeting that he attended”

- The NF-RC has no relative complementizer.

NF-RCs as reduced relative clauses

- Reduced relative clauses in English:

(23) a. standing in the doorway
 b. hassled by the police
 c. in the room

- A reduced relative clause is a predicate that is missing a subject (Sag 1997).
- The construction *reduced-rel-cl* provides the MOD specification and the linking between the indices.

(24) *reduced-rel-cl* \Rightarrow $\left[\begin{array}{l} \text{HEAD} \left[\text{MOD} \left[\dots \text{INDEX} \square \right] \right] \\ \text{SUBJ} \left\langle \left[\dots \text{INDEX} \square \right] \right\rangle \end{array} \right]$

- Unlike Sag (1997), I assume that the MOD property of the NF-RC comes lexically from the participle or adjective (the *predicative modifier*).

- The link between the indices of the relative head and the relativized position is defined constructionally.
- In subject NF-RCs the INDEX feature of the relative head is token-identical to the INDEX feature of the unrealized SUBJ.

$$(25) \text{ subject-non-fin-rel-cl} \Rightarrow \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \textit{pred-mod} \\ \text{MOD} [\dots\text{INDEX } \boxed{\text{I}}] \end{array} \right] \\ \text{SUBJ} \langle [\dots\text{INDEX } \boxed{\text{I}}] \rangle \end{array} \right]$$

- In non-subject NF-RCs the INDEX feature of the relative head is token-identical to the INDEX feature of the resumptive pronoun.¹

$$(26) \text{ non-subject-non-fin-rel-cl} \Rightarrow \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \textit{pred-mod} \\ \text{MOD} [\dots\text{INDEX } \boxed{\text{I}}] \end{array} \right] \\ \text{HD-DTR} [\text{RES-PRON} | \dots\text{INDEX } \boxed{\text{I}}] \end{array} \right]$$

6 Conclusion

- Situations in which conflicting constraints clash can potentially provide linguists with insights into the architecture of grammar.
- The hybrid agreement strategy of Standard Arabic provides supporting evidence for a theory of agreement which distinguishes between morphosyntactic and semantic 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.
- Although the Standard Arabic construction is rare and ‘exotic’, the proposed HPSG analysis does not require extensive stipulations and ad-hoc machinery.
- The proposed analysis can be straightforwardly extended to account for the Modern Hebrew conflict resolution strategy — avoidance.
- The hybrid agreement strategy of Standard Arabic does not necessarily imply that “linguistic structure is constructed procedurally rather than checked declaratively” (Doron & Reintges 2005:42).
- The issue of whether subject-verb agreement takes precedence over head-modifier agreement, as predicted by Doron & Reintges’s (2005) transformational analysis, remains open.

¹The representation of resumptive pronouns is adopted from Vaillette (2002).

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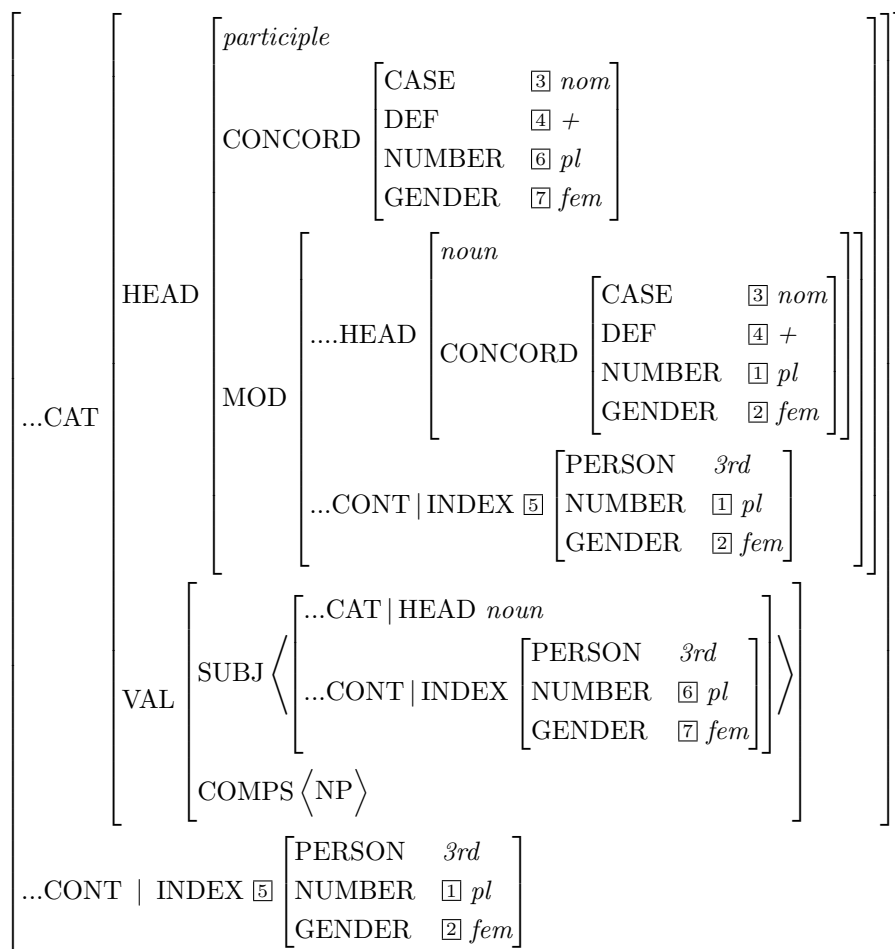
The principles at work:

{A} noun-internal agreement	$\boxed{1}$	$\boxed{2}$
{B} subject-predicate agreement	$\boxed{6}$	$\boxed{7}$
{C} noun-modifier agreement (index)	$\boxed{5}$	
{D} partial noun-modifier agreement (concord)	$\boxed{3}$	$\boxed{4}$

Subject Non-Finite Relative Clauses

(27) al-banaat-u l-waahibaat-u l-maal-a
 the-girls.FP-NOM the-giving.PART.FP-NOM the-money.MS-ACC

“The girls who are giving the money”



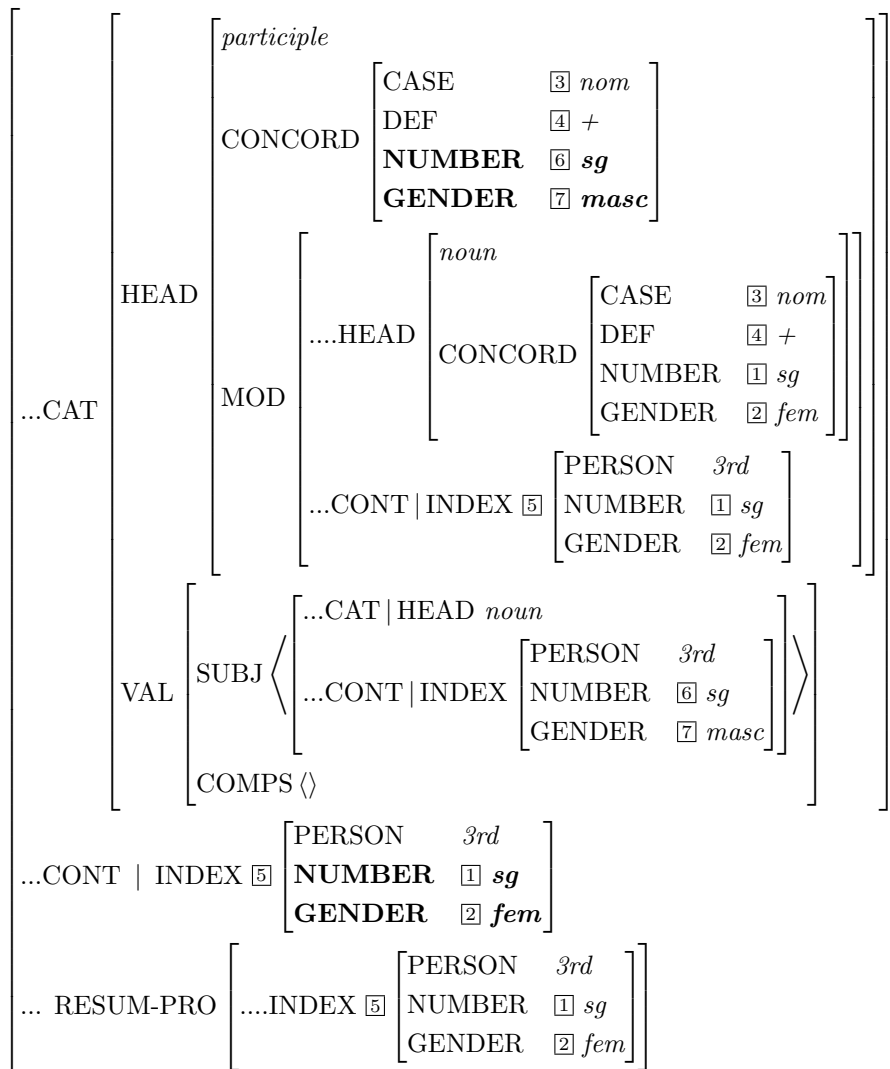
$$\text{subject-non-fin-rel-cl} \Rightarrow \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \text{participle} \\ \text{MOD} [\text{INDEX } \boxed{1}] \end{array} \right] \\ \text{SUBJ} \langle [\text{INDEX } \boxed{1}] \rangle \end{array} \right]$$

In a *subject-non-fin-rel-cl* the INDEX of the participle/adjective is token-identical to the INDEX of the subject and therefore: $\boxed{1} = \boxed{6}$ and $\boxed{2} = \boxed{7}$

Non-Subject Non-Finite Relative Clauses

- (28) al-marāt-u [l-jaalis-u zawj-u-haa]
 the-woman.SF-NOM the-sitting.PART.MS-NOM husband.MS-NOM-POSS.3FS

“The woman whose husband is sitting”



$$\textit{non-subject-non-fin-rel-cl} \Rightarrow \left[\begin{array}{l} \text{HEAD} \left[\begin{array}{l} \textit{pred-mod} \\ \text{MOD} \left[\text{INDEX } \boxed{1} \right] \end{array} \right] \\ \text{HD-DTR} \left[\text{RES-PRON} \mid \text{INDEX } \boxed{1} \right] \end{array} \right]$$

In a *non-subject-non-fin-rel-cl* the INDEX of the participle is token-identical to the INDEX of the resumptive pronoun.

Hybrid agreement: the NUMBER and GENDER properties in the CONCORD complex of the participle/adjective ($\boxed{1}$ & $\boxed{2}$) are not token-identical to those in the INDEX complex ($\boxed{6}$ & $\boxed{7}$).