The Syntax of Wh-Interrogatives in Hijazi Arabic: A Non-Transformational Approach

Nouf Y. Alaowffi
Department of English Language and Translation, College of Arabic and Social Studies, Qassim University, Saudi Arabia

Abdulrahman A. Althawab* 
Department of English Language and Translation, College of Arabic and Social Studies, Qassim University, Saudi Arabia

Abstract—Unbounded dependencies are structures where two elements that typically co-occur appear far from one another in spite of the syntactic dependency between them. Wh-interrogatives are one of the mostly investigated types of unbounded dependencies cross-linguistically. To contribute to the ongoing linguistic research in wh-interrogatives, the current paper attempts to explore them in one of the Arabic varieties: Hijazi Arabic (HA). The paper primarily focuses on how to account for the constructions of HA wh-interrogatives using one of the prominent non-transformational theories in generative syntax: Head-Driven Phrase Structure Grammar (HPSG). The analysis proposed herein also sheds light on the word order used in HA. The paper concludes that there are two constraints to which wh-interrogatives in HA are subject.

Index Terms—unbounded dependencies, wh-interrogatives, HPSG, Hijazi Arabic

I. INTRODUCTION

Throughout the decades, syntacticians tried to formally account for unbounded dependencies, structures that involve a gap of some kind and a higher constituent that contains a filler for this gap. The filler normally has the gap’s syntactic and semantic properties, and neither can appear without the other. Such a phenomenon provokes syntactician’s desire to investigate the syntactic specifications at play. Unbounded dependencies also present itself as a challenging area of research in almost all modern syntactic theories. Among the unresolved issues regarding the syntax of wh-interrogatives is whether their constructions can be accounted for by the mechanism of ‘movement’ assumed in transformational theories of syntax (e.g., Minimalist Program proposed by Chomsky, 1995). Borsley (2022), among others, argues that it is rather problematic to assume that a mechanism which “allows a constituent to occupy one position at one stage of a derivation and a different position at a later stage” can directly account for such complex phenomena (p. 204).

Within generative grammar theories, Head-driven Phrase Structure Grammar (HPSG) proposes its own account for such instances. Adopting an HPSG approach that does not employ the mechanism of ‘movement’, we attempt herein to provide a systematic analysis of wh-interrogatives in Hijazi Arabic (HA), an Arabic variety spoken in the western region of the Kingdom of Saudi Arabia.


II. THEORETICAL PRELIMINARIES

Through the high flexibility it offers, the non-transformational framework of HPSG has proved itself to be successful in accounting for naturally occurring structures, particularly in controversial linguistic phenomenon like the one under discussion here. By being a constraint-based theory, HPSG assumes that grammar comprises a set of type signs and a set of constraints to which these signs are subject (Pollard & Sag, 1987, 1994). For example, for the declarative sentences in (1), HPSG proposes systematically organized constraints that specify all the necessary requirements that license such structures. If, however, any of these constraints is violated, ungrammaticality looms as exhibited in (2). HPSG formally specifies that these sentences in (1) are all grammatical because they satisfy the subcategorization of the verbs used, while those in (2) do not.

1 Corresponding author.
1 For a general introduction to the framework of HPSG, see, for instance, Sag et al. (2003), Abeillé and Borsley (2021), and Borsley and Müller (2021).
1. a. John likes football.
   b. The boy hit the table.
   c. The mother handed the salt to Yousef.
2. a. *John likes to the football.
   b. *The boy hit.
   c. *The mother handed to Yousef.

Interestingly, there are cases in which the transitivity of verbs seems to be violated as shown in (3). What makes these sentences unique is that they maintain grammaticality even though they appear to miss an argument.

3. a. Who hit the table?
   b. What does John like?
   c. To whom did the mother handed the salt?

Intuitively, there is a kind of linkage between the missing arguments and the initial \(wh\)-phrases. For example, (3a) is an interrogative structure that asks about the NP subject of the transitive verb \(hit\) and that subject is something referred to by the initial \(wh\)-phrase who. Thus, syntactically speaking, the \(wh\)-phrase is the NP subject of the transitive verb and hence no violation of the transitivity has occurred. In other words, the sentences in (3) do not miss arguments; rather, the arguments merely do not appear in their canonical positions; they occupy left peripheral positions as illustrated in (4).

4. a. Who _____ hit the table?
   b. What does John like____?
   c. To whom did the mother handed the salt______?

Other than English, this phenomenon is attested cross-linguistically, such as in French, Irish, Chamorro, and Standard Arabic as exemplified in (5) respectively.

5. a. Quand [s partira ton ami ____]?
   ‘When will your friend leave?’
   (Kayne & Pollock, 1978, p. 959)
   b. Cén uair al thainig siad na bhaile_____
      [which time] COMP came they home e
   ‘What time did they come home?’
   (Levine, 2017, p. 272)
   c. Hayi f-un-ágasi _____ i kareta
      who UM-wash the car
   ‘Who washed the car?’
   (Kim & Lim, 2008, pp. 189-194)
   d. ʔaeena δahaba Yousef-u______?
      where went Yousef-NOM
   ‘Where did Yousef go?’

Generally, this phenomenon is called unbounded dependency. Unbounded dependencies are “constructions in which the locality of co-occurrence restrictions appears to be violated in a more radical way” (Sag et al., 2003, p. 427). They are unbounded in the sense that elements that normally co-occur appear to be far from each other in these constructions. Other than \(wh\)-interrogatives, relative clauses, topicalization, and clefts are instances of these constructions. However, for the purpose of this paper, we will focus on \(wh\)-interrogatives. We seek to examine HA in which this phenomenon is also attested as shown in (6).

6. a. ʔeeʃ t-hub Noura_____?
   ‘What does Noura love?’
   b. ʔeeʃ ʔakaal tala ʔal-ʔawlah?
   ‘Who ate on the table?’

A successful linguistic theory should systematically code the linkage between the remote element and its canonical position. To this end, HPSG breaks its analysis to account for three important parts of the dependency: (i) the bottom, (ii) the middle, and (iii) the top of the dependency.

To analyze the bottom of the dependency, the feature \(SLASH\) was declared (Bouma et al., 2001; Ginzburg & Sag, 2000).\(^4\) \(SLASH\) is a set-valued feature which indicates that a given phrase is missing an element of a particular kind. More particularly, the \(SLASH\) feature generally expresses the \(LOCAL\) feature of the missing element; in a nutshell, the element’s syntactic and semantic properties. For instance, a verbal head that misses an NP subject will have a \(SLASH\) feature that indicates what the head lacks precisely. In other words, \(SLASH\) works as “a placeholder for missing elements” (Bouma et al., 2001, p. 18). This specification allows the structure to be built syntactically regardless of the missing

\(^2\) The gap represents the canonical positions of the arguments.
\(^3\) For discussions about other types of unbounded dependencies, see Kim and Michaelis (2020), Levine (2017), and Sag et al. (2003), to name a few.
\(^4\) Sag et al. (2003) alternatively propose a list-valued feature called \(GAP\).
element (Sag et al., 2003). Since the missing element is not as any canonical argument, it is realized only in the ARG-ST of the head.\(^5\)

To account for the middle of the dependency, Ginzburg and Sag (2000), following Bouma et al. (2001), proposed the SLASH-Amalgamation constraint, given in (7).

\[(7) \text{SLASH-Amalgamation Constraint}
\]

\[
\text{word} \rightarrow [ \text{SS}[\text{SLASH} \ [\Sigma_1] \cup \ldots \cup [\Sigma_n]] \ \text{ARG-ST} < [ \text{SLASH} \ [\Sigma_1], \ldots, [ \text{SLASH} \ [\Sigma_n] ] ]
\]

\((\text{Ginzburg & Sag, 2000, p. 169})\)

(7) states that, by default, the SLASH value of a word is the union of the SLASH values of the arguments with which it combines. In other words, to keep track of the missing element, the SLASH value is passed from the head daughter to the mother and then to the higher node throughout the extraction structure. As explained by Ginzburg and Sag (2000), "extraction is thus treated entirely in terms of the inheritance of SLASH specifications" (p. 167). In fact, such inheritance of SLASH specifications follows logically from the Generalized Head Feature Principle (GHFP) proposed also in Ginzburg and Sag (2000). However, whenever a suitable filler is found in a higher position, the SLASH specification is consumed.

Turning to consider the top of the dependency, the phrasal type head-filler-phrase (hd-fill-ph) was declared (Bouma et al., 2001; Ginzburg & Sag, 2000). This phrasal type comprises subtypes to account for the various types of unbounded dependencies according to the multiple inheritance hierarchy shown in (8). These include: (i) topicalization clauses (top-cl), (ii) wh-interrogative clauses (wh-inter-cl), and (iii) wh-relative clauses (wh-rel-cl), among others.

\[(8) \text{Phrase CLAUSALITY HEADEDNESS}
\]

\[
\begin{array}{c}
\text{clause} \ \\
\text{core-cl} \ \\
\text{rel-cl} \ \\
\text{decl-cl} \ \\
\text{inter-cl} \ \\
\text{top-cl} \ \\
\text{wh-inter-cl} \ \\
\text{wh-rel-cl} \\
\end{array}
\]

\((\text{Adapted from Ginzburg & Sag, 2000})\)

All subtypes of hd-fill-ph are subject to the constraint in (9) (Bouma et al., 2001; Ginzburg & Sag, 2000). As shown in (9), hd-fill-ph introduces the compatible filler as its non-head daughter while it takes the slashed head that lacks an element as its head daughter. Moreover, (9) guarantees that the head daughter, and hence the phrase itself, is a verbal projection. The SLASH set of this head daughter might contain several elements. The first member corresponds to the LOCAL value of the filler daughter while any other members shall constitute the SLASH value of the mother, which is normally empty.\(^6\)

\[(9) \text{hd-fill-ph:}
\]

\[
[ \text{SLASH} \ [\Sigma_2] ] \rightarrow [ \text{LOC} \ [11] ], \text{H} \left[ \begin{array}{c}
\text{phrase} \\
\text{HEAD} \ v \ \\
\text{SLASH} \ [[11]] \ \uplus \ [\Sigma_2] \\
\end{array} \right]
\]

\((\text{Ginzburg & Sag, 2000, p. 174})\)

To narrow down the analysis of hd-fill-ph to its subtype wh-inter-cl, the feature of WH was declared.\(^7\) As the SLASH feature, WH is a set-valued feature that is essentially based on the semantic CONTENT value of the mother (Borsley & Crysmann, 2021; Ginzburg & Sag, 2000). Hence, it denotes that the structure in hand is an interrogative one and contains a wh-phrase. To warrant that the WH value is kept on track throughout the structure, Ginzburg and Sag (2000) proposed the WH-Amalgamation constraint given in (10).

\[(10) \text{WH-Amalgamation Constraint}
\]

\[
\text{word} \rightarrow [ \text{SS}[\text{WH} \ [\Sigma_1] \cup \ldots \cup [\Sigma_n]] \ \text{ARG-ST} < [ \text{WH} \ [\Sigma_1], \ldots, [ \text{WH} \ [\Sigma_n] ] ]
\]

\((\text{Ginzburg & Sag, 2000, p. 189})\)

\(^5\) Such a demand caused Ginzburg and Sag (2000) to reformulate their Argument Realization Principle (ARP) to ensure that when the verb is slashed, then the missed element must be realized in the ARG-ST.

\(^6\) The symbol ‘\(\uplus\)’ refers to the operation of disjoint set union.

\(^7\) Other references follow Pollard and Sag (1994) in proposing the feature QUE which roughly corresponds to WH.
(10) guarantees that the WH value of any word is the union of the WH values of its arguments. In simple words, together with the SLASH-Amalgamation constraint, the two constraints ensure that the relevant feature’s specifications are percolated throughout the extraction structure until consumed in a proper position. It is worth noting, however, that the WH feature was also declared to differentiate between wh-interrogative clauses and exclamative clauses in English.

Finally, the two features incorporate elegantly to provide a full analysis of WH-interrogative clauses. Thus, an interrogative clause as ‘who likes football?’ can be analyzed as a WH-inter-cl that has a clausal head daughter. That head daughter has SLASH features whose values correspond to the filler daughter’s LOCAL value. The two daughters are WH-speicted and tagged with the CONTENT value of the mother as shown in (11).

(11)

IV. PRELIMINARY CONSIDERATIONS ON HA

In general, HA flexibly licenses different word orders, as many other Arabic varieties. VSO and SVO word orders are the commonly permitted word orders in HA, as shown in (12-13), respectively.

(12)a. ders-at Noura an-nahu
    study.PST-3.Fem.Sg Noura the-syntax
    ‘Noura studied syntax’

b. ʔakaal-at Noura ʕala ʔal-ʕawlah
    eat.PST-3.Fem.Sg Noura on the-table
    ‘Noura ate on the table’

c. t-ʔub Noura ʔal-kutub
    3.Fem.Sg-love.Pres Noura the-books
    ‘Noura loves books’

d. ʔarsal-at Noura ʔal-kitab li-Sara
    send.PST-3.Fem.Sg Noura the-book to Sara
    ‘Noura sent the book to Sara’

(13)a. Noura ders-at an-nahu
    Noura study.PST-3.Fem.Sg syntax
    ‘Noura studied syntax’

b. Noura ʔakaal-at ʕala ʔal-ʕawlal
    Noura eat.PST-3.Fem.Sg on the-table
    ‘Noura ate on the table’

c. Noura t-ʔub ʔal-kutub
    Noura 3.Fem.Sg-love.Pres the-books
‘Noura loves books’

d. *Noura अरस-अल کتب لی سارا
Noura send.PST-3.Fem.Sg the-book to-Sara
‘Noura sent the book to Sara’

In HPSG, verb-initial clauses as those in (12) can be analyzed as *hd-subj-comp-ph* in which the verbal head takes its subject and complement as sisters (Borsley, 1995; Althawab, 2022). In the case of subject-initial clauses, two competing analyses have been proposed (e.g., Borsley, 1989, 1995; Wintner, 2001; Vaillette, 2001). First, some syntacticians analyze them as *hd-subj-cl* analogously to their English counterparts. On the other hand, others merely analyze them as slashed *hd-subj-comp-ph* in which the subject has been fronted. A third party assumes that both analyses are available.

To accommodate the following discussion, this section provided a very concise explanation of the word orders adopted in HA generally. Despite the different analysis proposed in the literature, and for the sake of consistency, we show with data from HA that the slashed *hd-subj-comp-ph* analysis is the one that should be presumed.

V. WH-INTERROGATIVES IN HA

Wh-interrogatives in HA are unbounded dependencies that involve displacing arguments from their canonical positions as shown in (14–15). The data in (14) shows subject wh-interrogatives while the data in (15) shows non-subject wh-interrogatives. As explained in section [2], the transitivity of the verbs used is respected despite the fact that the arguments’ requirements are remotely filled by displaced constituents.

(14) a. *meen deres an-nahu?
who study.PST.3.Masc.Sg the-syntax
‘Who studied syntax?’

b. *meen अरسال کتب لی سارا?
who send.PST.3.Masc.Sg the-book to-Sara
‘Who gave the book to Sara?’

c. *meen جو-حب الكتب?
who 3.Masc.Sg-love.Pres the-books
‘Who loves books?’

d. *meen अكاال نارجع?
who eat.PST.3.Masc.Sg on the-table
‘Who ate on the table?’

(15) a. *؟؟؟؟ ders-at Noura?
what study.PST-3.Fem.Sg Noura
‘What did Noura study?’

b. *؟؟؟؟ अरسال نارجع لی سارا?
what send.PST-3.Fem.Sg Noura to-Sara
‘What did Noura send to Sara?’

c. *؟؟؟؟ t-حب نارجع?
what 3.Fem.Sg-love.Pres Noura
‘What does Noura love?’

d. *؟؟؟؟ اكاال نارجع?
where eat.PST-3.Fem.Sg Noura
‘Where did Noura eat?’

Generally, the first thing that can be noticed is that the wh-phrase is always followed by the main verb of the clause; otherwise, ungrammaticality looms either in subject or non-subject wh-interrogatives as shown in (16). Moreover, verbs are always inflected for masculine gender in subject wh-interrogatives. Since verbs must be inflected for gender in HA, this leads to the assumptions that whenever the subject’s gender is unknown, the masculine is the default one.

(16) a. *؟؟؟؟ अلكتب لی سارا ?ارسال?
who the-book to-Sara send.PST-3.Masc.Sg
‘Who gave the book to Sara?’

b. *؟؟؟؟ لی سارا ?ارسال الكتب?
who to-Sara send.PST-3.Masc.Sg the-book
‘Who gave the book to Sara?’

c. *؟؟؟؟ نارجع لی سارا ?ارسال?
what Noura to-Sara send.PST-3.Fem.Sg
‘What did Noura send to Sara?’

d. *؟؟؟؟ لی سارا ?ارسال Noura?

An alternative analysis treats these structures as extra complements in which both the subject and complement are members of COMPS. Yet, Borsley (1995) argues that such an analysis is plausible for Welsh, but not for Arabic.
Digging rather deep into the data, an interesting behavior can be detected. Considering the word orders explained in section [4], the mechanisms of forming wh-interrogatives might be different for each of them. In the case of verb-initial clauses, the missing arguments are basically fronted in either subject or non-subject wh-interrogatives as illustrated in (17a-b) respectively.

(17) ʔarsal-at Noura ʔal-kitab li-Sara
send.PST-3.Fem.Sg Noura the-book to-Sara
‘Noura sent the book to Sara’

a. meen ʔarsaal________ ʔal-kitab li-Sara?
who send.PST.3.Masc.Sg the-book to-Sara
‘Who gave the book to Sara?’

b. ʔeef ʔarsal-at Noura________ li-Sara?
what send.PST-3.Fem.Sg Noura to-Sara
‘What did Noura send to Sara?’

Likewise, in subject-initial clauses, the missing arguments are fronted in subject and non-subject wh-interrogatives as in (18). However, the verb must be inverted in non-subject wh-interrogatives in order to follow the wh-phrase as shown in (18b). This results in having the subject occupying a post-verbal position exactly as in verb-initial clauses above. Whenever the verb is not inverted, the outcome is ungrammatical non-subject wh-interrogatives as shown in (19).

(18) Noura ʔarsal-at ʔal-kitab li-Sara
Noura send.PST-3.Fem.Sg the-book to-Sara
‘Noura sent the book to Sara’

a. meen________ ʔarsaal ʔal-kitab li-Sara?
who send.PST.3.Masc.Sg the-book to-Sara
‘Who gave the book to Sara?’

b. ʔeef ʔarsal-at Noura________ li-Sara?
what send.PST-3.Fem.Sg Noura to-Sara
‘What did Noura send to Sara?’

(19) a. *ʔeef Noura ʔarsal-at________ li-Sara
what Noura 3.Fem.Sg-love.Pres to-Sara
‘What did Noura send to Sara?’

b. *ʔeef Noura ders-at________
what Noura study.PST-3.Fem.Sg
‘What did Noura study?’

c. *ʔeef Noura t-ħub________
what Noura 3.Fem.Sg-love.Pres
‘What does Noura love?’

The inversion of the verb in non-subject wh-interrogatives is also attested in English (Ginzburg & Sag, 2000). Specifically, the verb must be inverted in English non-subject direct interrogatives while no inversion is required when the interrogative is embedded. In English, the inverted version can occur independently unlike the non-inverted one as illustrated in (20). Contrarywise, inverted or not, they are both independent in HA as elucidated above.

(20) a. [Who [will Sandy visit___]]?
b. *[Who [Sandy will visit___]]?
c. They wonder [who [Sandy will visit___]]?
d. *They wonder [who [will Sandy visit___]]? (Ginzburg & Sag, 2000, p. 231)

This section attempted to describe the wh-interrogative in HA with regard to the word orders attested in this variety. The unique behavior of non-subject wh-interrogatives in subject-initial clauses poses the question about the kind of syntactic conditions at play that license such discrepancy. To this end, the next section will provide a formal analysis of wh-interrogatives in HA within the framework of HPSG.

VI. THE ANALYSIS

Within HPSG’s framework, the two types of wh-interrogatives are analyzed in a multiple inheritance hierarchy in which they are treated as subtypes of wh-inter-cl which is in turn a subtype of hd-fill-ph and inter-cl simultaneously as in (21).
Since they show a consistent behavior in both word orders, the first type of interrogatives to be formally analyzed here is subject wh-interrogative clauses (su-wh-int-cl). At the moment, we are collectively following the analyses adopted by Ginzburg and Sag (2000) for English, and Johnson and Lappin (1997) for Iraqi Arabic (IA). Hence, leaving the semantic specifications aside, instances of the type su-wh-int-cl are subject to the constraint in (22)\(^9\) on both word orders in HA.

\[
\text{su-wh-int-cl:} \quad [\quad \to [\text{LOC} [\text{A}]], H\left[ \begin{array}{c} \text{SUBJ} < > \\ \text{ARG-ST} < [A] > \end{array} \right] 
\]

Therefore, the instance of su-wh-int-cl in (23) has structure in (24), regardless of the word order assumed prior the extraction.\(^{10}\)

\[
\begin{align*}
\text{Meen} & \quad ?\text{arsaal} \quad ?\text{al-kitab} \quad li-Sara? \\
\text{who} & \quad \text{send.PST.3.Masc.Sg} \quad \text{the-book} \quad \text{to-Sara}
\end{align*}
\]

\[\text{‘Who gave the book to Sara?’}\]

\[
\begin{array}{c}
\text{(24)} \\
\text{S} \\
\text{su-wh-int-cl} \\
\text{SLASH} [\ ] \\
\text{WH} [\ ] \\
\text{SUBJ} < > \\
\text{COMP} < > \\
\text{CONT} [4] \\
\text{NP} \\
\text{LOCAL} [1] \\
\text{WH} [4] \\
\text{Meen} \\
\text{S} \\
\text{SLASH} [1] \\
\text{WH} [4] \\
\text{SUBJ} < > \\
\text{COMPS} < > \\
\text{ARG-ST} < [1], [2], [3] > \\
\text{?arsaal} \quad ?\text{al-kitab} \quad li-Sara? \\
\text{?arsaal} \quad ?\text{al-kitab} \quad li-Sara?
\end{array}
\]

Particularly, if we assume that this clause is essentially verbal-initial, then the su-wh-int-cl has a filler daughter as a non-head daughter and a slashed hd-subj-comp-ph as its head daughter. Both daughters are WH-specified; they are tagged with the CONTENT value of the mother as a result of being a wh-int-cl. Satisfying the constraint on hd-fill-ph, the SLASH value of the head daughter corresponds to the LOCAL value of the filler daughter, which is the remote filler needed. Analogously, if we assume that this clause is essentially subject-initial, then the su-wh-int-cl has a filler daughter as a non-head daughter and a slashed hd-subj-ph as its head daughter. As with the verb-initial clauses, the daughters are WH-specified and hence tagged with the CONTENT value of the mother. In addition, the SLASH feature of the head daughter and the LOCAL feature of the filler daughter agree in value due to the constraint on hd-fill-ph. Recall that, despite the simplification in tree (24), both features are amalgamated throughout the extraction structure to satisfy the constraints discussed in section [3].

In considering non-subject wh-interrogatives, and before giving them a certain phrasal type, specifications about each word order shall be taken into account. Assuming a verbal-initial word order, the structure shall be simply analyzed as a wh-int-cl that has a filler daughter and a head daughter of the type hd-subj-comp-ph that is slashed. Thereby, the non-

\(^9\) The constraint has been slightly modified to accommodate only the assumptions introduced and discussed herein.

\(^{10}\) For the rest of the paper, only features that are crucial for the analysis have been included, while others are underspecified.
subject *wh*-interrogative in (25) will have the structure in (26), which in many ways resembles the analysis of *su-wh-in-cl* explained above.

(25) ʔeeʃ ʔarsal-at Noura li-Sara?

‘What did Noura send to Sara?’

(26)

\[
\begin{array}{c}
\text{S} \\
\text{wh-inter-cl} \\
\text{SLASH \{} \\
\text{WH \{} \\
\text{SUBJ } < > \\
\text{COMP } < > \\
\text{CONT } [4] \\
\end{array} \]

\[
\begin{array}{c}
\text{NP} \\
\text{LOCAL } 2 \\
\text{WH } [1[4]] \\
\end{array} \]

\[
\begin{array}{c}
\text{S} \\
\text{hd-subj-comp-ph} \\
\text{SLASH } \{ 2 \} \\
\text{WH } \{ 4 \} \\
\text{SUBJ } < > \\
\text{COMPS } < > \\
\text{ARG-ST } < [1], [2], [3] > \\
\end{array} \]

ʔeeʃ ʔarsal-at Noura li-Sara?

On the other hand, if the subject-initial word order is assumed, then the structure would be analyzed as *wh-int-cl* that has a filler daughter and a head daughter of the type *hd-subj-ph* that is slashed. The slashed head daughter has a head daughter that is inverted. Thereby, it behaves analogously to its English counterpart and hence requires a special constraint which should ensure that the verbal head in *hd-subj-ph* must be [INV+] to slash the non-subject argument. Consequently, the *wh-int-cl* in (25) will have the structure in (27).

(27)

\[
\begin{array}{c}
\text{S} \\
\text{ns-wh-int-cl} \\
\text{SLASH } \{} \\
\text{WH } \{} \\
\text{HEAD } [\text{INV+}] \\
\text{SUBJ } < > \\
\text{COMP } < > \\
\text{CONT } [4] \\
\end{array} \]

\[
\begin{array}{c}
\text{NP} \\
\text{LOCAL } [2] \\
\text{WH } [1[4]] \\
\end{array} \]

\[
\begin{array}{c}
\text{S} \\
\text{hd-subj-ph} \\
\text{SLASH } \{ [2] \} \\
\text{WH } \{ [4] \} \\
\text{HEAD } [\text{INV+}] \\
\text{SUBJ } < > \\
\text{COMPS } < > \\
\text{ARG-ST } < [1], [2], [3] > \\
\end{array} \]

ʔeeʃ ʔarsal-at Noura li-Sara?

One might argue to simply follow Ginzburg and Sag’s (2000) analysis for *ns-wh-in-cl*, shown in (28). They assume that whenever the main verb is inverted (i.e., [INV+]), then the structure is independent (i.e., [IC+]), and vice versa. This
might be true for English; though, as exhibited in (26-27), it fails to reconcile HA data because non-subject wh-interrogatives can be independent regardless of whether the verb is inverted or not.

\[(28)\text{ns-wh-int-cl:}\]
\[
[\ ] \rightarrow \ldots \text{H} \begin{bmatrix}
\text{IC} & \text{[1]} \\
\text{INV} & \text{[1]}
\end{bmatrix}
\]

(Ginzburg & Sag, 2000, p. 231)

Collectively, this would lead to the conclusion that the analysis of subject wh-interrogatives in HA is consistent with English and IA. Conversely, the analysis of non-subject wh-interrogatives in HA requires the verbal head to be \([\text{INV}+]\) in subject-initial clauses, under the assumption that they are \(\text{hd-subj-ph}\). One might also reckon that the necessity to invert the verbal head applies to subject-initial word order in general and not only in cases of non-subject wh-interrogatives per se. This is because whether the verbal head has been inverted or not in subject wh-interrogatives, no disparity is surfaced as shown in (24) above. Such a postulation may be plausible; however, we believe that a more consistent and unified analysis could be pursued elsewhere.

Recall that two distinct analyses have been proposed for subject-initial clauses in HA. To this point, we have considered them to be of the type \(\text{hd-subj-ph}\); nonetheless, assuming that they are essentially \(\text{hd-subj-comp-ph}\) that have been slashed would result in a more consistent analysis of wh-inter-cl in HA. Apart from consistency preferences, another motivation for this argument is the fact that HA is a subdialect of Standard Arabic, which is a VSO language (Alrajhi, 1999, 2000; Althawab, 2014).

Bearing this in mind, it should be assumed that subject and non-subject wh-interrogatives simply involve wh-inter-cl that has a filler daughter and a slashed \(\text{hd-subj-comp-ph}\). In other words, they both stem from a single type and constraint as we have initially speculated. However, the possibility of (29) demands taking agreement’s specification into consideration.

\[(29)\text{a. meen faaf} \quad \text{Noura?}
\]
\[\text{who see.PST-3.Masc.Sg Noura}
\]
\[\text{‘Who saw Noura?’}
\]
\[\text{b. meen faaf-at} \quad \text{Noura?}
\]
\[\text{who see.PST-3.Fem.Sg Noura}
\]
\[\text{‘Who did Noura see?’}
\]

(29a) is an instance of subject wh-interrogatives, whereas (29b) is an instance of non-subject wh-interrogatives. The difference between the two lies in the verb’s gender inflection. In subject wh-interrogatives, the verb is normally masculine while it agrees with the subject in non-subject wh-interrogatives.\(^{11}\)

Consequently, in view of the above assumptions, we propose the types in (30-31) for su-wh-int-cl and ns-wh-int-cl in HA, respectively. These types are adopted from Ginzburg and Sag (2000) with the exception that the main verb must be inflected for masculine in subject wh-interrogatives.

\[(30)\text{su-wh-int-cl:}\]
\[
[\ ] \rightarrow \text{[LOC [A]., \text{H} \begin{bmatrix}
\text{SUBJ} < \ \\
\text{ARG-ST} < [A], \ldots, n > \\
\text{HEAD} [\text{GEN masc}]
\end{bmatrix}]
\]

\[(31)\text{ns-wh-int-cl:}\]
\[
[\ ] \rightarrow \text{[LOC [B]., \text{H} \begin{bmatrix}
\text{COMP} < \ \\
\text{ARG-ST} < [A], [B], \ldots, n >
\end{bmatrix}]
\]

The two types can be best clarified through the examples given in (32-33). (32) is a su-wh-int-cl which is a subtype of wh-inter-cl; therefore, it is also a subtype of \(\text{hd-fill-ph}\) and \(\text{inter-cl}\) according to the multiple inheritance hierarchy and inherits their constraints. Precisely, it has a head daughter and a filler daughter. To satisfy the constraint on \(\text{hd-fill-ph}\), the head daughter is a slashed \(\text{hd-subj-comp-ph}\) and its \text{SLASH} value is tagged with the \text{LOCAL} value of the filler. Also, the first member of the \(\text{hd-subj-comp-ph}\)’s \text{ARG-ST} corresponds to the filler. Both the filler and the slashed \(\text{hd-subj-comp-ph}\) are WH-specified; they are tagged with the \text{CONTENT} value of the mother to obey wh-int-cl. Finally, to obey the constraint on su-wh-int-cl, the \text{GENDER} value of the verbal head is \text{masc}.

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\(^{11}\) This is a general statement because sometimes the verb might be inflected for feminine gender in subject wh-interrogatives depending on extralinguistic discourse where all the possible subjects are females. However, given the currently examined data, we will not consider this possibility.
Likewise, the same goes with (33); nonetheless, to discriminate it from \textit{su-wh-int-cl}, the \textsc{gender} value of the verbal head agrees with the subject, whether it is masculine or feminine. Needless to say, regardless of the simplification in the trees, \textsc{slash} and \textsc{wh} features are amalgamated throughout the structure to satisfy the constraints reviewed in section [3].

Providing a consistent and systematic analysis that accommodates the \textit{wh}-interrogatives in HA, here and throughout this section, again mirrors HPSG’s flexibility to account for naturally occurring utterances with respect to their cross-linguistic diversity.

\textbf{VII. Conclusion}

Unbounded dependencies never cease to provoke syntacticians’ attention. In this paper, we lay out a formal non-transformational analysis of \textit{wh}-interrogatives in HA with the HPSG framework. The analysis also offers an insight into...
the word order of HA. We argue for two phrasal types that underlie the wh-interrogatives in HA: subject wh-interrogative clauses (su-wh-int-cl) and non-subject wh-interrogative clauses (ns-wh-int-cl). Each one of these two types has its own information and constraints that account for its syntactic structure. The proposal of these types is mediated by the postulation that HA is a verbal-initial language in the first place.

REFERENCES


Nouf Y. Alaowffi is a graduate researcher whose interests and research publications are in the area of language and linguistics. She has an MA in theoretical linguistic from Qassim University, Saudi Arabia.

Abdulrahman A. Althawab is an assistant professor at the Department of English Language and Translation, College of Arabic and Social Sciences, Qassim University, Saudi Arabia. He has a PhD in linguistics from the University of Essex, United Kingdom (2014). His research interest and publications are mainly in the field of syntax and syntactic theories.