

Functional Control and Long Distance Dependencies in Arabic

Mohammed Attia

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Functional Control is an instance of structure sharing where there is equality of the controller and the control target. Either syntactic or lexical constraints require an argument of the matrix clause to occupy the position of an argument of a subordinate or modifying adjunct clause. "Structure sharing results in a single element occupying multiple syntactic spots" (Ash Asudeh. Control and Semantic Resource Sensitivity) This can be either lexically determined such as raising and equi structures, or structurally determined such as open adjuncts and long distance dependencies. The control target can be totally absent or have some sort of realization such as agreement features attached to the verb in the subordinate clause or a resumptive pronoun, such as the case in long distance dependencies.

Much of the talk within the literature on the control theory has been on whether certain cases exhibit functional or anaphoric control. This has been even led to more confusion in languages where the English infinitive is replaced by a complementizer followed by a verb that carries the agreement features of the subject. This made some researchers to assume that they are closed functions instead of open functions. The assumption here is that when control is obligatory it is functional control and when it is optional it is anaphoric control.

Raising and equi constructions as control functions prove to be inline with traditional Arabic grammarian views of specific phenomena. So this analysis captures generalizations about Arabic and provides a good framework for the analysis.

The purpose of this study is to investigate the nature of control in Modern Standard Arabic within the framework of Lexical-Functional Grammar and to provide practical solutions to the different aspects of the phenomenon.

The aim of this research is not to add to the theoretical discussions on what can be functional or anaphoric control, but to show how the main phenomenon of structure sharing (which involves both functional control and long-distance dependencies) is dealt with in an LFG Arabic grammar. My aim is also to reconcile as much possible between LFG as a theory and the main tenets of Arabic traditional grammar.

Raising

In *raising construction* only one thematic role is involved: Peter bears a thematic relation to 'study', but not to 'seem'.

seem V (↑ PRED)= 'seem<(↑ XCOMP)> (↑ SUBJ)'
(↑ XCOMP SUBJ) = (↑ SUBJ)

The verb "seems" takes a non-thematic subject. The subject is not semantically selected by the verb (outside the angle brackets in the verbs a-structure) but the XCOMP is, yet the SUBJ is syntactic argument of *seem* as well as of the XCOMP.

"The relation between the infinitival clause and the controller is one of predication: the infinitival clause can be seen as a kind of predicate, predicated of the SUBJ of *seem*." (Falk. LFG: an intro)

The controller is **not** a semantic argument of the verb

- They take propositional-themes
seem ___ < propositional-theme >
expect < experiencer propositional-theme > ___
believe < experiencer propositional-theme > ___
- Control is lexically determined

Raising to Subject

He looks nice

Raising to Object

make: takes verbal/non-verbal complements

expect, believe: takes verbal complements

find: takes non-verbal complements

Types of predicational Constructions involved in raising in English

- Verbal XCOMPs
 - Infinitives with *to*
 - He seems to sleep
 - Infinitives without *to*
 - I saw him go
 - He kept playing
- Non-Verbal XCOMPs
 - Adjectives
 - We found him nice
 - PPs
 - He seems in a bad mood
 - NPs
 - The pills made him a monster

Arabic Raising Construction

Arabic Nominal (Verbless) Sentences

- الرجل سعيد
The man [is] happy
- الرجل في الدار
The man [is] in the house
- الرجل طبيب
The man [is] a doctor
- الرجل يشاهد التلفزيون
The man watches TV

Governors of Subject-Predicate Constructions (نواسخ الابتداء)

Raising to Subject

1. Verbal/non-verbal complements (كان وأخواتها)

(كان وأصبح وصار وظل وليس)

- كان الولد سعيدا The boy **was** happy
- كان الولد يذاكر The boy **was** studying

- أصبح الولد سعيدا The boy **became** happy
- أصبح الولد يحب القراءة The boy **became** to love reading
- ظل الولد سعيدا The boy **remained** happy
- ظل الولد يذاكر The boy **remained** studying

2. Only non-verbal complements

- يبدو الولد سعيدا The boy seems happy

3. Only Verbal complements

أفعال المقاربة: كاد وأوشك، يجب اقترانها بأن

- كاد الولد أن ينام The boy nearly slept
- أوشك الولد أن ينام The boy nearly slept

أفعال الشروع: شرع، أخذ، جعل، قام، يجب عدم اقترانها بأن

- أخذ الرجل يدرس القرار The man kept study[ing] the decision.
- قام الرجل بداسة القرار The man undertook with studying the decision.

"Interestingly, not all raising predicates accept XCOMPs of all categories. For example, in Standard American English *seem* cannot take an NP (or DP) complement. In some of the LFG literature, categorically restricted XCOMPs are called VCOMP, NCOMP, ACOMP and PCOMP. However, this is formally illicit, since it expresses c-structure (category) information in f-structure. A better approach would be to include the ... specification in the lexical entry of *seem*." (Falk. LFG: an intro)

"In addition, verbs that allow verbal/clausal XCOMPs typically impose morphological restrictions on the XCOMP: most commonly *to* infinitive ... or present participle.

- a. The geneticist seems *to clone dinosaurs*.
- b. The geneticist kept *cloning dinosaurs*." (Falk. LFG: an intro)

Raising to Object

ظن وأخواتها: ظن ورأى وعلم ووجد وحسب وزعم
believe, see, know, find, reckon, claim

- ظننت الولد سعيدا I believe the boy happy
- حسبت الولد يذاكر I reckon the boy study
- رأيت الولد سعيدا I saw the boy happy
- وجدت الولد يذاكر I found the boy study

Equi

The controller **is** a semantic argument of the verb that lexically determines the identity of the controllee

Control is lexically determined

- *to*-infinitive
 - I promised him to go
- gerund

In Arabic this relationship can be established either through token identity or token equality

حاول الرجل أن يشكر الرئيس على جهوده (token equality)

حاول الرجل شكر الرئيس على جهوده (token identity)

In the first the subject of the subordinate clause is established as a pro-drop (unexpressed pronoun) and the subordinate verb provides gender and number information about the subject. The control relationship here equates the number and gender of the subject of the subordinate clause with those of the subject of the matrix clause.

In the second example the subject of the embedded verbal noun is entirely provided by the control relationship as the same subject of the matrix clause.

" since verbs can have a COMP/XCOMP alternation, being a functional control verb does not necessarily rule out an alternative with a lexical SUBJ." (Falk. LFG: an intro)

أراد الرجل أن يشكر الولد الرئيس
أراد الرجل أن يشكر الرئيس

Contrary to (Dalrymple, Mary (2001). *Lexical Functional Grammar*) I believe that both raising and equi verbs are instances of functional control.

"There is no constituent structure distinction between VP complements that are functionally controlled, bearing the XCOMP function, and those that are anaphorically controlled and bear the COMP function; XCOMP and anaphorically controlled COMP appear in the same position relative to adverbs and direct objects.

Thus, it is only the functional annotations on the rule that distinguish the two cases." (Dalrymple, Mary (2001). *Lexical Functional Grammar*)

" Recall the Serbo-Croatian sentence (18):

(18) Petar je pokušao da dodje
Petar Aux tried Comp come(Pres)
Peter tried to come.

Zec (1987) noted this as a problem for the property theory because the clausal equi complement is clearly a CP with a null subject

This verb optionally specifies its SUBJ PRED as 'pro', since Serbo-Croatian is a pro-drop language. When the null subject is contributed by the verb, the semantics of the null pronominal is also contributed

The entry for the subject equi verb pokušao is different from the entry for the English verb try in (20) above. Its clausal complement is a COMP, not an XCOMP, because the complement has its own subject rather than the subject being structure-shared with another GF by functional control. Instead, the control relationship is anaphoric as indicated by the equation requiring that pokušao's COMP SUBJ and SUBJ be coindexed.

" Ash Asudeh. *Functional Identity and Resource-Sensitivity in Control*

Regardless of the type of the complement (COMP or XCOMP) control is decided by functional annotation on the lexical entry of the verb. The presence of a complementizer does not stop the relationship from being classified as control.

Moreover the phrase structure of the CP in a control relationship is different in its distribution from other CPs.

علم زيد أن الشمس جميلة
علم زيد أن الرجل يذاكر
* علم زيد أن يذاكر

* حاول زيد أن الشمس جميلة
* حاول زيد أن الرجل يذاكر
حاول زيد أن يذاكر

“The answer of Dalrymple (2001) to the question of functional vs. anaphoric analysis of equi is that anaphoric control is most appropriate for the analysis of equi. Dalrymple (2001) presents two kinds of anaphoric control. Obligatory anaphoric control is proposed for sentences such as (17: John tried to yawn), because the anaphor is assigned an antecedent by the rules of sentence grammar. Indeed, no understood subject except John is possible for the controlled sentence, and therefore such restriction can be represented as a functional equation in the verb’s lexical entry (Dalrymple, 2001, p. 334):

(33) try V (↑ pred)=‘try<subj,comp>’

(↑ comp subj pred) = ‘pro’

((↑ comp subj)_σ antecedent)=(↑ subj)_σ

The additional functional equation establishes the semantic relation between the understood subject and its antecedent in the semantic (σ) structure. However, this relation originates from a syntactic property of the control verb and it can be realized as functional control in the f-structure as well.

Dalrymple favors anaphoric control analysis because there are no overt syntactic restrictions that the controlled verb imposes on its understood subject. For example, in Icelandic it is possible for a controlled verb to restrict the case of its controller. Control constructs that allow such restriction are analyzed using functional control and constructs that do not impose such restriction are analyzed using anaphoric control.

However, this observation only means that we must use functional control to analyze the restricting constructs. It does not mean that we must use anaphoric control when the restriction is not imposed. In fact, it is possible to simply omit the functional equation that imposes such restriction from control verb’s lexical entry since the infinitival form of the control verbs in English does not impose agreement restrictions on the understood subject. However, in section 4.1.4 I show that in English the semantic number property imposes a syntactic restriction on the controller in both equi and raising constructs, which favors the functional control analysis.

As a result, I conclude that while we can use anaphoric control instead of functional control, there is no immediate benefit in doing so, and some phenomena, such as semantic number restriction, may be better described using functional control.

The relevance of semantic number restrictions to control is exemplified by the difference between the two sentences in (40):

(40) (a) * John tried to meet in the afternoon

(b) The committee tried to meet in the afternoon

These restrictions are unique in the fact that they cross the boundaries of the controlled sentence and influence directly the matrix sentence.” Genady Beryozkin. 2005. Plural semantics for control sentences in LFG’s “glue” interface. Research Thesis

Open Adjuncts

“There is also a different kind of functional control that concerns "open" adjuncts.

37 She went to bed hungry, ashamed of herself

38 We met him in the park yesterday, happy and pleased

Which arguments can be controllers of an XADJ seem to vary between languages; in English, they include at least subjects and objects, as in 37 and 38. This kind of functional control cannot be lexically induced, because an XADJ can occur with any kind of verb. Instead, control is constructionally induced, an XADJ is equipped with an equation which says that its subject is in the set of grammatical functions that the language specifies as possible controllers.

$$(\uparrow \text{GF}) = (\downarrow \text{SUBJ}) \quad \text{GF} \in \{ \text{SUBJ}, \text{OBJ} \dots \}$$

” Helge Lødrup. Functional Structure

"The control of XADJUNCTs is determined by a rule which annotates a control relation to a c-structure (at least in English). For example, a clause-initial adjectival adjunct is obligatorily controlled by the subject of the clause.

Sure of winning, Mary entered the competition yesterday.

Functional control is structurally determined

$$\begin{array}{l} \text{S} \rightarrow \quad (\text{AP}) \quad \quad \quad \text{XP} \quad \quad \quad \text{VP} \\ \quad \quad (\uparrow \text{XADJUNCT}) = \downarrow \quad (\uparrow \text{SUBJ}) = \downarrow \quad \quad \quad \uparrow = \downarrow \\ \quad \quad (\uparrow \text{SUBJ}) = (\downarrow \text{SUBJ}) \end{array}$$

" (Sells. Lectures)

"John discusses peeling navel oranges.

Peeling navel oranges, John watched the game.

Gerunds are V-*ing* clauses that have nominal functions such as subject, object, or prepositional object,

Participial clauses are V-*ing* (or V-*en*) clauses that have sentential (adjunct or complement) functions.

- With gerunds the missing subject is a PRO
- With participials the missing subject is identified by a control equation ... $(\downarrow \text{SUBJ}) = (\uparrow \text{SUBJ})$

" (Mohan. 1983. Functional and Anaphoric Control)

" *Walking the dog, Chris saw David*

The SUBJ of the adjunct *walking the dog* is functionally controlled by the SUBJ of the matrix clause *Chris*

" Dalrymple, Mary. 2001. Lexical Functional Grammar

Arabic Adjuncts

- Subordinating conjunctions are not omissible. Conjunctions express adverbs of time (when, while), place (where), reason (because, since), condition (if, provided), concession (although, even if), purpose (to, in order to), result (so that)
- Subordinating conjunctions are followed by finite verbs or infinitival nouns of action
 - بعد أن ذاكر الولد، ذهب إلى الحديقة
After the boy studied, he went to the park.
 - بعد إنهائه المذاكرة، ذهب الولد إلى الحديقة
After him finishing studying, the boy went to the park.
 - بعد إنهاء التجهيزات، ذهب الأولاد إلى الحديقة
After finishing preparations, the boys went the park.
- Control is arbitrary anaphoric control
- When adjuncts are not preceded by Subordinating Conjunctions, the clause is headed by a noun agent, patient or noun of action, and control seems to be functional. Adverbs here express either manner or resumption.
- **Noun Agent (active participle)**
 - قدم الاقتراح إلى البرلمان، رافضا انتقادات المعارضة
He introduced the proposal to the parliament, rejecting the reservations of the opposition
 - قال إن الوضع متري مضيئا أن الإصلاح أصبح ضرورة
He said that the situation is deteriorating, adding that reform had become a necessity
 - معربا عن أسفه، قدم الوزير استقالته
Expressing his regret, the minister offered his resignation.
- **Noun Patient (passive participle)**
 - خرج من الانتخابات مهزوما
He came out of the elections defeated.
 - عاد إلى البيت منهرا
He came home devastated.
 - محبطا ومهزوما، خرج الشعب إلى الشارع
Frustrated and defeated, the people took to the street.
- **Noun of Action**
 - زار زعماء المعارضة بحثا عن الدعم
He visited opposition leaders, [searching for/in search for] support
 - ألغى زيارته تأكيدا لرفضه لسياسات الدولة
He cancelled his visit, [confirming/as a confirmation of] his rejection of the country's policies
 - تعبيرا عن الرفض، خرج الناس إلى الشوارع
[Expressing/as an expression of] rejection, the people took to the street.
- With subordinating conjunctions, control is anaphoric.
- Tenseless clausal adjuncts without subordinating conjunction are functionally controlled.

English Verbal Nouns

- English gerunds can be classified into nominal and verbal
 - The meeting was useful. (Nominal)
 - Meeting new people is useful. (Verbal)
- English gerunds can have various subcategorization frames
 - meeting
 - meeting new people
 - his meeting with them
 - the meeting between him and them

Verb	Verbal Noun (Gerund)	Nominal Noun (Participial)
Meet	Meeting	Meeting
Confront	Confronting	Confrontation
Assist	Assisting	Assistance
Enrol	Enrolling	Enrolment
Break	Breaking	Break
Lead	Leading	Leadership
Analyze	Analyzing	Analysis

The Arabic Verbal Noun System

- In Arabic there is a class of nominals derived from verbs. They are assumed to inherit some or all of the verb's argument structure
- The derivation process uses non-concatenative morphotactics: unlike English –ing, or –en suffixes

Verb	Verbal Noun	Nominal Noun
قابل	مقابلة	مقابلة
واجه	مواجهة	مواجهة
ساعد	مساعدة	مساعدة
سجل	تسجيل	تسجيل
كسر	تكسير	تكسير
قاد	قيادة	قيادة
حلل	تحليل	تحليل

A word on subcategorization

1. SUBJ:
 - تدهور deteriorating/deterioration
2. SUBJ,OBJ
 - قتل killing ...
3. SUBJ,OBJ,OBL
 - إبلاغ informing ... of ..
4. SUBJ, OBL
 - إخفاق failing in ...

5. SUBJ,COMP
 - إثبات proving that ...
6. SUBJ,OBJ,OBJ2
 - اعطاء giving
7. SUBJ,OBJ,COMP
 - طمأنة comforting ... that ...
8. SUBJ,OBL,COMP
 - طلب appealing to ... to ...
9. SUBJ,OBL1,OBL2
 - اتفاق agreeing with ... on ...
10. SUBJ,OBJ,OBL1,OBL2
 - تحويل transferring ... from ... to ...
11. SUBJ,OBL1,OBL2
 - رحيل moving from ... to ...
12. SUBJ,OBL1,OBL2
 - إصلاح reconciling between ... and ...
13. OBL1,OBL2,OBL3
 - اتفاق agreement between ... and ... on ...

The Problem of Obliques: Solution #1
OBL1, OBL2, OBL3

Disadvantages:

1. Obliques can easily exchange places with no default order
speak with ... about ... / speak about ... with ...
travel from ... to ... / travel to ...from ...
2. No packed features can be expressed
put ... on/in/above/under/besides ...

Advantage:

1. Grammatical functions are expressed in a way that is distinct from both lexical and semantic levels
2. Easy to do

The Problem of Obliques: Solution #2
OBL-on, OBL-from, OBL-to

Disadvantages:

1. Lexical forms are expressed in the grammatical level
2. No packed features can be expressed
put ... on/in/above/under/besides ...

Advantage:

1. Easy to do

The Problem of Obliques: Solution #3
OBL-topic, OBL-source, OBL-medium

Disadvantages:

1. Semantic terms are expressed in the grammatical level
2. Hard to do

Advantage:

1. Packed features can be expressed:
 - direction (origin/path/destination)
 - temporal (start/completion)

Long Distance Dependencies

"a. Which book do you think I put on the shelf?

b. That theory, she told me she had never heard of.

- A phrase belongs in two different clauses simultaneously
- The top end = **filler** = discourse function
 - Question = FOCUS
 - Topicalized phrase and relative pronoun = TOPIC
- The lower end = **gap** = grammatical function
- Process = **extraction**
- Unlimited number of clauses between the filler and the gap
= long distance dependencies/unbounded dependencies

" Yehuda N. Falk. 2001. Lexical-Functional Grammar: An Introduction to Parallel Constraint-Based Syntax

"Extended Coherence Condition:

FOCUS and TOPIC must be linked to the semantic predicate argument structure of the sentence in which they occur, either by functionally or by anaphorically binding an argument.

The clause 'anaphorically binding' is related to cases where the domain of extraction is not a gap in c-structure, but rather some kind of pronominal form.

" Dalrymple, Mary. 2001. Lexical Functional Grammar

- "The functional control involves structure sharing.
- Outside-in functional equation

(↑ DF) = (↑ COMP* GF)

- An infinite number of possible COMPs intervening = **functional uncertainty**

Subjects vs. nonsubjects

- extraction of subjects is different from the extraction of nonsubjects
- In English
 - No inversion
 - Who put the book on the shelf?
 - No overt complementizer
 - *Who do you think that ___ put the book on the shelf?
- In Arabic/Hebrew
 - resumptive pronouns are generally more likely to be used for non-SUBJ gaps than SUBJ gaps
- Explanation: SUBJ is an overlay function and not exclusively related to its governing predicate

" Yehuda N. Falk. 2001. Lexical-Functional Grammar: An Introduction to Parallel Constraint-Based Syntax

Topicalization Constructions

- Phrase Structure
 - NP: *Chris, I like.*
زيد أحبه
 - PP: *To Chris, I gave a book.*
في الدار زيد
 - AP: *Happy, Chris will never be.*
سعيد أنت
 - CP: *That Chris was a movie star, I never would have guessed.*
NO

English TopicP = {NP | PP | VP | AP | CP}

Arabic TopicP = {NP | PP | VP | AP}

- Topic Path
 - هذا الرجل أكل التفاحة (Topicalized subject, not an SVO order. Only here a resumptive pronoun is not allowed)
 - *Chris, we like.* (from the object position)
هذا الرجل نحبه
هذا الرجل نحب
 - *Chris, we want to thank.* (from the xcomp object position. A grammatical function contained in xcomp)
هذا الرجل نريد أن نشكره
 - *Chris, we think that David saw.* (from the comp object position. A grammatical function contained in comp)
هذا الرجل نظن أن زيدا رآه
 - *Chris, we saw a picture of.* (extracted from the (^ obj obl obj) position. A grammatical function contained in obj)
هذا الرجل رأينا صورة له
 - *This hammer, we smashed the vase with.* (from a nontensed adjunct function. A grammatical function contained in a nontensed adjunct)
هذا السلاح حاربنا العدو به
 - هذا الرجل هناك زعم أنه يستعد لخلافة والده (noun island constraint)
 - هذا الرجل فزعنا عندما رأيناه (tensed adjunct clause)

English TOPICPATH:

$$\{ \text{XCOMP} \mid \begin{array}{c} \text{COMP} \\ (\rightarrow \text{LDD}) \neq - \end{array} \mid \begin{array}{c} \text{OBJ} \\ (\rightarrow \text{TENSE}) \end{array} \}^* \{ (\text{ADJ} \mid \begin{array}{c} \in \\ -(\rightarrow \text{TENSE}) \end{array}) \mid (\text{GF}) \mid \text{GF} \}$$

Relative Clauses

- Phrase Structure
 - NP: *a man who I selected*
الرجل الذي اخترته
 - PP: *a man to whom I gave a book*
NO (No pied piping)
 - AP: *the kind of person proud of whom I could never be*
NO (No pied piping)
 - AdvP: *the city where I live*
NO (No pied piping)

English RelP = {NP | PP | AP | AdvP}
Arabic RelP = {NP}