| **RESEARCH ARTICLE**

The Scope of Negation and Dual Operators in Standard Arabic: The Theory of Functional Discourse Grammar and Negative Operators on Dual Constructions

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| **ABSTRACT**
Negation has been extensively dealt with in the domain of formal theories of linguistics and grammar. The general consensus usually converges towards the conclusion that it is a morpho-syntactic operation by which the truth value of an utterance is reversed. On the other hand, Functional theories, such as Functional Discourse Grammar (henceforth FDG), reveal that Negation could potentially carry more nuances up its sleeves. This paper investigates how FDG could potentially account for the phenomenon of the scope of Negation on Dual constructions in Standard Arabic. It also sheds light on how the interaction between the negative operator and the numeral operator (on an individual x) could be problematic to the uniformity of FDG as a theory. The research takes a qualitative approach analyzing examples constructed with the aim of putting the focus on the factors relevant to this enquiry. The findings unveil that the Scope of Negation in Standard Arabic can target just the Dual operator on an individual x. This behavior is noteworthy as Operators are usually off-limits when it comes to being exclusively under the scope of Negation. The main reason is that Negation itself is expressed with the operator (Neg). Therefore, a new amendment to FDG might be required to representationally account for this phenomenon.

| **KEYWORDS**

Functional Discourse Grammar, Negation in Standard Arabic, Scope Negation, Operators in FDG, Negation in FDG

1. Introduction
Unlike its modern variations, standard Arabic still makes use of a productive dual system. In dual structures, there is an inflectional agreement with nouns, adjectives, pronouns, and verbs. Across languages, negations can take scope over various components of a sentence. Using Functional Discourse Grammar, for example, the scope of negation can take scope over a Proposition (p), an Episode (ep), a State-of-Affairs (e), and a property (f) or individual (x). However, adding the extra level of complexity that comes with Dual structures, FDG might need to introduce an amendment for an exhaustive account, lest its uniformity is at stake.

2. Functional Discourse Grammar
Functional Discourse Grammar, or FDG, is a theory that was developed by Simon C. Dik in the 1970s. It considers language structure as typologically-based and makes Discourse Acts its main unit of analysis. Extensive discussions of its forefather theory, known as Functional Grammar, or FG, pushed the theory to evolve and become what is currently known as Functional Discourse Grammar (henceforth FDG). The latest version of the theory encompasses a module of Pragmatic/Interpersonal representation. Therefore, FDG is the grammatical component of a wider theory of verbal interaction, which also has a conceptual, contextual, and output component.
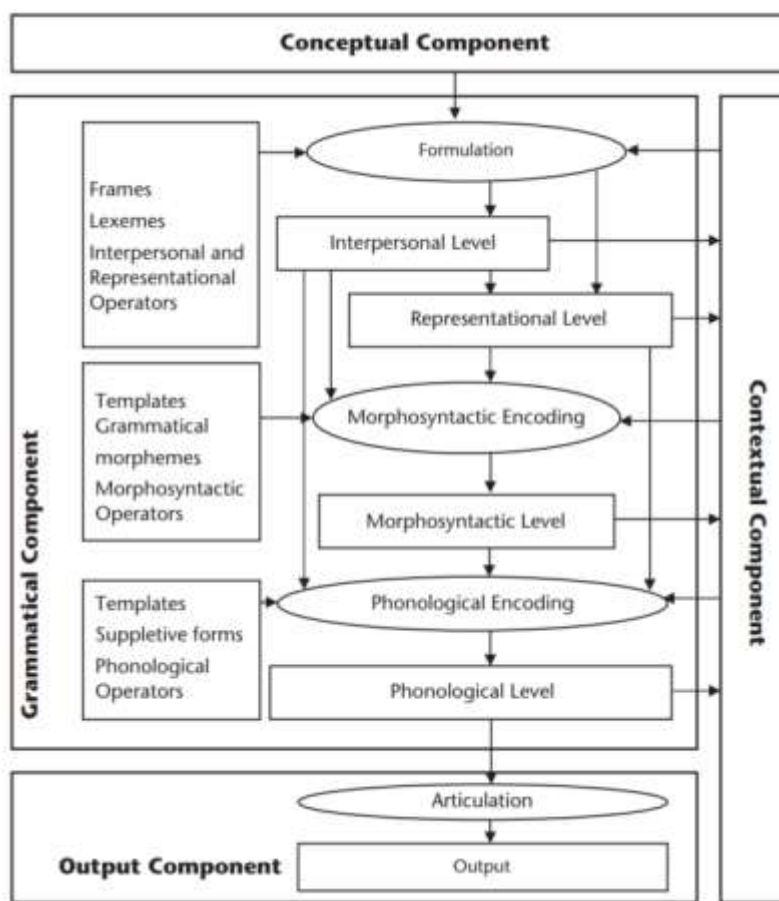
Figure 1: The Architecture of FDG (Hengeveld et al. 2008, p. 13)

To demonstrate the application of this theory, an example is processed below:

Watch out; a car is coming!

At the highest level, the conceptual component, the communicative intention of issuing a warning, along with a mental representation of the event causing the danger, are activated.

In the Grammatical component, the operation of Formulation translates the conceptual configurations mentioned before into pragmatic and semantic representations, which correspond to the Interpersonal and Representational levels. At the Interpersonal Level, the speaker formulates a set of discourse Acts that contain the direct and indirect illocutionary forces.

At the representational Level, the speaker gets to designate the predicate along with its argument. The configurations of this Discourse Act at the Interpersonal and the Representational Levels and are translated into a morphosyntactic structure at the Morphosyntactic Level through the operation of Morphosyntactic Encoding.

Finally, the structures at the Interpersonal, Representational, and Morphosyntactic Levels are translated and come together as an Utterance at the Phonological Level, which is the input to the operation of articulation.

Although the different levels of representation may seem distinct, they all have basically the same compositional structure presented below.

$$(\pi\, v_1: [\text{head } (v_1)_\Phi]: [\sigma\, (v_1)_\Phi])_\Phi$$

Figure 2: The Structure of FDG Layers (Hengeveld et al. 2008, p. 13)

3. Negative Operator in Functional Discourse Grammar
Polarity is generally regarded in this framework as something that happens at the e-layer (Hengeveld et al.,2008, p.179).

a. I don't like burgers.

IL:(M$_1$: (A$_1$: [(F$_1$:DECL(F$_1$))(P$_1$)$_S$(P$_2$)$_A$(C$_1$:[(T$_1$)(R$_1$)(R$_2$)](C$_1$))(A$_1$))(M$_1$))

RL: (p$_1$: (pres ep$_1$:(**neg** e$_1$:[(f$_1$)(x$_1$)$_{\{A\}}$ (x$_2$) $_{\{U\}}$](e$_1$))](ep$_1$))(p$_1$))

In FDG, operators usually are positioned before the head of a specific layer. The negative polarity item is not represented by the insertion of the negative operator neg just before the State-of-Affairs (e).

4. FDG's Account for Numeral Operator in Neg Scope in Standard Arabic
Standard Arabic, unlike most modern variations of Arabic, still has a productive system of use for the Dual mode. The agreement in dual mode happens with a full inflection in nouns, adjectives, demonstrative and relative pronouns, and verbs.

Agreement System of the Standard Arabic Perfective

Person	Number	Gender	Affix	Verb+Affix
1	Singular	F/M	-tu	daras-tu
2	S	M	-ta	daras-ta
2	S	F	-ti	daras-ti
3	S	M	-a	daras-a
3	S	F	-at	daras-at
2	Dual	M/F	-tumaa	daras-tumaa
3	D	M	-aa	daras-aa
3	D	F	-ataa	daras-ataa
1	Plural	M/F	-naa	daras-naa
2	P	M	-tum	daras-tum
2	P	F	-tunna	daras-tunna
3	P	M	-uu	daras-uu
3	P	F	-na	daras-na

Figure 3: Agreement in Standard Arabic (Aoun, 2010, p.73)

Agreement System of the Moroccan Arabic Perfective

Person	Number	Gender	Affix	Verb+Affix
1	Singular	F/M	-t	ktəbt
2	S	F/M	-ti	ktəbti
3	S	M	-Ø	ktəb
3	S	F	-at	kətbat
1	Plural	M/F	-na	ktəbna
2	P	M/F	-tu	ktəbtu
3	P	M/F	-u	kətbu

Figure 4: Agreement in Moroccan Arabic (Aoun, 2010, p.74)

Moutaouakil (1986) has dealt extensively with the scope of negation in Standard Arabic. As it is difficult to know the true restrictive scope of negation in an isolated sentence, Moutaouakil (1986) employed a method whereby a second corrective segment is provided after an initial denial; the corrective segment makes it explicit as to what the speaker intended to negate. Below are two examples to illustrate this methodology.

1. لا **أحمد فالبيتي** بل أحمد في الخارج
    Ahmed is not in the house; Ahmed is outside.
    Scope takes over the whole episode (ep).
    Example 2
2. ليس **أحمد** في البيت بل سعاد
    Ahmed is not in the house; Souad is.
    Scope takes over the individual (x) Ahmed.

As illustrated in the previous segment, FDG is built to accommodate for negation taking scope in different items within the same layer (RL for Neg).

Neg operator positioned itself before the head it affects. However, it becomes less straightforward in the case of a sentence in Standard Arabic with an individual in the Dual Mode taken under the scope of Negation, as the example below illustrates:

1. لا رجل في الدارس بل رجلان\رجال
   La raʒula fi da:ri bal raʒulain/riʒalun
   Not man-nom in the-house-gen but man-dual-nom/man-plur-nom
   "There is not one man in the house but two men/many men. "

As Moutaouakil (1986) argued, the negated element is actually the number feature of the NP and not the whole NP per se. Because number features are themselves, operators, it is unclear how an operator (number) would take another operator (Neg) under its wing. Due to a lack of literature in FDG's accounts of languages with Dual constructions, the theory -as it is- does not provide a template to accommodate for cases such as (4).

Abiding by FDG's terminology, the operator **Neg** has to take scope over the numerical operator **1,** which is found in the operator position of the individual x_i. This is made clear in the IL, and RP representations of (4) provided below:

2. IL:$(M_i$: $(A_i$: $[(F_i$:DEN$(F_i))(P_a)(P_s)(C_i$:$[(T_i)(R_i)(R_e)](C_i))(C_e$: $[(T_e)(R_i)_{\{Contr\}}$
        $(R_i)](C_e))](A_i))(M_i))$

   RL: $(p_i$: $(ep_i$:$[(e_i$:$[(f_x$:$[(f_n$:fi$(f_n))(x_x$:dari $(x_x))$ $_{\{L\}}$ (**Neg-I x_j**: raʒul $(x_j))$
        $_{\{U\}}](f_x))](e_i))(e_e$:$[(f_j$:$[(f_n)(x_x)(2x_e$ raʒul$))](f_j))](e_e))(ep_i))(p_i))$

An initial solution – like the one above - would be to simply stack the two operators in front of the individual x. However, this analysis would not be preferred for four reasons:

  i.   It is not clear that the Neg operator actually modifies the numeral operator 1 and not the individual x.
  ii. Operators tend to be homogenous in their category (tense operators in Episodes).
  iii. Operators tend to be mutually exclusive (the same individual x cannot have the numerical operator 1 and 2 at the same time), which in turn leaves the operator position vacant for only one operator.
  iv. Two operators would violate the uniformity of the Structures of Layers in FDG, given in figure 2.

Since FDG does not provide the necessary tools to deal with a Neg operator taking scope over a numeral operator, the situation can be amended by the introduction of a few notational conventions. Creating a new layer just to account for this marked phenomenon would rob the theory of its economy and uniformity. Therefore, a preferable solution is to notations to establish this convention. For instance, the use of the symbol hyphen '-' between the Neg and 1 operator could signify a relation of scope restriction. That is to say, neg is taking scope only over the numeral operator 1 and not the entire x. An illustration is provided below.

3. IL:$(M_i$: $(A_i$: $[(F_i$:DEN$(F_i))(P_a)(P_s)(C_i$:$[(T_i)(R_i)(R_e)](C_i))(C_e$: $[(T_e)(R_i)_{\{Contr\}}$
        $(R_i)](C_e))](A_i))(M_i))$

   RL: $(p_i$: $(ep_i$:$[(e_i$:$[(f_x$:$[(f_n$:fi$(f_n))(x_x$:dari $(x_x))$ $_{\{L\}}$ (**Neg-I** x_j: raʒul $(x_j))$
        $_{\{U\}}](f_x))](e_i))(e_e$:$[(f_j$:$[(f_n)(x_x)(2x_e$ raʒul$))](f_j))](e_e))(ep_i))(p_i))$

5. Conclusion

The aim of this paper was to look into the nature of the interaction between Negation and the Dual Operator in Standard Arabic. In addition, this research tested how adequate an account FDG can provide as a response to the issue at hand. The findings pointed out an unusual scope relation between Negation and the Numeral operator in Standard Arabic. The default framework of FDG does not provide a template to represent how an operator (Neg) can take a scope and therefore be the operator of another operator (Numeral). Hence, the paper provisionally suggested that this relationship can be represented by means of inserting a hyphen (-) between the (Neg) and (Numeral) operators. Despite the fact that FDG's typologically based nature makes it a prime candidate for cross-linguistic analyses, the availability of literature in various languages tends to vary from very scarce to abundant. Such was the case of Negation taking scope over a numeral operator in Arabic. Dual constructions are not commonly found or studied thoroughly in languages, and there are definitely numerous venues to be explored in this regard. For instance, the proposal this paper argued for could be strengthened if a comparative study between languages with multiple Numeral operators is undertaken. Another potentially fertile area of enquiry could be the FDG's conventions and how amendable they are to adapt and account for marked constructions and phenomena.

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