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## Quantifiers as functional heads: A study of Quantifier Float in Hebrew\*

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This paper argues that the quantifier *all* in Modern Hebrew is a functional head in the sense of Abney (1987) and related work, which selects a DP complement headed by the definite determiner. We hope to demonstrate that such an analysis has advantages over analyses which take Q to be a specifier (Abney 1987) and over an analysis such as that of Sportiche (1988) according to which *tous* ('all') is adjoined to NP (or DP) in the base.

Concerning the phenomenon of Quantifier Float, the Hebrew data discussed support rather strongly the fundamental insight of Sportiche (1988), namely that Quantifier Float consists of moving an NP (DP) subject leftwards, from a D-structure VP-internal position, leaving behind the quantifier. We argue, however, for some modification in the implementation of this idea. In particular, we hypothesize that leftward movement undergone by the subject over the quantifier proceeds through the specifier of QP, of which the quantifier is a head. Our basic claim is illustrated in (1), where an empty category appears to the left of Q.

- (1) [NP]<sub>i</sub> ... [QP [e]<sub>i</sub> Q [e]<sub>i</sub>]

We attempt to motivate the existence of this empty category for Hebrew and indirectly also for French. In addition, we investigate *wh*-movement of a subject out of QP, showing that extraction is possible only when QP itself is in a head-governed position. This accords with the familiar constraint on extraction out of NPs, suggesting, again, that the floated quantifier not only

\* This paper expands and develops ideas first discussed in Shlonsky (1991). We are indebted to Edit Doron, Tanya Reinhart and Hagit Borer for preliminary discussion, to participants in the 1990 NELS colloquium and to Teun Hoekstra for comments on an earlier draft. All errors and omissions are our own. This work is supported by SSHRC grant # 411-85-0012.

marks the position from which movement is launched but also that the floated or *wh*-moved DP is moved out of a maximal projection, a QP of which Q is the head.

### 1. The phenomenon

Hebrew manifests the following alternation in the positioning of the quantifier *kol* ('all').<sup>1</sup>

- (2a) Katafti ?et kol ha-praxim bi-zhirut.  
 (I) picked acc all the-flowers with-care  
 'I picked all the flowers carefully.'
- (2b) Katafti ?et ha-praxim kul-am bi-zhirut.  
 (I) picked acc the-flowers all-[3MPL] with-care  
 Same as (2a).

(2a) and (2b) are synonymous, although (2b) is considered more formal.<sup>2</sup> Yet when the quantifier appears to the right of the DP *ha-praxim* ('the flowers'), as in (2b), it obligatorily hosts a clitic pronoun which must agree with the quantified DP in number and gender, as shown by the ungrammaticality of (3a).<sup>3</sup> A bare quantifier as in (2a) cannot appear to the right of the quantified DP, (3b). Moreover, *kol* cannot host a clitic when it precedes the quantified DP, as shown in (3c).

<sup>1</sup> This paper deals only with collective *kol* ('all'). However, *kol* can also have the interpretation of 'every' and 'each', as in *kol gever ohev xatul* ('Every/Each man loves a cat'). In these latter uses, *kol* must be followed by an indefinite singular noun.

<sup>2</sup> The phonological alternation *kol* → *kul* is induced by the attachment of the clitic and subsequent stress shift to the final syllable. Throughout this paper we follow Ritter (1988) in assuming Hebrew NP's to be DP's.

<sup>3</sup> The following table lists the clitic pronouns which appear with *kol*.

-i	1s.
-xa	2s.m.
-ex	2s.f.
-o	3s.m.
-a	3s.f.
-anu	1pl.
-xem	2pl.m.
-xen	2pl.f.
-am	3pl.m.
-an	3pl.f.

- (3a) \*Katafti ?et ha-praxim kul-o bi-zhirut.  
 (I) picked acc the-flowers all-[3MS] with-care
- (3b) \*Katafti ?et ha-praxim kol bi-zhirut.  
 (I) picked acc the-flowers all with-care
- (3c) \*Katafti ?et kul-am ha-praxim bi-zhirut.  
 (I) picked acc all-[3MPL] the-flowers with-care

This reversal in the order of the quantifier and quantified DP and the concomitant changes are not restricted to direct objects of V. (4), (5) and (6) demonstrate that clausal subjects, objects of subcategorized prepositions and objects of adjunct prepositions all exhibit the same alternation.

- (4a) Kol ha-yeladim ?ohavim le-saxek.  
 all the-children like to-play  
 'All the children like to play.'
- (4b) Ha-yeladim kul-am ?ohavim le-saxek.  
 the-children all-[3MPL] like to-play  
 Same as (4a).
- (5a) Dan himer ?al kol ha-kesef.  
 Dan gambled on all the-money  
 'Dan gambled on all the money.'
- (5b) Dan himer ?al ha-kesef kul-o.  
 Dan gambled on the-money all-[3MS]  
 Same as (5a).
- (6a) Dan sixek ?im kol xatulei-ha-rexov.  
 Dan played with all cats-the-street  
 'Dan played with all the street cats.'
- (6b) Dan sixek ?im xatulei-ha-rexov kul-am.  
 Dan played with cats-the-street all-[3MPL]  
 Same as (6a).

## 2. The categorial status of Q

As a first step towards an analysis of QPs, suppose that *kol* is a head, i.e. an  $X^0$  element, and not a specifier (Abney 1987) or an adjunct (Sportiche 1988). Such a hypothesis provides a straightforward explanation for the fact that *kol* can host clitics in (2b) and (4b)–(6b). This is so because only heads

can host pronominal clitics in Hebrew.<sup>4</sup> Consider (7), which exemplifies third person clitics on non-finite verbs, nouns, prepositions and the negative particle *?eyn*, which Doron (1983) argues to be an Infl<sup>0</sup> element.

- (7a) Baati lir?ot-o/a/am.  
 (I) came to see-him/her/them  
 ‘I came to see him/her/them.’
- (7b) Baati lir?ot ?et ?axot-o/a/am.  
 (I) came to see acc sister-his/her/their  
 ‘I came to see his/her/their sister.’
- (7c) Baati lir?ot ?et ha-seret ?al-av/eha/ehem.  
 (I) came to see acc the-film about-him/her/them  
 ‘I came to see the film about him/her/them.’
- (7d) Dan ?eyn-o šamen.  
 Dan neg-him fat  
 ‘Dan is not fat.’

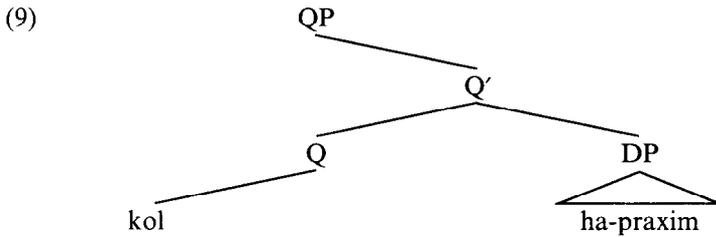
While complementizers do not host clitics in Hebrew — perhaps as a result of their own affixal nature (Shlonsky 1988) — they do so in the related Modern Standard Arabic and in many colloquial dialects. The example in (8) is from Northern Palestinian Arabic.

- (8) Fakkart ?inno-o/ha/hin fi-l-beet.  
 (I) thought that-he/she/they at-the-house  
 ‘I thought that he/she/they are at home.’

Both lexical and functional heads, then, form a natural class with respect to their capacity to host clitics. Assimilating Q to the class of heads allows us to capture the fact that it can host pronominal clitics without any additional assumptions.

Suppose, then, that (2a) and (4a)–(6a) all instantiate a structure in which *kol* heads a QP and takes a DP complement, as in (9).

<sup>4</sup> For reasons which are unclear to us, adjectives do not host clitics either in Hebrew or in the related Arabic. Tensed verbs host clitics productively in Arabic but in Hebrew, tensed verbs and clitic combinations are archaic and restricted to certain person and tense combinations. This may be due to the existence of an accusative free-standing pronoun, *?oto/?ota/?otam* (‘him/her/them’), absent from Arabic (cf. Borer 1983).



Assume further that *kol* selects or subcategorizes for a DP headed by the definite determiner *ha-*. The difference between the quantifier under discussion in this paper and e.g. the distributive quantifier mentioned in note 1, can therefore be stated in terms of subcategorization: ‘All’ takes a DP headed by *ha-* and a plural or collective NP, while ‘every/each’ requires a singular indefinite complement. Note also that the illformedness of phrases such as *kol Dan* (‘all Dan’), discussed further in note 6, also follows under this view, since the DP containing *Dan* is not headed by a definite determiner and thus fails to meet the requirements imposed by *kol*.

In the structure proposed in (9), the QP headed by *kol* is represented as a syntactic constituent. Standard constituency tests such as clefting (10a), pseudo-clefting (10b), topicalization (10c) and conjunction (10d) confirm the validity of this representation.

- (10a) Ze hayu kol ha-yeladim še-zarku ?avanim.  
 it was all the-children that-threw stones  
 ‘It was all the children who threw stones.’
- (10b) Mi-še zorek ?avanim ze kol ha-yeladim.  
 who-that throws stones it all the-children  
 ‘Those that throw stones are all the children.’
- (10c) Kol ha-yeladim, ?ani batu?ax še-zorkim ?avanim.  
 all the-children I sure that-throw stones  
 ‘All the children, I’m sure throw stones.’
- (10d) ?etmol zarku štei banot ve-kol ha-banim ?avanim  
 yesterday threw two girls and-all the-boys stones  
 ?al ha-mora.  
 on the-teacher  
 ‘Yesterday three girls and all the boys threw stones at the teacher.’

### 3. Preposing in QP

Consider, now, more closely, the (b) examples in (2) and in (4)–(6). The hypothesis we shall try to support is that the Q-final construction has the same underlying structure as the Q-initial one, from which it derives transformationally.

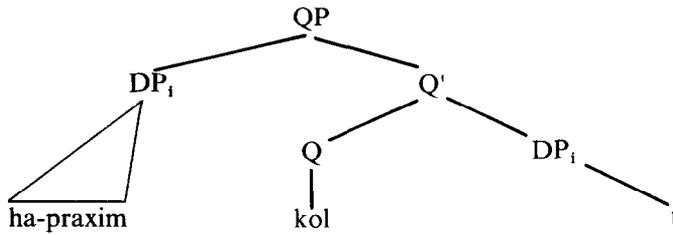
Q-initial and Q-final QP's are both expressions of the same category and bar level, since they can both appear in all argument positions, as example sentences (2) and (4)–(6) show. In addition, the constituency tests applied to the Q-initial expressions in (10a–d) can be successfully applied to the Q-final ones, as in (11a–d). Finally, a Q-initial and a Q-final expression can be conjoined, as in (12) and when serving as direct objects, both are preceded by the accusative marker *?et*.<sup>5</sup>

- (11a) Ze hayu ha-yeladim kul-am še-zarku ?avanim.  
it was the-children all-[3MPL] that-threw stones  
Same as (10a).
- (11b) Mi-še zorek ?avanim ze ha-yeladim kul-am.  
who-that throws stones it the-children all-[3MPL]  
Same as (10b).
- (11c) Ha-yeladim kul-am, ?ani batu?ax še-zorkim ?avanim.  
the-children all-[3MPL] I sure that-throw stones.  
Same as (10c).
- (11d) ??etmol zarku štei banot ve-ha-banim kul-am ?avanim  
yesterday threw two girls and-the-boys all-[3MPL] stones  
?al ha-mora.  
on the-teacher  
Same as (10d).
- (12) ?Ra?iti ?et kol ha-banot ve-?et ha-banim kul-am.  
(I) saw acc all the-girls and-acc the-boys all-[3MPL]  
'I saw all the girls and all the boys.'

Let us, then, take the Q-final expressions to be derived from the Q-initial ones by an application of *Move- $\alpha$* , which preposes the DP complement of Q into the specifier position of Q, yielding (13).

<sup>5</sup> The marginality of (11d) and (12) should probably be attributed to the fact that in these sentences, the two conjuncts are not symmetric in linear order.

(13)



#### 4. Agreement in QP

Movement of the DP in (13) from complement of Q position to its specifier position leaves a trace which must meet the ECP. Let us assume antecedent government of the trace is met by coindexation with the DP in [Spec/Q].

Now consider head-government. Rizzi (1990) argues that not all heads are inherent head-governors. However, a deficient head can become an appropriate head-governor if it bears agreement. In Rizzi's system, overt and covert movement of Agr into Comp serve to turn Comp into a head-governor for a subject trace in some languages, while in others Comp bears Agr features at D-structure.

With this idea in mind, let us hypothesize that the clitic which obligatorily appears on *kol* when the quantified DP is fronted to [Spec/Q] is an agreement marker. This agreement marker serves to transform an otherwise defective governor into a licit head-governor for the trace in the complement position of Q.

The obligatory absence of the agreement clitic illustrated by the ungrammaticality of (3c) can be subsumed under the generalization that agreement is a relation which holds exclusively between a head and a local specifier and not between a head and its complement.

The alternation between the configurations in e.g. (2) is highly reminiscent of the patterning of clausal agreement in Modern Standard Arabic and Modern Irish (see e.g., Ayoub 1980, McCloskey and Hale 1984, and much other work). In Arabic, clausal subjects may appear either clause-initially or following the verb. In the former case, the verb agrees with the subject in number while in the latter case it does not.

- (14a) ?al ?awlaad-u      raqas-u.  
 the children-NOM danced-PL  
 'The children danced.'

- (14b) Raqasa            l-ʔawlaad-u.  
 danced-SING the-children-NOM  
 Same as (14a).

Koopman and Sportiche (1988) argue that nominative Case assignment in Arabic is implemented either by (exceptional) government of a VP internal subject by the verb in I, or by agreement of the verb with the subject in [Spec/I]. Case assignment by government is exemplified in (14b) and Case assignment by agreement in (14a). The internal syntax of QP in Hebrew might be considered another instance where Case may be assigned in either one of two ways.<sup>6</sup>

<sup>6</sup> T. Hoekstra suggests that the Agr features which appear on Q absorb the Case assigned to the DP sister of Q. His proposal is essentially to assimilate the impossibility of [<sub>QP</sub> Q + cl, DP<sub>i</sub>] to the impossibility of clitic doubling in Hebrew NPs, in the absence of an insertable Case assigning preposition, as discussed in Borer (1984): \*[<sub>NP</sub> N + cl, NP<sub>i</sub>] and (ia) below. This is plausible, but fails to account for why movement of the quantified DP to [Spec/Q] allows it to satisfy the Case filter since the option of preposing inside QP does not extend to NPs, as shown by the unacceptability of (ib).

- (ia) \*[<sub>NP</sub> tmunat-a ha-mora]  
 picture-her the-teacher  
 'the teacher's picture'  
 (ib) \*[<sub>NP</sub> ha-mora tmunat-a]  
 the-teacher picture-her  
 'the teacher's picture'

It is more likely that the clitic on N is not Agr and therefore specifier head agreement within Hebrew NPs is not a viable means for assigning or realizing Case on an NP-internal argument. The clitic on Q, by contrast, *is* Agr, permitting a DP sister of Q to appear in [Spec/Q] and be licensed in that position by coindexation with Q.

A different kind of problem is illustrated in the pair in (ii).

- (iia) \*Kol Dan šazuf.  
 all Dan tanned  
 'Dan is all tanned'  
 (iib) Dan kul-o šazuf/šazuf kul-o.  
 Dan all-him tanned/tanned all-him  
 Same as (iia)

We have argued that [DP Q-cl] expressions derive from [Q DP] structures by optional preposing of DP. The pair in (ii), then, poses a problem, since DP preposing appears to be obligatory, viz. the ungrammaticality of (iia). However, it is plausible that (iia) is independently ruled out by failing to meet the selectional restrictions imposed by *kol*, namely being in a DP headed by the definite determiner *ha-*. As for (iib), one might entertain the possibility that it is actually not derived from (iia). Suppose that we construe the clitic on *kol* in (iib) as an emphatic reflexive, on a par with the clitic endings of standard reflexives in Hebrew, e.g., *šacm-o*, *šacm-a*,

### 5. Floating quantifiers

Consider, now, the data in (15), which illustrate the familiar phenomenon of Quantifier Float (Kayne 1975, Sportiche 1988, among others).

- (15a) Ha-yeladim yašnu kul-am.  
 the-children slept all-[3MPL]  
 'The children all slept.'  
 (15b) \*Ha-yeladim yašnu kol.  
 the-children slept all  
 Same as (15a).

In (15a), the DP complement of Q appears in the clausal subject position, while the Q+AGR expression appears to its right, separated from it by the verb.

Kayne (1975) has argued, for French examples superficially resembling (15a), that the quantifier – which he took to be an adverbial element – is moved rightwards transformationally. The analysis we have been developing thus far renders such an operation highly implausible for Hebrew.

(15b) shows that when the Q is floated it *must* bear agreement. This seems to indicate that the pre-float structure is (13), i.e., one where the DP appears as the specifier of QP. If Kayne's analysis were carried over to Hebrew, it would mean that Q' is moved rightwards transformationally. This is highly unlikely since X' phrases are not constituents and are therefore not subject to movement transformations. Even if they were, it is not clear how the trace they leave behind would be antecedent governed.

However, the strongest piece of evidence which Hebrew provides against an analysis which takes the Q to move rightwards, is the obligatory occurrence

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*šacm-am*, ('himself', 'herself', 'themselves'). Seen in these terms, (iib) should be assimilated to (iii), rather than to (15a).

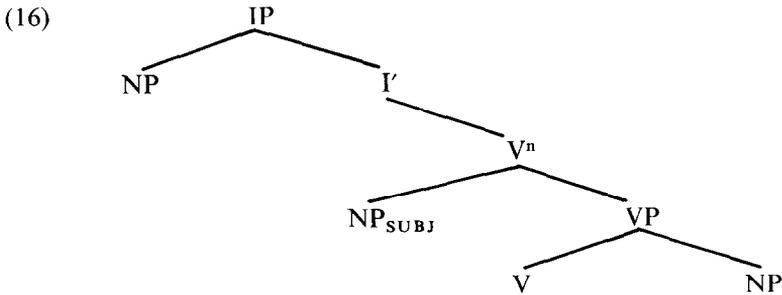
- (iii) Dani šacm-o šazuf.  
 Dani self-him tanned  
 'Dani himself is tanned'.

This analysis might also extend to (iv), (v).

- (iv) Dani šod-o šazuf.  
 Dani still-him tanned  
 'Dani is still tanned'.  
 (v) \*šod Dani šazuf.  
 still Dani tanned  
 Same as (iv).

of the agreement clitic on Q. We have argued, on the basis of the alternations illustrated in (2)–(6), that the quantified DP may appear to the left of Q, in which case Q bears agreement. We suggested that this should be analyzed as movement of the quantified DP into [Spec/Q]. The obligatory occurrence of agreement in (15) above should then be taken to indicate that the operation of quantifier float takes the quantified DP and moves it into the subject position of the clause *through* [Spec/Q].

This is close to the theory developed in Sportiche (1988). Sportiche argues that the quantifier remains *in situ* and the subject is raised into the clausal subject position. Sportiche utilizes his proposal as evidence for a theory developed by Koopman and Sportiche (1988) (see also Kitagawa (1986), Kuroda (1988) and others) according to which subjects are generated at D-structure in a position internal to a projection of V, specifically, as subjects of a small clause complement of Infl, as in (16).

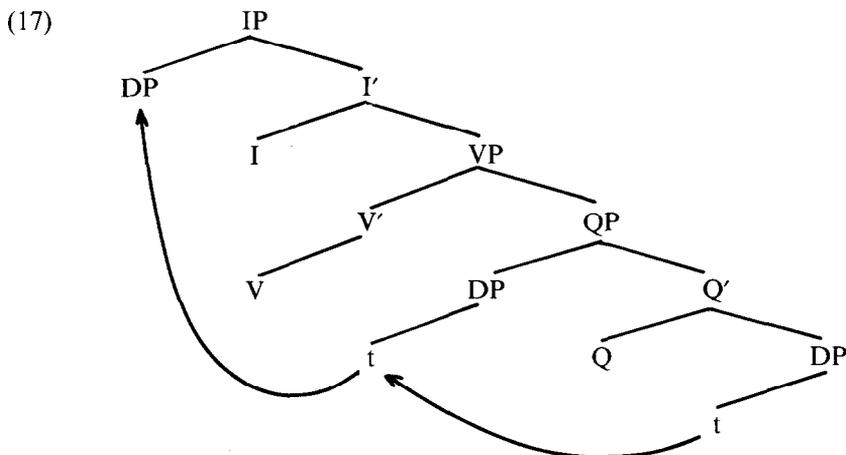


Koopman and Sportiche argue that the  $V^n$ -internal subject receives a theta-role in its base position and then raises to the clausal subject position to receive nominative Case via agreement. In their analysis, [Spec/I] is not a theta-position, only a Case position. While adopting the essence of this proposal, we assume, for reasons which will become clear in section 6, that Hebrew subjects are base-generated in [Spec/V] rather than as sisters to VP.

For Sportiche (1988), the quantifier in French is adjoined to NP. I have tried to show that in Hebrew it is the head of QP.<sup>7</sup> Putting aside this language-particular difference, we can derive the facts in (15) by assuming that the clausal subject QP is base-generated in VP and its DP specifier is

<sup>7</sup> Sportiche's proposal cannot be carried over to Hebrew without further assumptions. If *kol* is adjoined to NP (or DP), it is not clear how the Q-final configuration arises, and how or why agreement surfaces on Q. A similar difficulty arises if we assume that Q is a specifier. Thus, the phenomenon of Q-Float in Hebrew in and of itself lends support to the view that Q is a head.

subsequently raised to the clausal subject position. In addition, we assume that V is raised to I (Doron 1983, Shlonsky 1987). In section 6 below, we argue that the VP internal subject position is VP-final; we argue that the specifier of VP linearly follows V'. For now, we merely assume it. The derivation which gives rise to Q-Float is illustrated in (17), with irrelevant details suppressed.



Movement of the quantified DP from [Spec/Q] to [Spec/I] does not cross any barrier in the sense of Chomsky (1986): Two maximal projections are crossed in the movement path, QP and VP. VP is L-marked by the V+I complex, QP is L-marked in virtue of being the specifier of VP. The trace of DP in [Spec/Q] is head-governed by V in I and antecedent-governed by the DP in clausal subject position (see below).

The intriguing question at this point is what rules out (15b). I have argued that Q agrees with DP iff DP is the specifier of QP. (15b) shows that the generally optional preposing of the quantified DP from complement to specifier position is obligatory when DP is moved out of QP into [Spec/I].

This state of affairs closely resembles extraction out of NP in Romance. Cinque (1980) and others have observed that extraction of arguments out of NP in Romance is only possible if the argument is first preposed to the specifier of NP. There are a number of proposals in the literature attempting to derive this requirement (see e.g., Giorgi and Longobardi, forthcoming, and references cited therein).

I have followed Rizzi in assuming that the transformation of a C into a licit head-governor requires the appearance of Agr features on C. In a similar

vein, Rizzi argues that Romance nouns are not head-governors and that movement out of NP in Romance requires that covert agreement features appear on N in order to turn it into a licit head-governor. These agreement features need to be licensed by coindexation with a specifier bearing those same features, since, by hypothesis, a specifier of a head controls and thereby licenses agreement on that head. Thus, movement through [Spec/N] in Romance can be said to follow from the need to activate the specifier position in the NP. This reasoning can be successfully applied to Hebrew Q-Float, with the added advantage that agreement on Hebrew Q, unlike Agr on Romance N, is phonetically realized.

Thus, the phenomenon of Q-Float can be fully assimilated to a case of extraction from an  $X^{\max}$  where X is not a proper head-governor. The complement DP of Q is moved in two steps: first to [Spec/Q] where it triggers agreement, and subsequently to [Spec/I]. Both traces are head-governed and antecedent-governed. The trace in complement position is head-governed by Q and antecedent-governed by the trace in [Spec/Q] and the latter trace is head-governed by V in I and antecedent-governed by the DP in the clausal subject position.

## 6. Clause-final subjects and the structure of the Hebrew VP<sup>8</sup>

The Q-cl constituent from which the clausal subject is moved can also appear clause-finally, (18).

- (18a) Ha-yeladim medabrim sinit kul-am.  
 the-children speak Chinese all-[3MPL]  
 ‘The children all speak Chinese.’
- (18b) Ha-saparim hiku ?et ha-yeled kul-am.  
 the-barbers hit acc the-boy all-[3MPL]  
 ‘The barbers all hit the boy.’

I have adopted the view that subjects – hence Q + AGR expressions – are base-generated as specifiers of VP. I have also suggested that the specifier of VP in Hebrew lies in the right margin of VP. This would account for the acceptability of clause-final QPs in (18a,b). In this section, I discuss this matter in greater detail.

Consider the fact that QP subjects cannot appear on the right of VP when

<sup>8</sup> I am grateful to T. Hoekstra for substantial improvements in this section.

a non-subcategorized constituent follows V. A good illustration of this restriction is provided by the interaction of VP-internal subject QPs with manner adjuncts, which I take to be adjoined to VP.<sup>9</sup> The contrast between (18b) above and (19) below shows that postverbal subjects can only follow VP-internal material but not VP-adjoined material. Notice, moreover, that if subjects were sisters to VP and adjuncts adjoined to VP as in Sportiche's system, (19) would incorrectly be predicted to be grammatical.

- (19) \*Ha-saparim hiku ?et ha-yeled *be-?axzariyut* kul-am.  
 the-barbers hit acc the-boy *with-cruelty* all-[3MPL]  
 'The barbers all hit the boy cruelly.'

Rather, when the adjunct is adjoined to VP on the right, it must follow the subject, as in (20).<sup>10</sup>

- (20) Ha-saparim hiku ?et ha-yeled kul-am *be-?axzariyut*.  
 the-barbers hit acc the-boy all-[3MPL] *with-cruelty*  
 'The barbers all hit the boy cruelly.'

Note, now, that a floated QP may also appear between V and the direct object, or between V and a left-adjoined VP adjunct.

<sup>9</sup> This is supported by the fact that manner adjuncts may not appear between the clausal subject and the verb, as shown in (i,ii) below. This follows if V is in I and manner adjuncts may not adjoin higher than VP.

- (i) \*Ha-yeladim *bi-zhirut* ?axlu dagim.  
 the-children *with-care* ate fish  
 'The children ate fish carefully.'
- (ii) \*Ha-yeladim *be-sadinut* hadfu ?et ha-kadur.  
 the-children *with-gentleness* hit back acc the-ball  
 'The children hit back the ball gently.'

<sup>10</sup> VP-adjuncts may also be adjoined to VP on the left. We thus predict that an intransitive verb in I may be followed by an adjunct (left-adjoined to VP) and a subject in [Spec/Q] and that such a sentence will minimally differ from e.g. (19), where the presence of VP material to the left of the adjunct diagnoses right-adjunction of the adverbial element. Although (i,ii) contrast with (19), we find the contrast rather weak, something for which we have no explanation.

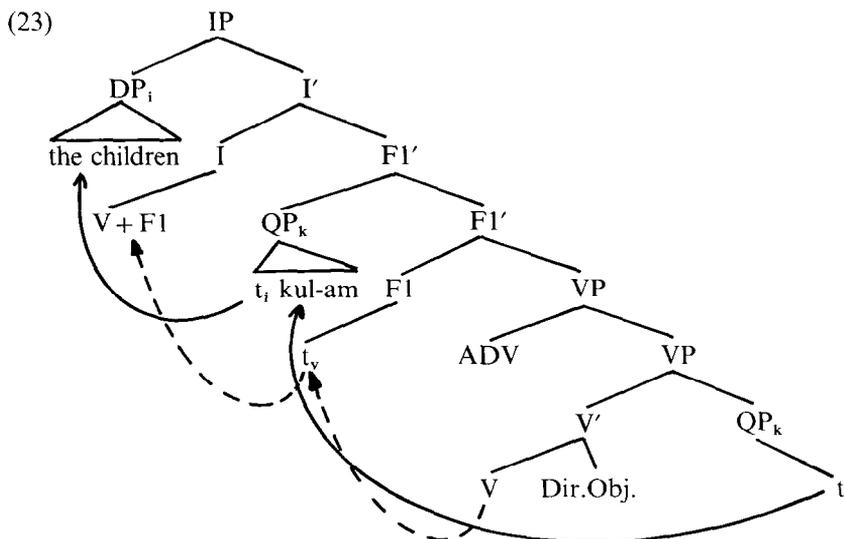
- (i) ?Ha-yeladim šaru *be-kol ram* kul-am.  
 the-children sang *with-voice loud* all-[3MPL]  
 'The children all sang in a loud voice.'
- (ii) ?Ha-banot soxot *be-?erom* kul-an.  
 the-girls swim *in-nude* all-[3FPL]  
 'The girls all swim nude.'

- (21a) Ha-yeladim hiku kul-am (be-ʔaxzariyut) ʔet ha-mora.  
 the-children hit all-[3MPL] (with-cruelty) acc the-teacher  
 ‘The children all cruelly hit the teacher.’
- (21b) Ha-banot hadfu kul-an (be-ʔadinut) ʔet ha-kadur.  
 the-girls hit-back all-[3FPL] (with-gentleness) acc the-ball  
 ‘The girls all gently hit back the ball.’

Notice, moreover, that the floated QP itself cannot be preceded by a VP adverbial element; the adjunct must appear between QP and the direct object, (22).

- (22) \*Ha-yeladim hiku *be-ʔaxzariyut* kul-am ʔet ha-mora.  
 the-children hit *with-cruelty* all-[3MPL] acc the-teacher  
 ‘The children all cruelly hit the teacher.’

It must, then, be the case that QP has raised out of VP, over the VP-adjoined adjunct. Recent work (notably Pollock 1989) argues for the existence of an additional functional projection between I and VP, through which the verb moves on its way to I. The relative order of constituents in the sentences we have been considering also supports this view. Let us call this projection F1 and assume that the QP in (22) may raise to the specifier of F1. The relevant structure for (22) is given in (23). (By naming this intermediate head F1, we remain uncommitted as to whether F1 = Tense, as in Pollock’s work, or Agr as in Chomsky 1989, Belletti 1990.)



## 7. Extensions of the analysis: Wh-movement of DP/QP

In previous sections, we examined movement from QP base-generated in VP, the D-structure subject position, into [Spec/I]. The arguments developed in this paper and crucially, the claim that the quantifier *kol* heads a maximal projection and that movement out of QP proceeds through [Spec/Q], lead us to predict that extraction should be prohibited from inside a QP which itself occupies a non head-governed position. Thus, we predict that wh-movement out of QP in the clausal subject position ought to be ungrammatical, while movement from QP which remains in VP should be perfectly acceptable. This is so because [Spec/I], the clausal subject position is not governed by its head but only agrees with it. Agreement, being formally distinct from government, is not a formal relation which can satisfy the ECP. Extraction from inside a QP should be possible only when [Spec/Q] is head-governed by an external governor. When QP remains in VP, it is head-governed by the verb in F1. Similarly, when QP is in [Spec/F1], it is governed by V in I. When QP has raised to the clausal subject position, however, it is no longer head-governed.

With these considerations in mind, observe the contrast in (24).

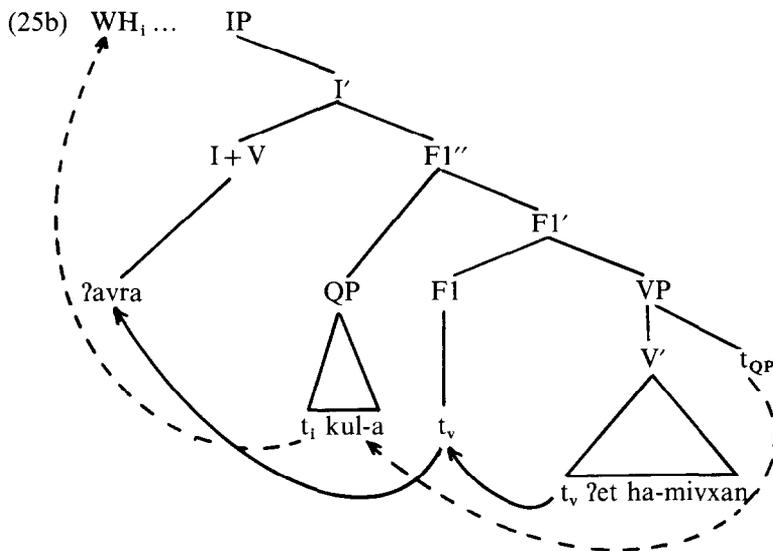
- (24a) \*?eize kita kul-a ?avra ?et ha-mivxan?  
 which class all-[3FS] passed acc the-exam  
 ‘Which class did all the members of pass the exam?’
- (24b) ?eize kita ?avra ?et ha-mivxan kul-a?  
 which class passed acc the-exam all-[3FS]  
 ‘Which class did all the members of pass the exam?’

(24a) violates the ECP, since QP is in [Spec/I], as discussed above. (24b) differs from (18a) in the linear order of the verb and the QP subject. Assume that in (24b), the QP remains in situ in VP and take the inflected verb in I to be the head-governor for QP. The presence of a head-governor for QP in I in (24b) versus the absence of a head-governor in (24a) accounts for the grammaticality of the former and the ungrammaticality of the latter.

QP may also appear between the verb and the direct object, (25a). In section 6 above, we argued that when QP appears in a position between the verb and the direct object, it has been raised out of VP into the specifier of an intermediate functional category, F1. As illustrated in (25b), then, V raises to I via F1, QP moves from [Spec/V] to [Spec/F1] and wh-movement is launched

from inside QP in [Spec/F1]. Note that the variable,  $t_i$  in (25b) is head-governed by V in I. <sup>11, 12</sup>

- (25a) ?eize kita ?avra kul-a ?et ha-mivxan?  
 which class passed all-[3FS] acc the-exam  
 ‘Which class did all the members of pass the exam?’



<sup>11</sup> Another possibility, which we do not explore here, is that the inflected verb moves to Comp in Hebrew interrogatives. Under such circumstances, QP is in [Spec/I] in (25). However, a verb in Comp can head-govern the clausal subject position as argued in Rizzi (1990). See Doron and Shlonsky (to appear) for development of this idea.

<sup>12</sup> An unexpected turn occurs when we shift attention to wh-movement of the quantified DP from direct object position.

- (i) \*?eize tapu?ax ?axalta ?et kul-o?  
 which apple (you) ate acc all-it  
 ‘Which apple did you eat all of it?’

Sportiche provides an example of direct object relativization in French and argues that it is acceptable, while Kayne (1975) provides examples of non-restrictive relatives. Interestingly, neither cites well-formed cases of interrogation of the quantified DP from direct object position. Deprez (1990) argues that wh-movement of a quantified DP from direct object should be universally unacceptable. Indeed, the Hebrew data support the view that it is not a language particular deviation which prohibits (i) since wh-movement from a VP-subject is perfectly acceptable, as shown by (24b).

## 8. Quantifier Float in French

In this final section, we attempt to extend to French the analysis for Quantifier Float which we proposed for Hebrew.

Let us begin by noting that in French, as in Hebrew, the phrase consisting of Q and the quantified DP is also a constituent, as evidenced by the constituency tests in (26).

- (26a) C'était tous les enfants qui jetaient des pierres.  
 it was all the children who threw stones  
 'It was all the children who threw stones.'
- (26b) Tous les enfants, je suis sûr, jetaient des pierres.  
 all the children I am sure threw stones  
 'All the children, I am sure, threw stones.'
- (26c) Les filles et tous les garçons jetaient des pierres.  
 the girls and all the boys threw stones  
 'The girls and all the boys threw stones.'

The most restrictive and strongest claim we could make is that Quantifier Float in French proceeds essentially like Quantifier Float in Hebrew. Let us entertain the hypothesis that the French Q-float structure also contains an empty category to the left of Q, i.e., in [Spec/Q] and that Quantifier Float is engineered by associating an Agr element with Q so as to turn it into a licit governor.

Yet there are two major differences between French and Hebrew: first, Agr on Q in French is covert, as we shall demonstrate below, while in Hebrew it is overt, and second, a lexical DP may appear in the [Spec/Q] in Hebrew, as we have seen, but not in French; contrast the sentences in (27) with those of (28) below. (Note that in both subject and object *tous* phrases, the quantified DP may not precede the quantifier.)

- (27a) \*Elle a lu [<sub>QP</sub> les livres tous [e]].  
 she has read the books all  
 'She has read all the books.'
- (27b) \*<sub>[QP]</sub>Les enfants tous [e] ont mangé.  
 the children all have eaten  
 'The children have all eaten.'

- (28a) Hi qarʔa ʔet [<sub>QP</sub> ha-sfarim kul-am [e]].  
 she read acc the-books all-[3MPL]  
 ‘She has read all the books.’
- (28b) [<sub>QP</sub> Ha-yeladim kul-am [e]] ʔaxlu.  
 the-children all-[3MPL] ate  
 ‘The children all ate.’

On the other hand, an empty category may, by hypothesis, appear in French [Spec/Q], as shown in (29).

- (29a) Les livres que j’ai lus presque [<sub>QP</sub> [e] tous [e]]...  
 the books which I have read almost all  
 ‘The books almost all of which I have read...’
- (29b) Les enfants ont [<sub>QP</sub> [e] tous [e]] mangé.  
 the children have all eaten  
 ‘The children have all eaten.’
- (29c) Elle les a lus [<sub>QP</sub> [e] tous [e]].  
 she them has read all  
 ‘She has read them all.’

Notice the grammaticality of (30) where the quantified DP follows the quantifier and contrast it with the unacceptable (27a).

- (30) Elle a lu [<sub>QP</sub> tous les livres].  
 she has read all the books  
 ‘She has read all the books.’

The impossibility of a lexical DP in [Spec/Q] bears resemblance to another phenomenon in French, namely, past participle agreement, as analyzed in Kayne (1989). Again, the relevant generalization is that there is an asymmetry between lexical DPs and empty categories. The latter, but not the former, can occupy the position to the left of the past participle, the position which triggers agreement.

- (31a) Elle les a [e] repeintes.  
 she them has repainted-FPL  
 ‘She has repainted them.’
- (31b) Quelles tables est-ce que tu as [e] repeintes?  
 which tables is-it that you have repainted-FPL  
 ‘Which tables have you repainted?’

- (31c) \*Elle a les tables repeintes.  
 she has the tables repainted-FPL  
 ‘She has repainted the tables.’

Kayne explains this asymmetry by recourse to Case theory. The auxiliary *avoir* cannot assign Case to an NP (DP) to its immediate right, presumably in the specifier of the object agreement node (cf. Chomsky 1989) and since that position heads an A chain, it must receive Case. A'-movement is possible through that position however, as evidenced by the acceptability of past participle agreement when clitic movement or wh-movement have occurred, as in (31a,b). This leads Kayne to posit another empty category adjoined to AgrP. Since the adjoined position is not an A position, Case need not be assigned to it.

While the facts concerning what may or may not appear to the left of the quantifier in French basically parallel those of clauses containing agreeing past participles, Kayne's explanation does not directly carry over to them. We believe, however, that the two phenomena, that of Quantifier Float and that of past participle agreement, yield to a single analysis.

Notice, first, that Kayne's analysis immediately excludes (32), on a par with (31c). In general, an object cannot follow the auxiliary *avoir* in French.

- (32) \*Elle a [tous les livres ]lu(s).  
 She has all the books read(-PL).  
 ‘She has read all the books.’

The more interesting cases, though, are those in (27). Observe (27a): although the entire object QP is in a Case position, following the past participle, the quantified DP cannot precede Q.

Consider the possibility that it is not the QP itself which requires Case, but rather, the DP within it. The quantifier is a functional category but the actual argument is the DP within it. Suppose, now, that the Case assigned to the quantified DP is a structural Case assigned by e.g., V, I or a past participle. Q serves only to *transmit* this Case. Our discussion of Case assignment internal to QP in Hebrew can be trivially restated in these terms with the added condition that QP and its head be themselves in positions to which structural Case is assigned (essentially, complements of V, specifiers of an Agr node and perhaps uniquely for Hebrew, specifiers of a functional category governed by the verb, e.g. F1). (32) is excluded since the auxiliary *avoir* is not an assigner of Case, as Kayne argues.

Now, consider the following principle, which provides a mechanism for transmitting Case to a DP either in complement position of Q or to a DP in its specifier position.

(33) *Case Transmission*

A functional head (e.g., Q) can transmit Case to a DP which is either governed by it or strongly agrees with it.

Since Q governs the D-structure position of the quantified DP and QP itself is governed by a Case assigning participle, (30) is predictably grammatical. In (27a), on the other hand, Q does not govern the quantified DP in [Spec/Q] so Case cannot be transmitted by Q through government.

Recourse can now be made to the second strategy for Case transmission, namely, strong agreement. Yet even the utilization of this option fails to yield a grammatical output in French. To see why this is so, consider some independent differences between French and Hebrew. In French, agreement between Q and the quantified DP is found not only when the quantified DP is fronted over Q, but also when it is in situ, in the complement position of Q, as in (34).

- (34) J'ai vu tous les enfants  
 I have seen all-MPL the children  
 'I have seen' 'all the children'
- toute la famille  
 all-FS the family  
 'all the family'
- toutes les filles  
 all-FPL the girls  
 'all the girls'

We take these facts to mean that the type of agreement manifested on the French quantifier is not a reflex of specifier–head coindexing, as in Hebrew, but adjectival agreement, implemented perhaps by feature–copying of the sort discussed in e.g. Halle (1990). Another difference is that Hebrew Q manifests person agreement while French Q does not.

Rather than drawing the consequence that French Q simply does not agree with its specifier, let us say that in Hebrew, Agr on Q is strong in that it is overtly manifested while in French it is weak, to borrow terminology from recent work on the clausal inflectional system. Thus, in French, a lexical DP

in need of Case cannot appear in the specifier position of Q even if QP itself occupies a Case marked position. This is so because Q does not strongly agree with its specifier and hence cannot transmit case to it. By the same reasoning, both sentences in (27) are excluded as are all cases where a lexical DP surfaces in [Spec/Q] in French. In Hebrew, as we have seen, agreement is overtly manifested on Q and phi features are directly represented. Hence, Agr is strong. Case can therefore be transmitted to a lexical DP in [Spec/Q], accounting for the grammaticality of (28).

Wh-movement and clitic movement (of nonsubjects) may proceed through [Spec/Q] in French because no Case needs to be assigned to the intermediate trace in [Spec/Q]. This is so because the trace of the quantified DP in the complement position of Q can serve as the Case-marked variable. Under such circumstances, only the ECP requires the intermediate empty category since direct movement from the complement position of Q would leave an offending trace and moreover, Agr on Q, albeit weak, needs to be licensed by coindexation with a specifier.

Thus, [Spec/Q] serves as an intermediate A' landing site for wh-movement and clitic movement and facilitates extraction of a wh-phrase or a clitic by permitting the ECP to be satisfied by the variable in the complement position of Q. In cases of NP movement of the quantified DP (Quantifier Float), [Spec/Q] functions as an A position, although not as a Case position. But since Case is assigned to DP by agreement in [Spec/I], the intermediate trace in [Spec/Q] does not need to get Case.

French [Spec/Q] is never a Case position but it may form an intermediate link in both A and A' chains. Therefore, lexical DPs cannot appear in [Spec/Q] but only empty categories. In Hebrew, on the other hand, [Spec/Q] is a Case position and therefore admits lexical DPs as well as empty categories.

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