The scope of too with gapped infinitival clauses

The degree operator too can be accompanied by an infinitival clause with an optional non-subject gap. (1)a-b are both acceptable and in fact truth-conditionally equivalent, assuming him is understood as anaphoric to John. Both express (2), where d rich is short for rich at least to degree d, conveying that John's being rich to the degree that he actually is is incompatible with the monastery hiring him.

(1)  
a. John is too rich [for the monastery to hire him].  
b. John is too rich [for the monastery to hire _].

(2)  
that ∃d[ j is d rich & not Possible [that j is d rich & the monastery hires j] ]

Chomsky (1977) considered for-clauses like those in (1) complements of too, and argued that gapped for-clauses like the one in (1)b are predicates of individuals derived by empty operator movement. How do (1)a-b come to be equivalent under these assumptions? The obvious answer makes too associate the gap in (1)b with its antecedent. We spell out this answer in order to interpret, though not explain, two unexpected findings. First, too+gapped infinitival does not exhibit the same scope mobility that Heim (2001) observed for too+gapless infinitivals and other degree phrases. Second, this restriction is lifted in environments reminiscent of those licensing parasitic gaps.

No inverse scope. We begin with a previously unnoticed contrast illustrated in (3). (3)a-b share the reading in (4), where (2) expresses the content of John’s desire and which accordingly implies that John wants not to be hired. (3)a has the additional reading in (5), where it is John's wanting to be rich to the degree that he actually wants to be rich that is incompatible with the monastery's hiring him. Curiously, (3)b does not have this second reading. Hence only (3)a can be judged consistent with John actually wanting to be hired.

(3)  
a. John wants to be too rich [for the monastery to hire him].  
b. John wants to be too rich [for the monastery to hire _].

(4)  
that [j wants [that ∃d [ j is d rich & not Possible [that j is d rich & mon. hires j] ] ] ]

(5)  
that ∃d[ j wants [that j is d rich] ] & not Poss [that [j wants [that j is d rich] ] & mon. hires j] ]

The ambiguity of (3)a can be understood as a scope ambiguity of the sort described by Heim (2001). With Heim, we take gradable adjectives to express relations between degrees and individuals and take too and the for-infinitival to form a DegP that undergoes covert movement, as shown in (6)a. The lexical entry in (6)b, adapted from Heim, then derives (2) as the notation of (1)a.

(6)  
a. [DegP too [for us to see him] ] λd[John be [AP d short] ]

b. | too | (p,d)(f,d,sto) = that ∃d[ f(d) & not Possible [f(d) & p] ]

Turning to (3)a, reading (4) can be credited to a logical form where DegP scopes under want, whereas reading (5) arises when DegP takes inverse scope over want, as sketched in (7).

(7)  
[DegP too … ] λd[John want [PRO to be [AP d rich] ] ]

Type-shifted too. As a straightforward extension to cases like 1)b, we posit a type-shifted operator too' in (8)b which takes as its first argument a property of individuals, rather than a proposition, and also takes an additional individual argument, feeding the latter as an input to the former. This renders (1)b interpretable without DegP movement, assigning (8)a the intended denotation (2).

(8)  
a. John be [AP [DegP too' λx[for us to see x] ] short]

b. | too' | (P,d)(f,d,sto)(x) = that ∃d[F(d)(x) & not Possible [F(d)(x) & P(x)]]

In this account of gapped for-clauses, the observation that (3)b lacks reading (5) indicates that a logical form like (9), which would derive this reading, is not available.

(9)  
*John [DegP too' … ] λdλx[x want [PRO to be [AP d rich] ] ]

Faraci’s Generalization. One might conclude that, unlike other DegPs, too+gapped infinitival cannot take inverse scope over another operator. However, this would be both too weak and too strong. To begin, Faraci (1974) noted that a gap in too+gapped infinitival must be anaphoric to the
subject of the AP containing too. This is illustrated by the unacceptability of (10)a, where the A(dv)P containing too does not predicate a subject that could antecede the gap, as well as by the observation that the gap in (10)b cannot be anaphoric to the adjective’s complement Mary, but only to its subject.

(10)   a.  *John is yelling too angrily [for us to invite _].
       b.  John is too [angry at Mary] [for us to invite _JOHN/*MARY].

Under our assumptions, the ungrammaticality of (10)a and the restriction in (10)b must signal ill-formedness of (11)a-b. In principle, covert DegP movement could target a predicate derived by movement of John to subject position in (11)a, or a predicate derived by covert movement of Mary in (11)b. Faraci’s generalization thus points to a stronger condition than a mere restriction against inverse scope over other operators: it suggests that too+gapped infinitival must be interpreted in situ.

(11)   a.  *John [DegP too’ …] λdλx[x yelling [AP d angrily]]
       b.  *Mary [DegP too’ …] λdλx[John is [AP d angry at x]]

Exceptions to Faraci’s Generalization. However, Faraci’s generalization turns out to have previously unnoticed exceptions. In (12), for example, where the complement of angry has moved overtly, the anaphoric possibilities in (10)b are reversed, as the gap in the infinitival clause now can and in fact must be anaphoric to Mary. On our assumptions, this reading must be due to the logical form in (13). Hence, too’-DegP-movement is able to target a predicate derived by overt movement of the internal argument of angry.

(12)   Mary, who [John is too [angry at _] [for us to invite _JOHN/MARY]]
(13)   Mary, who [DegP too’ …] λdλx[John is [AP d angry at x]]

This is strikingly reminiscent of familiar restrictions on the licensing of parasitic gaps. As (14)a illustrates, a parasitic gap in an adjunct clause can be anaphoric to a wh-phrase that has moved overtly. However, as illustrated in (14)b, such a gap cannot be parasitic on a subject, or on an object that has not moved overtly.

(14)   a.  Mary, who [John praised _][in order for us to invite _MARY]
       b.  *John praised Mary [in order for us to invite _JOHN/MARY]

Exceptional inverse scope. We conclude that movement of too+gapped infinitival is ordinarily prohibited, but that the prohibition is lifted when DegP is able to target a predicate derived by overt wh-movement. If this is correct, we are lead to also expect exceptions to the otherwise frozen scope of too+gapped infinitival illustrated in (3)b. Specifically, we expect inverse scope to be available when overt wh-movement creates a derived predicate which the DegP is then able to target in moving past an intensional operator such as want. For example, we would expect (15) to have available the logical form sketched in (16).

(15)   Mary, who [my mother wants me to be too [angry at _] ] [for me to (actually) dislike _]
(16)   Mary, who [DegP too’ …] λdλx[my mother wants me to be [AP d angry at x]]

This prediction is, remarkably, borne out. (15) conveys that what is incompatible with my disliking Mary is my mother’s wanting me to be angry at Mary to the degree that she actually wants me to be angry. This is in fact the only sensible interpretation that (15) has. And it is precisely what (16) expresses.

Conclusions. That a gapped infinitival can in general appear with too only if DegP remains in situ is surprising; that this immobility seems to reverse just when DegP can target a predicate derived by wh-movement is equally so. These empirical findings provide support for, and suggest constraints on, the ability of Degree phrases to take their scope syntactically.