

Quantifier Binding Connectivity in Specificational Clauses

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1. Introduction and aims

A common assumption about the licensing of quantifier bound interpretations is that there must be syntactic c-command between a quantifier and a pronoun (eg. Reinhart 1983).

- (1) a. Every boy_i likes his_i sister.
b. *The girl that every boy_i likes his_i sister.

In (1a), the quantifier phrase c-commands the pronoun and the quantifier bound interpretation is available. However, in (1b), the quantifier phrase does not c-command the pronoun and the quantifier bound interpretation is not available. Recently, this assumption has been questioned in light of data where there clearly is no c-command between a quantifier phrase and a bound pronoun in English (Barker 2012). One context in which this is evident is in specificational copular clauses (Higgins 1973).

- (2) The girl that every boy_i likes is his_i sister.

In (2), there is no c-command between the quantifier phrase and the pronoun yet the quantifier bound interpretation is clearly available. This is known as connectivity in the specificational clause literature and is part of a range of phenomenon where an element, β , which usually needs to be c-commanded by some element, α , can occur as the pivot of a specificational clause where α does not c-command β .¹ The analysis of such phenomenon has been used to motivate different analyses of specificational clauses. For example, Jacobson (1994), Sharvit (1999), Cechetto (2000) among others propose an equation analysis of (2) where there really is no c-command between the quantifier phrase and the pronoun in (2). In contrast, Ross (1972), Schlenker (2003) among others propose that there actually is elided structure in the pivot which retains the assumption that there is c-command between the quantifier phrase and the pivot at an abstract level.

In this paper, I show novel data from Tamil specificational copular clauses that indicates that QB connectivity is much more complicated than the simple picture afforded by English. Based on Tamil data, I argue that whether QB connectivity is possible in a specificational clause depends on two different factors: 1) whether the QP c-commands the PRN at some point in the derivation and 2) whether the pivot containing the pronoun can be interpreted as a function. Combination of these two factors gives rise to the following permutations.

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|--|------------------------|
| (3) a. QP c-commands PRN + Pivot cannot be a function: | QB connectivity OK |
| b. QP does not c-command PRN + Pivot cannot be a function: | QB connectivity not OK |
| c. QP c-commands PRN + Pivot can be a function: | QB connectivity OK |
| d. QP does not c-command PRN + Pivot can be a function: | QB connectivity OK |

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¹ Other such phenomenon includes reflexive connectivity, NPI licensing connectivity, opacity connectivity among others. See Sharvit (1999) for a discussion of these various types.

In (3a) and (3b), the pivot cannot be interpreted as a function but only as a type *e* variable. In these cases, whether QB connectivity is possible or not depends on whether there is a point in the derivation where the QP *c*-commands the pronoun. If there is as in (3a), then QB connectivity is possible, but if there is not as in (3b), then QB connectivity fails. In contrast, in (3c) and (3d), the pivot has a functional meaning. In these cases, it does not matter whether the QP *c*-commands the pronoun at some point in the derivation or not as QB connectivity is always going to be possible.

The main implication of (3) is that a pivot that can only be a type *e* variable must be *c*-commanded by a QP in order to exhibit QB connectivity. I motivate (3) by showing that Tamil which has two different ways of forming specificational clauses exhibits all four cases seen in (3). Once this is done, I turn to English and argue that English which has only one way of forming specificational clauses only exhibits (3b) and (3d). The implication of this analysis is that even English can be shown to exhibit a *c*-command requirement for quantifier binding once mitigating factors are controlled for. On a larger picture, the findings of this paper indicate that quantifier binding is mainly semantically driven, but when the conditions for semantic licensing are absent, syntactic binding must be possible.

The outline of the paper is as follows. In section 2, I discuss the two ways to form specificational clauses in Tamil and the unexpected QB connectivity pattern where one allows QB connectivity with bare pronoun pivots and possessor pivots while the other only allows QB connectivity with possessor pivots. I also motivate (3) in this section. In section 4, I consider two extensions of the analysis, one pertaining to Tamil complex reflexives and one pertaining to English QB connectivity. I then conclude.

2. Tamil specificational clauses and QB connectivity

In this section, I discuss the Tamil specificational clauses and analyze the QB connectivity patterns.

2.1. Two Tamil specificational clauses

In Tamil, there are two different ways to form a specificational clause. These constructions look minimally different on the surface.

- (4) a. [[___ Mala-ve paatt]-**adu**] Balan IC
 Mala-acc saw-**ADU** Balan
 '[The one that saw Mala] is Balan.'
- b. [[___ Mala-ve paatt]-**avan**] Balan AC
 Mala-acc saw-**AVAN** Balan
 '[The one (masc.) that saw Mala] is Balan.'

(4a) shows what I call the Invariant Construction (IC) and (4b) shows the Agreeing Construction (AC). These are so named for the fact that the verbal morphology (bolded) appears to 'agree' with the pivot *Balan* which is a masculine name. In the IC, this verbal morphology is homophonous with the 3rd person neuter pronoun and in the AC, this verbal morphology is homophonous with the 3rd person masculine pronoun (in cases where the pivot is masculine). The portion shown in square brackets in the Tamil sentences correspond to their English translations. The verbal morphology is assumed to be a nominalizer, distinct from regular subject-verb agreement morphology.

I assume an equation analysis of specificational clauses (Jacobson 1994, Heycock & Kroch 1999, Sharvit 1999) for both these constructions. The two constructions in (4) are analyzed as an equation of two elements of type *e* as shown below with the partial semantic composition.

- (5) $[[\lambda x.x \text{ saw Mala}] \text{DET}_{\text{DEF}}] = b$

- b. [Balan [__ palat-te pidikum-ni] conn-aval] Mala-(*vikki) AC
 Balan fruit-acc like-comp said-AVAL Mala-dat
 'The one (fem.) that Balan said likes fruit is Mala.'

These other among reasons support the derivations of the IC and AC shown in (6).

2.2. Quantifier Binding Connectivity

In this section, I will now show the QB connectivity facts in Tamil starting with the case where the pivot is a pronoun in a possessor phrase. Consider the base clause first.

- (10) [ellarum_i [avenode_{i/j} tambi vanth-aan ni] conn-aan]
 everyone his brother come-3sm comp said-3sm
 'Everyone_i said his_i brother came.'

(10) shows an embedded clause with a subject that contains a possessor pronoun. This pronoun can be bound by the matrix subject quantifier. Now consider the IC and AC counterparts of (10) where the embedded subject occurs as the pivot.

- (11)a. [ellarum_i [__ vanth-aan ni] conn-**adu**] avenode_{i/j} tambi **IC**
 everyone come-3sm comp said-**ADU** his brother
 'The one that everyone_i said came is his_i brother.'
- b. [ellarum_i [__ vanth-aan ni] conn-**avan**] avenode_{i/j} tambi **AC**
 everyone come-3sm comp said-**AVAN** his brother

Even if the gap is in the embedded clause, the nominalizer suffix still occurs on the matrix verb as seen in (11). Both the IC and AC show QB connectivity here. Recall that I have claimed that the derivations of the IC and AC are different. While the IC subject phrase contains a copy of the pivot, the AC subject phrase does not. This means that the availability of QB connectivity in the AC indicates that there does not have to be syntactic binding between the quantifier and the pronoun for the bound pronoun reading.

Instead, I propose that the availability of QB connectivity in the IC and AC in (11) is a result of an equation of two functions. This is the same analysis Sharvit (1999) gives to the English sentence *The person that every boy_i liked is his_i brother*. In this analysis, the LF of the IC and AC in (11) is as shown.

- (12) $\text{if}_{\langle e, e \rangle} [\forall x (\text{person}(x) \rightarrow \text{said}(x, f(x) \text{ came})] = \lambda x \text{ } \iota y [\text{brother-of}(y, x)]$

The subject phrase is the unique function that maps every individual to the person that this individual said came. The pivot is the function that maps every individual to their unique brother. In this instance, QB connectivity does not depend on syntactic binding. The fact that even the AC exhibits QB connectivity is a good indicator of that. Such data thus supports the view that quantifier bound interpretations do not require syntactic binding.

But this is not the whole picture. There is a complication which becomes apparent when the pivot is not a pronoun in a possessor phrase but rather a bare pronoun by itself. Consider the following.

- (13) [ellarum_i [aven_{i/j} vanth-aan ni] conn-aan]
 everyone he come-3sm comp said-3sm
 'Everyone_i said he_i came.'

In (13), the embedded subject is bare pronoun and it can be bound by the matrix subject, the quantifier phrase. Unlike with the earlier case, there is an asymmetry when we form the IC and AC variants.

- (14) a. [ellarum_i [__ vanth-aan ni] conn-**adu**] aven_{i/j} **IC**
 everyone come-3sm comp said-**ADU** he
 The one that everyone_i said came is his_i brother.’
- b. [ellarum_i [__ vanth-aan ni] conn-**avan**] aven_{*i/j} **AC**
 everyone come-3sm comp said-**AVAN** he

(14) shows the corresponding IC and AC of (13) where the embedded subject is the pivot. In both, the free variable interpretation of the pronoun is available. However, while the IC still allows the QB connectivity interpretation, the AC does not. If QB connectivity was purely semantically driven, this asymmetry between the IC and AC is unexpected. Suppose there is an identity function meaning of the pronoun as Reuland & Winter (2009) propose. Under such an analysis, one would expect the following to be a possible denotation of the IC and AC in (14).

- (15) $\iota_{\langle e, e \rangle}[\forall x(\text{person}(x) \rightarrow \text{said}(x, f(x) \text{ came}))] = \lambda x[x]$

In this analysis, the function that maps every individual to the person that this individual said came is the identity function. However, this apparently is not sufficient to license QB connectivity in the AC. This, thus, is a puzzle that has to be explained.

2.3. Towards an analysis

In this section, I argue that the reason why bare pronouns do not exhibit QB connectivity in the AC comes down to two independent facts. The first fact has to do with the fact that there is a copy of the pivot in the subject phrase only in the IC, not the AC. Based on the derivations that I have proposed for the IC and AC in section 2.1, the following shows the derivation (with copies) of (14).

- (16) a. [ellarum [<aven> vanth-aan ni] conn-**adu**] aven **IC**
 everyone come-3sm comp said-**ADU** he
 The one that everyone_i said came is his_i brother.’
- b. [Op_i ellarum [t_i vanth-aan ni] conn-**avan**] aven **AC**
 everyone come-3sm comp said-**AVAN** he

In (16a), the quantifier phrase c-commands the unpronounced copy of the bare pronoun in the IC but in (16b), the quantifier does not c-command any copy of the bare pronoun in the AC. But this alone is not enough to derive the Tamil QB connectivity data. The other important fact is the following: a bare pronoun, unlike a possessor phrase, does not have a functional meaning, it only has a type e meaning.

There are two reasons to doubt that the bare pronoun has a functional meaning. The first is the lack of Q-A pairs with a bare pronoun meaning. One of the main pieces of independent evidence for the claim that possessor phrases have a functional meaning comes from the fact that they can serve as answer fragments.

- (17) Q: Who did every boy_i say came?
 A: {His_i brother/ *Him_i}

Groenendijk & Stokhof (1984) analyze such Q-A pairs as quantification over functions. Thus, the question asks what function is such that it maps every boy to the person he said came. The answer identifies the function as the *brother-of* function. However, this function meaning is not possible with the bare pronoun as seen in (17). The other reason to doubt that a bare pronoun has a function meaning comes from the fact that copular clause pivots do not have proxy readings (Ken Safir p.c.). Note that Reuland & Winter (2009) primarily motivate a function meaning for bare pronouns to account for proxy readings like the following.

(18) John washed himself in the museum.

While (18) has a meaning where *John* washed the individual *John*, it also has a meaning in which *John* washed perhaps a statue of himself. This is the proxy reading. Reuland & Winter (2009) propose that such proxy readings can be captured by treating reflexives and bare pronouns (which also have a proxy reading) as identity functions. However, it appears that pronouns as copular clause pivots do not in general have proxy readings after all.

(19) John is himself.

While (19) is possible on the interpretation where *John* is behaving as one familiar with *John* might expect him to, there is possible proxy interpretation for this sentence. In addition, Ken Safir points out the following contrast.

(20) All the celebrities were flattered by the way they looked in the exhibit, so you can imagine how shocked and outraged they were when Ringo started undressing them one by one.

(21) John thought all the other celebrities were silly and vain for getting so upset when first reports from the wax museum indicated that many of them had been undressed by Ringo (who had supposedly done it for a prank), that is, until John realized that the only one Ringo had bothered to undress was him.

In (20), the pronoun occurs in a regular transitive clause and a proxy reading for the pronoun is available here, i.e. *them* can refer to the statues of the celebrities. (21) is different. Here, the pronoun occurs as the pivot of a specificational clause. Safir notes that while the context should make a proxy reading possible, such a reading is very much marginal here on the pronoun. I should note that I share his judgment on these. What (19), (20), and (21) show is that even if a proxy reading of a pronoun should be given a functional meaning, such a meaning is not possible in a specificational clause pivot. In summary, I conclude that bare pronouns as specificational clause pivots do not have functional meanings at all. They only have a type e meaning.

We now have the two factors that can account for the Tamil data. 1) The IC, but not the AC, allows syntactic binding of the pivot pronoun by the quantifier phrase. 2) A pronoun in a possessor phrase but not a bare pronoun has a functional meaning as a specificational clause pivot. The combination of these two factors gives us the whole Tamil paradigm of when QB connectivity is possible.

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|--------|--------------------|------------------------|-------|
| (22)a. | IC + Bare pronoun | QB connectivity OK | (14a) |
| b. | AC + Bare pronoun | QB connectivity not OK | (14b) |
| c. | IC + Poss Pronoun | QB connectivity OK | (11a) |
| d. | AC + Poss. Pronoun | QB connectivity OK | (11b) |

The Tamil data thus motivates the following generalization.

(23) A type e element can exhibit connectivity in a specificational clause only if it is c-commanded by its licenser at some point in the derivation.

3. Extensions

In this section, I discuss two implications of (23). The first has to do with reflexive connectivity and the second has to do with English quantifier binding licensing.

3.1. Reflexive connectivity

The data in this section has been discussed in Selvanathan (to appear), so I will just discuss briefly how the reflexive facts corroborate (23). First observe that the Tamil complex reflexive, unlike, English *himself* does not appear to have a function meaning.

- (24) Who does John_i love?
 {Himself_i/ **tanne taane*}

(24) shows that English *himself* can be an answer fragment, but Tamil complex reflexive *tanne taane* cannot. If this indicates that *himself* has a function meaning, but *tanne taane* does not, (23) makes a clear prediction. While *himself* should be possible as a specificational clause pivot in English, *tanne taane* is only possible as a specificational clause pivot in the IC. This is correct.

- (25) a. The person that John_i loves is himself_i.
 b. [Balan_i __ adicikit-**adu**] tan-ne taane_i **IC**
 Balan beat.koL-**ADU** self-acc.self^c
 The one Balan beat was himself.'
 c. *[Balan_i __ adicikit-**avan**] taan taane_i **AC**
 Balan beat.koL-**AVAN** self-self

(25a) shows a specificational clause which I assume is similar to the AC wherein there is no point in the derivation at which the antecedent *John* c-commands the pivot. Nonetheless, reflexive connectivity is possible as *himself* has a functional meaning. However, *tanne taane* does not have a function meaning. It can only be a type e variable. Thus, the IC in (25b) but not the AC in (25c) exhibits reflexive connectivity, as only the derivation of the former has a point at which *Balan* c-commands the reflexive.

Note that this also has the implication that reflexives can occur in (at least) two types; an English-type identity function, or a Tamil complex reflexive-type type e variable.

3.2. Quantifier binding in English

A recent claim about quantifier bound interpretation in English is that it does not require syntactic binding and that it is purely semantic (Barker 2012). However, (23) shows that even English can be shown to require syntactic licensing for quantifier bound interpretations. This comes from the fact that we see a similar bare pronoun-possessor phrase distinction when it comes to QB connectivity in English.

- (26) a. The person that every boy_i said came is his_{i/j} brother.
 b. The person that every boy_i said came is him_{*i/j}.

While (26a) with a possessor pronoun pivot exhibits QB connectivity, (26b) with a bare pronoun pivot does not. Note that (26b) is possible with an interpretation of the pronoun as a free variable. In addition, the pronoun can also be bound by a c-commanding quantifier as shown below.

- (27) Every boy_i said that [the one that Susan loves is him_i].

The comparison of (26b) and (27) suggests strongly that the problem with (26b) is that the pronoun cannot be bound. In other words, *him* being a type e pronoun when it occurs as a copular clause pivot requires a c-commanding quantifier phrase. The absence of this in (26b) is what leads to failure of QB connectivity.

If true, then this indicates that English too requires syntactic c-command in order to license quantifier bound interpretation if the conditions for semantic binding are not present. If this is correct, then this would mean that in cases where quantifier bound interpretations are possible even without syntactic binding, there is likely to be a specific semantic licensing effect.

4. Conclusion

In this paper, I have argued that whether QB connectivity in a specificational clause is available is dependent on two factors: 1) whether the QP c-commands the PRN at some point in the derivation and 2) whether the pivot containing the PRN can be interpreted as a function. This is motivated by Tamil QB connectivity facts. I show that there are two ways to form specificational clauses in Tamil and that only one of them exhibits QB connectivity with a bare pronoun. I argue that this is because a bare pronoun, unlike a possessive phrase, does not have a function meaning. This means that only the IC, which has a point in its derivation where the quantifier phrase c-commands the pronoun, exhibits QB connectivity with a bare pronoun.

I, then, discuss two implications of the Tamil QB connectivity facts. First I show that we can identify a distinction between English and Tamil reflexives, namely that the former but not the latter has a function meaning. Second, I argue that the QB connectivity facts in English indicates that even English quantifier bound meaning can require syntactic binding. This is contra Barker (2012) who argues that English never requires syntactic binding for quantifier bound meanings. The data and analysis here suggests that while it is the case that semantic binding is likely to be the primary source of quantifier bound meanings, syntactic binding cannot be completely ruled out.

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