CONSTRAINTS ON MOVEMENTS OF RELATIVE CLAUSES IN CHINESE

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Three processes are involved in making a relative clause in Chinese. Two of these are clause-internal: (A) de-occurrence, and (B) coreferential noun deletion. A third process, leftward movement, involves the entire relative clause. In this paper, I shall concentrate on this latter process, taking both (A) and (B) as given.

On the surface, relative clauses can occur in two positions illustrated by (1).

(1) a. ((DET) NU-M) S de N
    b. S de ((DET) NU-M) N

S de refers to the relative clause with de-occurrence and coreferential noun deletion both having applied. N is the head noun coreferential to the noun in the relative clause deleted by coreferential noun deletion. Examples for both cases of (1) are found below.

(2) a. zhe san ge mai bao de xuesheng
    DET NU M S de N
    these 3 sell paper student
    'these three students who sell newspapers'

    b. shengfu xie de zhe san ben shu
    S de DET NU M N
    priest write these 3 book
    'these three books which the priest has written'

Since relative clauses always appear pre-nominally as shown in (1), one might wish to argue for an underlyingly pre-nominal position for Chinese relative clauses. There would then be two possible underlying forms. If (1a) reflects the underlying form, (1b) can be derived by leftward S de movement or by rightward ((DET) NU-M) movement. If (1b) reflects the
underlying form, then (1a) can be derived by rightward S de
movement or by leftward ((DET) NU-M) movement. ((DET) NU-M)
movement can be dismissed as a serious possibility since it
is ad hoc. It would only occur as a movement when relative
clauses are concerned, and not where (surface) adjectives
are found, despite structural similarities.

(3) a. ((DET) NU-M) Adj N
b. *Adj ((DET) NU-M) N

I believe that the underlying form of relative clauses
is not mirrored in (1) at all. I suggest it is in fact (4).

(4) NP S

where NP expands as ((DET) NU-M) N. Even though (4) is the
more abstract possibility, it is justified in that it brings
a greater level of overall simplicity to the entire system.
Consider the sentences in (5).

(5) a. Suiran ta₁ pa zuo feiji, Zangsen,
Even though he fear fly ZS
'Even though he's afraid of flying, ZS
hai shi hui qu.
still will go
will still go.' (disjoint reference)

b. *Suiran ta₁ pa zuo feiji, Zangsen₁
'Even though he's afraid of flying, ZS
hai shi hui qu.
will still go.' (coreference)

The sentences of (5) show that coreference between a noun and
a pronoun under a non-precedence command relationship is not
acceptable in Chinese subordinate clauses, although it is in
English.

But note the sentence below in (6).
(6) Suiran Zhangsen, pa zuo feiji, ta

    Even though ZS fear fly he
    'Even though ZS is afraid of flying, he
    hai shi hui qu.
    still will go
    will still go.'

In (6), where the head noun precedes the coreferential pronoun, the sentence is grammatical. The same judgments apply for PRO-forms. (The pronoun ta 'he' is an animate pronoun. If we provide sentences similar to (5) and (6) with inanimate subjects, only PRO will be allowed, and the same judgments with respect to binding will carry.) There appears to be a very general principle in Chinese that coreferential binding is limited to the case where the head precedes the anaphor. We can call this binding constraint, the strict precedence constraint. This constraint appears violated only once, with respect to relative clauses. However, if coreferential noun deletion applies to the structure in (4), i.e. prior to any movement, the deletion rule will fall under the constraint that the anaphor (or deletable noun) follow the head. The whole system of Chinese grammar will thus be made more general. The positing of (4) as opposed to the structures in (1) as a base form has beneficial effects for de-occurrence as well. However, such discussion is quite complex and is completely out of the scope of this short paper. For discussion, cf. Nygaloff (1971), Mercier (1982).

Under the assumption that (4) is underlying, we get the surface forms shown in (1) by a simple leftward movement from post-nominal to pre-nominal position. The structure of the NP prior to movement can be shown using X notation.

\[
(7) \quad \begin{array}{c}
\text{DET} + \text{NUM} \\
\text{N}' \\
\text{N}^m \\
\text{N}^n \\
N \\
\text{S-de}
\end{array}
\]
To get (1) from (7) we need a movement rule. This movement must be obligatory since (7) does not occur as a possible surface form. It must also follow what appears to be a binding constraint, the strict precedence constraint. Positing (4), then, seems to have, as a nasty consequence for REST, the use of an obligatory and ordered movement rule. Further, this movement rule appears to be ordered after (at least part of) the interpretive component's rule applications.

Note that the movement required to yield (1a) from (7) can be considered a local movement. It involves only a single phrasal node \( S = V'' \) and a non-phrasal node \( N \). The movement involves adjacent constituents specified without variables. In this sense, the movement fits in perfectly well with the definition of a local movement, as given in Emonds (1976, 4).

The movement required to get (1b) from (7) can also be viewed as a local movement rule, this time with \( N' \) acting the part of a non-phrasal constituent. Note that (1a) and (1b) actually exhaust all the possibilities for local movement rules. The phrasal node \( S \) is actually adjacent to two non-phrasal nodes \( N \) and \( N' \). If indeed local movement is involved, then the problems with REST vanish. REST claims that movements are optional and unordered. However, these movements can all be subsumed under the rule 'Move a', a structure-preserving rule. It is entirely feasible to claim that local movements apply late in the derivation and that they are obligatory, or possibly rule-specified.

Thus, positing (4) as the underlying form for Chinese relative clauses presents a major advantage in terms of unifying the language under the strict precedence constraint. One might argue that the cost involves the addition of an obligatory local movement rule. However, as we shall presently see, (1a) and (1b) are not merely alternatives. There are constraints on when either can appear. Therefore, if we assume either (1a) or (1b) as a base form, we will need to specify an obligatory movement rule, under certain appropriate conditions, to yield
the possible derived form. If we take (1a) to be the base form, then, to derive (1b) we need some kind of non-local movement rule, since the movement takes place over more than one non-phrasal constituent. This movement cannot be root because relative clauses occur within embedded clauses.

(8) Wo zhidaq zhe sange mai bao de xuesheng
     I know these 3 sell paper student
     'I know that these three students who sell
dou hen yonggong.
     all very work hard
newspapers all work very hard.'

Such movement cannot be structure-preserving. If it were, we would expect the underlying structure to be (9).

(9) S de ((DET) NU-M) S de N

However, such sentences do not occur in the language. ¹

Therefore, positing either (1a) or (1b) as underlying structure for relative clauses and deriving the other one, leads to an ad hoc and undesirable enrichment of the theory. On the other hand, (4) makes the system simpler at no cost whatsoever. A movement is needed in any case to account for the facts. (4) makes use of local movement—(1a, b) of a new kind of movement. For these reasons, I believe that Chinese relative clause formation involves (4) and leftward local movement after de-occurrence and coreferential noun deletion.

It is now necessary to determine when local movement leads to (1a) and when it leads to (1b). In other words, what are the constraints on local movement?

¹ We do find sentences such as (ı) in Chinese.

(i) Ai chifan de shengfu xie de shu
     Love eat priest write book
     'The book that the priest who loves to eat wrote'

(i), of course is an instance of structure :

\[ S[S de N \ VP ]_S \ de \ N \]

and not of structure \[ S de S de N \].
Relative clauses with the structure shown in (1a) are statistically far more common. Furthermore, it appears that in the majority of cases anyway, if a relative clause can have the structure of (1a), it can also have the structure of (1b), albeit with a slightly different interpretation.

(10) a. zheige ai he cha de shengfu
    DET NU M S de N
    this love drink tea priest
    'this priest who loves to drink tea'

b. ai he cha de zheige shengfu
    S de DET NU M N
    love drink tea this priest
    'this (particular) priest who loves to
    drink tea'

On the other hand, we find some cases of relative clauses which can only be found with the structure (1b).

(11) a. *zheiben shengfu xie de shu
    DET NU M S de N
    this priest write book
    'this book which the priest has written'

b. shengfu xie de zheiben shu
    S de DET NU M N
    priest write this book
    'this book which the priest has written'

The simplest possible explanation for the above facts involves optional local movement either with N or with N'. If local movement applies with respect to N' then we get (10b) or (11b). If it applies with respect to N, then we get (10a) and (*11a). We are left lacking an explanation for why (11a) is ungrammatical. Other ungrammatical cases are shown below.

(12) a. *zheige shengfu xie de zi
    DET NU M S de N
    this priest write character
    'this character that the priest wrote'

b. *sange xuesheng mai de jidan
    NU M S de N
    student buy egg
    'the three eggs which the student bought'
The ungrammatical forms in (11a) and (12) all share the fact that the relative clause begins in a noun and follows a (DET) NU-M sequence. We can show that the ungrammaticality in fact lies with the following structural peculiarity.

(13) * (DET) NU-M S | N ...

If we remove the (DET) NU-M from the sentences in (12), the corresponding sentences are grammatical.

(14) a. shengfu xie de zi
     S de N
     priest write character
     'the character that the priest wrote'

   b. xuesheng mai de jidan
     S de N
     student buy egg
     'the egg that the student bought'

If we keep the (DET) NU-M in (12), but incorporate it within the sentence so that the resulting structure is not (13), but (15), the sentences are also grammatical.

(15) S | [(DET) NU-M N ... ] S de N

(16) a. zheige shengfu xie de zi
     S de N
     this priest write character
     'the character that this priest wrote'

   b. sange xuesheng mai de jidan
     S de N
     3 student buy egg
     'the egg which the three students bought'

Finally, if we remove the N as the initial member of the relative clause in (13), the sentences are all grammatical. One can only remove the N by coreferential noun deletion. It will involve a necessary change in head nouns so that the head noun may become coreferential to the subject of the relative clauses in (12).
(17) a. zheige xie zi de shengfu
    DET NU M S de N
    this write char. priest
    'this priest who writes characters'
b. sange mai jidan de xuesheng
    NU M S de N
    3 buy eggs student
    'three students who buy eggs'

We can thus see that the only ungrammatical case is shown in (13). Thus, a local leftward movement to a position immediately before the head noun is prohibited when the relative clause begins with a noun.

There are at least three serious possibilities with respect to assigning ungrammaticality to the appropriate sentences. It might be done by means of a rule condition. Aside from violating the spirit of REST, such a condition is ad hoc in two ways. First, no rule needs a condition even remotely similar to it, and secondly, within REST, this local leftward movement rule would be the only rule with a condition present in Chinese grammar.

One might want to argue that there is an interpretive principle at work. This principle would assign the interpretation of the (DET) NU-M with the interpretation of the closest rightward N to interpret the entire structure as an NP. This principle might be justified on the grounds that a regular NP expansion in Chinese is indeed:

(18) NP → ((DET) NU-M) N

Thus, given a string such as (19) (equivalent to (12a),

(19) # zheige shengfu xie de zi #
    DET NU M N VP N
    this priest write character

the interpretation principle would force a reading where zheige 'this' and shengfu 'priest' form part of the same
NP constituent. Thus, (12a) is correctly excluded as a possible sentence. The same reason accounts for (12b)'s ungrammaticality. Consider however (11a). If the interpretive principle is not modified, it will lead to the interpretation of *which* *ben shengfu* 'this priest' as a single constituent. The ungrammaticality here is due to the fact that the *ben* 'root' is limited by selectional restriction to nouns which reflect the semantic property of books. Thus, the interpretive principle would have to be modified to state that (DET) NU-M is associated with the closest rightward compatible N to form a NP. But note that this reformulation of the interpretive principle, necessary on independent grounds of selectional restriction, now fails to account for the ungrammaticality of (11a). In that sentence, the closest rightward compatible N for the 'DET NU-M sequence is the N *shu* 'book'. Thus, the NP is properly joined, and (11a) ought to be acceptable.

Since (11a) is ungrammatical, it appears that the interpretive principle proposed above is not sufficient to do the job. We suggest that the appropriate way to handle the constraint lies with a filter blind to selectional restrictions. This filter will simply mark as ungrammatical any structure such as (13). (repeated here as (20) for convenience).

(20) (DET) NU-M s[ N

Note that such a filter provides a decision procedure to provide structure to a surface string. Consider the string in (21).

(21) # zheige shengfu ... #
    this priest

One possible structure assignment to (21) is DET NU-M N, as assigned by the basic expansion rule shown in (18). Another possible assignment would be the structure of (20). Therefore, every noun phrase is potentially ambiguous.
The filter proposed to account for the ungrammaticality of the sentences (11a) and (12) actually removes the potential ambiguity of the string in (21) by ensuring the continual ungrammaticality of the structural configuration (20) on a string (21). The filter ensures that given a surface (DET) NU-M followed by a surface N, these elements will only be interpreted as belonging to a single noun phrase. Interestingly, given two possible structures for a single string, the filter removes the most complicated one and the most abstract one. By removing one of the two potential structural configurations from consideration, the filter has allowed the hearer to avoid interpreting a potentially ambiguous string in an ambiguous way. The name we propose for this filter is therefore the Ambiguity Avoidance Constraint, or AAC for short.

One might like to ask whether there is a reason for the existence of AAC in Chinese, and not in English or French. AAC appears to serve a very interesting perceptual function. To the extent that it in fact removes potential ambiguity, it removes the need for a garden path approach to the interpretation of noun phrases. Basic Chinese noun phrases expand readily to (DET) NU-M N structures. It is also a fact that even if the sentences in (12) were grammatical and acceptable, the structure (DET) NU-M N would statistically be far more prevalent than the structure (DET) NU-M g[ N . It is an easy matter to show that simple sentences are statistically more numerous than sentences with noun-initial relative clauses. It is intuitively apparent to us, then, that native speakers would probably give a string like (21) a preferential interpretation with the structure (DET) NU-M N. Thus, if (12a) were an acceptable sentence, the preferred interpretation would associate shengfu 'priest' with the sentence-initial DET NU-M sequence. The next word sie 'to write' would allow the processing to continue since Chinese offers many cases of NF + V (i.e. subject verb). The following word de 'relative clause marker' might not even give the structure away since full sentences of the following
form do exist.

(22) Zheige shengfu xie de hen piaoliang.
DET NU M N V ADV SV
this priest write very beautiful
'This priest writes very beautifully.'

Only the very last word in the string (12a), zé 'character', and the crucial fact that it is a noun, gives the structure away. At that point, reinterpretation of the whole string would have to take place to make sure that the DET NU-M actually belongs to the noun 'priest' or to the noun 'character'. Although (12a) crucially depends on evidence from pointing, (12b) provides more of a salient problem. If (12b) were an acceptable string, the preferred interpretation would find 3 students buying one egg. For the interpretation of (12b) that is in fact given by the structure (i.e. one student buying three eggs), the necessary reinterpretation of the whole string would have to wait until the very last word of the string and would involve reprocessing the entire string from the beginning.

AAC does away with this possible garden path approach to relative clauses by ensuring that if a (DET) NU-M sequence immediately precedes a noun (N), the entire sequence can only be interpreted as part of the same NP.

The constraint prohibits the interpretation of the more abstract of the two structures in favour of the base generable structure. This fact will be of some importance later on.

One can see that there is a very general and useful function for this constraint. But why would such a constraint not be needed in English and French? We suggest that the answer is simply that English and French do not need it since another device prevents garden path sentences in these languages. Complementizers and its effects of pronominal fronting always ensure that there exists a (syntactic) and hence surface marker indicating the arrival of a relative
clause in the string. We can call these combined effects, flags. English, French and most Indo-European languages have flags which signal syntactically the arrival of relative clauses and thus prevent garden-path interpretations (in most cases). Chinese does not have these flags, and must therefore either suffer garden-path interpretations or find another way around it. We suggest that the use of the AAC is the other way around garden-path interpretations in Chinese, and in possibly all languages which lack flags to indicate relative clauses.¹ In this respect, it is interesting to note what Chomsky & Lasnik have to say about filters (Chomsky & Lasnik 1977, 489):

[Filters] involve properties of the COMP system and that in many instances there seem to be functional considerations relating to them. Filters seem to be designed to permit grammatical outputs corresponding to "reasonable" base structures, and they regularly restrict the association of deep and surface structures, often to biuniqueness. In some cases, they may be linked with some plausibility to perceptual strategies, in that they facilitate the operation of such strategies. (emphasis mine, PM)

Their description of filters and their properties based on an analysis of English appears to be in general accord with our perception of filters necessary for Chinese, with the exception that filters in Chinese cannot involve properties of the COMP, this constituent not being a constituent of Chinese. (Cf. Mercier 1982) Either way, it does not appear strange to us to see filters doing much the same work as COMP, and therefore being associated to properties of COMP. Both filters

¹ Note that flags need not be limited to complementizers or pronominal fronting. A particle which does not cause pronominal fronting might be a flag. In fact, any overt marker or any process which prevents or reduces garden path interpretations by means of phonologically-realized items is a flag.
and COMP (or flags in general) can be seen as ways around an undesirable garden-path interpretation of sentences.

We have seen that constraining the movement of Chinese relative clauses by means of the AAC is a functionally viable thesis. The filter does appear to serve a function in the language and the facts are explained. There remains a problem in terms of theoretical elegance if AAC does turn out to be only an ad hoc explanation of facts about relative clauses. As AAC is formulated now, it is quite specific to relative clauses. Note however that AAC provides a choice between two possible structures, and that it opts for the choice of structure DET NU-M N as a single NP. It is not an arbitrary choice. This choice of structure is a less abstract one. It is also the structure which one gets on independent grounds from NP expansion. On the other hand, a structure like DET NU-M 3[ N can never occur as a result of phrase structure expansion - again under the independently-motivated assumption that relative clauses are base-generated post-nominally. We can thus propose as a hypothesis that the actual constraint AAC is:

\[(23) \text{Ambiguity Avoidance Constraint (AAC)}\]

If a string can be assigned more than one structural configuration and one (or more) of these structural configurations are base-generable, * all non-base-generable structural configurations.

The formulation of (23) can be made far more elegant than its definition.

\[(24) \text{AAC (formulation)}: \]

* \ldots \ X[ k ]_X \ Y[ z[ k ]_z \ldots

if \ X[ k ]_X \ Z[ k ]_z \text{ is base-generable.}\]

The if-clause in (24) assumes that AAC has access to the
information of the phrase-structure component. Note that the ungrammaticality is due to an intervening bracket (\( \_ \)). AAC, despite its name, is thus not a derivational constraint and is blind to transformational activity. \( X, Y, \) and \( Z \) represent any syntactic nodes and \( k \) represents a phonologically-realized constituent. The reasons for the presence of \( k \) in (24) are complicated and not in the scope of this paper. (Cf. Mercier 1982 for the reasons.)

We can thus readily see that the ambiguity avoidance constraint we have argued for in the context of relative clauses is an instance of (24). The same constraint can be used in at least one other case in Chinese, that of NP focussing. I shall very briefly summarize the arguments for its use with focussing here. Detailed argumentation and justification for the various assumptions will be found in Mercier 1982.

The expansion rule for focus node in Chinese is:

\[
(25) \quad S \rightarrow S \ FOCUS (=\{[-V]\})
\]

Thus, [-V] categories like NPs can move into the rightmost position of the sentence. Direct objects may also do so. However, direct objects are base-generated by means of the VP expansion rule to sentence-final position as follows:

\[
(26) \quad VP \rightarrow V \ NP
\]

From (25) and (26) we can readily see that a focussed direct object arises as the last constituent of the surface form of a sentence. Likewise, a regular direct object occurs as the last constituent of a non-focussed sentence. Consider this string:

\[
(27) \quad \#Wo shuo Zhongwen.\#
\]

I speak Chinese

Zhongwen 'Chinese' can either be a direct object NP by (26)
or a focussed direct object by (26) and subsequent movement to the \([-V]\) position by a regular rightward movement rule. There are two possible structural configurations for (27).


Only the structural parts relevant to the discussion at hand are illustrated in (28).

The prediction AAC makes is that (28b) will be marked ungrammatical. And in fact it is, for when the string in (27) appears on the surface, the only interpretation which can be given to it is the interpretation where \(\text{Zhongwen} '\text{Chinese}'\) is the direct object of the sentence. (For more complete argumentation, cf. Mercier 1982). In any case, (28b) illustrates a case of an intervening parenthesis (i.e. \(-V[\) which competes structurally with (28a), a base-generable structure. AAC thus correctly rules (28b) ungrammatical.

AAC can be made use of to explain two quite distinct and unrelated phenomena of Chinese grammar. To the extent where AAC can be used to account for more and more constraints on individual rules of the grammar of Chinese, it is independently-motivated and the cost of incorporating it to the grammar is lowered. Furthermore, AAC appears to be functionally motivated since its purpose is to help the hearer avoid garden path interpretations of sentences. The use of a filter is made necessary by the fact that Chinese contains no flags permitting a syntactic resolution of garden path interpretation. A reasonable proposal, which is empirically verifiable, is a perceptual language typology. English makes use of COMP and pronominal fronting as flags whereas Chinese makes use of filters since it has no COMP or other kinds of flags. English belongs to a type of language one can call COMP-ful, whereas Chinese belongs to a language type called COMP-less. We propose that COMP-less
(and probably more generally, flag-less languages) use filters for much the same purposes COMP-ful languages use COMP. We can see in this claim, part of the rationale in the otherwise quite strange fact that filters involve properties of the complementizer system, in English. It is to be hoped that evidence from other languages will be brought to bear on this COMP (or flag) dichotomy to determine whether in fact it is a universal feature of language (two processing types) or a fact about Chinese alone. Lacking evidence to the contrary, I make the former claim.

As far as Chinese is concerned, relative clause movement is a simple local leftward movement from a base N S structure, around either the N or the N'. The constraint against one particular movement around the N is fully explained by the filter AAC, a perceptual strategy which Chinese, belonging to the COMP-less family of languages, must make use of to avoid garden-path interpretation.

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