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The partial availability of Universal Grammar in second language acquisition: the ‘failed functional features hypothesis’

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A number of studies in the research literature have proposed that Universal Grammar (UG) is partially available to adult second language learners. Attempts to provide a syntactic characterization of that partial availability have only recently begun to appear, however. In this article we will argue that speakers of Chinese (a language without wh-operator movement in overt syntax) learning second language English (a language with wh-operator movement in overt syntax) establish mental representations for English which involve pronominal binding rather than operator movement. It will be suggested that this divergence from native-speaker representations is an effect of the inaccessibility of features of functional categories in second language acquisition, what we will refer to as the ‘failed functional features hypothesis’. Implications are drawn from the findings for the syntactic characterization of accessibility to UG more generally in second language acquisition.

I Introduction

The availability of Universal Grammar (UG) in postchildhood second language acquisition (SLA) has been a topic of considerable debate from the earliest applications of principles and parameters theory to the domain of SLA. In early work this meant a fairly stark opposition between ‘non-availability’ views (or availability mediated only by the L1) and ‘full availability’ views, perhaps following an initial period of L1 transfer. (For representative statements of the former see Clahsen and Muysken, 1986; Schachter, 1988; 1989; Bley-Vroman, 1989. For discussion of the latter see, for example, White, 1986; Flynn, 1987; Schwartz and Sprouse, 1990).
More recently, with empirical studies continuing to provide results which sometimes suggest the availability of principles and parameter resetting, and which sometimes do not (see White, 1996; Flynn, 1996 for comparisons of some cases), the debate has taken a more nuanced line. Work is beginning to focus on the possibility that certain subparts of UG are inaccessible or less accessible to second language learners, while other subparts remain fully available. The idea that UG operates in adult language acquisition ‘in some attenuated form’ (Bley-Vroman et al., 1988: 27), or that near-native L2 grammars diverge from those of native speakers in systematic ways, has appeared in various guises in a number of studies (see, for example, Coppieers, 1987; Bley-Vroman et al., 1988; Johnson and Newport, 1991; Sorace, 1993). However, attempts to provide a syntactic characterization of the nature of ‘attenuation’ are only just beginning to appear (see Beck, 1996; Tsimpli, 1996; Wakabayashi, 1997 for some recent proposals). One example is work by Tsimpli and Smith (1991) and Smith and Tsimpli (1995) who investigate the linguistic knowledge of a cognitively impaired subject, Christopher, who happens also to have enhanced ability for second language learning. On the basis of evidence from this prolific L2 learner and other studies of second language acquisition, Smith and Tsimpli hypothesize that a particular subpart of UG becomes inaccessible in adult SLA: features associated with functional categories (see directly below for an explanation).

Adopting a modular view of linguistic ability in which the ‘language faculty’ is composed of a number of differentiated (but interacting) modules, they argue that the principles of UG are located in a separate component from the parametric options which give rise to variation between grammars. The parametric options are to be found in a functional component which they term the ‘UG lexicon’. The UG lexicon contains the functional categories C (complementizer), Agr (agreement), D (determiner), and perhaps others. In first language acquisition, exposure to samples of a target language triggers the fixing of the values of the parameters crucially in conjunction with the surface morphophonological paradigms which instantiate C, Agr, D. Parameter values are then encoded in the lexical entries for items belonging to the categories C, Agr, D. Thus, following parameter setting in first language acquisition, functional lexical items (e.g., that, -s, the, etc.) consist of a pairing of the morphophonological form with functional features encoding a specific parametric option (or options).

Smith and Tsimpli’s proposal is that features of the functional categories, and only those features, are subject to a critical period.
This sets in sometime during childhood. Beyond the critical period the functional features, with the exception of those already encoded in the entries for specific lexical items, become inaccessible to modification. Since the UG lexicon is the locus of parametric options, it becomes impossible for language learners to set new parameters or reset options already fixed in the L1. At the same time, principles of UG like the Empty Category Principle (ECP), Subjacency, the Binding Principles, and so on, remain operative to constrain grammar construction. Moreover, the morphophonological part of functional lexical items, being nonparametrized, is still potentially open to change. Hence although a category like C will have the value of its features fixed for the L1 during the critical period, say to require an operator to raise to the specifier position of Complementizer Phrase (CP), it is still possible for an L2 learner to map new morphophonological material on to those features. For example, an English speaker learning French might map French que on to the features fixed for English that.

These proposals are an interesting attempt to give a principled account of the idea that UG is accessible to L2 learners ‘in some attenuated form’. They suggest that the class of postchildhood L2 grammars will be ‘possible grammars’, but they also suggest that where parameter settings differ between an L1 and a target L2 there will be considerable restrictions on the extent to which an L2 learner can build a mental grammar like that of a native speaker. Two possibilities come to mind: either learners will behave as if the L2 were like the L1, or, once they have sufficient exposure to recognize that the L2 is different on the surface, they will adopt solutions which are different from those of their L1, but also different from those of native speakers of the target language. In the latter case the solutions will nevertheless be compatible with the principles of UG. Hence L2 learners would have divergent but possible interlanguage grammars. (See Sorace, 1993; Martohardjono and Gair, 1993 for similar suggestions that L2 grammars which systematically diverge from native grammars are nevertheless ‘possible grammars’.)

The results of the present study are compatible with Smith and Tsimpli’s (1995) hypothesis. We will argue that L1 Chinese speakers learning L2 English develop grammatical knowledge about English restrictive relative clauses (RRCs) which diverges from that of native speakers because the Chinese speakers have failed to reset a parametric difference between English and Chinese RRCs: English RRCs involve wh-operator movement in overt syntax, while Chinese RRCs do not. We will attempt to show: (a) that postchildhood Chinese learners of L2 English, following an initial
period of transfer, move towards the surface patterns of English RRCs in their mental representations; (b) that this is not, underlyingly, the result of Chinese speakers acquiring the parametric option which allows wh-operator movement – i.e., their mental representations for English are different from those of native speakers; (c) that the interlanguage grammars of the subjects tested nevertheless appear to be sensitive to a presumed universal concerning pronominal binding in a domain for which there is no evidence in overt syntax in Chinese. We will then consider the implications of this finding for a theory of how second language syntactic knowledge is acquired.

II Linguistic assumptions

The structure of English restrictive relative clauses

Following Chomsky (1986) and subsequent work, we will assume that restrictive relative clauses (RRCs) in English involve the movement of a wh-phrase to the specifier position of CP in the embedded clause. This movement leaves a trace in the position from which the wh-phrase has moved:

1) a. The girl [\_ [\_ e [\_ like wh-\_]]] is here
   b. The girl [\_ [\_ who [\_ e [\_ like t-\_]]]] is here

The specifier of CP is an A’ (nonargument) position. Hence the moved wh-phrase is an operator which binds the trace it leaves behind. In English, wh-operators can be either overt – who, which, etc. – or null. When they are overt the head C must be null, as in (1b). When the wh-operator is null, the complementizer may be either that or null, as in (2):

2) a. The girl [\_ [Op [\_ that [\_ like t-\_]]]] is here
   b. The girl [\_ [Op [\_ e [\_ like t-\_]]]] is here

We will also assume, following Rizzi (1990), that this is an effect of the feature specification of C, and a (universal) requirement that heads and specifiers agree. Relative that has the features [+predicative, –wh]. Since overt wh-operators are [+wh], the co-occurrence of *[who that] is a violation of specifier-head agreement: [+wh] and [-wh] disagree.1 Null operators (Op), are

1On Rizzi’s account, differences between languages or varieties of language which allow a ‘doubly-filled’ CP, for example Middle English or non-standard varieties of Modern English, and those which do not, are simply phonological differences which result from different spell-outs of the features of C.
unspecified for the feature wh - [\(\emptyset\)wh] - and so may co-occur with that. A non-empty C is [+predicative], but has the specification [+wh]. Hence either an overt or a null operator may co-occur with an empty C, as in (1b) or (2b).

The only exception to this is relativization of a subject. In this case either an overt wh-operator or an overt complementizer must be present; operator and C cannot both be null:

3) a. The girl, [\(\text{who}\), [\(\text{t}\), likes me]] is here
   b. The girl, [\(\text{O}\), [\(\text{p}\), [\(\text{t}\), likes me]]] is here
   c. *The girl, [\(\text{Op}\), [\(\text{e}\), [\(\text{t}\), likes me]]] is here

Rizzi’s account of this distribution makes use of the ECP. The trace in the embedded subject position must be licensed by a proper governor. This means that C (which is normally inert for government) must be endowed with agreement features which turn it into a proper governor. Rizzi argues that this occurs in two ways: by spec-head agreement between C and an overt operator, as in (3a), or by head-head agreement between an overt C and a governing head. This is the case in (3b) where [+predicative] that agrees with girl, and by inheriting its lexical features becomes a proper governor for the subject trace. Since null complementizers are assumed not to allow head-head agreement, and null operators are assumed not to carry agreement features (Rizzi, 1990: 69), the null complementizer in (3c) remains inert for government, and hence the subject trace is in violation of the ECP.

The reason why it is assumed that English RRCs involve operator movement, as opposed to other conceivable analyses not involving movement, relates to subjacency and ECP effects. If RRCs involve movement, then certain kinds of RRC should be ungrammatical, because the traces produced by movement will not be appropriately bound. And this is indeed the case. For example, RRCs which involve operator movement taking the operator outside a wh-island are ungrammatical:

4) *The man who, Mary told me [when she will visit t] is here

Similarly, if RRCs involve operator movement out of a complex NP, they are ungrammatical:

5) *The boy who, Mary described [the way [that Bill attacked t]] is here

By the same token, as we saw in (3), repeated here as (6), relativization of a subject leaves a gap which is only grammatical:
Failed functional features hypothesis

under certain circumstances, suggesting that it is a trace which must be properly governed. Where it is not, it violates the ECP:

6) The girl who I like is here

2 Restrictive relative clauses in Chinese

Much of the work on Chinese within the linguistic framework we are adopting (principles and parameters theory) has been on the Mandarin variety. The subjects investigated in this study are, however, native speakers of Cantonese. Nevertheless, we believe that the structure of restrictive relative clauses in the two varieties is sufficiently similar to enable us to draw on the descriptive insights of linguists working on Mandarin. We first present the descriptive facts concerning RRCs in Mandarin, and then draw a comparison with Cantonese.

Mandarin

In Mandarin Chinese, the same range of NP positions can be relativized as in English—subject, object, indirect object, oblique object, genitive and object of comparison. There are, however, important differences in the way the two languages execute relativization. Firstly, Chinese RRCs are head-final:

7) [I like [the girl who I like]]

Here the ‘head’ or ‘subject’ of the relative clause—neige nuhai ‘the girl’—is to the right of the clause. Secondly, assuming that de is a complementizer (Henry, 1988), unlike English there is no morphological differentiation either in the specifier of CP or in C itself: de is the only overt manifestation of the CP, as illustrated in (7), and it is always obligatory. Thirdly, where English manifests surface gaps in all relativized positions, gaps in Chinese are only possible in subject position (where a gap is obligatory) and object position, where the gap alternates freely with a resumptive pronoun. In the relativization of embedded subject position, and all object positions, both indirect and oblique, a resumptive pronoun is obligatory (ec = ‘empty category’ in these examples):
8) a. ec*ta gongzuo qinglao de neige nuhai
   ec*the work hard C the girl
   The girl who works hard
   (Subject relative)
b. Wo xihuan ec*ta de neige nuhai
   I like ec*her C the girl
   The girl who I like
   (Object relative)
c. Wo jiao ta/*ec lai de neige nuhai
   I ask her come C the girl
   The girl who I asked to come
   (Embedded subject relative)
d. Wo sung liwu gei ta/*ec de neige nuhai
   I gave present to her C the girl
   The girl who I gave a present to
   (Indirect object relative)

etc. Resumptive pronouns are obligatory in all other RRC types.

Theories of the structure of Chinese RRCs within a principles
and parameters framework are thin on the ground. We will assume,
however, an account which combines elements from two main
sources: Huang (1980; 1995) and Xu (1986), Xu and Langendoen
movement in overt syntax. Instead, and on the basis of a number
of properties shared by Chinese RRCs and topicalized structures,
he proposes that Chinese RRCs involve a null topic which shares
referential indices with the head of the relative clause and a
position in the embedded clause, as in (9) (reformulated within a
CP and IP framework – Huang’s original proposals assume S’ and
S):

9) [CP Top, [IP wo xihuan ec] de neige nuhai]
   null topic I like ec C the girl
   The girl who I like

Where the position in the embedded clause is an empty category,
as it is in (9), the question then arises as to whether it is a trace
resulting from topic movement, or whether it is a null pronominal.
Huang argues in favour of movement, so that in cases like (8a) and

That Chinese lacks wh-operator movement in overt syntax is not as self-evidently true as
the presence of wh-phrases in situ in surface sentences like the following might make it
appear:
Zhangsan kandao shenme?
Zhangsan saw what?
‘What did Zhangsan see?’

There have been proposals that in sentences like the above a null qu-operator moves to the
specifier of CP in overt syntax in Chinese (Aoun and Li, 1993).
the empty category version of (8b) a null topic has moved from the subject and object positions respectively to CP, leaving a trace behind. By contrast, in cases where there are resumptive pronouns, for example (8b–d), there is no topic movement. In these cases, the null topic is generated in situ in CP, and the resumptive pronoun is generated in situ in an argument position. Thus Huang has a mixed theory: movement in the case of empty categories, nonmovement in the case of overt pronouns.

Xu and Langendoen (1985) and Xu (1986), however, describe a number of cases of topicalization involving empty categories which appear to violate subjacency. In the following examples, empty categories are possible in Chinese but not in English:

10) a. Zhege ren wo xiang zhidao shui jian guo ec
   This man I want know who meet ASP ec
   *This man I wonder who met ec
   (Extraction of a topic from a wh-island. From Xu and Langendoen, 1985: 12)

b. Zhexie shi [ta shuo ec] bu heshi
   These things he say ec not proper
   *These things that he says ec, is not proper
   (Extraction of a topic from a sentential subject: i.e., from [[That he says these things] is not proper]. From Xu and Langendoen, 1985: 13)

c. Zheben shu [ec] j du guo ec de ren j bu duo
   This book ec read ASP ec C man not many
   *This book, the people who read ec aren’t many
   (Extraction of a topic from a complex noun phrase. From Xu and Langendoen, 1985: 14)

If the empty categories in question are traces, resulting from topic movement as Huang claims, the grammaticality of these sentences in Chinese would be unexpected. However, the acceptability of the sentences in (10) suggests that some operation other than movement is involved in deriving [topic . . . empty category] structures in Chinese. We will assume that this operation is the binding of a null pronominal, pro, by the topic in these cases. On this account, the topics in (10) are generated in situ (in CP, we will assume for the sake of argument, although nothing hangs on this), and pro is generated in the positions indicated by ec. Pro, being a pronominal, is subject to Condition B of the Binding Theory (‘A pronominal must be A-free in its governing category’) and in all of the cases in (10) may be bound, grammatically, by the topic, which is in an A* position. With pro in topicalized structures, nonviolation of subjacency is expected, because subjacency is a constraint on movement, and no movement has taken place.

Returning to the RRC case. If Chinese RRCs involve
topicalization (of a null topic generated in situ), rather than wh-movement, then by virtue of the analysis proposed for topicalization, those cases where empty categories appear in the embedded clause - obligatorily in subject relatives (8a) and optionally in object relatives (8b) - involve pro and not trace. Unlike Huang’s mixed theory for RRCs (movement in the case of empty categories, nonmovement in the case of overt resumptive pronominals) this account treats RRCs uniformly: they all involve [null topic . . . pronominal] structures. But in two cases the pronominal is potentially null: in subject position (obligatorily) and in direct object position (optionally). It seems likely that the possibility of null pronominals in these cases is the effect of a more general property which allows null subjects and null objects in Chinese (Huang, 1989). Consideration of this would take us far afield, so we simply assume the account here, noting merely that an independent account for null subjects and objects in Chinese is required anyway. We return to the justification for regarding empty categories in Chinese RRCs as null pronominals rather than traces in the discussion section.

To summarize: on the basis of ideas drawn from the two sets of studies in question, we make the following assumptions about the structure of Mandarin Chinese RRCs. Mandarin Chinese RRCs do not involve movement; a null topic is generated in situ in CP, which is coindexed with the head of the RRC by predication coindexing, and binds a pronominal in the embedded clause. That pronominal may be null (obligatorily in subject position, optionally in object position). Where the pronominal is null, i.e., pro, we assume that it is both formally licensed and identified (the two conditions normally assumed to apply: Rizzi, 1986). On the basis of these assumptions, Chinese RRCs have the kind of structure illustrated in (11):

\[
\begin{align*}
11. \quad & \text{[CP Top \quad \{wo xihuan pro/ta\} de neige nuhai]} \\
& \quad \text{null topic \quad I like \quad pro/her C \quad the \quad girl} \\
& \quad \text{The girl who I like}
\end{align*}
\]

4 Cantonese

The structural properties of RRCs in Mandarin and Cantonese appear to be identical, with one possible exception: the optionality of the Cantonese complementizer ge (equivalent of the Mandarin complementizer de; see Matthews and Yip, 1994).3 In a sentence

3We would like to thank a reviewer for pointing out the need to give an account of the optionality of ge in Cantonese.
like (12), ge may be absent (whereas the equivalent de of Mandarin would be obligatory):

12) Ngo jungyi (ge) go go neuijai hou leng.
   I like C that CL girl very pretty
   (CL = ‘classifier’)

In informal testing of structures like these with 20 native speakers of Cantonese (students at the City University of Hong Kong), one of the coauthors, Chan, found that around half of the subjects accepted sentence (12) with ge present. We believe, though, that the apparent optionality this suggests is a property of the phonological context in which ge appears, rather than a property of the syntax. For example, contexts can be constructed where native speakers’ acceptance of ge is dependent on the form of the classifier accompanying the embedded subject. Alongside (12) (which around half of Chan’s subjects accepted when ge was present), the sentence (13a), where the classifier is di (‘some’), was accepted by only two of the subjects when ge was present. By contrast, seven of the subjects accepted ge with the classifier ban (‘a group’) in the same context (13b):

13) a. Jouye hou kanlik ge go di gungyan jaujo
   work very hard C those CL workers leave
   b. Jouye hou kanlik ge go ban gungyan jaujo.
   work very hard C those CL workers leave
   Both mean ‘Those workers who worked hard left.’

When the demonstrative itself is changed from go ‘that/those’ to ni ‘this/these’, ge became obligatory for many of the subjects:

14) Ngo jungyi *(ge) ni go neuijai giu Siu Fa.
   I like C this CL girl called Siu Fa
   ‘The girl who I like is called Siu Fa.’

Secondly, for stylistic reasons the ‘demonstrative + classifier’ constituent can be fronted (both in Mandarin and Cantonese). When this happens, ge is obligatory. Compare (12), where ge is optional, with (15):

15) Go go ngo jungyi *(ge) neuijai hou leng.
   That CL I like C girl very pretty
   ‘The girl who I like is very pretty.’

For these reasons we believe that ge undergoes PF-deletion (PF =
Phonetic Form) in Cantonese in specific phonological contexts, but that syntactically the properties of predicative C in Mandarin and Cantonese are identical. We make this assumption in the rest of the study.

III A parametric difference between English and Chinese

The differences in the structure of English and Chinese RRCs follow if it is assumed that the languages differ in their choice of two parameter values. The first is head direction, which determines that the heads of relative clauses follow the clause in Chinese but precede the clause in English. This will not be of concern to us in this article. The subjects studied appeared to have no problems with head direction in English. The second determines the possibility of operator movement in English and lack of it in Chinese, and will be the central concern of this study.

We will assume that operator movement in RRCs is an effect of a particular specification of the functional features of predicative C. In English this specification is present, in Chinese it is not. Suppose that in the initial state of UG (i.e., before any exposure a language learner might have to a specific language) the category C is a cluster of virtual, unspecified parametric options, including [predicative], [wh] and [Agr(eement)]:

Initial state

\[
C \begin{bmatrix}
\text{(predicative)} \\
\text{(wh)} \\
\text{(Agr)} \\
\ldots
\end{bmatrix}
\]

A standard assumption is that wh-operators in mature, native English move to the specifier position of CP (Chomsky, 1995: 70). Given this assumption, on exposure to English a first language learner will acquire the fact that the feature [wh] under C is in some

4Another factor which may be involved in giving the impression of optionality is that when ge is deleted, the clause following the head phrase may be interpreted ambiguously as either a relative clause or a nominalization:

Ngo jungyi go ge neuijai hou leng.

I like that CL girl very pretty

= The girl who I like is pretty.

or I like the girl’s beauty.

The informants interviewed all agreed that they would use ge to disambiguate such sentences (only a relative clause interpretation is possible when ge is present). Where context of discourse disambiguates, however, some of the informants indicated a preference for deleting ge, while others accepted equally the presence or deletion of ge.
sense ‘strong’, requiring that an operator move into the specifier position of CP in overt syntax, perhaps for the purposes of ‘checking’, as outlined in Chomsky (1995). How this acquisition takes place is an interesting question, but it is unnecessary for us to consider it here. The fact that mature native speakers of English have grammars which involve wh-operator movement means that the strength of the feature [wh] under C has been triggered during acquisition. Similarly, exposure to RRCs of the appropriate type (subject RRCs such as the girl that likes me) will activate the [Agr] feature associated with predicative that.

The learner exposed to Chinese, however, will encounter no evidence to indicate that the [wh] or [agreement] features of C are active, since there is no operator movement in Chinese predicative C (given our assumptions), nor any potential ECP violation resulting from operator movement which might require an agreeing C as a proper governor. This difference between the data available to L1 learners of English and L1 learners of Chinese will lead, from the same initial state, to quite different functional feature specifications for predicative C in mature, native grammars for each language. Whereas in English [predicative], [wh] and [Agr] will all be specified, in Chinese only [predicative] will be:

English

\[
C \\
\quad +/\text{-predicative} \\
\quad +/\text{-wh} \\
\quad +/\text{-Agr} \\
\quad \ldots
\]

Chinese

\[
C \\
\quad +/\text{-predicative} \\
\quad \ldots
\]

The presence of [+/-wh] features in English RRCs forces operator movement in overt syntax to the specifier of CP. The presence of [+Agr] licenses trace in the following subject position. The absence of the [wh] feature in Chinese means the absence of operators in relative clauses and the irrelevance of the feature [Agr].

Following Ouhalla (1991) and Tsimpli and Roussou (1991), we will also assume that the syntactic features of functional categories become associated with overt morphophonological realizations as part of the acquisition process. In the case of predicative C in English and Chinese, features become associated with forms along the following lines:
Making this assumption means that the realizations of functional categories in particular languages – i.e., specific functional lexical items like that, Ø – consist of two components: a functional feature (F-feature) component and a morphological paradigm (M-paradigm), for example:

<table>
<thead>
<tr>
<th>Complementizer</th>
<th>F-features</th>
<th>M-paradigm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+pred</td>
<td>that</td>
</tr>
<tr>
<td></td>
<td>-wh</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+Agr</td>
<td></td>
</tr>
</tbody>
</table>

IV The focus of the present study

If Smith and Tsimpli (1995) are right, once the cluster of virtual, unspecified parametric options associated with the initial state of functional categories like C (e.g., [predicative], [wh], [Agr]) are given specific values and are associated with particular phonetic content (like that, Ø, Chinese de/ge) they are consigned to the ‘UG lexicon’ as lexical entries. Beyond some critical period, the virtual options in their initial-state form disappear, and what is left are the language-particular specifications associated with language-particular morphophonological forms in the UG lexicon. This leads to some very specific predictions about post-critical-period second language acquisition, as noted in Section I.

Firstly, the proposal does not affect the principles of UG. Hence it is expected that grammar building in second language acquisition will be UG-constrained: grammars will be ‘possible grammars’. Secondly, L2 learners will not have access to the full range of virtual options made available by functional categories to language learners within the critical period, because by hypothesis such options have disappeared. L2 learners may be able to map the functional features (F-features) of the L1 entries in the UG lexicon on to new L2 morphophonological material, but they will not have full access to functional features, and so where the L1 and L2 differ in their F-feature specifications learners will not be able to determine the full functional significance of that new morphophonological material. Finally, where an L1 and an L2 have differently specified F-feature components for entries in the UG lexicon, but where nevertheless L2 learners come to perform in ways which approximate to the performance of native speakers of...
the target language, this cannot be the result of changes in the specification of functional categories, i.e., parameter resetting. Parameter resetting has become, by hypothesis, impossible. Some other operation which is not parameter resetting must be involved in producing the observed restructuring of the learner's grammar away from the L1 and towards the L2.

The aim of the present study is to test these predictions in relation to the acquisition of English RRCs by Chinese speakers. If the evidence is compatible with the predictions of Smith and Tsimpli’s proposal, the implication will be that an important step has been taken in trying to give a principled characterization to the idea that UG is available ‘in some attenuated form’ to adult L2 learners. There are four questions which we will ask in order to accumulate relevant evidence. Given sufficient exposure to target English:

1) Can Chinese speakers acquire the surface morphophonological properties of English CP?
2) Can Chinese speakers acquire the surface [CP . . . gap] pattern of English restrictive relative clauses in cases where gaps are not possible in Chinese?
3) Where Chinese speakers show evidence of a [CP . . . gap] pattern, is there evidence that this is underlyingly an [operator . . . gap] chain (i.e. has the learner activated the functional feature [wh] in C)?
4) Is there evidence that Chinese speakers’ mental representations for L2 English are constrained by principles of UG in cases not instantiated in the L1?

V Method

1 Subjects

The study was undertaken among second language learners of English in Hong Kong. There were seven groups of subjects in the study: three experimental Chinese groups at different age and proficiency levels; three groups of native French-speaking subjects at comparable age and proficiency levels to the Chinese groups to act as controls for the reliability and validity of the test instrument (a grammaticality judgement test – see below); and a group of native speakers of English to act as a control for the reliability of the tokens used in the test. The Chinese experimental subjects and the French control subjects were selected on the basis of performance on a general proficiency test: the Oxford Placement Test (Allan, 1992). This consists of a multiple-choice listening test
and a multiple-choice grammar test, each with 100 items. Hence the maximum total possible score is 200.

Following administration of the test, the three Chinese groups and the three French groups were selected, and were assigned to three proficiency bands: elementary (scores in the range 105–20), intermediate (scores in the range 135–50) and advanced (scores in the range 170 and above). The English control subjects also took the Oxford Placement Test and scored in the advanced range, as expected.

The elementary and intermediate Chinese subjects were studying at a secondary school in Hong Kong, while the advanced group were undergraduates at the City University of Hong Kong. All the subjects were native speakers of Chinese learning English as a second language, predominantly in a classroom setting. Their mother tongue was Cantonese, but they were familiar with standard written Chinese. As discussed in Section II, we assume that the syntactic structure of RRCs in Cantonese is the same as in Mandarin.

The minimum amount of exposure to English that the Chinese subjects had had was six years (and some had had much more), but this was predominantly in a classroom setting. Note that this means that subjects began learning English from the age of six, and it might be asked whether these really are post-critical-period L2 learners. However, a number of studies looking at the issue of ultimate attainment in SLA have found early classroom exposure to an L2 to be a poor predictor of the attainment of native-like competence, the only reliable predictor being age of arrival in a community where the L2 is used for normal communicative purposes on a daily basis (Patkowski, 1990; Coppieters, 1987; Johnson and Newport, 1989; White and Genesee, 1996). Indeed, the exposure to English that the Chinese subjects got in the early years was limited to six to eight weekly classroom lessons of 40–45 minutes. The results we will present subsequently will also make it clear that the subjects’ mental grammars for English are quite different from those of native speakers, and this is in contrast to the French subjects who actually had less exposure to English (also in a classroom setting) but who nevertheless appear to have syntactic representations much closer to those of the native speakers. This suggests that whatever exposure the Chinese subjects received in the early years of life did not trigger native-like acquisition, and they can be regarded as post-critical-period learners.

The French subjects were all originally from France and other European countries and were studying at a French International
School in Hong Kong. Their exposure to English was, like the Chinese subjects, predominantly classroom-based, but the French subjects had had less exposure than the Chinese subjects. The English control subjects came originally from Britain, America and Australia, and were all studying at the King George V Secondary School in Hong Kong. The French and English subjects had lived in Hong Kong for a number of years. Details of the numbers of subjects in each group, their scores on the Oxford Placement Test, their age ranges and the average number of years they had been studying English are all given in Table 1.

The reason for including the French subjects in the study was, as we have said, to provide a control on the reliability and validity of the test instrument used with learners of different ages and levels of proficiency. Relative clause formation in French is standardly assumed to involve wh-movement like English, but unlike Chinese. Our assumptions are that where the feature specifications of a functional category in the L1 and the L2 are similar, acquisition of syntactic properties associated with that functional category in the L2 should be possible, but where they are different any acquisition will be different in nature. In view of this we would expect to see significant differences between the Chinese speakers and the French speakers at comparable age and proficiency levels. If, however, the test instrument is unreliable, for example because grammaticality

Table 1 Subject details

<table>
<thead>
<tr>
<th>Subject group</th>
<th>Number of subjects</th>
<th>Oxford Placement Test</th>
<th>Average number of years of English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese elementary</td>
<td>47</td>
<td>105-20</td>
<td>114.4</td>
</tr>
<tr>
<td>Chinese intermediate</td>
<td>46</td>
<td>135-50</td>
<td>141.7</td>
</tr>
<tr>
<td>Chinese advanced</td>
<td>54</td>
<td>170+</td>
<td>180.2</td>
</tr>
<tr>
<td>French elementary</td>
<td>33</td>
<td>105-20</td>
<td>114.1</td>
</tr>
<tr>
<td>French intermediate</td>
<td>40</td>
<td>135-50</td>
<td>142.2</td>
</tr>
<tr>
<td>French advanced</td>
<td>40</td>
<td>170+</td>
<td>180.3</td>
</tr>
<tr>
<td>English natives</td>
<td>32</td>
<td>170+</td>
<td>183.8</td>
</tr>
</tbody>
</table>

5 There are nevertheless some important differences between French and English. These are discussed in Section VI.
judgement does not work with young adolescents, we would expect different patterns of response: both groups performing equally, or the Chinese subjects outperforming the French subjects.

2 The test

One of the problems facing us in investigating Chinese speakers' knowledge about the properties of English RRCs was the possibility that in natural production the subjects might not produce such structures as frequently as other groups of speakers learning English as an L2 (see Schachter, 1974 for an early consideration of this problem). There may be a variety of reasons for this, none of them germane to the present study (see Kamimoto, et al., 1992 for discussion). In view of the potential problem, we decided to use a grammaticality judgement test. Providing that care is taken in the design and presentation of such a test, and in the analysis of the results, the elicited data should be perfectly acceptable, given that we are interested in comparative, rather than absolute, performance (within the three Chinese groups, and between the Chinese groups and the French and English control groups).

A full discussion and review of the design features of grammaticality judgement tests can be found in Chaudron (1983), Birdsong (1989) and Ellis (1991). On the basis of issues raised in those discussions, the test used in this study was constructed to be sensitive to a number of the potential effects of performance, and other factors which might affect learners' judgements. Potential background variables among subjects in the same group were controlled; explicit and clear instructions for doing the test were given; attention was given to the number, presentation and ordering of test items; and each test item was presented simultaneously in written form and in aural form (recorded on to tape by a native speaker of English), with a nine-second gap between each item (see Murphy, 1997 for the importance of controlling for modality in the administration of grammaticality judgement tests).

Of a total of 101 sentences in the full grammaticality judgement test (GJT), 59 relate to specific aspects of English RRCs of interest in this study (see the Appendix for the 59 sentences used). These sentences can be divided into four groups:

1) Those displaying the grammatical and ungrammatical use of operators and complementizers
2) Those involving ungrammatical resumptive pronouns in simple relative clauses
3) Those violating the Subjacency condition
4) Sentences involving ungrammatical null subjects in embedded clauses

The 59 sentences in which we are interested were arranged in such a way that no three consecutive items tested the same thing. This arrangement reduced the chance of subjects becoming aware of the linguistic knowledge being tested.

3 Administration of the grammaticality judgement test

The grammaticality judgement test was given to subjects about one week after they had taken the Oxford Placement Test. At the beginning of the test, subjects read the written instructions in their native language so they knew what to do. A tape recorder was used for the test and subjects were instructed to follow the pace of the tape while doing the test. They read a sentence on a slip of paper and at the same time listened to a sentence spoken on the tape and then judged the correctness of each. They were asked to write a letter ‘A’ for any sentence they judged to be definitely correct, a ‘B’ for sentences they thought were probably correct, a ‘C’ for sentences which they thought to be probably incorrect and a ‘D’ for sentences they felt were definitely incorrect. In addition, they were required to correct those parts of sentences which they judged to be probably or definitely incorrect. They wrote their answers and made corrections during the nine-second gaps between sentences.

Four practice sentences were included in the instructions for taking the test. Subjects were encouraged to ask questions in their native language at this point if they had any problems with the test. The sentence structures in the practice set were not those tested in the experiment. After the practice set had been completed, the experimenter discussed the test with the subjects to make sure they knew how to do it. Following the introduction, the test started. Subjects were instructed to turn to the question number when they heard it spoken on the tape. They were not allowed to return to previous questions, to change answers, or to attempt those following questions which had not yet been read on the tape. They were also reminded not to worry about errors relating to spelling, meaning, tense and punctuation.

Due to the length of the test, subjects were given a 15-minute break halfway through. They remained in the classroom and were told not to check the answers or discuss the questions with their classmates during the break. After the break, subjects did the second part of the test. Including the 15-minute break, the test took about 55 minutes.
4 Scoring procedure

On sentences in the test which were presumed, at the outset of the study, to be grammatical, subjects' responses were scored in the following way:

- definitely correct: 3
- probably correct: 2
- probably incorrect: 1
- definitely incorrect: 0

For sentences presumed to be ungrammatical from the outset the scoring procedure was reversed:

- definitely incorrect: 3
- probably incorrect: 2
- probably correct: 1
- definitely correct: 0

Corrections made by subjects were scored separately from their judgements of correctness or incorrectness. One mark was given for the right correction, while no mark was given for a wrong correction, or no correction. Statistical analyses (ANOVA's and post hoc Scheffé tests) were performed separately on judgements and on corrections.

VI Results

Recall the four questions listed on pages 203-204 to which we would like answers in order to test the predictions of Smith and Tsimpli's (1995) theory that access to the virtual functional features associated with functional categories, and made available by UG, is impossible in post-critical-period second language acquisition. We consider the results of the grammaticality judgement test in relation to each of these four questions in turn.

1. Acquisition of CP morphology

The grammaticality judgement test (GJT) contained 20 grammatical sentences relativizing all possible positions. They were distributed across RRC types as follows: two subject relatives, three direct object relatives, four indirect object relatives, four oblique object relatives, four genitive relatives, three object of comparison relatives. Subjects' overall accuracy in judging the grammaticality of these sentences is displayed in Table 2.

A one-way ANOVA indicated significant differences between the
groups (F(2,285) = 75.76, p < 0.001). A post hoc Scheffé test showed that the elementary Chinese group was significantly less accurate than all the other groups, including the elementary French group. The elementary French group was only significantly less accurate than the advanced French group and the English controls. The advanced Chinese subjects were significantly less accurate than the intermediate and advanced French and the English control subjects.

This is the result we expected to find if a GJT is a valid indicator of syntactic competence when used with 12-14-year-old subjects. Because there is a significant difference between the elementary Chinese and elementary French subjects of the same age and at the same level of general proficiency in English on an independent test, performance on RRCs cannot be the effect of the test alone. The findings are compatible with the proposal that it is the L1 which gives rise to such differences: French has movement of wh-operators, Chinese does not, and this difference is transferred into the L2 grammar. Although the Chinese subjects improve in accuracy on grammatical RRCs with proficiency, they start out at a much lower level of accuracy than the French subjects, and subsequently achieve lower levels of accuracy, where general proficiency and age are held constant.

To find out how the overall pattern of development relates to the acquisition of the specific morphophonological forms of English predicative CP, we broke the scores down by type of operator/complementizer involved in the same grammatical sentences. The results are given in Table 3.

A number of observations emerge from Table 3. The English controls, as expected, treat all of the cases as grammatical (assuming the standard 90% criterion, which allows a 10% margin for irrelevant task-related factors). The Chinese experimental and the French control subjects, by contrast, show a proficiency-related progression. The more advanced subjects are more willing to accept

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean accuracy scores %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese elementary</td>
<td>56</td>
</tr>
<tr>
<td>Chinese intermediate</td>
<td>67</td>
</tr>
<tr>
<td>Chinese advanced</td>
<td>79</td>
</tr>
<tr>
<td>French elementary</td>
<td>81</td>
</tr>
<tr>
<td>French intermediate</td>
<td>88</td>
</tr>
<tr>
<td>French advanced</td>
<td>92</td>
</tr>
<tr>
<td>English controls</td>
<td>96</td>
</tr>
</tbody>
</table>
grammatical English RRC CP morphology than the less advanced subjects. Both Chinese and French subjects show a preference for overt wh-operators over complementizer that with subject RRCs, and a preference for overt over null forms in non-subject relatives, particularly at the lower proficiency levels.

There is a clear trend suggesting that with increasing proficiency the Chinese subjects acquire the main properties of English predicative CP morphology, while remaining less accurate than age- and proficiency-matched French-speaking controls. That the Chinese subjects are acquiring the main properties of English predicative CP morphology is confirmed by their performance in judging the ungrammaticality of sentences in the GJT involving ‘doubly-filled’ CP, for example:

16) a. *The girl who that lost her way cried
b. *The vase which that I broke was very expensive

There were 10 sentences of this type in the GJT. The performance of the subjects in judging these sentences as ungrammatical, and then making an appropriate correction, is displayed in Table 4.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Subject relatives</th>
<th>Non-subject relatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>wh- that Ø</td>
<td>wh- that Ø</td>
</tr>
<tr>
<td>Chinese elementary</td>
<td>74 46 -</td>
<td>60 54 42</td>
</tr>
<tr>
<td>Chinese intermediate</td>
<td>81 77 -</td>
<td>68 65 60</td>
</tr>
<tr>
<td>Chinese advanced</td>
<td>94 80 -</td>
<td>82 75 68</td>
</tr>
<tr>
<td>French elementary</td>
<td>100 77 -</td>
<td>82 95 61</td>
</tr>
<tr>
<td>French intermediate</td>
<td>98 81 -</td>
<td>93 94 80</td>
</tr>
<tr>
<td>French advanced</td>
<td>94 92 -</td>
<td>94 93 86</td>
</tr>
<tr>
<td>English controls</td>
<td>100 100 -</td>
<td>94 96 97</td>
</tr>
</tbody>
</table>

A one-way ANOVA conducted on the judgement scores indicated significant differences between the groups ($F_{6,285} = 85.28, p < 0.001$), and another one-way ANOVA performed on the correction scores also showed significant differences between the groups ($F_{6,285} = 85.52, p < 0.001$). Post hoc Scheffé tests showed that there were no significant differences between any of the French controls and the English controls on either judgement or correction. French, like English, does not allow ‘doubly-filled CP’. The elementary Chinese group, however, were significantly less accurate than all the other groups on both tasks. The advanced Chinese subjects were significantly less accurate than the intermediate French, advanced French and English control subjects in their...
judgement scores, but only significantly less accurate than the advanced French and English controls in their corrections. Although, again, the Chinese subjects are less accurate in judging and correcting ungrammatical predicative CP morphology than age- and proficiency-matched French speakers, Chinese speakers nevertheless make considerable advances in acquisition with increasing proficiency. The results suggest a positive answer to our first question: Chinese speakers can acquire the surface morphophonological properties of English predicative CP.

2 \([CP \ldots gap]\) constructions

The second question we are interested in is whether the Chinese subjects can acquire the \([CP \ldots gap]\) properties of English RRCs, particularly in contexts where a resumptive pronoun is obligatory in Chinese. The 20 grammatical sentences relativizing all possible NP positions described above provides one measure of the subjects’ recognition of the grammaticality of gaps. Is this also reflected in subjects’ ability to recognize the ungrammaticality of resumptive pronouns? The GJT incorporated 17 sentences in which there were ungrammatical resumptive pronouns in simple sentences in all relativizable positions. Subjects’ performance in correctly judging these sentences as ungrammatical, and their ability to correct them appropriately, is displayed in Table 5.

One-way ANOVAs conducted on the judgement and correction scores (judgement: \(F_{6,285} = 101.51, p < 0.001\); correction: \(F_{6,285} = 85.71, p < 0.001\)) indicated significant differences between the groups. Post hoc Scheffé tests showed that the elementary Chinese group was significantly less accurate than all the other groups, both in judging the ungrammaticality of the sentences and in correcting them. The elementary French group was only significantly less accurate than the advanced French group and the English controls.

### Table 4

<table>
<thead>
<tr>
<th>Groups</th>
<th>Judgement scores</th>
<th>Correction scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese elementary</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>Chinese intermediate</td>
<td>68</td>
<td>60</td>
</tr>
<tr>
<td>Chinese advanced</td>
<td>83</td>
<td>81</td>
</tr>
<tr>
<td>French elementary</td>
<td>91</td>
<td>86</td>
</tr>
<tr>
<td>French intermediate</td>
<td>95</td>
<td>91</td>
</tr>
<tr>
<td>French advanced</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>English controls</td>
<td>99</td>
<td>99</td>
</tr>
</tbody>
</table>

Failed functional features hypothesis
The advanced Chinese group was also significantly less accurate than the advanced French group and the English controls. The results show that for age- and proficiency-related Chinese and French speakers there are significant differences in accuracy on resumptive pronouns which, given that the GJT is a constant, cannot be the result of the test. The results are compatible with the view that the feature specification of C in the L1 affects the construction of the L2 grammar, as expected. At the same time the mental grammars of the Chinese subjects clearly develop towards English with proficiency. Chinese subjects become progressively aware that English RRCs have an obligatory [CP . . . gap] pattern, although there are still some types of RRCs on which the advanced Chinese group are less accurate than others (which are, in fact, indirect and oblique object relatives). In answer to our second question, it seems that Chinese speakers make significant progress in acquiring the surface [CP . . . gap] pattern of English RRCs, even where such gaps do not exist in Chinese RRCs.

3 Wh-operator movement

In native English the [CP . . . gap] pattern of RRCs is by hypothesis a manifestation of wh-operator movement, i.e., an [operator . . . trace] chain. Where Chinese speakers have acquired [CP . . . gap] constructions, as Table 5 shows that they do, our third question is: Are these cases of wh-operator movement? If the experimental subjects have acquired wh-operator movement, and if their L2 grammars are constrained by principles of UG, they should be sensitive to constraints on movement: in particular they should treat sentences which violate Subjacency as ungrammatical. To test the question we included ungrammatical sentences in the GJT which are standardly assumed to be the result of Subjacency violations. There were four sentences which involved ungrammatical

<table>
<thead>
<tr>
<th>Groups</th>
<th>Judgement scores %</th>
<th>Correction scores %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese elementary</td>
<td>38</td>
<td>27</td>
</tr>
<tr>
<td>Chinese intermediate</td>
<td>55</td>
<td>41</td>
</tr>
<tr>
<td>Chinese advanced</td>
<td>90</td>
<td>70</td>
</tr>
<tr>
<td>French elementary</td>
<td>81</td>
<td>65</td>
</tr>
<tr>
<td>French intermediate</td>
<td>90</td>
<td>82</td>
</tr>
<tr>
<td>French advanced</td>
<td>96</td>
<td>87</td>
</tr>
<tr>
<td>English controls</td>
<td>98</td>
<td>97</td>
</tr>
</tbody>
</table>

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movement out of a wh-island and four sentences involving ungrammatical movement out of a complex NP as in (17):

17) a. *This is the man [CP who [IP Mary told me [CP when [IP she will visit [CP Bill attacked]]]] (wh-island)
b. *This is the boy [CP who [IP Mary described [CP the way [IP that [IP Bill attacked]]]] (complex NP)

Our decision to use French speakers as controls both complicates the analysis of the results and raises other interesting questions at this point in the study. It seems that in languages which have wh-operator movement in overt syntax, the structural domains which give rise to Subjacency effects are parametrized. Sportiche (1981), for example, has argued that while in English IP and NP (but not CP) are such domains (described as 'bounding nodes' in the theory at the time), and a wh-operator crossing more than one such domain in a single movement (as in (17)) gives rise to a Subjacency violation, in French CP and NP are such domains (and not IP). This means that extraction in French out of a wh-island is potentially grammatical, providing that only one CP is crossed in a single movement, unlike English. So French sentences like (18a) are grammatical, where the English equivalent (18b) is not (examples from Sportiche):

18) a. Voilà quelqu'un [CP à qui [IP je crois [CP que [IP je sais [CP lequel [IP j'offrirais]]]]]] (complex NP)
b. *Here is someone [CP to whom [IP I think [CP that [IP I know [CP which [IP I would give]]]]]]

But extraction from a complex NP in French will always give rise to a Subjacency violation, like English, although for different reasons: in French a wh-operator extracted from a complex NP will always cross, minimally, a CP and an NP node; in English it will always cross, minimally, an NP and an IP node:

19) a. *[CP Qui [IP croit [IP il [IP l'histoire [CP que [IP tu as vu]]]]]]
b. *[CP Who does [IP he believe [IP the story [IP that [IP you saw]]]]]

It is not entirely clear to us from current work in theoretical syntax how differences between languages concerning the structural domains which give rise to Subjacency violations are to be represented. If they are the result of a difference in the setting of parameters, given the theory we are assuming the difference would
have to reside in the feature specifications of functional categories. Since we are also assuming, with Smith and Tsimpli, that once such specifications are associated with lexical items in the UG lexicon, they are not available for recalibration by adult second language learners, we would expect to see some effect on the performance of French speakers in judging Subjacency violations in L2 English. In particular, French speakers might be expected to be more accurate in judging the ungrammaticality of extractions out of complex NPs (which are not possible in French either) than they are in judging the ungrammaticality of extractions out of wh-islands, which are possible in French.

Subjects' performance in recognizing sentences like (17) as ungrammatical, and their ability to correct them (for example by introducing a ‘rescuing’ resumptive pronoun) are displayed in Table 6.

Concerning the wh-island violations, one-way ANOVAs indicated significant differences between groups, both on judgements and corrections (judgements: $F_{6,285} = 29.71, p < 0.001$; corrections: $F_{6,285} = 39.39, p < 0.001$). Post hoc Scheffé tests showed that the elementary Chinese and French subjects and the intermediate Chinese and French subjects were not significantly different from each other, but they were significantly less accurate than the advanced French subjects and English controls. The most remarkable result was that the advanced Chinese subjects were significantly less accurate at detecting wh-island violations than all the other subjects, including the elementary Chinese group. (The correction scores showed a similar pattern.)

We interpret these results as follows. The sentences in question are ungrammatical sentences like (17a), and subjects are scored for their ability to recognize this ungrammaticality and to rescue the sentence in some form, typically by using a resumptive pronoun to

Table 6 Accuracy of judgements (%) as ‘ungrammatical’ of sentences violating the wh-island and complex NP constraints, and accuracy of corrections (%)

<table>
<thead>
<tr>
<th>Groups</th>
<th>wh-island judgements</th>
<th>Complex NP judgements</th>
<th>wh-island corrections</th>
<th>Complex NP corrections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese elementary</td>
<td>63</td>
<td>30</td>
<td>71</td>
<td>31</td>
</tr>
<tr>
<td>Chinese intermediate</td>
<td>54</td>
<td>21</td>
<td>61</td>
<td>18</td>
</tr>
<tr>
<td>Chinese advanced</td>
<td>41</td>
<td>14</td>
<td>38</td>
<td>1</td>
</tr>
<tr>
<td>French elementary</td>
<td>59</td>
<td>36</td>
<td>72</td>
<td>33</td>
</tr>
<tr>
<td>French intermediate</td>
<td>66</td>
<td>46</td>
<td>79</td>
<td>44</td>
</tr>
<tr>
<td>French advanced</td>
<td>85</td>
<td>76</td>
<td>90</td>
<td>51</td>
</tr>
<tr>
<td>English controls</td>
<td>98</td>
<td>95</td>
<td>85</td>
<td>60</td>
</tr>
</tbody>
</table>
produce a passable sentence: The man who Mary told me when she will visit HIM. Over half the elementary Chinese subjects appear able to judge these sentences as ungrammatical, and a third appear able to make corrections. By contrast, less than half the advanced Chinese subjects are able to recognize the ungrammaticality, and only 14% of them are able to make corrections. Have the elementary subjects acquired wh-operator movement? We think not. Rather, we think that the Chinese speakers have transferred the nonmovement [topic . . . pronoun] pattern of their L1 Chinese into their English grammars. At the elementary level of proficiency, subjects’ ability to recognize the use of English predicative CP morphology is reasonably good (see Table 3), but this is not because wh-operators have moved into CP: rather, wh-phrases are generated in situ in CP and bind a pronominal in the lower clause. At the elementary level of proficiency subjects still have a preference for overt pronouns, as in their L1, where gaps would appear in English: hence 30% of the subjects appear to correct the Subjacency violations appropriately. But this is only apparent; in reality they simply have in situ pronouns in these positions, a property transferred from their L1.

To check more closely whether this was the case, we compared the performance of individuals in the elementary group who accepted overt resumptive pronouns where they are ungrammatical in English – in ordinary relative clauses which do not violate Subjacency (see the results in Table 5) – with their performance on the sentences which violate Subjacency. The results are given in Table 7. The subjects (S1-S47) are ranked on the basis of their acceptance as ‘correct’ of ungrammatical relative clauses involving a resumptive pronoun like *The man who she admires him is an artist. The man who she told me when she will visit him. The results are given in Table 7. The subjects (S1-S47) are ranked on the basis of their acceptance as ‘correct’ of ungrammatical relative clauses involving a resumptive pronoun like *The man who she admires him is an artist. The man who she told me when she will visit him.

Twenty-two of the 47 subjects accepted as ‘correct’ ungrammatical sentences involving resumptive pronouns in 73% or more cases. Of these 22, 18 ‘corrected’ the Subjacency violations by introducing a resumptive pronoun in 75% or more cases. By contrast, of the 17 subjects who accepted ungrammatical sentences involving resumptive pronouns in 53% or fewer cases, only three introduced resumptive pronouns to ‘correct’ Subjacency violations in 73% or more cases. This suggests very strongly that those elementary subjects who appear to be able to ‘rescue’ Subjacency violations by inserting a resumptive pronoun are not doing so because they have recognized that there is a Subjacency violation;
rather they are inserting resumptive pronouns where they would be required in their native Chinese. As proficiency increases among the Chinese speakers, the tendency to insert overt resumptive pronouns in the sentences violating Subjacency declines. Given that the ability to judge the ungrammaticality of the wh-island violation sentences also declines, the conclusion we draw is that with proficiency Chinese speakers do not acquire wh-operator movement, but analyse the gap as a null resumptive pronoun pro. It is this [CP . . . pro] representation which gives rise to the apparent decline in accuracy with proficiency. A [CP . . . pro] representation works extremely well in most cases to produce what seem like grammatical English RRCs, and the subjects will appear to perform in a native-like way. But such surface similarity to native speakers conceals the fact that they have quite different underlying syntactic representations.

Concerning the sentences which have extraction from a complex NP, one-way ANOVAs again indicated significant differences between groups both on judgements and on corrections (judgements: $F_{6,285} = 43.14, p < 0.001$; corrections: $F_{6,285} = 21.91, p < 0.001$). Post hoc Scheffé tests showed once again that while the elementary Chinese were only significantly less accurate than the advanced French and English control groups on each task, dramatically the advanced Chinese subjects were significantly...
worse than all the other groups on both tasks. In other words, the
decrease in accuracy on sentences displaying Subjacency violations
involving wh-islands and complex NPs, in conjunction with
increasing general proficiency, strongly suggests that although
Chinese subjects’ grammars become more English-like in
appearance, underlyingly they develop a different grammatical
representation. Whereas for native English speakers RRCs involve
wh-operator movement, for Chinese speakers of English they
involve a [wh-phrase . . . pronominal] binding relationship.

The French subjects appear to be influenced by their grammatical
representations for English by the properties of Subjacency in
French, particularly at lower levels of proficiency. On sentences
involving extraction from wh-islands, which are possible in some
cases in French, but not in English, the elementary and intermediate
French subjects’ judgements were significantly less accurate than
those of the English controls. In the case of extraction from complex
NPs, however (impossible both in French and in English), the
elementary and intermediate subjects were not significantly
different from the English controls (although the difference
between their scores and those of the advanced French group did
reach significance). These results would appear to suggest that the
L1 plays a role in determining the bounding status of structural
domains for Subjacency in the L2, at least in the early stages. It is
noteworthy, however, that the advanced French group were not
significantly different from the English controls either on
extractions from wh-islands or from complex NPs. If the difference
in the status of bounding nodes is a parametrized one, given our
assumptions it is surprising that the advanced French speakers
appear to acquire the appropriate syntactic representations. It
would be a counterexample to the claim that the features of
functional categories are no longer accessible to adult L2 learners.
We note this as a problem, but consideration of the question is
beyond the scope of the present article.

4 Evidence that L2 grammars are constrained by UG

The fourth question we asked was: Where L2 learners’ mental
representations for an L2 appear to be different from those for their
L1, is there any evidence that they are constrained by UG? In our
analysis of the Chinese subjects' mental representations for English
[CP . . . gap] constructions we argued that they had not acquired
[wh-operator . . . variable] chains, but instead had established [wh-
phrase . . . pronominal] binding relationships. This analysis is based
on the assumption that syntactic representations in L2 grammars
are constrained by principles of UG (pronominal binding being one possibility allowed by UG). We need to try to determine that the subjects have really established a UG-licensed option and have not simply learnt a [wh-phrase . . . gap] strategy with the result that every time they come across a wh-phrase they will expect a gap. This would produce similar surface effects to both operator-variable and pronominal-binding representations in many cases, but it is not the kind of principle-based operation licensed by UG. To test this out we included four sentences in the GJT which involved ungrammatical null subjects in an embedded clause introduced by a wh-phrase, for example:

\[
\text{20) *The girl cried when e lost her way}
\]

Crucially, equivalent sentences in Chinese involving an embedded null subject are grammatical:

\[
\text{21) nuhai ku dang e milu shi girl cried when e lost-way (dang . . . shi = 'when')}
\]

If subjects had formed a non-UG-constrained representation for [wh-phrase . . . gap] constructions (e.g., one which says something like: 'if there is a wh-phrase expect a gap'), we would have expected them to judge these sentences as grammatical. All the more so since the L1 allows null subjects in the equivalent environment. The results of the Chinese subjects' performance on these sentences are displayed in Table 8.

Contrary to expectations, there is a progressive recognition, with proficiency, of the ungrammaticality of sentences like (20). A though not conclusive, this result is suggestive: subjects have not adopted an unconstrained [wh-phrase . . . gap] strategy. We return to what constraint might be involved in the next section.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Judgements %</th>
<th>Corrections %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese elementary</td>
<td>44</td>
<td>28</td>
</tr>
<tr>
<td>Chinese intermediate</td>
<td>58</td>
<td>53</td>
</tr>
<tr>
<td>Chinese advanced</td>
<td>72</td>
<td>71</td>
</tr>
</tbody>
</table>

Table 8 Correct judgements (%) about ungrammatical subject gaps in non-relative wh-clauses, and accuracy of corrections (%)
VII Discussion

In this study we have sought to test whether the predictions of a particular syntactically based theory about the partial availability of UG in post-critical-period second language acquisition can provide insight into the acquisition of English RRCs by Chinese speakers. The theory in question (Tsimpli and Smith, 1991; Smith and Tsimpli, 1995) proposes that the virtual, unspecified features associated with the initial state of functional categories like C, Agr, D, and which determine parametric differences between languages, are available in that form only for a limited period in early life. Exposure to samples of language during that critical period fixes the values of the features and associates them with particular morphophonological realizations. Beyond the critical period the virtual, unspecified features disappear, leaving only those features encoded in the lexical entries for particular lexical items (like that, Ø in the case of English predicative complementizer). The principles of UG, however, remain fully available and constrain grammar building. We will call this the 'failed functional features hypothesis'.

Faced with learning a second language with differently fixed functional category features, two possible effects of the failed functional features hypothesis appear to be predicted for post-critical-period L2 learners. Firstly, they will map morphophonological forms from the L2 onto L1 feature specifications. The performance of L2 learners with such grammars would display properties of a familiar kind: L1 syntax with L2 lexical items. Such grammars appear to be typical of early-stage L2 learning (see Schwartz and Sprouse, 1996 for arguments suggesting a ‘full transfer’ account of SLA). Secondly, with continued exposure to the L2, they will progressively approximate in performance to native speakers of the target language and away from their L1. But to do this, given that the differently fixed functional features are inaccessible, they will establish grammatical representations which diverge from those of native speakers, as well as from their own L1s but which are nevertheless constrained by the principles of UG: ‘possible grammars’.

What we found was that the results obtained using a GJT with L1 Chinese learners of L2 English at different proficiency levels are compatible with such a theory. There was evidence that Chinese speakers become progressively more accurate in their intuitions about English predicative CP morphology as exposure to L2 English increases. We also found that they become progressively more accurate in their intuitions about (CP . . . gap) constructions...
in simple RRCs. But their mental representations for these phenomena appear not to involve wh-operator movement, because their accuracy and ability to correct Subjacency violations declines with increasing proficiency. This is in contrast to age- and proficiency-matched French-speaking learners of English whose accuracy on and ability to correct Subjacency violations increase with proficiency. This would be expected if learners are constrained by the feature specifications of functional categories in their L1s.

French allows wh-operator movement, Chinese does not. At the same time, the Chinese subjects' mental representations, although different from those of native speakers of English, appear to be constrained by UG because they correctly reject non-UG-licensed [wh-phrase . . . gap] constructions like "The girl cried [when e lost her way], even though a null subject is possible in this environment in their native Chinese.

The findings led us to hypothesize that the status of the gap in the Chinese speakers' representations for English RRCs is not that of a trace, but is instead the null pronominal pro, and that wh-operators, whether overt or null, are not moved in the grammars of these speakers, but are topics generated in situ in CP. Thus, we propose that Chinese speakers' representations for English RRCs are along the lines of (22):

\[
\begin{align*}
\text{(22)} & \quad \text{a. The girl} \{ \text{CP who} \{ \text{e pro likes me} \} \} \text{ is here} \\
& \quad \text{b. The girl} \{ \text{CP who} \{ \text{e I like pro} \} \} \text{ is here} \\
& \quad \text{c. The girl} \{ \text{CP who} \{ \text{e I talked with pro} \} \} \text{ is here}
\end{align*}
\]

and so on. Who or the null topic is coindexed by predication coindexing with the head of the RRC, and binds pro in the embedded clause. Thus RRCs for Chinese speakers are topic-antecedent-bound pronoun structures, rather than operator-bound variable structures. The syntax, then, is essentially Chinese, with the difference that in cases where overt pronouns are obligatory in Chinese, advanced speakers allow null pronominals in their interlanguage grammars. They have not reset the parametric option in C to allow wh-operator movement; their mental representations only appear superficially like operator-trace constructions.6

6 A reviewer suggests, as a possible alternative, that Chinese speakers have acquired wh-operator movement, but without having fixed any of the bounding nodes required by English in other words; they have unbounded wh-movement. If this were the case they would behave just as our subjects do, allowing extraction out of wh-islands and complex NPs. There
If this account is correct, two important questions remain. Firstly, are [CP . . . pro] binding constructions allowed by UG? Secondly, if the construction of L2 grammars is constrained by the principles of UG, why should the Chinese subjects prefer a [topic . . . pro] solution for English RRCs in the face of (presumably) considerable evidence that English RRCs instantiate [wh-operator . . . trace] constructions? A fir for all, L1 learners of English construct grammars involving wh-operator movement. Why do Chinese learners of L2 English also not do so?

A possible answer can be given to these questions if we extend a proposal made in Cinque (1990: 155–60). Cinque argues that both wh-operator movement and [NP . . . pro] binding, where the NP is in the specifier position of CP, are made available by UG. In the normal case, though, according to Cinque, wh-operator movement is the preferred option. Where, however, in a specific language independent principles ‘conspire’ (to use Cinque’s term, p. 156) to cause a violation of some universal constraint if movement occurs, the [NP . . . pro] option will be possible. Cinque argues (1990: 156–59) that this is the case in Complement Object Deletion cases in English like (23):

23) The article was too long [op, for [us to read pro]].
(Cinque’s example (59c), p. 116)

Here, according to Cinque, the object in the complement clause has to be pro, A’-bound by an empty NP generated in the specifier position of CP, because no movement analysis is possible which does not violate some principle of UG (see Cinque, 1990: 156–59 for the details of a rather complex argument).

A similar idea is developed in Shlonsky (1992) who argues that (overt) resumptive pronouns in RRCs only appear in languages where wh-operator movement would lead to a violation of a
principle of UG. He suggests that in Palestinian Arabic, for instance, resumptive pronouns are obligatory in object relative clauses, as in (24), because the complementizer ʔilli selects an argument specifier, and movement of a wh-operator from object position would violate the Specified Subject Condition:

(24) l-bint ʔilli shufṭi-ha
the-girl that (you) saw-her
The girl that you saw

Both cases – the use of [NP . . . pro] and the use of resumptive pronouns – are examples of a ‘last resort’ strategy. The normal case would be wh-operator movement. It is only when independent properties in a language conspire to produce a violation of principles of UG that languages resort to other options allowed within UG to rescue particular constructions.

The case of the Chinese learners of L2 English is both similar and different. Here there is no conspiracy of independent principles of UG leading to a potential violation of a universal constraint if wh-operator movement occurs. For native speakers of English wh-operator movement is possible and required in all simple RRC types. But because, if we are correct, the functional features of English C have become inaccessible to the Chinese speakers, and because wh-operator movement in overt syntax is not licensed in Chinese, no wh-operator movement is licensed in their L2 grammars either. Yet exposure to English, and the ability to acquire surface morphophonology, forces learners to construct [CP . . . gap] constructions in cases where they do not exist in Chinese. The only possibility, then, is to resort to an alternative made available by UG: an [NP . . . pro] structure, of which [wh-phrase . . . pro] is a subcase. (Noteworthy here is the fact that wh-phrases in some languages function as nonoperator indefinite NPs. Chinese is one such language; see Aoun and Li, 1993).

That this account may be going along the right lines seems to be suggested by subjects’ performance on sentences involving ungrammatical null subjects in embedded clauses like (20) (repeated here as (25)):

(25) *The girl cried [when e lost her way]

Null subjects are possible in the embedded clause in equivalent Chinese sentences, and yet we have found that the Chinese subjects show a tendency to reject them, correctly, in English, and this tendency increases with exposure to English. If they were operating
with a [topic . . . pro] representation for English, where pro must be antecedent-bound by an appropriate NP in an A'-position, subjects would reject (25) because when is not an appropriate antecedent for the null subject. If the Chinese subjects were operating either with the transferred null-subject possibility allowed by their native Chinese (where pro is a discourse-bound null subject), or with a non-UG-constrained random [wh-phrase . . . gap] strategy, they would be expected to accept sentences like (25).

If the 'failed functional features hypothesis' continues to be confirmed in ongoing work, it represents an important step forward in characterizing the role that UG plays in the acquisition of second language syntax. Firstly, it provides an explicit and testable account of the observation that many adult second language learners, despite long exposure to an L2, never fully acquire the same syntactic representations as native speakers (for example in studies like those of Coppieters, 1987; Johnson and Newport, 1991).

Secondly, it offers the possibility of reconciling such observations with those of other researchers who have found adult L2 learners whose syntactic representations appear to be indistinguishable from those of native speakers (for example, Birdsong, 1992; White and Genesee, 1996). It is noteworthy that in these two studies the languages involved have similar functional feature specifications to English in cases relevant to the properties on which they were tested. In Birdsong's study all the subjects were L1 English speakers tested on their knowledge of L2 French, while in the White and Genesee study the majority of subjects were L1 French speakers of L2 English, and those who didn't appear to have been speakers of languages with wh-operator movement (Germanic and Romance languages). In the latter study, subjects were tested on their knowledge of the ungrammaticality of extraction from strong islands, complex NPs and adjuncts, and also on their knowledge of the ECP, properties which are instantiated in their L1s, and which under the failed functional features hypothesis they would be expected to have access to. More generally, on the failed functional features hypothesis it would be expected that where functional feature specifications in the L1 and the L2 are similar, L2 learners will approximate quite closely in their syntactic representations to those of native speakers. A testable prediction here is that it should be more difficult to find adult second language learners speaking languages with functional feature specifications more remote from English and French who have syntactic representations indistinguishable from native speakers of these languages.

Thirdly, the hypothesis forces a new look at previous studies of L2 learners' knowledge of constraints like Subjacency, where the
claim has been that learners do not have access to principles of UG (for example Schachter, 1989; 1990). If, where functional features in an L2 are not accessible, adult learners construct alternative, but nevertheless UG-constrained, syntactic representations, results which show that they accept apparent violations of universal constraints cannot be taken at face value. Their acceptance may be precisely because they have different underlying syntactic representations (a similar point is made in Martohardjono and Gair, 1993).

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VIII References
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--- 1988: Second language acquisition and its relationship to Universal


Appendix: Sentences included in the Grammaticality Judgement Test

A: Sentences displaying the grammatical and ungrammatical use of operators and complementizers

Simple, grammatical relative clauses involving a wh-operator

1. The actor who performs well wins a lot of prizes. (S)
2. The boy whom I hit broke the window. (O)
3. The woman for whom I have bought a vase is my aunt. (IO)
4. The man whom I have borrowed money from has a big house. (IO)
5. The house in which they had a party was on fire. (OO)
6. The man whom they are talking with is my principal. (OO)
7. The tennis player whose leg was broken could not join the competition. (GENS)
8. The manager whose car John borrowed arrived late. (GENO)
9. The classmate to whose mother I always send a Christmas card has moved. (GENIO)
10. The woman with whose son we always discuss problems is a good mother. (GENOO)
11. The man whom Peter runs faster than is an athlete. (OCOMP)

Simple, grammatical relative clauses involving that

12. The thief that stole my purse escaped. (S)
13. The lady that I met yesterday was my former teacher. (O)
14. The girl that he gave a gift to was delighted. (IO)
15. The girl that I always play with is my cousin. (OO)
16. The neighbour that I am taller than does not play basketball. (OCOMP)

Simple, grammatical relative clauses involving a null operator and a null complementizer

17. The girl John likes is studying at the university. (O)
18. The friend I lent the book to studied very hard. (IO)
19. The postcard John wrote his address on disappeared. (OO)
20. The girl we sing better than is in the choir. (OCOMP)

Ungrammatical relative clauses involving a ‘doubly-filled’ CP

21. *The girl who that lost her way cried. (S)
22. *The dog which that hurt a child ran away. (S)
23 *The classmate who(m) that I hate is very selfish. (O)
24 *The vase which that I broke was very expensive. (O)
25 *The student whom that I lent the book to worked very hard. (IO)
26 *The cat which that I gave the milk to was very skinny. (IO)
27 *The lady whom that I talked with was my teacher. (OO)
28 *The school which that they are studying English at is very famous. (OO)
29 *The classmate whom that I work harder than always copies my homework. (OCOMP)
30 *The tree which that I am shorter than is falling down. (OCOMP)

B: Sentences involving ungrammatical resumptive pronouns in simple relative clauses
31 *The man who he lives next door has left. (S)
32 *The waiter that he always serves us is called George. (S)
33 *The man who(m) she admires him is an artist. (O)
34 *The patient that I visited was very sick. (O)
35 *The actress I saw her was very famous. (O)
36 *The aunt whom I received a parcel from her had left America. (IO)
37 *The schoolboy that I read a story to him finished his homework. (IO)
38 *The uncle Mary sent the letter to him moved to a new house. (IO)
39 *The river which he got the water from it was very dirty. (OO)
40 *The pan that the cook made his pancake in it was very big. (OO)
41 *The file she put the papers in it has been stolen. (OO)
42 *The teacher whom we talk about her is very nice. (OO)
43 *The neighbour that I chat with him will move very soon. (OO)
44 *The boy I play with him is my cousin. (OO)
45 *The classmate whom Sally is cleverer than him reads very slowly. (OCOMP)
46 *The sailor that Bill is more experienced than him owns a boat. (OCOMP)
47 *The writer David became more famous than him lives in England. (OCOMP)
C: Sentences violating the Subjacency condition

Violation of the wh-island constraint

48 *This is the man who(m) Mary told me when she will visit. (O)
49 *This is the clerk who(m) Lily told Peter when she will employ. (O)
50 *This is the lady who(m) Richard told me when he will meet. (O)
51 *This is the flat which my mother told me when she will rent. (O)

Violation of the complex NP constraint

52 *This is the secretary who(m) Peter heard the news that the boss will marry. (O)
53 *This is the boy who(m) Mary described the way that Bill attacked. (O)
54 *This is the building which they heard the news that the government will buy. (O)
55 *This is the land which the manager questioned the decision that we should sell. (O)

D: Sentences involving ungrammatical null subjects in embedded clauses

56 *The girl cried when lost her way.
57 *The children played games when attended lessons.
58 *The boy felt sick when took the examination.
59 *My sister burnt her fingers when cooked the chicken.