STRUCTURES AND FUNCTIONAL CATEGORIES OF MANDARIN SENTENCES

T.-H. Jonah Lin
National Tsing Hua University

Abstract: This paper examines the functional categories in Mandarin sentences. It argues that the "backbone" of Mandarin sentences consists of a series of light verbs and mood heads. It also discusses the status and structural properties of the sentence-final particle *le*, showing that *le* denotes perfect aspect and is a predicate-level aspectual element. Other aspectual elements in Mandarin sentences are also examined.

1. Introduction

Functional elements, in a sense, constitute the "backbone" of the natural language sentences. They serve two purposes: they contribute meanings or functions, and provide positions to host syntactic elements. Grammatical theory has witnessed a change from the S'-S system to the current C-T systems, along with an increase in the higher functional categories (e.g. Chomsky 1986, Pollock 1989, Chomsky 1995, Rizzi 1997, among others). There are also proposals on predicate-internal functional elements, such as the light verb v, the predication head Pr, the voice head Voice, the transitivity head Tr, and so on (see Larson 1988, Bowers 1993, Chomsky 1995, Kratzer 1996, and Bowers 2002, for example). In this paper, I will investigate the functional elements in Mandarin and illustrate how they construct sentences. In the current minimalist framework of syntax (Chomsky 2000 and subsequent works), the categories V, v, T, and C are assumed to be the basic units that compose a sentence. It will be shown that Mandarin sentences also contain these elements. However, it will also be shown that in Mandarin some of these elements get proliferated, resulting in multiple instances of the same kind of functional element. Specifically, I will argue that Mandarin sentences contain multiple instances of vP and CP, with specific syntactic and semantic effects. This will lead to a quite sophisticated phrase structure for Mandarin sentences, which, nonetheless, is empirically motivated. This paper is organized as follows. Section 2 and 3 discuss the sentence-final particle *le* in Mandarin, which, as will be shown, is a perfect aspect element. This element is important in that it stands in a kernel position of the sentence and interacts both with the predicate-internal elements and with the higher functional categories. Clarifying the syntax and semantics of the sentence-final particle *le* is beneficial for the discussions of other parts of the Mandarin sentence structure. Section 4 looks "downward" into the predicate-internal area, in particular the

USTWPL 6: 41-79, 2010.

predicate-internal aspects and the light verb projections. It is argued that in addition to the predicate-level aspect -- e.g. the sentence-final particle *le*, which scopes over the predicate -- there is also a lower aspect that scopes over the verb only. Furthermore, it is argued that a Mandarin sentence may contain three vP layers: the subject-selecting vP, the object-selecting vP, and an "intermediate" vP that hosts the preposed object. Section 5 looks "upward" and examines the modals, tense, and the various CP projections. The following claims are made: modals in Mandarin are verbs; tense exists in Mandarin; and, there are multiple instances of CP, among which are two CP projections for moods. Section 6 concludes this paper.

2. Head-initiality of the sentence-final aspectual particles

2.1. Sentence-final particles and complement-to-specifier movement

In this and the next section we discuss the sentence-final particle *le*. We start by examining the word order properties of this element. It is known that Mandarin is a VO language. However, many researchers also point out that Mandarin shows a number of head-final characters (e.g. Huang 1982, Li 1985). Descriptively, therefore, Mandarin could be regarded as a language with mixed head-initial and head-final properties. But closer examinations of the relevant facts reveal that all the head-final phenomena in Mandarin still conform to the predictions of Kayne's (1994) Linear Correspondence Axiom (see Lin 2009). The sentence-final aspectual particles are such cases.

Shen (2004) argues that Mandarin sentences have a functional category, Aspect Phrase (AspP), between TP and vP. The head elements of AspP come in several varieties. They can be phonetically overt, such as the sentence-final perfect particle *le*, as in (1), and the sentence-final progressive particle *ne*, as in (2). According to Shen, these are dynamic aspectual elements. On the other hand, the head element of AspP can be phonetically empty, as in (3), in which case the sentence is in the static aspect, represented by the symbol ∅. An important property of AspP is that the head Asp agrees with the predicate vP in aspectuality. For example, when a stative predicate is appended with the perfect particle *le*, the predicate is coerced into a dynamic one with a sense of change of state, as in (4).[1]

(1) Zhangsan chi hanbao le.
Zhangsan eat burger PERF
'Zhangsan has eaten the burger.'

(2) Zhangsan (zheng) shuijiao ne.
Zhangsan right.now sleep PROG
'Zhangsan is sleeping (right now).'

[1] The abbreviations used in this paper are: CL: classifier; DISP: disposal marker; DUR: durative aspect; EXP: experiential aspect; EXT: extension/result marker; PERF: perfect aspect; PFTV: perfective aspect; PROG: progressive aspect; Q: question particle; STAT: static aspect.

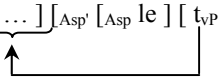
(3) Zhe-ge gushi hen youqu [∅].
This-CL story very interesting STAT
'This story is interesting.'

(4) (Zhangsan zheme jia you tien cu,)
Zhangsan this.way add oil supply vinegar
zhe-ge gushi jiu hen youqu le.
this-CL story then very interesting PERF
'(With Zhangsan adding colored details to it,) this story then becomes very interesting'

Shen (2004) proposes that AspP is the complement of TP. But this amounts to claiming that AspP is head-final with its complement vP preceding its head, as in (5). Lin (2006) argues that the particle *le* is sentence-final because the vP complement of AspP undergoes complement-to-specifier movement to Spec of AspP, as illustrated in (6) (also see Takida 2007 and 2009).

(5) $[_{TP}$ Subject T $[_{AspP}$ $[_{vP}$ …] $[_{Asp}$ le]]]

(6) $[_{TP}$ Subject T $[_{AspP}$ $[_{vP}$ …] $[_{Asp'}$ $[_{Asp}$ le] [t_{vP}]]]]



Lin's evidence is as follows. It has been assumed that the nominal wh-in-situ in Mandarin does not undergo LF movement, but is licensed via binding (Aoun and Li 1993, Tsai 1994, Reinhart 1998). But Tsai (1994) points out that the adverbial wh-in-situ in Mandarin, being an operator, still needs to move in LF for scope purposes. Lin observes that an in-situ wh-adverb like *zenmeyang* 'how' may occur in a sentence without an overt sentence-final aspectual particle; but if the perfect particle *le* is present, the wh-adverb *zenmeyang* cannot occur in the sentence. (7)-(8) show that the wh-nominal and the wh-adverb are both grammatical in a sentence without *le*; (9)-(10) show that the presence of *le* makes the wh-adverb ungrammatical.

(7) Zhangsan zenmeyang xiu che?
Zhangsan how repair car
'How does Zhangsan repair the car?'

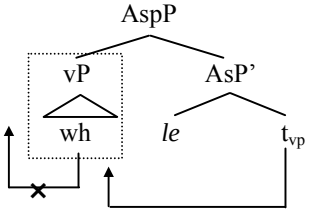
(8) Zhangsan xiu shenme?
Zhangsan repair what
'What does Zhangsan repair?'

(9) *Zhangsan zenmeyang xiu che le?
Zhangsan how repair car PERF
'How did Zhangsan repair the car?'

(10) Zhangsan xiu sheme le?
Zhangsan repair what PERF
'What did Zhangsan repair?'

The conclusion drawn by Lin is that, when *le* is present, the complement of AspP, namely vP, moves to the specifier of AspP, leaving *le* in the sentence-final position, and, on the other hand, if the head of AspP is ∅, no movement takes place. In the former case, if a wh-adverb is extracted out of the vP, it would be moving out of a moved constituent, in violation of the freezing effect (see Collins 2005 and references cited). In the latter case, since the vP doesn't move, there is no violation of any grammatical principle when the wh-adverb is extracted.[2]

(11)



Some other sentence-final particles in Mandarin can also be subjected to the same analysis. An example is the purpose particle *qu* '(lit.) go'. Just like the perfect particle *le*, it agrees with a dynamic predicate; see (12)-(13). Furthermore, its presence makes the in-situ wh-adverb ungrammatical, as in (14)-(15). This suggests an analysis identical to (11). Interestingly, a Mandarin sentence may contain the perfect particle *le* and the purpose particle *qu* simultaneously; this means that there can be cyclic complement-to-specifier movements in Mandarin sentences. See the illustration of (16)-(17).

(12) Zhangsan mai shu qu.
Zhangsan buy book go
'Zhangsan went out [for the purpose of] buying the book.'

(13) * Zhangsan xihuan Lisi qu.
Zhangsan like Lisi go

(14) Zhangsan xiu sheme qu?
Zhangsan repair what go
'(Lit.) Zhangsan goes out for repairing what?'

---

[2] The case of the progressive aspect *ne* is somewhat different; it doesn't permit interrogative wh-in-situ at all, be it nominal or adverbial:

(i) * Zhangsan (zheng) xiu shenme ne?
Zhangsan right.now repair what PROG
'(Intended) What is Zhangsan repairing (right now)?'

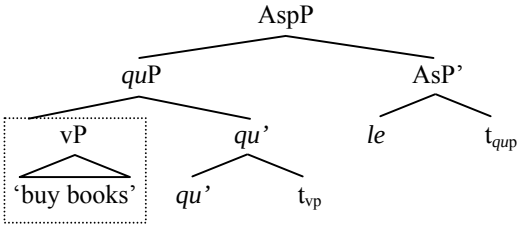
(ii) * Zhangsan (zheng) zenmeyang xiu che ne?
Zhangsan right.now how repair car PROG
'(Intended) How is Zhangsan repairing the car (right now)?'

This may have to do with the fact that *ne*, in addition to the function of progressive aspect, also assumes the function of a mood marker (see section 5.5 for discussion). The mood use of *ne* presupposes the truth of the proposition and hence is incompatible with questions.

(15) *Zhangsan zenmeyang xiu che qu?
Zhangsan how repair car go
'(Lit.) Zhangsan goes out for repairing the car in what manner?'

(16) Zhangsan mai shu qu le.
Zhangsan buy book go PERF
'Zhangsan went out for buying books.'

(17)



2.2 Motivating complement-to-specifier movement

In this section we remark on some questions related to the complement-to-specifier movement employed in the analysis above.

What motivates such movement? We assume that particles such as *le* and *qu* are bound elements and need to suffix to some other element via (upward and leftward) encliticization (Simpson 2002). In the minimalist framework, if we hold a "liberal" interpretation on Chomsky's (2007, 2008) theory, namely that Move is in no way less economical and marked than Merge and can be employed freely for the expressiveness of language, we may simply assume that an edge feature is given to the head of AspP to facilitate the movement of its complement to its specifier. This may not be as arbitrary as some would think. In Chomsky 2007, 2008 it is proposed that Move is driven by the edge feature; furthermore, Merge is also driven by the edge feature. If the two operations employ the same edge feature, it could well be assumed that Move can be as free as Merge, as long as the interpretation component yields sensible results (see Chomsky 2007, 2008). Viewed from this perspective, the movements in (11) and (17) should be permitted.

Takida (2007), however, argues that movements of the kind in (11) and (17) need to be reconsidered since problems may arise. This is because such complement-to-specifier movement violates the principle of anti-locality (e.g. Grohmann 2003 and Abels 2003), and, also, the raising of the internal subject in Spec of vP to Spec of TP would be impossible. Takida (2007) therefore suggests that what moves actually is VP, targeting Spec of AspP passing the projection of vP. In this way anti-locality is respected, and the subject would not be raising from a moved constituent.

But the problems that Takida (2007) points out may not be real. First, complement-to-specifier movements have been employed by researchers to derive successful accounts for linguistic phenomena; for instance, Carstens (2002: 5) proposes that in Ịjọ the vP complement of TP moves to Spec of TP,

and Simpson and Wu (2002: 82) argue that in Taiwanese the IP complement of the CP headed by the complementizer *kong* moves to Spec of the CP. To the extent that these proposals yield analyses with explanatory power, complement-to-specifier movement should not be rejected simply on theoretical grounds.

Furthermore, the theoretical grounds on which anti-locality is built are not completely self-evident. First, it is not clear how the three-way partition of a clausal structure in Grohmann's (2003) system could be accorded with Chomsky's (2004, 2007, 2008) two-phase theory (vP and CP). Second, if movement is in fact driven by the edge feature but not by checking of Case or thematic features, Abel's (2003) notion of anti-locality -- according to which merger of Y to the head X entails that checking of all features that should be checked between Y and X has already been done, and thus movement of Y to the specifier of X would be unmotivated -- becomes irrelevant. In conclusion, anti-locality is not a concern to our analysis; on the "liberal" interpretation of the edge feature and its function in driving Merge and Move, there doesn't seem to be a need to assume anti-locality as a principle of syntax.

The raising of the internal subject to Spec of TP will not be a problem, either. A detailed examination of the relevant phenomena indicates that in Mandarin, the subject-selecting light verb must be higher than AspP. Thus in a more refined clausal structure of Mandarin sentences, TP takes the subject-selecting vP as complement, which in turn takes AspP as complement. The complement-to-specifier movement of the vP within AspP has no effect on the raising of the internal subject, since it is outside the domain of the moved vP. We turn to this issue later.

3 More on the sentence-final particle *le*

3.1 *Le* as a perfect aspect element

Where exactly is the sentence-final particle *le*? Some researchers assume it is fairly high, for example in the CP-area (e.g. Tang 1992, Tsai 2008). Its function is also in debate. Some say it is a perfect aspect (Shen 2004), others say it is an inchoative particle, or a "new situation" marker (Li and Thompson 1981). But there is evidence indicating that, first, it is indeed a perfect aspect particle, and, second, it is a predicate-level element, lower than T and even lower than the subject-selecting vP.

The sentence-final particle *le* is said to be an inchoative marker because it appears to trigger a change-of-state meaning; compare (18) and (19). But there are also cases where it doesn't trigger change-of-state meaning, such as the sentence in (20).

(18) Hua hen hong.
Flower very red
'The flower is red.'

(19) Hua hong le.
Flower red PERF
'The flower becomes red.'

(20) Zhe-ben shu tai gui le.
This-CL book too expensive PERF
'This book is too expensive.'

However, there are examples in which *le* clearly functions as perfect aspect (Liao 2004).[3]

(21) 1492 nian, Gelunbu faxian xin dalu.
1492 year Columbus discover new continent
'In 1492, Columbus discovered the new world.'

(22) 1492 nian, Gelunbu faxian xin dalu le.[4]
1492 year Columbus discover new continent PERF
'In 1492, Columbus discovered the new world.'

(23) #1495 nian, Gelunbu faxian xin dalu.
1495 year Columbus discover new continent
'In 1495, Columbus discovered the new world.'
(A false statement)

(24) 1495 nian, Gelunbu faxian xin dalu le.
1495 year Columbus discover new continent PERF
'In 1495, Columbus [had] discovered the new world.'
(A true statement)

Note in particular the sentences (23)-(24). The year given in the sentences is 1495, three years later than the time of the discovery of the new world. While (23) clearly is a false statement, (24) is true, and its acceptability no doubt has to be attributed to the particle *le*, which locates the event time prior to a reference time, namely the year 1495. This is what perfect aspect does. Such perfect reading cannot be satisfactorily accounted for by taking *le* as an inchoative or change-of-state marker. This is evidence for *le* as perfect aspect.

But what about the change-of-state reading that *le* triggers? According to Shen (2004), the aspectual agreement between the perfect particle *le* and the predicate leads to the change-of-state reading of the predicate (see section 2.1). Specifically, Shen proposes that a light verb representing change of state is merged into the predicate in response to the aspectual agreement enforced by the perfect particle *le*. If Shen is correct, then the so-called inchoativity of *le* is actually derivative of the aspectual agreement between *le* and the predicate; *le* itself is a perfect aspect marker throughout.

---

[3] The examples in (21)-(24) are adopted from Liao 2004: 67-68 with minor changes. The changes do not affect the original points that Liao intends to make.

[4] Unlike the English perfect auxiliary *have*, *le* does not obligatory enforce a backshift reading; this is why the use of *le* in (22) is acceptable as if it denotes the past event time. See Drubig 2001 and references cited therein for relevant discussion.

We will henceforth adhere to Shen's proposal and continue to call *le* a perfect particle. The "stative" use of *le* such as (20) is in fact quite limited and requires further investigation. We will leave it aside.[5]

3.2 *Le* and the "incompleteness effect"

The particle *le* has a function that seems to be directly linked to its aspectual properties -- it can help to "complete" a sentence that would otherwise sound "incomplete".

It has been observed that a sentence such as (25) lacks a sense of completeness (see Tsai 2008 and references cited) – that is, it sounds unfinished. Note that (25) contains what is known as the post-verbal perfective suffix *-le*. It has the same phonetic form as the sentence-final particle *le*, but it is a verbal suffix. In fact these two elements can occur in the same sentence, as in (26). The infelicity of (25), that is, its "incompleteness", indicates that the perfective suffix *-le* alone cannot make the sentence a complete utterance. In contrast, the sentence-final perfect particle *le* can make the sentence complete, as in (26)-(27).

(25) #Zhangsan chi-le yao.
Zhangsan eat-PFTV medicine
'Zhangsan took medicine.'

(26) Zhangsan chi-le yao le.
Zhangsan eat-PFTV medicine PERF
'Zhangsan has taken the medicine.'

(27) Zhangsan chi yao le.
Zhangsan eat medicine PERF
'Zhangsan has taken the medicine.'

An "incomplete" sentence such as (25) can be made "complete" by one of several means: it can be followed by another sentence ((28)), it can have its object changed to a numeral NP ((29)), or it can take the sentence-final particle *le* ((30)).

(28) Zhangsan chi-le yao, ranhou shang chuang shuijiao.
Zhangsan eat-PFTV medicine and.then get.on bed sleep
'Zhangsan took medicine, and then went to bed and sleep.'

(29) Zhangsan chi-le liang-ke yao.
Zhangsan eat-PFTV two-CL medicine
'Zhangsan took two pills of medicine.'

(30) Zhangsan chi-le yao le.
Zhangsan eat-PFTV medicine PERF
'Zhangsan has taken the medicine.'

[5] See Shen 2004: 175 for some speculations on the origin of such stative uses of *le*.

Tsai (2008) proposes that the incompleteness effect in sentences such as (25) arises because the event isn't appropriately anchored in time, as Mandarin doesn't have morphological tense that overtly indicates the event time. Insertion of a temporal expression, therefore, would make the sentence complete, as in (31). The use of the particle *le* serves a similar function, namely to provide temporal anchoring for the event.[6]

(31) Zhangsan xiawu chi-le yao.
Zhangsan afternoon eat-PFTV medicine
'Zhangsan took the medicine in the afternoon.'

This "temporal anchoring" analysis, however, faces some problems. First, as shown in (29), if the object is changed to a numeral NP, the sentence becomes complete. It is not clear how this could be related to the temporal anchoring of the event. Second, change of the main verb can make the sentence complete; compare (32) and (33). In (32) the verb is *qiao* 'knock', an activity verb (on a par with *chi* 'eat' in (25)). The sentence, again, sounds incomplete. In (33), the verb is changed to *qiao-huai* 'knock and cause to become broken', an accomplishment compound verb. Now this sentence becomes complete, even though all other parts of the sentence are the same as (32) (the subject, the object, and the verbal suffix *-le*). The temporal anchoring analysis doesn't provide an explanation for this phenomenon.

(32) #Zhangsan qiao-le men.
Zhangsan knock-PFTV door
'Zhangsan knocked the door.'
(33) Zhangsan qiao-huai-le men.
Zhangsan knock-broken-PFTV door
'Zhangsan knocked the door and caused it to become broken.'

Some more details about the verbal suffix *-le* are in order. Many researchers observe that the perfective verbal suffix *-le* only denotes the realization of an event and thus only has an impoverished aspectual function (Liu 1988, Klein et al 2000, Lin 2000, among others). It has been observed, for example, that *-le* doesn't necessarily yield an end-bound reading or a telic reading, as in (34)-(35) (Lin 2000). It doesn't even have to yield a start-bound reading as some have assumed (e.g. Wu 2005); for instance, in (36) the second occurrence of *-le* does not have an inception meaning, since the action of writing (homework) has been continued from morning to afternoon without stop.

[6] Tsai (2008) use the term "tense anchoring". But this term has already been used by Enç (1987) to denote a different set of phenomena in English (the temporal interpretations of subordinate clauses). We change the term to "temporal anchoring" to avoid confusions.

(34) Zhangsan xie-le yi-feng xin, keshi mei xie-wan.
Zhangsan write-PFTV one-CL letter but have.not write-finish
'(Lit.) Zhangsan wrote a letter, but hasn't finished it yet.'
(Not a logical contradiction)

(35) Zhangsan yang-le yi-tiao gou.
Zhangsan pet-PFTV one-CL dog
'Zhangsan pets a dog.'
(Not a telic event)

(36) Zhangsan shangwu xie-le zuoye, xiawu ye xie-le
Zhangsan morning write-PFTV homework afternoon too write-PFTV
zuoye. Shishi-shang ta zhongjian mei ting-guo.
homework in.fact he in.between have.not stop-EXP
'Zhangsan wrote the homework in the morning; he also wrote the homework in the afternoon. In fact he didn't stop in between.'

A more satisfactory account for the incompleteness effect is provided by Hsueh (2010), who argues that it originates from the requirement that a Mandarin sentence must denote a bound event. The sentence (25) sounds incomplete because the verbal suffix *-le* only indicates realization of the event; it doesn't give a clue as to how it is bounded. This is why adding a temporal adverbial helps (see (31)), since the adverbial provides the time span in which the event is bounded. But this is just one way to make the event bound; other ways can work too. Following up with another sentence with the temporal conjunction *ranhou* 'and then' has the effect to locate the event in a sequence of events and make it bound with respected to the ensuing event ((28)). Changing the verb to an accomplishment or achievement can make the event bound, because eventive predicates are telic and thus are bounded ((33)). A sentence with a numeral object can be understood as an existential assertion, because the numeral object can introduce existential quantification over individuals denoted by the object NP. An existential assertion is stative and atemporal (see Bach 1981); this makes it vacuously satisfy the boundedness requirement ((29)). Adding the sentence-final perfect particle *le* also has the effect to make the event bound, because, if it denotes perfect aspect, the event must have culminated at a time prior to the reference time introduced by *le* (see Parsons 1990). Thus, the remedial function of the particle *le* for "incomplete" sentences such as (25) amounts to one more piece of evidence for *le* as perfect aspect.

3.3 The structural position of the perfect particle *le*

Most researchers consider *le* a high element; for instance, Tang (2003) proposes that *le* originates in T and subsequently moves to C, and Tsai (2008) suggests that *le* is a CP-level left-peripheral element. But there is evidence that *le* actually is very low.

Le cannot be a CP-level element, since it is within the scope of the subject and the TP-level adverbials.

(37) Meige xuesheng dou hui jia le.
Every student all return home PERF
'Every student has gone home.'
('every' > le; *le > 'every')

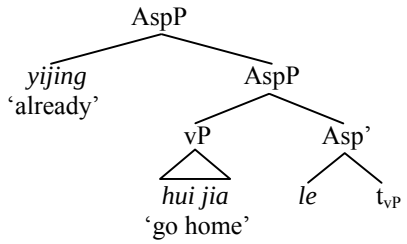
(38) Zhangsan sihu hui jia le.
Zhangsan seem return home PERF
'Zhangsan seems to have gone home.'
('seem' > le; *le > 'seem')

In (37) *le* is within the scope of the quantificational subject *meige xuesheng* 'every student'; in (38), *le* is within the scope of the modal adverb *sihu* 'seem'. Thus *le* cannot be higher than the TP-level elements.

Sometimes the scope relation is not as transparent as one would hope. In those cases we can use the adverb *yijing* 'already' as a test probe. The adverb *yijing* 'already' is perfective in meaning; we assume that it adjoins to AspP. Thus, if it precedes an element X, this means that X is within the scope of AspP. Conversely, if X precedes *yijing* 'already', it is outside the scope of AspP. See (39)-(40) for a demonstration of the position of *yijing* 'already'.

(39) Zhangsan yijing hui jia le.
Zhangsan already return home PERF
'Zhangsan has already gone home.'

(40)



Now let's see the distribution of *yijing* 'already' with respect to other elements in Mandarin sentences. *Yijing* 'already' can only follow, but not precede, the time adverb, as shown in (41)-(42). But it can precede or follow the location adverbial, as in (43)-(44). Notice that in Mandarin, the time adverb is higher than the location adverbial; see (45)-(46). If the time adverb in Mandarin adjoins to TP, these facts indicate that *le*, namely AspP, must be lower than TP.

(41) Zhangsan **zuotien** **yijing** hui jia le.
Zhangsan yesterday already return home PERF
'Zhangsan has gone home already yesterday.'

(42) * Zhangsan **yijing** **zuotien** hui jia le.
Zhangsan already yesterday return home PERF
'(Intended) Zhangsan has gone home yesterday already.'

(43) Zhangsan **yijing** **zai Taibei** mai fangzi le.
Zhangsan already at Taipei buy house PERF
'Zhangsan has already bought a house in Taipei.'

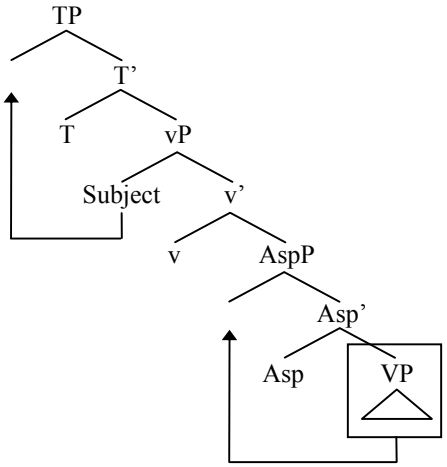
(44) Zhangsan **zai Taibei** **yijing** mai fangzi le.
Zhangsan at Taipei already buy house PERF
'Zhangsan has already bought a house in Taipei.'

(45) Zhangsan **zuotien** **zai Taibei** mai-le yi-dong fangzi.
Zhangsan yesterday at Taipei buy-PFTV one-CL house
'Zhangsan bought a house in Taipei yesterday.'

(46) * Zhangsan **zai Taibei** **zuotien** mai-le yi-dong fangzi.
Zhangsan at Taipei yesterday buy-PFTV one-CL house
'(Intended) Zhangsan bought a house yesterday in Taipei.'

Recall Takida's (2007) warning about the raising of the internal subject to Spec of TP. Indeed, if the subject-selecting vP is the complement of AspP, then in a sentence where *le* is present (and thus the complement vP of AspP moves to the specifier position of AspP), the internal subject will be trapped inside the vP due to the freezing effect. But as we have seen above, the subject of the Mandarin sentences has a higher scope over *le* ((37)). The subject-selecting vP, therefore, must be higher than AspP. See the following diagram for illustration.

(47)



There is evidence that supports this conclusion -- AspP is lower than the subject-oriented adverbs. Look at (48)-(51). In (48) and (50) the adverbs *buxiaoxing-di* 'carelessly' and *guyi-di* 'on purpose' precede *yijing* 'already', and the sentences are good. In (49) and (51) these adverbs follow *yijing* 'already', and the sentences become significantly degraded.[7]

[7] All the native Mandarin speakers that I consulted (and myself) detect a clear contrast between (48) and (49) and between (50) and (51). But we all agree that (49) and (51) are only marginal but not categorically unacceptable. A possible explanation is that the Mandarin speakers choose to coerce

(48) Zhangsan buxiaoxing-di yijing chi san-ge hanbao le.
Zhangsan carelessly already eat three-CL burger PERF
'Zhangsan carelessly has already eaten three burgers.'

(49) ??Zhangsan yijing buxiaoxing-di chi san-ge hanbao le.
Zhangsan already carelessly eat three-CL burger PERF
'(Intended) Zhangsan has already carelessly eaten three burgers'

(50) Zhangsan guyi-di yijing da-po san-ge huaping le.
Zhangsan on.purpose already hit-break three-CL vase PERF
'Zhangsan has already broke three vases on purpose.'

(51) ??Zhangsan yijing guyi-di da-po san-ge huaping le.
Zhangsan already on.purpose hit-break three-CL vase PERF
'(Intended) Zhangsan has broke three vases on purpose already.'

If the subject-oriented adverbials adjoin to the subject-selecting vP, and if *yijing* 'already' represents the position of AspP, then AspP must be lower than the subject-selecting vP.

MacDonald (2008) also argues for a functional projection AspP below vP in English. Among his proposals are: (A) There is a functional projection AspP which is the domain for aspectual interpretation; specifically, this domain determines the telicity of the predicate. (B) There is a subject-object asymmetry with respect to the ability to affect the telicity of the predicate: the object does, but the subject does not, contribute to the telicity of the predicate. In (52), the mass NP object triggers an atelic reading, but in (53), the mass NP subject cannot trigger an atelic reading (see MacDonald 2008: 132-135). This

---

a subject-oriented adverbs into a manner adverb (e.g. "… in a manner as if [Zhangsan] was careless / on purpose…") when it occurs in a lower position, as in (49) and (51). A piece of evidence for this conjecture is the adverb *mo-ming-qi-miao-di* 'cluelessly'. This adverb can be speaker-oriented or subject-oriented. Due to its semantics, it cannot be construed as a manner adverb. Now consider the contrast between (i) and (ii).

(i) Zhansagn **mo-ming-qi-miao-di** **yijing** ying-de san-ge da jiang le.
Zhangsan cluelessly already win-obtain three-CL big prize PERF
'Cluelessly, Zhangsan has already won three big prizes.'
('Cluelessly' speaker-oriented or subject-oriented)

(ii) Zhansagn **yijing** **mo-ming-qi-miao-di** ying-de san-ge da jiang le.
Zhangsan already cluelessly win-obtain three-CL big prize PERF
'(Intended) Zhangsan has already, cluelessly, won three big prizes.'
('Cluelessly' speaker-oriented only)

In (i) *mo-ming-qi-miao-di* 'cluelessly' precedes *yijing* 'already'; it can be speaker-oriented or subject-oriented. In (ii) it follows *yijing* 'already'; interestingly, in this case it can only be speaker-oriented. If *yijing* 'already' marks the boundary of AspP, the unavailability of the subject-oriented reading for (ii) indicates that the subject-selecting vP indeed is higher than AspP, so that the adverb *mo-ming-qi-miao-di* 'cluelessly' cannot maintain the subject-oriented reading. This supports the claim that in Mandarin AspP is lower than the subject-oriented adverbs.

asymmetry indicates that AspP must exclude the subject but include the object. As a result, AspP must be lower than the subject-selecting vP.

(52) John drank soda for an hour.
(53) Wildlife ate a sheep in ten minutes / #for ten minutes.

To summarize, if our proposals are correct, Mandarin clause structure contains the following projections.

(54) TP >
vP (for subject) >
AspP (*le*, *ne*, ∅, etc) >
VP

This hierarchical structure will be refined, though. There are some more functional elements to be postulated. In the next section we turn to the internal structure of the Mandarin predicate.

4 Predicate-internal aspects and arguments

4.1 Three layers of aspect

Liao (2004) proposes that there are three layers of aspect in Mandarin sentences: the lexical aspect, the lower aspect, and the higher aspect.[8] All the three layers of aspect are present in (55). The verb *dao* 'arrive', an achievement verb, has its own lexical aspect. The verbal perfective suffix -*le* is the lower aspect. The sentence-final perfect particle *le* is the higher aspect.

(55) Huoche dao-le chezhang le.
Train arrive-PFTV station PERF
'The train has arrived at the station.'

The following table summarizes the three layers of aspect in Mandarin.[9, 10]

[8] Liao's original terms are the compositional level, viewpoint level, and temporal level of aspect. We use the terms lexical aspect, lower aspect and higher aspect for ease of exposition.

[9] For relevant works, see Li and Thompson 1981, Tai 1984, Smith 1994, Sybesma 1997, Lin 2003, Liao 2004, Shen 2004, Tseng 2010, among many others.

[10] Mandarin sentences can take multiple higher aspects and lower aspects. See (i) and (ii) for example:

(i) Iteration of the higher aspect
Zhangsan **zai** chi wanfan **le**.
Zhangsan PROG eat dinner PERF
'Zhangsan has come to be having dinner.'

(56)

Aspect	Instances
Higher aspect	Static: ∅ Perfect: *le* Sentence-final progressive: *ne* Pre-verbal progressive: *zai* Delimitative: reduplication of the verb
Lower aspect	Perfective: *-le* Durative: *-zhe* Experiential: *-guo*
Lexical aspect	State Action (activity) Result (achievement)

The examples (57)-(61) demonstrate the higher aspects, (62)-(64) the lower aspect, and (65)-(67), the lexical aspects.[11]

(57) Static: ∅
Zhangsan xiang Lisi.
Zhangsan resemble Lisi
'Zhangsan resembles Lisi.'

(58) Perfect: *le*
Zhangsan chi hanbao le.
Zhangsan eat burger PERF
'Zhangsan has eaten the burger.'

(59) Sentence-final progressive: *ne*
Zhangsan (zheng) shuijiao ne.
Zhangsan right.now sleep PROG
'Zhangsan is sleeping.'

(60) Pre-verbal progressive: *zai*
Zhangsan zai chi hanbao.
Zhangsan PROG eat burger
'Zhangsan is eating a burger.'

(ii) Iteration of the lower aspect
Zhangsan chi-**guo**-**le** hanbao le.
Zhangsan eat-EXP-PFTV burger PERF
'Zhangsan has had the experience of eating burger.'

We thus assume that Mandarin permits iteration of the higher AspP and the lower AspP. We will not go into the relevant questions.

[11] Tai (1984) proposes that in Mandarin there are only three primitive event types: states, actions, and results. They correspond to states, activities, and achievements. Tai (1984) argues that accomplishment is not a primitive event type in Mandarin; it is compositional derived, e.g. resultative compound verbs.

(61) Delimitative: reduplication of the verb
Zhangsan mo-mo Lisi.
Zhangsan touch-touch Lisi
'Zhangsan touched Lisi slightly.'

(62) Perfective: *-le*
Zhangsan chi-le san-ge hanbao.
Zhangsan eat-PFTV three-CL burger
'Zhangsan ate three burgers.'

(63) Durative: *-zhe*
Qiang-shang gua-zhe yi-fu hua.
wall-on hang-DUR one-CL painting
'On the wall is hanging a painting.'

(64) Experiential: *-guo*
Zhangsan he-guo Riben jiu.
Zhangsan drink-EXP Japanese wine
'Zhangsan has the experience of drinking Japanese wine.'

(65) State
Zhangsan xihuan Lisi
Zhangsan like Lisi
'Zhangsan likes Lisi.'

(66) Action (activity)
Zhangsan zai xue Yingwen.
Zhangsan PROG study English
'Zhangsan is studying English.'

(67) Result (achievement)
Huoche dao le.
train arrive PERF
'The train arrived.'

We have shown that the higher aspects (e.g. *le*, *ne*) are the head of AspP. The lexical aspects are the inherent aspectual properties of the verbs, which we will not go into. We will show that the lower aspects project an AspP too, which is higher than VP (the lexical verb) but lower than other elements in the predicate. Before that, however, we will look at the object selecting vP first.

4.2 The structure of the lower aspect

Lin (2001) proposes that Mandarin is a "Davidsonian language", in the sense that the elements that compose the event structures of the sentences are precisely the elements that build the clause structures, namely the event predicates, or light verbs. Lin (2001) specifically argues that the lexical verbs in Mandarin don't have arguments of their own; the arguments are introduced into the sentence by subject-selecting and object-selecting light verbs. For example, an action verb in Mandarin such as *kai* 'drive' can freely take an agent, a locative, or a causer as subject, see (68)-(70). Lin (2001) proposes that specific subject-selecting light verbs introduce these different expressions into the

sentence, DO, EXIST, and CAUSE. See (74). In addition, Lin (2001) also observes that an action verb in Mandarin, such as *chi* 'eat', can freely take a patient, an instrument, or a location as object; see (71)-(73). Again, Lin (2001) proposes that specific light verbs introduce these expressions into the sentence, UPON, USE, and AT. See (75).[12]

(68) Zhangsan kai-le yi-liang tanke-che. (Agentive subject)
Zhangsan drive-PERF one-CL tank
'Zhangsan drove a tank.'

(69) Gaosugonglu-shang kai-zhe yi-pai tanke-che. (Locative subject)
expressway-on drive-DUR one-line tank
'There is a line of tanks on the expressway.'

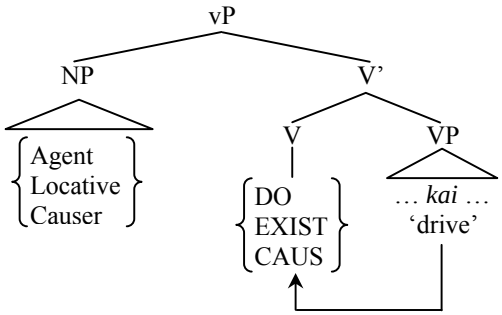
(70) Zhe-liang che kai-de wo xia-si le. (Causative subject)
this-CL car drive-EXT I scare-dead PERF
'Driving this broken car made me scared to death.'

(71) chi niu-rou mian (Patient object)
Eat beef noodle
'To eat beef noodle'

(72) chi da-wan (Instrument object)
eat big-bowl
'To use a big bowl to eat'

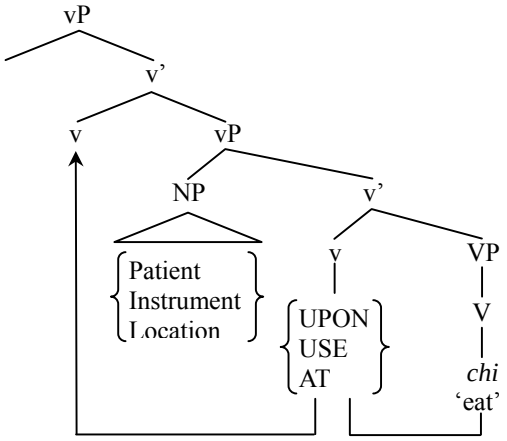
(73) chi guanzi (Location object)
eat restaurant
'To dine at some restaurant'

(74)



[12] Lin's (2001) original proposal is that the patient is directly licensed by the verb, not by some specific light verb. But Lin and Liu (2005) suggest that there may be a need to assume a light verb introducing the patient/theme argument, hence UPON in (75).

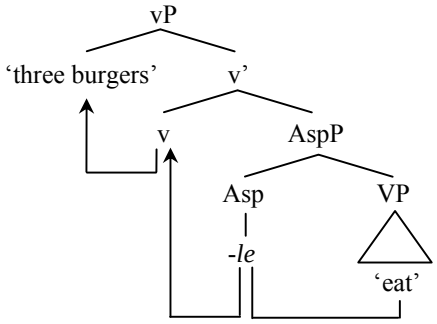
(75)



Liao (2004) incorporates Lin's (2001) theory and proposes that the lower aspect is an independent projection taking the lexical VP as complement, and the lower aspect itself is the complement of the object-selecting vP. The verb moves to the lower aspect first, then to the object-selecting v, and then further up to the subject-selecting v. See (76)-(77) for illustration.[13]

(76) Zhangsan chi-le san-ge hanbao.
Zhangsan eat-PFTV three-CL burger
'Zhangsan ate three burgers.'

(77)



We present two pieces of evidence that support Liao's (2004) proposal.

1. The scope of the lower aspect. Lin and Liu (2009) observe the contrast between (78) and (79). These two sentences contain the repetitive adverb *you* 'again', which Lin and Liu argue adjoins to AspP. They only differ in the

[13] In fact Liao (2004) proposes that the lower aspects are verbs and project vP. The difference in the name of the projection doesn't seem to be important in any way.

aspectual elements they take, the lower-aspectual verbal-suffix *-le* in (78) and the higher-aspectual perfect particle *le* in (79).

(78) Zhangsan you chi-**le** wu-ge pingguo.
Zhangsan again eat-PFTV five-CL apple
'Zhangsan ate five apples again.'

(79) Zhangsan you chi wu-ge pingguo **le**.
Zhangsan again eat five-CL apple PERF
'Zhangsan has eaten five apples again.'

The meanings of the two sentences are dramatically different, however. In (78), what is meant to be repetitive is just the action of eating; the antecedent event (that is, the event after which the asserted event is a repetition) could be eating of three apples, eating of five apples, or event eating of one apple. What is meant to be repetitive doesn't have to be eating of precisely five apples. On the other hand, in (79), what is meant to be repetitive has to be precisely "five-apple-eating"; that is, the asserted event must be identical to the antecedent event. To account for this contrast, we can make the following assumptions: suppose that the adverb *you* 'again' picks up the part of the event that is highlighted by the aspect, and furthermore, suppose that both the verbal suffix *-le* and the sentence-final particle *le* are both "realization operators" in some general sense (see Lin 2000). The above contrast can then be accounted for. The suffix *-le* only operates on the verb to the exclusion of the object argument, so only the action (i.e. the verb) is realized (and meant to be repetitive). The perfect particle *le* operates on the predicate as a whole, including the object argument (but excluding the subject argument; see the previous section), so the whole verb-object combination is realized (and meant to be repetitive). This supports the proposal that the verbal suffix *-le*, and the lower aspects in general, applies to the verb only, to the exclusion of the object.

2. The effect of the lower aspect on the selection of the object. The selection of object is not only affected by the verb (through incorporation to the object-selecting v), but also by the aspectual suffix that the verb takes, namely the lower aspect. In a sense, the selection of object is a "joint work" of the verb and the aspectual suffix. Consider the following examples.

(80) Zhangsan chi-**le** yi-ge hanbao.
Zhangsan eat-PFTV one-CL burger
'Zhangsan ate a burger.'

(81) Zhangsan chi-**zhe** yi-ge hanbao.
Zhangsan eat-DUR one-CL burger
'Zhangsan is eating a burger.'

(82) Zhangsan chi-**le** san-bang niurou.
Zhangsan eat-PFTV three-pound beef
'Zhangsan ate three pounds of beef.'

(83) *Zhangsan chi-**zhe** san-bang niurou.
Zhangsan eat-DUR three-pound beef
'Zhangsan ate three pounds of beef.'

(84) Zhangsan **zai** chi san-bang niurou.
Zhangsan PROG eat three-pound beef
'Zhangsan ate three pounds of beef.'

When the object is a count NP, the perfective suffix *-le* and the durative suffix *-zhe* are both grammatical; see (80)-(81). But when the object is a mass NP, only *-le* is grammatical, whereas *-zhe* is not, as in (82)-(83). Thus *-zhe* is incompatible with the mass object NP. Note that this cannot be attributed to the progressiveness of the durative aspect *-zhe*. If the higher progressive aspect *zai* is used instead, as in (84), the resulting sentence is grammatical, with an implication that there exists a chunk of beef that weighs three pounds. Such implication is lacking if *-zhe* is used. This contrast can be explained on the distinction between the higher aspect and the lower aspect. The lower aspect (in the present case *-zhe*) applies to the verb and the resulting verb-aspect complex conjointly licenses an object. The ungrammaticalityt of (83), we assume arises from the incompatibility of the imperfectness of the progressive action (resulted from the durative aspect *-zhe*) and the boundedness of the quantized object.[14] The higher aspect (e.g. *zai*), on the other hand, applies to the whole verb-object combination. Since the licensing of the object is independent of the function of the higher aspect, the existence of a chunk of beef (that weighs three pounds) can be assumed as long as semantics and pragmatics permit.

4.2 Deriving the VO order

There is one thing in Liao's (2004) theory that is incompatible with the present analysis. Liao proposes that the verb first incorporates to the lower aspect, then to the object-selecting v, and then to the subject-selecting v. But in earlier discussions we argued that the complement of AspP moves to the specifier position of AspP; thus the V-Asp-v complex would have to stay within this derived specifier and cannot move out to incorporate to the subject-selecting v, due to the freezing effect. This, however, would give rise to a wrong surface word order. In (77), if the V-Asp-v complex doesn't keep moving up away from the object-selecting vP, the resulting word order will be object-verb, rather than the correct verb-object. Some amendments, therefore, are needed.

A possible solution is to resort to a projection that hosts the preposed object (Paul 2002). In Mandarin sentences, the object can be preposed to preverbal position; see (85)-(86). But this doesn't necessarily involve real movement of the object, since the postverbal object can still be present even when there is a preposed object, as in (87). There must then be a syntactic position that hosts the preposed object.

[14] See Hinrichs 1986, among many others, for a discussion on the boundedness of NP.

(85) Zhangsan chi-wan pingguo le.
Zhangsan eat-finish apple PERF
'Zhangsan has eaten up the apple.'

(86) Zhangsan pingguo chi-wan le.
Zhangsan burger eat-finish PERF
'Zhangsan has eaten up the apple.'

(87) Zhangsan wu-ge pingguo chi-le san-ge.
Zhangsan five-CL apple eat-PFTV three-CL
'Zhangsan ate three [out of] the five apples.'

Suppose that between the subject-selecting vP and the object-selecting vP, there is an intermediate vP in Mandarin sentences. This vP may be similar in nature to the head Tr proposed by Bowers (2002), which is an element between the subject-selecting head Pr and the object-taking element V. The V-Asp-v complex moves up to it, yielding the desired word order Verb-Object. It also hosts a preposed object in its specifier.[15]

[15] A possible candidate for this intermediate v is the "affectedness" *gei* (literally meaning 'to give'), which often shows up in passives and the disposal *ba* constructions (see (91)-(92)). It attributes a sense of (adversative) affectedness to the patient or theme argument.

(i) Zhangsan bei Lisi da le.
Zhangsan PASS Lisi hit PERF
'Zhangsan was hit by Lisi.'

(ii) Zhangsan bei Lisi gei da le.
Zhangsan PASS Lisi give hit PERF
'Zhangsan was hit by Lisi [and was thereby adversatively affected].'

(iii) Zhangsan ba Lisi da le.
Zhangsan DISP Lisi hit PERF
'Zhangsan did hitting upon Lisi.'

(iv) Zhangsan ba Lisi gei da le.
Zhangsan DISP Lisi give hit PERF
'Zhangsan did hitting upon Lisi [who was thereby adversatively affected].'

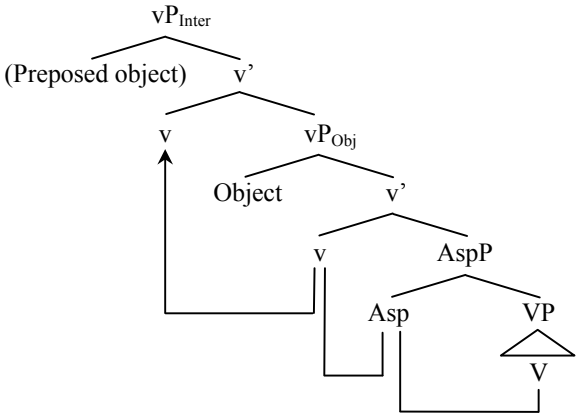
Noticeably, the affectedness *gei* can also occur with the preposed-object construction, and its position is as expected if it is indeed the head of the intermediate vP. It can also occur in a sentence where the preposed object further undergoes topicalization.

(v) Zhangsan wu-ge pingguo gei chi-le san-ge.
Zhangsan five-CL apple give eat-PFTV three-CL
'Zhangsan ate three [out of] the five apples [and thereby affected the apples].'

(vi) Wu-ge pingguo, Zhangsan gei chi-le san-ge.
five-CL apple Zhangsan give eat-PFTV three-CL
'[The] five apples, Zhangsan ate three [out of them and thereby affected the apples].'

We will leave the relevant questions to future research.

(88)



The analysis in (88) entails that the preposed object falls within the scope of AspP. But examples show that the preposed object can occur inside or outside the scope of the adverb *yijing* 'already'; see (89)-(90). It is possible that in the latter case a higher topical element controls an empty pronominal PRO in the specifier position of the intermediate vP. There is evidence that the preposed object originates in a low position. In the disposal construction in Mandarin -- known as the *ba* construction, where an affected object is preposed marked by the disposal marker *ba*, as in (91) -- the preposed object may occur inside the domain of the disposal marker *ba*, which presumably is very low and falls within the scope of AspP, as in (92). If the preposed object originates in a high position, it would be difficult to explain how it ends up in such a low position in sentences like (92).[16]

(89) Zhangsan **yijing san-ge pingguo** chi-diao liang-ge le.
Zhangsan already three-CL apple eat-away two-CL PERF
'Zhangsan has already eaten two [out of] the three apples.'

(90) Zhangsan **san-ge pingguo yijing** chi-diao liang-ge le.
Zhangsan three-CL apple already eat-away two-CL PERF
'Zhangsan has already eaten two [out of] the three apples.'

(91) Zhangsan ba pingguo chi le.
Zhangsan DISP apple eat PERF
'Zhangsan ate the apple [= Zhangsan did eating to the apple].'

[16] Another possibility is that the projection that hosts the preposed object could freely merge to the structure, low or high. Then, (89) and (90) would not be related in any formal way; in (90) the projection in question simply chooses to merge to a higher position in the phrase structure. But this possibility doesn't seem quite likely, because, if the projection in question could freely merge to a higher position, it is unclear how the semantic link (i.e. selectional restriction) between the preposed object and the verb could be established.

(92) Zhangsan (yijing) ba wu-ge pingguo chi-diao liang-ge le.
Zhangsan already DISP five-CL apple eat-away two-CL PERF
'Zhangsan has eaten two [out of] the five apples [= Zhangsan did eating two of them to the five apples].'

We thus assume that the V-Asp-v complex moves to the intermediate v. We further assume that the intermediate vP is projected even if there is no preposed object in the structure. This makes verb-object the default word order for Mandarin transitive predicates.[17]

4.3 Summary

If the above discussions are on the right track, a Mandarin sentence may contain the following projections with the designated hierarchy.

(93) TP >
vP (subject-selecting) >
AspP (higher) >
vP (intermediate) >
vP (object-selecting) >
AspP (lower) >
VP (the lexical verb)

Once again, there are still some more functional elements to come. In the next section we turn to the modals and elements in the C-T area.

5 Higher functional categories

[17] Lin (2001) assumes that the verb incorporates to the object-selecting v and the subject-selecting v for the purpose of event identification (Kratzer 1996). If the V-Asp-v complex stops at the intermediate v and does not reach the subject-selecting v, how is event identification achieved? We tentatively assume that probe-goal agreement (Chomsky 2000 and subsequent works) of the relevant features suffices for event identification. Incidentally, Shen (2004) points out that the verb in a Mandarin predicate doesn't necessarily move to the subject-selecting light verb. He provides the following example as evidence:

(i) Zhangsan xiangdang gao le.
Zhangsan quite tall PERF
'Zhangsan [has become] quite tall.'

In Shen's theory, since the perfect particle *le* agrees with the predicate in aspectuality, a light verb representing change of state has to be merged into the predicate of the sentence in (i) to agree with *le*. However, the main verb (or adjective) of the predicate is *gao* 'tall', a stative verb, and, what is more, it is modified by the degree adverb *xiangdang* 'quite', which only modifies stative verbs. This indicates that in (i) *gao* 'tall' remains stative, despite the change-of-state meaning of the predicate. This further indicates that *gao* 'tall' does not incorporate to the change-of-state light verb. Shen thus concludes that incorporation of a verb to the higher light verb is not a must in Mandarin.

5.1 Modals as verbs

Modals typically are treated as C-T elements in English syntax, e.g. Butler 2003. Similarly, some researchers consider modals in Mandarin as C-T elements, e.g. Tsai 2001, 2008. But there is strong evidence showing that modals in Mandarin are verbs, not C-T elements. Lin and Tang (1995) argue that modals in Mandarin, both epistemic and root, are lexical verbs taking a clause as complement. Lin (to appear) also argues for the same conclusion.

Lin (to appear) observes that modals in Mandarin can be divided into two types, those that fall within the scope of the sentence-final particle *le*, and those that don't. The former include the root modals ((94)-(95)), and the latter, the epistemic modals ((96)-(97)). There are two exceptional cases, though: the obligation modal *bixu* 'must' is ambiguous ((98)-(99)), and, the future modal *hui* 'will' typically doesn't occur with the sentence-final particle *le*. For *hui* 'will' to occur with *le*, a reference time must be given ((100)-(101)).

(94) Zhangsan nenggou / keyi / ken qi jiaotache.
Zhangsan be.able.to be.permitted.to be.willing.to ride bicycle
'Zhangsan is able / permitted / willing to ride the bicycle.'

(95) Zhangsan nenggou / keyi / ken qi jiaotache le
Zhangsan be.able.to be.permitted.to be.willing.to ride bicycle PERF
'Zhangsan has become able / permitted / willing to ride the bicycle.'
(*le* > modal; *modal > *le*)

(96) Zhangsan yinggai / keneng hen youqian.
Zhangsan should be.likely.to very rich
'Zhangsan must be / is likely to be rich.'

(97) Zhangsan yinggai / keneng youqian le.
Zhangsan should be.likely.to rich PERF
'It should / is likely to be the case that Zhangsan has become rich.'
(**le* > modal; modal > *le*)

(98) Zhangsan bixu hui jia.
Zhangsan must return home
'Zhangsan must go home.'

(99) Zhangsan bixu hui jia le.
Zhangsan must return home PERF
1. 'It has become the case that Zhangsan must go home.' (*le* > modal)
2. 'It must be the case that Zhangsan has gone home.' (modal > *le*)

(100) Zhangsan hui qu xuexiao (*le).
Zhangsan will go school PERF
'(Intended) Zhangsan will go to school.'

(101) Mingtien xiawu san dian yiqian,
tomorrow afternoon three o'clock before
Zhangsan hui qu xuexiao le.
Zhangsan will go school PERF
'Zhangsan will have gone to school before three o'clock tomorrow afternoon.'

Since the root modals fall under the scope of the particle *le*, they must be generated within AspP. This indicates that they are verbs, not elements in the C-T area. Furthermore, Lin and Liu (2009: 1186) observe that the epistemic-possibility modal *keneng* 'be likely to' sometimes can be forced into the scope of the particle *le*, such as when the repetitive adverb *you* 'again' is present, which favors the presence of the sentence-final particle *le*, as in (102). It can be added that when *keneng* 'be likely to' is in a marked context, e.g. when it is negated, it can also be forced under the scope of *le*, as in (103). These facts indicate that the modal *keneng* 'be likely to' is a verb too, not a C-T element.

(102) Mingtian you keneng yao xia yu le.
tomorrow again be.likely.to be.going.to fall rain PERF
'It is again become likely that it will be raining tomorrow.'
(*le* > possibility modal)

(103) Women bu keneng jianmien le.
we not be.likely.to meet PERF
'We can't meet anymore.' [= 'It has become the case that we are not likely to meet.']
(*le* > possibility modal)

5.2 Epistemic modals and evidentiality

The epistemic-necessity modal *yinggai* 'should' is different. It is a verb, but for special reasons it cannot be tested as in the case of *keneng* 'be likely to'; it is an evidential element. Drubig (2001) proposes that the epistemic modals are evidentials (also see von Fintel and Gillies 2006). And, since evidentials express the speaker's certainty about the proposition, they are "extra-propositional" and thus cannot be under the scope of any operator. For instance, the necessity modal *must* cannot be negated ((104)-(105)), cannot be under the scope of past tense ((106)), and cannot be embedded in a question ((107)-(108)). The necessity modal *yinggai* 'should' in Mandarin behaves the same way ((109)-(113)). The fact that *must* cannot be embedded under the scope of any operator doesn't undermine its status as a verb; likewise, the fact that *yinggai* cannot be negated, questioned, or embedded in a past context does not indicate that it is not a verb.

(104) John must be rich.

(105) John must not be rich.
(Obligation reading; *necessity reading)

(106) Last night John must be here.
(must > last night; *last night > must)

(107) John must like Bill.

(108) Must John like Bill?
(Obligation reading; *necessity reading)

(109) Zhangsan yinggai hen youqian.
Zhangsan should very rich
'Zhangsan should be rich.'

(110) Zhangsan bu yinggai hen youqian.
Zhangsan not should very rich
'Zhangsan should not be rich.'
(Obligation reading; *necessity reading)

(111) Zuo-wan Zhangsan yinggai zai zheli.
last-night Zhangsan should at here.
'Last night Zhangsan should have been here.'
('should' > 'last night'; * 'last night' > 'should')

(112) Zhangsan yinggai xihuan Lisi.
Zhangsan should like Lisi
'Zhangsan should like Lisi.'

(113) Zhangsan yinggai xihuan Lisi ma
Zhangsan should like Lisi Q
'Should Zhangsan like Lisi?'
(Obligation reading; *necessity reading)

Drubig (2001) considers the possibility modals as evidentials too, but von Fintel and Gillies (2006: 11) point out that in English a possibility modal can be under the scope of some operators ((114)-(116)). Again, the possibility modal *keneng* 'be likely to' in Mandarin is the same ((117)-(119)).

(114) There can't have been a mistake.
(Negation > modal)

(115) Where might you have put the keys?
(Question > modal)

(116) The keys might have been in the drawer.
(Past > modal)

(117) Zhangsan bu keneng lai.
Zhangsan not be.likely.to come
'Zhangsan is not likely to come.'
(Negation > modal)

(118) Zhangsan keneng lai ma?
Zhangsan be.likely.to come Q
'Is Zhangsan likely to come?'
(Question > modal)

(119) Zhangsan qu-nian hai keneng mai tade fangzi,
Zhangsan last-year still be.likely.to sell his house
jin-nian shi bu keneng le.
this-year be not likely.to PERF
'Last year it was still possible for Zhangsan to sell his house; this year it is not possible anymore.'
(Past > modal)

These examples indicate that, even though the necessity modals and the possibility modals may both be evidentials, their evidential force can differ; the former is stronger, and the latter weaker. Or to put it in another way, the necessity modal is more "extra-propositional" than the possibility modal. This results in the word order necessity > possibility when the two modals occur in one and the same sentence in Mandarin, as in (120)-(121).

(120) Zhangsan yinggai keneng lai.
Zhangsan should be.likely.to come
'It should be the case that Zhangsan is likely to come.'

(121) Zhangsan keneng yinggai lai.
Zhangsan be.likely.to should come
'It is likely to be the case that Zhangsan should come.'
(*Yinggai*: obligation reading; *necessity reading)

We will come back to the issue of evidentiality again when we examine the sentence-final mood particles in Mandarin.

5.3 Tense

Lin (to appear) argues that the interaction between the perfect particle *le* and the different types of modals is evidence for the syntactic tense in Mandarin, even though this language doesn't have morphological tense. It was shown above that the root modals fall within the scope of *le*, whereas the epistemic modals fall outside the scope of *le*. However, this doesn't mean that the root modals are below AspP and the epistemic modals are above AspP. Since both types of modals are verbs, they are all below AspP; see (122)-(123) for illustration (irrelevant details omitted). The real difference is that (i) the epistemic modals are typically under the aspect ∅, and the root modals can be under the aspect *le*, and (ii) the epistemic modals can take a TP complement that contains the aspect *le*, resulting in the narrow scope of *le* relative to the epistemic modals, but the root modals cannot take a TP complement that contains the perfect aspect *le*, which results in the wide scope of *le* relative to the root modals (when *le* is present in the matrix AspP).

(122) Epistemic modal keneng 'be likely to':
[AspP [Asp' [Asp ∅ / *le] [VP keneng [TP … [Asp ∅ / le] …]]]]

(123) Root modal nenggou 'be able to':
[AspP [Asp' [Asp ∅ / le] [VP nenggou [TP … [Asp ∅ / *le] …]]]]

Lin (to appear) proposes that the root modals cannot take a complement containing the perfect aspect *le* because they select a nonfinite TP as complement. Since *le* is perfect aspect and requires a reference time for temporal support, the nonfinite complement of the root modals cannot contain the perfect aspect *le*. On the other hand, the epistemic modals take a finite TP as complement. The TP can take *le*, because its tense supports perfect aspect.

The matrix AspP cannot take *le*, though, because epistemic modals are evidentials and disfavor other operators dominating them. All this indicates that Mandarin indeed has syntactic tense. So the Mandarin sentences contain the functional projection TP in the syntactic structure.

Other evidence also supports this conclusion. Paul (2002) points out that the finiteness of a clause affects the object preposing within the clause. In a finite clause, the object can be preposed to the local preverbal position, as in (124)-(125). In a nonfinite clause, however, the object cannot be preposed to the local preverbal position; it must be preposed to a higher clause, as the contrast in (126)-(128) shows.

(124) Zhangsan chi-le **na-ge hanbao**.
Zhangsan eat-PFTV that-CL burger
'Zhangsan ate that burger.'

(125) Zhangsan **na-ge hanbao** chi-le.
Zhangsan that-CL burger eat-PFTV

(126) Zhangsan mingling Lisi chi **na-ge hanbao**.
Zhangsan order Lisi eat that-CL burger
'Zhangsan ordered Lisi to eat that burger.'

(127) *Zhangsan mingling Lisi **na-ge hanbao** chi.
Zhangsan order Lisi that-CL burger eat

(128) * Zhangsan **na-ge hanbao** mingling Lisi chi.
Zhangsan that-CL burger order Lisi eat

Interestingly, the effect of the finiteness contrast on local object preposing is also attested in the different modal constructions. Local object preposing is not permitted in the complement clause of a root modal, which takes a nonfinite complement; see (129)-(131). The complement clause of an epistemic modal, on the other hand, permit local object preposing, as expect; see (132)-(133).

(129) Zhangsan nenggou chi **na-ge hanbao**.
Zhangsan be.able.to eat that-CL burger
'Zhangsan can eat that burger.'

(130) *Zhangsan nenggou **na-ge hanbao** chi.
Zhangsan be.able.to that-CL burger eat

(131) Zhangsan **na-ge hanbao** nenggou chi.
Zhangsan that-CL burger be.able.to eat

(132) Zhangsan keneng chi-le **na-ge hanbao**.
Zhangsan be.likely.to eat-PFTV that-CL burger
'It is likely that John has eaten that burger.'

(133) *Zhangsan keneng **na-ge hanbao** chi-le.
Zhangsan be.likely.to that-CL burger eat-PFTV

Conclusion: Mandarin sentences exhibit the finite/nonfinite contrast. This in turn indicates that there is syntactic tense, namely the category T, in Mandarin sentences.

5.4 CP

Mandarin doesn't have lexical complementizers corresponding to *that*, *for*, and *whether* in English. But since Huang 1982 it has been assumed that a complementizer position is available for LF wh-movement. Tsai (1994) proposes that in-situ wh-nominals in Mandarin are interpreted via unselective binding rather than LF movement. The binder, the question operator Q, is in Spec of CP. Thus the existence of CP in Mandarin is widely assumed and adopted.

Cheng (1991) proposes that the sentence-final question particles *ne* and *ma* has clause-typing functions ((134)-(135)). This might lead one to the speculation that the particles *ne* and *ma* could be the lexical realizations of the operator Q.

(134) Zhangsan xihuan shei ne?
Zhangsan like who Q
'Who does Zhangsan like?'

(135) Zhangsan xihuan Lisi ma?
Zhangsan like Lisi Q
'Does Zhangsan like Lisi?'

However, this speculation cannot be correct. First, the particles *ne* and *ma* are optional in most cases; see (136)-(137), which are question sentences without question particles. Second, some other mood particles can also be used in question sentences, such as *ba* and *o* in (138)-(139). Thus the question sentences in Mandarin do not exclusively employ particles *ne* and *ma*. So, there is no reason to assume that *ne* and *ma* are lexical realizations of Q.[18]

(136) Zhangsan xihuan shei?
Zhangsan like who
'Who does Zhangsan like?'

(137) Zhangsan xihuan-bu-xihuan Lisi?
Zhangsan like-not-like Lisi
'Does Zhangsan like Lisi or not?'

(138) Zhagsan xihuan Lisi ba?
Zhangsan like Lisi **ba**
'Zhangsan likes Lisi, right?'

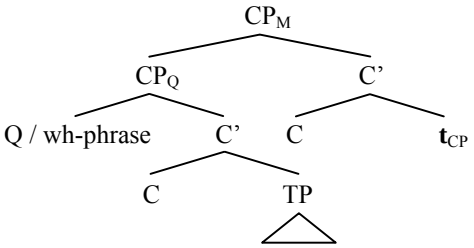
(139) Zhangsan xihuan Lisi o?
Zhangsan like Lisi **o**
'Zhangsan like Lisi? Really?'

In view of the separation of the sense of question and the use of the mood particles, we can make CP in Mandarin into two layers, the CP for the question

[18] Sentence-final mood particles such as *ba* and *o* have meanings, but it is difficult to express their meanings in terms of abbreviations. So we will just repeat the particle in boldface in the gloss of the example. See Li 2006 for the semantics of the mood particles in Mandarin.

operator Q and the CP for mood particles, symbolized as CP_Q and CP_M. If this is on the right track, *ne* and *ma* are simply mood particles that are somewhat specialized in expressing questions. Since the mood particles are sentence-final, we assume that they also trigger complement-to-specifier movement, on a par with the perfect particle *le*. In other words, the complement of CP_M, namely CP_Q, moves to the specifier position of CP_M. The unselective binding of Q into the clause and the LF wh-movement of in-situ wh-phrases are not affected by this movement.

(140)



At this point it is worthwhile to look at a proposal made by Shen (2003), who argues that Mandarin has two mood projections, one hosting sentence-final particles such as *ba* and *ma*, and the other hosting the indicative mood. According to Shen (2003), the indicative mood in Mandarin is phonetically empty, represented as ∅. There are two pieces of evidence for its existence.

1. The negative question. It is well known in the study of Mandarin grammar that, in response to negative questions, the affirmative and negative words "yes" and "no" in Mandarin do not have to agree with the truth value of the sentence, unlike English. Compare (141) and (142). Shen (2003) argues that this is because the words "yes" and "no" in Mandarin affirm or negate the indicative mood, not the truth of the sentence. The postulation of the indicative mood in Mandarin sentences can account for this phenomenon.

(141) Q: Didn't John go to school?
A: #Yes, he didn't.
[Correct form: No, he didn't.]

(142) Q: Zhangsan mei qu xuexiao ma?
Zhangsan did.not go school Q
'Didn't Zhangsan go to school?'
A: Shi, ta mei qu.
yes he did.not go
'Yes, he didn't.'

2. The preservation of the indicative mood. Shen (2003) argues that the mood particles *ba*, *ma*, and so on must be separated from the indicative mood. The evidence is that some mood particles preserve the indicative mood, and some don't. For example, when used in a question sentence, the mood particle *ba*

preserves the indicative mood, but the particle *ma* doesn't; compare (143) and (144). (143) shows that in response to a question with the mood particle *ba*, one can reply that the speaker of the question sentence "is correct"; this is not possible when the particle *ma* is used, as in (144). These phenomena show that the indicative mood must be distinct from the mood particles.[19]

(143) Q: Zhangsan qu xuexiao le ba?
Zhangsan go school PERF ba
'Zhangsan went to school, right?'
A: Shi, ta qu le. Ni shuo de dui.
yes he go PERF you say EXT right
'Yes, he went to the school. What you said is correct.'

(144) Q: Zhangsan qu xuexiao le ma?
Zhangsan go school PERF Q
'Zhangsan went to school, right?'
A: #Shi, ta qu le. Ni shuo de dui.
yes he go PERF you say EXT right
'Yes, he went to the school. What you said is correct.'

Shen (2003) postulates two different mood projections in Mandarin sentences, one for the indicative mood and the other for the mood particles, which he suggests represent different speech acts. We adopt this proposal and incorporate it into our system, illustrated in (145). Above CP_Q are two CP projections hosting mood elements, one for the indicative mood, represented as CP_I, the other for the "speech act" mood particles, represented as CP_S. The indicative mood is phonetically null, so it doesn't trigger complement-to-specifier movement. The "speech act" mood particles (*ba*, *ma*, etc.) trigger complement-to-specifier movement.[20]

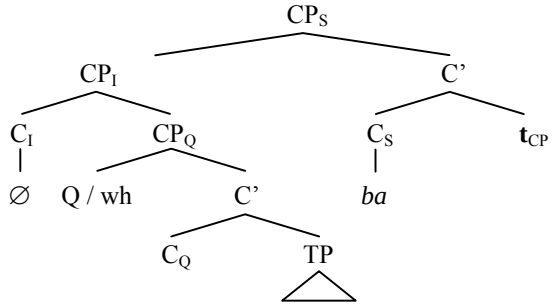
[19] Note that the particle *ba* does not always occur in a question sentence. It can occur in non-question sentences too, as in the following example:

(i) Zhangsan mingtian yinggai hui qu Taibei ba.
Zhangsan tomorrow should will go Taipei **ba**
'[I guess / infer that] It should be the case that Zhangsan will go to Taipei tomorrow.'

Thus we cannot say that *ba* is a special kind of question particle.

[20] If we adopt Shen's (2003) theory, then the CP for the indicative mood and the CP for the question operator Q and the wh-phrase must be different. This is because the presence of the mood particle *ba*, according to Shen, preserves the indicative mood. Yet when *ba* occurs, the sentence can be in the question mood as well; see (143). Since the indicative mood and the interrogative mood may co-occur in the same sentence, they cannot share the same CP.

(145)



5.5 Evidentiality of mood particles

The separation of the indicative mood and other "speech act" mood particles may help to account for a question about the semantics of the mood particles. Some mood particles in Mandarin are in fact evidential elements, for instance *ba*; but what their evidential force applies to is a question. It doesn't seem likely that the evidential force of, say, *ba* applies directly to the proposition, because the necessity modal *yinggai* 'should', which is also an evidential element, may co-occur with *ba* in one and the same sentence, as in (146). If *yinggai* 'should' applies its evidential force to the proposition, *ba* seems redundant if it applies its evidential force to the proposition too. However, there is no sense of redundancy with the sentence. If we adopt the idea about an indicative mood in Mandarin sentences, we can say that the evidential force of those mood particles is directed to the indicative mood.

(146) Zhangsan **yinggai** qu xuexiao le **ba**.
Zhangsan should go school PERF **ba**
'Zhangsan should have gone to the school, [presumably so].'

Now we show that mood particles such as *ba* are evidential elements. Modal verbs are more or less sensitive to the event types of the complement that they take. This is particularly clear with the epistemic modals. When a possibility modal takes a stative complement, there is no change in meaning; but when it takes an eventive complement, then the temporal interpretation of the complement is shifted to the future. The complement can also take the perfect aspect, in which case the temporal interpretation is shifted to the past. This is called Past Tense Replacement (PTR) (see Drubig 2001 and references cited). (147)-(149) and (150)-(152) are the relevant English and Mandarin examples.

(147) John may be rich.
(148) John may eat the burger.
(Shifted to future)
(149) John may have eaten the burger.
(Shifted to past)

(150) Zhangsan keneng hen youqian.
Zhangsan be.likely.to very rich
'Zhangsan is likely to be rich.'

(151) Zhangsan keneng chi hanbao.
Zhangsan be,likely to eat burger
'Zhangsan is likely to eat the burger.'
(Shifted to future)

(152) Zhangsan keneng chi hanbao le.
Zhangsan be,likely to eat burger PERF
'Zhangsan is likely to have eaten the burger.'
(Shifted to past)

The necessity modals exhibit an even higher degree of sensitivity to the event types of the complements: they cannot take eventive complements at all (and hence no shifting to the future). If a necessity modal takes an eventive complement, either the sentence is unacceptable or the modal is re-construed as an obligation modal. See (153)-(155) and (156)-(158) for English and Mandarin examples.

(153) John must be rich.

(154) John must have eaten the burger.

(155) John must eat the burger.
(Obligation reading; *necessity reading)

(156) Zhangsan yinggai hen youqian.
Zhangsan should very rich
'Zhangsan should be rich.'

(157) Zhangsan yinggai chi hanbao le.
Zhangsan should eat burger PERF
'Zhangsan should have eaten the burger.'

(158) Zhangsan yinggai chi hanbao.
Zhangsan should eat burger
'Zhangsan should eat the burger.'
(Obligation reading; *necessity reading)

Intriguingly, some "speech act" mood particles in Mandarin are also sensitive to the event type of the clause, for instance *ba*. Exactly like the necessity modal *yiggai* 'should', *ba* assumes an epistemic reading when it occurs with a stative clause or when the clause takes the perfect particle *le*; it assumes an obligation reading when it occurs with an eventive clause. See the examples in (159)-(161).

(159) Zhangsan hen youqian ba?
Zhangsan very rich ba
'[I infer that] Zhangsan is rich. [Right?]'
(Epistemic reading)

(160) Zhangsan chi hanbao ba.
Zhangsan eat burger ba
'[I urge that] Zhangsan eat the burger.'
(Obligation reading)

(161) Zhangsan chi hanbao le ba?
Zhangsan eat burger PERF ba
'[I infer that] Zhangsan has eaten the burger. [Right?]'
(Epistemic reading)

It has been noted that a sentence with the mood particle *ba* shows a "mild" speech force (e.g. Li and Thompson 1981). This can be explained by assuming that *ba* involves existential quantification over possible worlds in which the speaker is certain about the assertion. This makes *ba* very much like possibility modality. Since only existential quantification is involved in the case of *ba*, the certainty is not absolute and categorical. This accounts for the "mild" speech force of *ba*. If this is plausible, one would then expect there to be mood particles that denote universal quantification over such possible worlds, that is, mood particles that resemble necessity modality. A sentence-final mood particle in Taiwan Mandarin, *la* (which may have been borrowed from Taiwanese), appears to be one such particle. When it occurs with a stative clause or a clause with the perfect particle *le*, it assumes the reading of strong certainty. When it occurs with an eventive clause, it assumes the reading of strong demand. See (162)-(164). Again, its strong speech force can be accounted for by assuming that it involves universal quantification over possible worlds in which the speaker is certain about the assertion.

(162) Zhangsan hen youqian la!
Zhangsan very rich **la**
'[I am certain that] Zhangsan is very rich!'

(163) Zhangsan chi hanbao la!
Zhangsan eat burger **la**
'[I demand that] Zhangsan eat the burger!'

(164) Zhangsan chi hanbao le la!
Zhangsan eat burger PERF **la**
'[I am certain that] Zhangsan has eaten the burger!'

Some last words about the mood particles in Mandarin. It is not the case that all mood particles in Mandarin exhibit evidentiality. An example is *ne*. Li (2006) argues that the particle *ne* denotes "extraordinary" states of affairs when it is used with declarative sentences.[21] For instance, the use of *ne* in (165) isn't as felicitous as that in (166), since it is natural that Hokkaido, being in the far north of Japan, has snow, whereas it is truly extraordinary if Manila, a tropical city, indeed has snow. Now the point is that, no matter what kind of clause it

[21] Li (2006) suggests that the mood particles *ne*, the progressive aspect *ne* (see section 2-3) and the question particle *ne* (see the earlier part of this section) are the same item. I take no position on this issue and will leave it open.

occurs with (stative or eventive), there is no change of meaning with *ne* (e.g. no alternation between the epistemic reading and the deontic reading). This seems to indicate that *ne* is not an evidential element.

(165) Beihaidao xia xue ne.
Hokkaido fall snow **ne**
'It snows in Hokkaido.'

(166) Manila xia xue ne.
Manila fall snow **ne**
'It snows in Manila.'

(167) Zhangsan hen youqian ne.
Zhangsan very rich **ne**
'Zhangsan is rich. [Isn't it extraordinary?]'

(168) Zhangsan chi hanbao ne.
Zhangsan eat burger **ne**
'Zhangsan eats burgers. [Isn't it extraordinary?]'

(169) Zhangsan chi hanbao le ne.
Zhangsan eat burger PERF **ne**
'Zhangsan has eaten the burger. [Isn't it extraordinary?]'

6 Conclusion

If the proposals and analyses of this work are on the right track, the Mandarin sentence structure is built with elements that include at least the following ones, in the designated hierarchy.

(170) CP_S ("speech act" mood particles) >
CP_I (the indicative mood) >
CP_Q (question operator and wh-phrase) >
TP (tense) >
vP (subject-selecting) >
AspP (higher) >
vP (intermediate) >
vP (object-selecting) >
AspP (lower) >
VP (the lexical verb)

Researches on the left peripheries of natural language sentences have proposed other functional categories, such as TopicP, FocusP, FiniteP, and so on (Rizzi 1997); they may very well exist in Mandarin too. The list in (170) is not meant to be exhaustive. This work only picks up those which appear to be supported by sufficient empirical evidence at the present point. Future works on other aspects of Mandarin sentences may yield further evidence for functional elements that are not listed here.

Notice that the functional elements in (170), in a sense, reveal some important typological characteristics of the language. Putting the two Asp

projections aside, the phrase structure of Mandarin sentences basically conforms to the CP-TP-vP-VP architecture, with proliferations of vP and CP.[22] This points to at least two typological features of Mandarin.

First, the proliferation of vP projections is consistent with the proposal of Lin 2001 and Lin and Liu 2005, that lexical items in Mandarin are impoverished with inherent event information, and Mandarin Mandarin sentences are in fact assembling event structure in overt syntax. The multiple vP projections, which are not attested in languages such as English, provide the required event information (eventuality predicates) and help to build an event structure as the sentence is being constructed. Thus the impoverishment of event information in lexical items leads to proliferation of light verbs in the syntactic structure.

Second, the proliferation of CP projections may have resulted from the choice of Mandarin grammar to put more emphasis on the speaker's attitude and belief towards the assertion. Why this is so is not clear, but a possibility is that this may originate from the isolating character of this language. Mandarin is known to lack inflectional morphology and thus exhibits very strong isolating (or analytic) character. It could be the case that this makes Mandarin grammar pursue realizing the speaker's attitude and belief in grammatical means, instead of spelling out the grammatical functions (e.g. case) and grammatical relations (e.g. tense and agreement) in a more explicit way. This conjecture, of course, needs to be verified; we will not go into the relevant questions. It is important to point out that the moods are so central to Mandarin sentences that the Mandarin grammar develops ways to accommodate multiple moods in one and the same clause (e.g. the indicative mood and the "speech act" moods). This is very different from English and other European languages, and is worth further investigations.

References

Abel, Klaus. 2003. Successive cyclicity, anti-locality, and adposition stranding. Doctoral dissertation, University of Connecticut, Storrs.

Aoun, Joseph and Y.-H. Audrey Li. 1993. Wh-elements in situ: syntax or LF? *Linguistic Inquiry* 24: 199-238.

Bach, Emmon. 1981. On time, tense, and aspect: an essay in English metaphysics. In Peter Cole, ed. *Radical pragmatics*, 63-81. New York: Academic Press.

Bowers, John. 1993. The syntax of predication. *Linguistic Inquiry* 24: 591-656.

Bowers, John. 2002. Transitivity. *Linguistic Inquiry* 33: 183-224.

Butler, Jonny. 2003. A minimalist treatment of modality. *Lingua* 113: 967–996.

Carstens, Vicki. 2002. Antisymmetry and word order in serial constructions. *Language* 78: 3-50.

Cheng, Lisa L.-S. 1991. On the typology of wh-questions. Doctoral dissertation. Massachusetts Institute of Technology.

Chomsky, Noam. 1986. *Barriers*. Cambridge, Mass.: MIT Press.

Chomsky, Noam. 1995. *The minimalist program*. Cambridge, Mass.: MIT Press.

[22] Liao (2004) considers the two AspPs as vPs too. If this is correct, the resulting phrase structure fits the four-way partition even better.

Chomsky, Noam. 2000. Minimalist inquiries: The framework. In Roger Martin, David Michaels, and Juan Uriagereka, eds. *Step by step: Essays on minimalist syntax in honor of Howard Lasnik*, 89-155. Cambridge, Mass.: MIT Press.
Chomsky, Noam. 2004. Beyond explanatory adequacy. In Adriana Belletti ed. *Structures and beyond: The cartography of syntactic structures*, vol. 3, 104–131. Oxford: Oxford University Press.
Chomsky, Noam. 2007. Approaching UG from below. In Uli Sauerland and Hans-Martin Gärtner, eds. *Interfaces + recursion = language?* 1-31. Berlin: Mouton de Gruyter.
Chomsky, Noam. 2008. On phases. In Robert Freidin, Carlos Otero, and Maria Luisa Zubizarreta, eds. *Foundational issues in linguistic theory*, 133-166. Cambridge, Mass.: MIT Press.
Collins, Chris. 2005. A smuggling approach to the passive in English. *Syntax* 8: 81-120.
Drunig, Hans Bernhard. 2001. On the syntactic form of epistemic modality. Manuscript. University of Tübingen.
Enç Mürvet. 1987. Anchoring conditions for tense. *Linguistic Inquiry* 18: 633-657.
Grohmann, Kleanthes K. 2003. Successive cyclycity under (anti-)local considerations. *Syntax* 6: 260-312.
Hinrichs, Erhard 1985. A compositional semantics for aktionsarten and NP reference in English. Doctoral dissertation, Ohio State University.
Hsueh, Yun-Ru. 2010. Hanyu cunzai-ju zhong de dongmao biaozhi [Aspectual marking in Chinese existential sentences]. Paper presented at the 4th meeting of the Kanto Region, the Chinese Linguistic Society of Japan. Meikai University.
Huang, C.-T. James. 1982. Logical relations in Chinese and the theory of grammar. Doctoral dissertation. Massachusetts Institute of Technology.
Kayne, Richard. 1994. *The antisymmetry of syntax*. Cambridge, Mass.: MIT Press.
Klein, Wolfgang, Li Ping, and Henriette Hendriks. 2000. Aspect and assertion in Mandarin Chinese. *Natural Language and Linguistic Theory* 18: 723-770.
Kratzer, Angelika. 1996. Severing the external argument from its verb. In John Rooryck and Laurie Zaring, eds. *Phrase structure and the lexicon*, 109-137. Dordrecht: Kluwer.
Larson, Richard. 1988. On the double object construction. *Linguistic Inquiry* 19: 335-391.
Li, Boya. 2006. Chinese final particles and the syntax of the periphery. Doctoral dissertation. Leiden University.
Li, Charles N. and Sandra A. Thompson. 1981. *Mandarin Chinese*. Berkeley and Los Angeles: University of California Press.
Li, Y.-H. Audrey. 1985. Abstract case in Chinese. Doctoral dissertation. University of Southern California.
Liao, W.-W. Roger. 2004. The architecture of aspect and duration. MA thesis. National Tsing Hua University, Taiwan.
Lin, Jo-Wang. 2000. On the temporal meaning of the verbal *-le* in Chinese. *Language and Linguistics* 1: 190-133.
Lin, Jo-Wang. 2003. Temporal reference in Mandarin Chinese. *Journal of East Asian Linguistics* 12: 259-311.
Lin, Jo-Wang and C.-C. Jane Tang. 1995. Modals as verbs in Chinese: a GB perspective. Bulletin of the Institute of History and Philology Academia Sinica 66: 53-105.
Lin, T.-H. Jonah. 2001. Light verb syntax and the theory of phrase structure. Doctoral dissertation. University of California, Irvine.
Lin, T.-H. Jonah. 2006. Complement-to-specifier movement in Mandarin Chinese. Manuscript. National Tsing Hua University, Taiwan.
Lin, T.-H. Jonah. 2009. Parameterizing Complementation. *UST Working Papers in Linguistics* 5: 89-105.
Lin, T.-H. Jonah. To appear. Finiteness of clauses and raising of arguments in Mandarin Chinese. *Syntax* 14.

Lin, T.-H. Jonah and C.-Y. Cecilia Liu. 2005. Coercion, event structure, and syntax. *Nanzan Linguistics* 2: 9-31.
Lin, T.-H. Jonah and C.-M. Louis Liu. 2009. 'Again' and 'again': a grammatical analysis of *you* and *zai* in Mandarin Chinese. *Linguistics* 47: 1183-1210.
Liu, Xunning. 1988. Xiandai Hanyu ciwei 'le' de yufa yiyi [The grammatical meaning the sentence-final le in Modern Chinese]. *Zhongguo Yuwen* 5: 321-330.
MacDonald, Jonathan E. 2008. Domain of aspectual interpretation. *Linguistic Inquiry* 39: 128-147.
Parsons, Terence. 1990. *Events in the semantics of English*. Cambridge, Mass.: MIT Press.
Paul, Waltraud. 2002. Sentence-internal topics in Mandarin Chinese: The case of object preposing. *Language and Linguistics* 3: 695-714.
Pollock, Jean-Yves. 1989. Verb movement, universal grammar, and the structure of IP. *Linguistic Inquiry* 20: 365-424.
Reinhart, Tanya. 1998. Wh-in-situ in the framework of the minimalist program. *Natural Language Semantics* 6: 29-56.
Rizzi, Luigi. 1997. The fine structure of the left periphery. In Liliane Haegeman, ed. *Elements of grammar*, 281-337. Kluwer: Dordrecht.
Shen, Li. 2003. Hanyu de zhichen yutai fanchou [Indicative mood in Chinese]. *Yufa yanjiu yu tansuo* [Grammatical research and exploration], vol.12. Beijing: Shangwu.
Shen, Li. 2004. Aspect agreement and light verbs in Chinese: a comparison with Japanese. *Journal of East Asian Linguistics* 13: 141-179.
Simpson, Andrew. 2002. On the status of 'modifying' de and the structure of the Chinese DP. In Sze-Wing Tang and C.-S. Luther Liu, eds. *On the formal way to Chinese languages*, 74-101. Stanford: CSLI.
Simpson, Andrew and Zoe Wu. 2002. IP-raising, tone sandhi and the creation of S-final particles: evidence for cyclic spell-out. *Journal of East Asian Linguistics* 11, 67-99.
Smith, Carlota. 1994. Aspectual viewpoint and situation type in Mandarian Chinese. *Journal of East Asian Linguistics* 3: 107-146.
Sybesma, Rint. 1997. Why Chinese verb-*le* is a resultative predicate. *Journal of East Asian Linguistics* 6: 215-261.
Tai, James H.-Y. 1984. Verbs and times in Chinese: Vendler's four categories. In *Papers from the parasession on lexical semantics*, 289-296. Chicago Linguistic Society.
Takida. Kensuke. 2007. An argument for the derivational reformulation of the proper binding condition. Paper presented at the 4th Workshop on Altaic in Formal Linguistics, Harvard University.
Takida. Kensuke. 2009. If Chinese is head-initial, Japanese cannot be. *Journal of East Asian Linguistics* 18: 41-61.
Tang, Sze-Wing. 2003. Verbless adverbial clauses and economy. In Jie Xu, Donghong Ji, and Kim Teng Lua, eds., *Chinese syntax and semantics*, 157-176. Singapore: Prentice Hall.
Tang, Ting-Chi. 1992. *Hanyu cifa jufa* IV (Chinese morphology and syntax IV). Taipei: Student Books.
Tsai, Dylan W.-T. 1994. On economizing the theory of A-bar dependency. Doctoral dissertation. Massachusetts Institute of Technology.
Tsai, Dylan W.-T. 2001. On subject specificity and theory of syntax-semantics interface. *Journal of East Asian Linguistics* 10: 129-168.
Tsai, Dylan W.-T. 2008. Tense anchoring in Chinese. *Lingua* 118: 675-686.
Tseng, W.-H. Karen. 2010. Generalized post-syntactic movement in Mandarin Chinese. MA thesis, National Tsing Hua University, Taiwan.
Wu, Jiun-Shiung. 2005. The semantics of the perfective *le* and its context-dependency: an SDRT approach. *Journal of East Asian Linguistics* 14: 299-336.
von Fintel, Kai and Anthony S. Gillies. 2006. Epistemic modality for dummies. Manuscript. Massachusetts Institute of Technology and University of Michigan.

Contact Information
Graduate Institute of Linguistics
National Tsing Hua University
101, Section 2 Kuang Fu Road, Hsinchu,Taiwan 30013,
Republic of China

Email: jonahlin@mx.nthu.edu.tw