Degree Modification and Time Anchoring in Mandarin

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This paper discusses the syntax and semantics of Mandarin predicative adjectives. Mandarin does not require any copular to link the subject and the adjectival predicate; instead, under certain conditions, degree modifications on the adjectival predicate are obligatory. This paper proposes that Mandarin adjectives have no intrinsic boundedness and the degree adverbs specify the boundedness of an adjective, and by doing so the adjectival predicate is time-anchored with the boundedness-based temporal inference patterns proposed in Lin, Jo-Wang (2006) and Smith (2008).

1. Introduction

For tense languages such as English, temporal information is encoded by the syntactic projection of T. For tenseless languages such as Mandarin Chinese, temporal information is inferable from aspectual information (Smith 2008). I propose that the degree modifications specify the boundedness of an adjective (as unbounded). And with this given aspectual information, the temporal relation between event time and reference time is specified.

This paper is organized as following: in section two I introduce Smith's (2008) theory on the relation between aspect and time; in section three I show how the grammatical perfective morpheme *le* and the degree modifications interact with aspectual boundedness; section four is the explanations for unmodified but acceptable adjectives; section five discusses the ambiguity of *hen*; section six concludes this paper.

Before going into the detail of analysis, it is good to have a brief preview on the descriptive generalization of the distributions of Mandarin adjectives:

(1) As the main predicate of matrix declarative, the adjective must be modified or in reduplicated form.
  e.g. Zhangsan *(hen) **gao**.   (with modification)
     Zhangsan HEN tall.
     'Zhangsan is tall.' or 'Zhangsan is very tall.'
  e.g. Zhangsan gao-gao-de.   (in reduplicated form)
     Zhangsan tall RED DE
     'Zhangsan is tall.'

(2) An adjective can occur without degree modifications when:
   a. it is followed by the aspectual marker –*le*.
    e.g. Zhangsan **pang** le.
       Zhangsan fat LE
       'Zhangsan became fat.'

    b. it is non-predicative.
      e.g. **hong** (de) hua
          red DE flower
          'a red flower'
    c. it is in a comparative constriction.
      e.g. Zhangsan bi   Lisi **gao**
          Zhangsan compare Lisi tall
          'Zhangsan is taller than Lisi.'
    d. there a negation word.
      e.g. Zhangsan bu **gao**
          Zhangsan Neg tall
          'Zhangsan is not tall'
    e. it is in a interragative constriction.
      e.g. Zhangsan **gao**-bu-**gao**?
          Zhangsan tall Neg tall
          'Is Zhangsan tall?'

2. Aspect and Temporal Information

In this section, I give a brief introduction of Smith (1997) about how temporal information of tenseless languages is inferred from aspectual information.

2.1. Temporal Information

Linguistically speaking, locating a situation in time involves three times and the temporal relations between the three times (Reichenbach 1974). Speech time is the moment of speech. Event time is the time interval with which an event holds; this time interval is independent from the event itself. Reference time is the temporal standpoint from which an event is presented, and in a complex sentence Reference time may function as a secondary orientation point. Speech time is directly related to Reference time; Reference time is directly related to Event time; the relations can be simultaneous or sequent.

2.2. Two-component Theory of Aspect (Smith 1997)

Smith developed a theory of aspect, which decomposes aspect into two components: viewpoints and situation type. Viewpoint is about how an even is presented.

(3) a. Mary walked to school.
    b. Mary was walking to school.   (Smith 1997:2)

In (3) it is a walking event and it has a natural endpoint. The grammatical morphemes in (3a) and (3b) present difference part of this event. By the past tense morpheme *–ed*, (3a) presents a complete event; by the progressive morpheme *–ing*, (3b) presents part of the walking event without any information about whether the endpoint is reached.

    Situation type is an intrinsic property of an event, and can be decomposed into three temporal features (Vendler 1967): Stative-Dynamic, Telic-Atelic, and Durative-Punctual.

(4) Temporal features of the situation types (Smith 1997:20)

Situation Types	Static	Durative	Telic
States	[+]	[+]	[-]
Activity	[-]	[+]	[-]
Accomplishment	[-]	[+]	[+]
Semelfactive	[-]	[-]	[-]
Achievement	[-]	[-]	[+]

These two components of aspect, aspectual viewpoints and situation types, are independent from each other. And they can have interaction, and the interaction determines the boundedness of an event. Here I adopt the definition of boundedness in Smith (2008:229). Bounded events occur within the Situation Time interval; Unbounded events overlap or surround the Situation Time interval.

(5) Bounded events(E) are included in the SitT interval:
E $\subseteq$ SitT   e.g. *John left*.
Unbounded events and states (S) overlap the Sit
E O SitT   e.g. *John was working*.

A telic event, because of its natural endpoint, by default is bounded; an atelic event, which lacks a natural endpoint, by default, is unbounded. However, the default boundedness of a situation type can be overridden by aspectual viewpoint. Consider the walking-to-school event in (3) again. The event is dynamic ([-static]), durative and telic; it is an accomplishment situation. By default, it is bounded; however, when the viewpoint is imperfective as in (3b), which focuses on the walking part of the walking-to-school event, the event is unbounded. The boundedness of an event is determined by aspectual viewpoints and/or situation types.

2.3 A temporal location pattern inferred from aspect
The linking between aspect and temporal location is based on three pragmatic principles proposed in Smith (2008): the Deictic Principle, the Bounded Event Constraint, and the Simplicity Principle of Interpretation. The Deictic Principle and the Bounded Event Constraint are principles for linguistic system, and the Simplicity Principle of Interpretation is a universal principle for all cognition system.

The Deictic Principle is built upon the nature of time. Time is a single unbounded dimension that stretches into the past and future infinitely. To locate an event in time, we need an arbitrary but always available orientation point. Linguistic communication provides this orientation point. It is the Speech time. Speech time is taken as Present; the time preceding it is the Past; the time following it is the Future.

The Bounded Event Constraint states that a bounded event cannot be located in the Present. The explanation for this constraint is semantic and pragmatic. Let's consider this constraint from an opposite angle. What does it require for a bounded event to be located in the Present? When one utters '*John arrives in this room*', if the Bounded Event

Constraint is violated, it means that the moment that the speaker finishes the utterance is exactly the moment John opens the door and arrives. This is impossible in the linguistic communication. A bounded event in its entirety always goes beyond the present moment (Kamp and Reyle 1993: 536-537). It is impossible for a bounded event located at the speech time, the Present.

The Simplicity Principle of Interpretation is shared by all cognitive system. People often give utterance that does not include all the information required for the intended interpretation. The receiver recovers the intended interpretation by adding other pragmatic information to enrich the utterance. Among all the possible enriched interpretations, the receiver chooses the simplest interpretation which requires the minimal information added.

(6) Summary of Smith's (2008:231) universal pragmatic principle:
    a. The Deictic Principle
       Speech Time is the central orientation point for language. The Present time is located at Speech Time; the Past precedes it; the Future follows.
    b. The Bounded Event Constraint
       Bounded situations may not be located in the Present.
    c. The Simplicity Principle of Interpretation
       Choose the interpretation that requires lease information added or inferred.

These three principles derive the aspect-based temporal patterns. An event without any temporal information or violations of any constraints is located at the Present; this is the application of the Deictic Principle and the Simplicity Principle of Interpretation. Thus we get the first part of the temporal patterns – unbounded events are located at the Present. According to the Bounded Event Constraint, a bounded event cannot be located at the Present. Now we have two possible temporal locations of a bounded event: the Past or the Future. In determining these two possibilities, the Simplicity Principle of Interpretation kicks in. The simpler one wins. Futurity always involves some degree of uncertainty and predictions (Lyons 1997:677; Yavaş 1982). The uncertainty of futurity is explicit in the branching-time schema (Dowty 1977); we cannot be sure which branch will be the one that actually occur (Landman 1992). The uncertainty of the Future makes it more complex than the Past. By the Bounded Event Constraint and the Simplicity Principle of Interpretation, a bounded event by default is located at the Past.

(7) Mandarin Temporal location pattern – a default
    Unbounded events, Present
    Bounded events, Past

3. Mandarin Adjectives and Aspect
In this section, I'm going to show that the boundedness of Mandarin adjectives is changed with whether there are any co-occurring aspectual marker or degree adverbials. It is suggested that Mandarin adjectives have no intrinsic boundedness feature. Given the link between the boundedness and temporal location in Mandarin argued in Smith (2008) and Lin, Jo-Wang (2006), boundedness plays a crucial role to anchor the event in time. The degree adverbials or aspectual markers specify the boundedness of an adjective. With this given aspectual information, the temporal relation between event time and reference time is specified.

3.1. -*Le* and Aspect

There are two *le*s in Mandarin: perfective *le* and sentential *le*.

(8) Zhangsan daoda-le s han-ding   le.
     Zhangsan reach-LE mountain-top LE
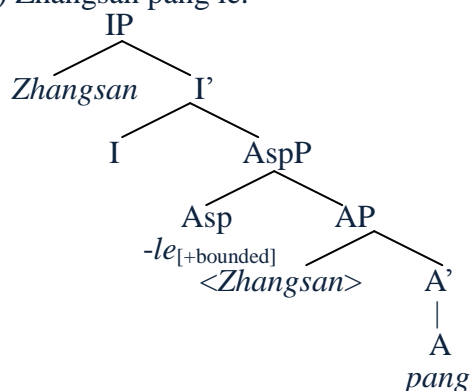   'Zhangsan reached the top of the mountain

In (8) the first -*le* is the affixial one, which directly follows the verb and is a perfective marker (Li and Thompson 1981; Smith 1997; Lin, Jo-Wang 2006; Wu 2010, among many others). The second -*le* is sentential one, which is a sentence final particle; its exactly semantic and syntactic functions are still in debate (see Soh 2009 for some proposals on sentential -*le*).
    This paper discusses the -*le* which follows a stative predicated.

(9) Zhangsan pang le.
     Zhangsan fat LE
     'Zhangsan became fat.'

The –*le* in (9) is post-predicate and sentence-finial at the same time. Here two questions may be asked. Is this –*le* is a perfective one or a sentential one? Is *pang* 'fat' here should be treated as a verb or an adjective? I'm open to the first question[1], but crucially it is agreed that this –*le* has a change of state interpretation. For example, in (9) there is a change from not being fat into being fat. Smith (1997:292-294) assumes that when stative predicates followed by –*le* express inchoative reading. Lin, Jo-Wang (2006:13) has the same observation; yet he treats them as being type-coerced into achievement event. Inchoatives and achievements are bounded events. In other words, when –*le* follows a stative predicate, the event is bounded. Given that boundedness is a feature of Aspect Phrase, I assume that the post-stative-predicate –*le* is the head of Aspect Phrase. For the second question, I assume that *pang* 'fat' in (9) is an adjective. Liu (2010) provides an analysis about how the non-modified Mandarin adjectives are licensed. However, in Liu (2010) the constructions like (9) are excluded from discussion because it is assumed that the stative predicates followed by –*le* is a verb instead of adjective. However, there are no prior arguments for treating the stative predicates as verbs or any constraints against adjectives with aspectual marker. I see no reason to treat the stative predicate followed by –*le* as verb and exclude this pattern from analysis when discussing Mandarin adjectives. In short, I assume that the stative predicate like (9) is an adjective and the post-stative-predicate –*le* is Asp^0 with [+bounded] feature.

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[1] Soh (2009) argues that –*le* in (6) is a sentential -*le*. Wu (2003) argues that –*le* in (6) is a perfective –*le*.

(10) Zhangsan pang le.[2]

```
              IP
         ／      ＼
   Zhangsan       I'
               ／    ＼
             I       AspP
                  ／     ＼
                Asp       AP
          -le[+bounded]  ／  ＼
                 <Zhangsan>    A'
                              |
                              A
                            pang
```

3.2. Adverbial and Event Types

Adverbials play a role in determining the event type. Specifically, adverbials may change the event type or disambiguate event types (Smith 1997:56-59). For example, perception verbs may denote to Sative or Achievement events depending on the adverbials.

(11) a. I saw a star from my window.
    b. Suddenly I saw a star.   (Smith 1997:54)

(11a) is about the state of seeing; (11b) is about a change of state from no-seeing into seeing. Some vague verb is also ambiguous as denoting an Activity or Accomplishment; this can also be disambiguated by the adverbials.

(12) a. Mary combed her hair.
    b. Mary combed her hair in an hour.
    c. Mary combed her hair for an hour.

(13) a. John mowed the lawn.
    b. John mowed the lawn in an hour.
    c. John mowed the lawn for an hour.   (Smith 1997:58)

In (12a) and (13a), the event may be an Activity or Accomplishment; with the adverbials '*in an hour*' and '*for an hour*', the event is Accomplishment and Activity respectively.

    Mandarin adjectival predication is parallel to perception verbs; it needs extra-modification to specify the event type, as Smith (1997:293) remarks on the adverb *hen* in (14) that 'hen *merely mark the construction*'.

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[2] To get the right word order, I assume that *–le* is moved to C^0 and that whole IP is moved Spec of CP. For detailed theoretical and empirical arguments for the movements, see Kayne (1994), Simpson & Wu (2002) and Lin T.-H. (2006).

(14) Zhangsan *(hen) **gao**.
    Zhangsan HEN tall.
    'Zhangsan is tall.' or 'Zhangsan is very tall.'

More specifically, the extra-modification on Mandarin adjectival predications is to mark the event into Stative. A Stative event by default is unbounded. In short, the extra-modification on Mandarin adjectival predications marks the event as unbounded.

3.3 Boundedness and Temporal Location in Mandarin Adjectival Predication
In the aspect theory of Smith (1997), the boundedness of an event is determined by the event type and the aspectual viewpoint. Adverbials play a role in determining the event type, and by changing the event type adverbials play a role in determining the boundedness of an event. The other way to specify the boundednss feature is achieved by aspectual viewpoint. Mandarin adjectives do not have intrinsic information of boundedness. The adjectival predications in Mandarin are bounded in the presence of the aspectual viewpoint marker –le; while they are unbounded in the presence of a degree adverbial.

(15) a. Zhangsan *(feichang) pang.
      Zhangsan   very   fat
      'Zhangsan is very fat.'   (unbounded)
   b. Zhangsan pang *(le).
      Zhangsa   fat   LE
      'Zhangsan became fatter.'   (bounded)

The boundedness given by the degree adverbial or aspectual viewpoint marker provides clues for temporal location of the event with the application of the temporal patterns in Smith (2008). The event of being fat in (15) has a present interpretation, while the event of changing from not fat into fatter has a past interpretation.
    The unacceptability of Mandarin adjectival predication without any degree adverbial or aspectual viewpoint marker results from the failure of time anchoring. This is the answer to the empirical puzzle about why Mandarin adjectival predication needs extra-elements.

4. Bare Adjectives
In this proposal, the degree modification provides boundedness feature for Mandarin adjectival predications, and the boundedness feature provides the inference premise for time anchoring of the event talked about. However, there are unmodified yet acceptable adjectives in Mandarin. In this section, I'm going to discuss this kind of patterns. It is argued that the bare adjectives are licensed either because they do not need time anchoring or because there are other elements that provide boundedness features.

4.1. Attributive Adjective
In The degree modification on Mandarin attributive adjectives is always optional.

(16) a. Zhangsan mai le yi-duo (hen) hong de hua.
      Zhangsan buy LE one-CL HEN red DE flower
      'Zhangsan bought a (very) red flower.'

b. Zhangsan kanjian le yi-ge   (hen)   gao de ren.
　Zhangsan see   LE one-CL HEN   tall DE person
　'Zhangsan saw a (very) tall person.'

An attributive adjective modifies an entity, which is neither an event nor a proposition. Thus, aspectual boundedness and time anchoring do not apply in this level. As a result, degree modifications for attributive adjectives are always optional.

4.2. Adjective in Comparison Construction
There are two comparison constructions in Mandarin, in which the adjectives are in bare form.

(17) a. With the comparative morpheme *bi*:
　　　Zhangsan bi   Lisi gao.
　　　Zhangsan compare Lisi tall
　　　'Zhangsan is taller than Lisi'
　　b. Subject combined with bare adjective:
　　　Zhangsan gao.
　　　Zhangsan tall
　　　'Zhangsan is taller (than someone known in the context)'

Comparison constructions are comparing the degrees of properties of entities (Kennedy 2007). For example, in (17a) the degree of Zhangsan's tallness is compared to that of Lisi's tallness. The semantics of comparison makes the comparison construction universally Stative. Thus, comparison constructions are intrinsically unbounded. In other words, the boundedness of an comparison construction is specified by itself. Thus, adjectives can be in bare forms in comparison constructions.

4.3. Adjective in Reduplicated Form
Unmodified adjectival predicates can occur if the adjective is in reduplicated form.

(18) Zhangsan gao-gao-de.
　　Zhangsan tall RED DE
　　'Zhangsan is tall'

Reduplicated forms in many languages mark the extending of states or actions (Greenberg 1978; Hurch 2005). Thus events with the predicates in reduplicated forms are unbounded. Reduplication plays the same role in Mandarin. In order to avoid circular argument, consider the verbal reduplication in the language.

(19) a. Zhangsan xiang chang-ge.
　　　Zhangsan want sing-song.
　　　'Zhangsan wants to sing'
　　b. Zhangsan xiang chang yi-shou-ge.
　　　Zhangsan want sing one-CL song
　　　'Zhangsan wants to sing a song'

In (19a) the event that Zhangsan wants to do is unbounded, given that singing does not have natural end point; in (19b) the event the Zhangsan wants to do is bounded given that singing one song has a natural endpoint. These two examples show that *xiang* 'want' is comparable to both bounded and unbounded events.

(20) a. Zhangsan xiang chang-chang ge .
     Zhangsan want   sing- RED song.
     'Zhangsan wants to sing some songs'
   b.* Zhangsan xiang chang-chang yi-shou-ge .
      Zhangsan want   sing-RED   one-CL-song

With the assumptions that the predicates in reduplicated forms are unbounded, the unacceptability of (20b) follows. Specifically, the reduplication is unbounded while singing one song is bounded; thus they are not compatible. The adjectival predicate in reduplicated form receives an unbounded feature, this makes unmodified adjectives acceptable.

4.4. Adjectives with Negation Words and in Interrogative Construction
Unmodified adjectival predicates can occur if there is a negation word or they are in interrogative construction.

(21) Zhangsan bu **gao**.
    Zhangsan Neg tall
    'Zhangsan is not tall'

(22) Zhangsan **gao**-bu-**gao**?
    Zhangsan tall Neg tall
    'Is Zhangsan tall?'

In Lin (2003), it is argued that the two negation words in Mandarin, *bu* and *mei*, are in complementary distribution. *Bu* co-occurs with unbounded event, and *mei* co-occurs with unbounded event.

(23) a. Ta mei/*bu nong-dong zhe-ge lilun
       he not/not make-understand this-CL theory
       'He hasn't understood this theory.'
   b. Ta bu/*mei dong zhe-ge lilun
       he not/not understand this-CL theory
       'He does not understand this theory'   (Lin 2003:426)

I propose that *mei* and *bu* are not only sensitive to boundedness but also they are able to provide boundedness feature, specifically with $bu_{[-bounded]}$ and $mei_{[+bounded]}$. Given this, negation words are able to license bare adjectives. The bare adjective in the interrogation construction is licensed in a similar manner. In (22), it is the negation word *bu* that provide [-bounded] and license the bare adjective *gao* 'tall'.
    In short, bare adjectives in attributives can occur for they do not need time anchoring; bare adjectives in comparison constructions, in reduplicated form, with

negation words and in interrogative construction are licensed by the structures or elements that have intrinsic boundedness features.
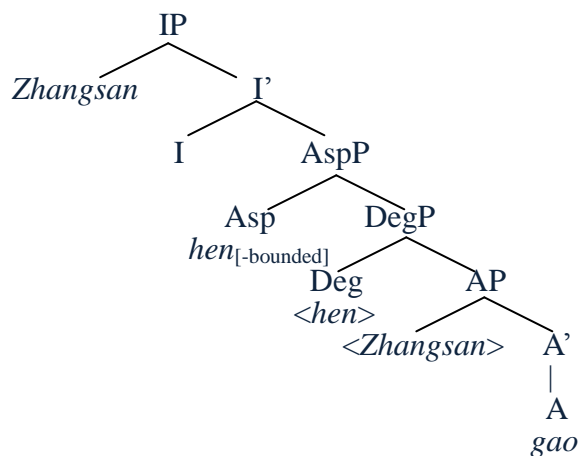
5. Syntax and Semantics of Hen
In this section, I'm going to discuss the syntax and semantics of *hen*. Recall that in certain conditions *hen* is ambiguous as being an intensifier or semantically bleached.
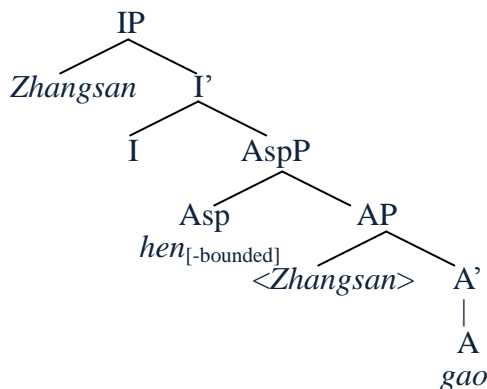
(24) Zhangsanhen **gao**.
Zhangsan HEN tall
'Zhangsan is tall.' or 'Zhangsan is very tall.'

I propose that there are two possible base-merging sites of *hen* in syntax: degree head and aspectual head.

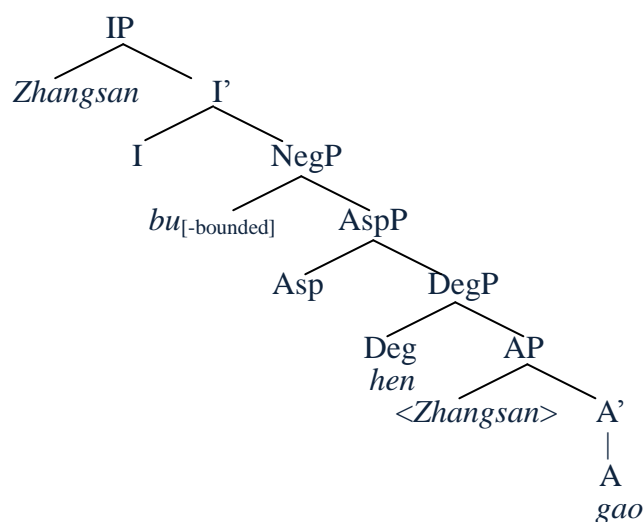(25) a.Zhangsan hen gao. 'Zhangsan is very tall'(with intensifier interpreation)

```
                IP
         _____/ _____
     Zhangsan          I'
                    ___/ \___
                   I        AspP
                        ____/ \____
                      Asp          DegP
              hen[-bounded]     ___/ \___
                              Deg        AP
                            <hen>    ___/ \___
                                 <Zhangsan>   A'
                                              |
                                              A
                                             gao
```

b Zhangsan hen gao. 'Zhangsan is tall' (with bleached interpreation)

```
             IP
       _____/ \_____
    Zhangsan       I'
               ___/ \___
              I        AspP
                   ___/ \___
                 Asp          AP
          hen[-bounded]   ___/ \___
                       <Zhangsan>   A'
                                    |
                                    A
                                   gao
```

In (25a) *hen* is base-generated at Deg^0, and this is the source of the intensifier interpretation. Then *hen* moved to Asp^0;this movement is driven by the [-bounded] of *hen*.

In (25b), the *hen* is a late insertion for boundedness feature; it simply specifies the eventuality and has nothing to do with degree. The bleached *hen* thus has a last-resort nature. In the presence of any other elements with boundedness feature, this bleached aspectual marker *hen* will not occur. If *hen* does occur in the presence of any other elements with boundedness feature, it is expected that it must be base-generated at Deg^0 and have intensifier meaning (i.e. the ambiguity of (24) is gone).

(26) Zhangsan bu   hen gao.
    Zhangsan NEG HEN tall
    'Zhangsan is not very tall'

In (26), the negation word *bu* has unbounded feature. Thus the late-insertion of the semantically bleached *hen* is blocked. As a result, the *hen* here is unambiguously interpreted as 'very'.

6. Conclusion and Final Remarks

The empirical puzzles this paper aims to solve are when and why degree modifications on Mandarin adjectival predicates are obligatory. It is argued that degree modifications provides aspectual boundedness feature, and the event denoted by the adjectival predicate is time-anchored by this aspectual feature and the temporal location patterns in Smith (2008).

However, if this is the answer to the puzzle, it is legitimate to ask whether temporal adverbials/nominals can license Mandarin adjectival predication since temporal adverbials or nouns are directly linked to time.

(27) a. * **Qu-nian** Zhangsan **pang**.
        last year Zhangsan fat
        Intended ' Zhangsan was fat last year.'
    b. * Zhangsan **xian-zai kai-xin**
        Zhangsan now   happy
        Intended ' Zhangsan is happy now.'

The examples in (27) show temporal adverbials/nominals cannot license Mandarin adjectival predication. Actually this is not a surprising result, since what all temporal adverbials/nominals can do is to specify the temporal location of Reference Time. Specification of Reference Time is optional since Speech Time is always available as being the default location of Reference Time. The examples in (27) do not specify the temporal relation between Reference Time and Event Time, and thus the events are not anchored in time. The degree modification and aspectual viewpoint marker can specify the temporal relation between Reference Time and Event Time and recover the acceptability of (27).

(28) a. **Qu-nian** Zhangsan feichang **pang**.
　　　 last year Zhangsan fat
　　　 'Zhangsan was very fat last year.'
　　b. Zhangsan **xian-zai** feichang **kai-xin**
　　　 Zhangsan now　 happy
　　　 ' Zhangsan is very happy now.'

(29) a. **Qu-nian** Zhangsan **pang** le .
　　　 last year Zhangsan fat LE
　　　 'Zhangsan became fatter last year.'
　　b. Zhangsan **xian-zai kai-xin** le.
　　　 Zhangsan now　 happy LE
　　　 'Zhangsan became happy now.'

Specifically, *feichang* 'very'in (28) marks the events as unbounded; thus the events overlap with the Event Time. And the Event Times in (28) are semultenous as Reference Time. The event of being fat in (28a) is located at last year and the event of being happy in (28b) is located at present. −*Le* in (29) marks the events as bounded; according to the temopral location pattern the Event times are located at Past. The temporal adverbials specify the exact time.

　　This paper links Smith's temporal inference rule to Mandarin obligatory degree modifications of adjectives. The degree modifications turn out to play a crucial role for specifying the temporal information of the proposition. The fact that in a tense language, such as English, degree modifications are never obligatory follows the prediction of this proposal.

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