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Mandarin *hen*, Universal Markedness, and Tense*

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Abstract

Under some conditions, gradable adjectives in Mandarin must co-occur with overt degree morphology (most neutrally, *hen* ‘very’) for positive interpretation; otherwise, a comparative interpretation results. This paper argues that this phenomenon is the consequence of two interacting factors: (1) Universally, whereas comparative semantics is provided by a (possibly covert) morpheme in syntax, positive semantics is provided by a type-shifting rule that does not project in syntax, and (2) The *[T AP] constraint: in Mandarin, the direct complement to T(ense) cannot be a bare adjective (derivable from more general principles of grammar). Consequently, a superficially bare adjectival complement to T may project a null comparative morpheme in order to satisfy *[T AP], but positive semantics is ruled out because it does not affect the AP categorial status of the predicate and hence does not satisfy *[T AP]. The semantically bleached degree adverb *hen* can be used instead to approximate positive semantics in a way that satisfies *[T AP]. This proposal makes the right predictions about the conditions under which bare adjectives do receive a positive interpretation, namely, when other elements intervene between T and AP, and when T is not projected. An important consequence of the proposal is that despite surface appearances, Mandarin does not counterexemplify the universal generalization that comparatives are the marked member of the positive/comparative opposition; on the contrary, its proper analysis actually depends on the idea that comparative-form adjectives involve extra structure.

Keywords: Mandarin Chinese, Gradable adjectives, Degree modification, Universal markedness, Tense

1 Introduction

According to an influential family of approaches (see especially Cresswell 1976; von Stechow 1984; Kennedy 1999; Kennedy and McNally 2005), gradable adjectives have a degree-based semantics and must combine with semantic operators in order to be useable as predicates of individuals. Two such operators, POS and COMP, yield positive and comparative predication, respectively:

- | | |
|-------------------------------|-------------------------|
| (1) John is tall. | POSITIVE PREDICATION |
| (2) John is taller than Bill. | COMPARATIVE PREDICATION |

The crucial semantic distinction between these two kinds of predication is that whereas comparative predication relates the subject to an arbitrary standard (provided by the *than* constituent in English) along the dimension associated with the adjective, positive predication requires that the subject ‘stand out’ along the dimension with respect to a contextually determined comparison class (Kennedy 2007).

In one standard implementation (see e.g. Cresswell 1976 and von Stechow 1984), for example, gradable adjectives denote functions from degrees to properties (type $\langle d, et \rangle$) as in (3).

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$$(3) \quad [[\text{tall}]] = \lambda d \lambda x. \mathbf{height}(x) = d$$

Comparative predication then involves an operator (4) that existentially binds the degree argument and returns TRUE just in case the degree holds for one individual (the target of comparison) with respect to the relevant dimension but not for the other individual (the standard of comparison), as in (5) (cf. Seuren 1973; Klein 1980; Schwarzschild 2008).

$$(4) \quad [[\text{COMP}]] = \lambda g_{\langle d, et \rangle} \lambda y \lambda x. \exists d [g(d)(x) \wedge \neg g(d)(y)]$$

- (5) a. John is taller than Bill.
 b. = [[COMP]]([[tall]])([[Bill]])([[John]])
 c. = $\exists d [\mathbf{height}(j) = d \wedge \neg \mathbf{height}(b) = d]$

Positive predication, in turn, involves an operator (6) that existentially binds the degree argument and returns TRUE just in case the degree holds for the individual and meets a contextually determined standard, as in (7).

$$(6) \quad [[\text{POS}]] = \lambda g_{\langle d, et \rangle} \lambda x. \exists d [\mathbf{standard}(d)(g)(\mathbf{C}) \wedge g(d)(x)]$$

- (7) a. John is tall.
 b. = [[POS]]([[tall]])([[John]])
 c. = $\exists d [\mathbf{standard}(d)([[\text{tall}]]) (\mathbf{C}) \wedge \mathbf{height}(x) = d]$

In this implementation, the relation **standard** captures the context sensitivity of positive predication; it relates a degree to a standard of comparison determined by the adjective and a contextual comparison class **C**.

Given this picture of gradable adjective predication,¹ an important question to ask is how the proposed operators POS and COMP get realized morphosyntactically in specific languages. To this end, the table in (8) lays out a descriptive typology of three crosslinguistically attested patterns. In one class of languages, exemplified by English and Irish, there is a morphologically basic form of the adjective used for positive predication (e.g., English *tall*), and a morphologically complex comparative form derived via affixation (e.g., English *taller*). In another class of languages, exemplified by Spanish and French, there is similarly a morphologically basic form of the adjective used for positive predication, and a complex comparative form derived periphrastically by the addition of a morpheme corresponding to English *more*. Finally, in a third kind of language, exemplified by Swahili and Japanese, there is no overt morphological contrast between positive and comparative forms; the same basic form is used for both purposes and the surrounding context disambiguates it.

	Positive form	Comparative form	
English	tall	taller	
Irish	ard	arda	DERIVED COMPARATIVE FORM
(8) Spanish	alto	más alto	
French	grand	plus grand	PERIPHRASTIC COMPARATIVE
Swahili	mrefu	mrefu	
Japanese	takai	takai	NO CONTRAST

To put these data in statistical perspective, Bobaljik 2007, working with Stassen's (1985) sampling of comparatives in 110 languages, finds that 38 of these languages mark the comparative form overtly in some fashion, either through affixation or periphrasis. These facts suggest the generalization in (9):

¹For more details, alternative implementations, and additional references, see section 3.1.

(9) Universally, the comparative form of an adjective is derived from (or identical to) its positive form.

If (9) is correct, it may have implications for the semantics of gradable adjective predication sketched above. The failure of the putative operator POS to correspond to overt material in language after language — in stark contrast to COMP — could be taken as evidence that POS does not actually exist and hence that any approach in which positive predication requires a special operator is misguided. Or at minimum, the facts suggest that there is some fundamental and as yet unexplained asymmetry between the way POS and COMP are realized crosslinguistically.

Before exploring these possibilities, however, we must verify that (9) is really a universal generalization, and to this end, we must contend with Mandarin Chinese. Under some conditions, gradable adjectives in Mandarin must co-occur with overt degree morphology (most neutrally, the semantically bleached *hen* ‘very’) for positive interpretation; otherwise, the utterance is infelicitous out of context and felicitous in a context in which there is a salient standard of comparison, in which case the adjective has a comparative rather than a positive meaning:

- (10) a. zhangsan gao.
Zhangsan tall
‘Zhangsan is taller (than someone known from context).’
NOT: ‘Zhangsan is tall.’
- b. zhangsan **hen** gao.
Zhangsan very tall.
‘Zhangsan is tall.’ (Sybesma 1999:27)

On the surface, the state of affairs depicted in (10) appears to be a striking counterexample to the universal claim (9) that the comparative form of an adjective is always derived from or identical to its positive form. In (10), it appears as though the basic meaning of *gao* ‘tall’ is comparative and that the positive form is derived periphrastically via the addition of *hen* ‘very’. Despite these appearances, however, I will argue for the following claim:

- (11) **Central claim of this paper:** Not only does Mandarin not counterexemplify (9), the proper analysis of the Mandarin data actually depends on the status of (9) as a real universal claim.

The first indication that Mandarin is not a straightforward counterexample to (9) is that under certain conditions, gradable adjectives in Mandarin do *not* require any overt morphological marking for positive interpretation. In a recent paper, Liu (2009) shows that such conditions include negation, polar questions, contrastive focus, and certain kinds of embedded clauses. In all of these environments, *hen* is optional:

- (12) a. zhangsan bu (hen) gao.
Zhangsan NEG very tall
‘Zhangsan is not (very) tall.’ (Liu 2009:17) NEGATION
- b. zhangsan (hen) gao ma?
Zhangsan very tall Q
‘Is Zhangsan (very) tall?’ (Liu 2009:33) POLAR QUESTION
- c. zhangsan (hen) gao, lisi (hen) ai.
Zhangsan very tall Lisi very short
‘Zhangsan is (very) tall, but Lisi is (very) short.’ (Liu 2009:29) FOCUS
- d. [zhangsan yaoshi (hen) gao dehua], lisi jiu bu ai.
Zhangsan if very tall PRT Lisi then not short
‘If Zhangsan is (very) tall, then Lisi is not short.’ (Liu 2009:34) CONDITIONAL

- e. wo renwei [ta (hen) wuli].
 1SG think 3SG very unreasonable
 ‘I think s/he is (very) unreasonable.’ (Liu 2009:38)

EPISTEMIC VERB

As demonstrated extensively in Liu 2009, in all of the sentences in (12), the adjectives are interpreted with positive rather than comparative semantics even though there is no overt degree morphology.

Therefore, what I will call the ‘Mandarin *hen* puzzle’ boils down to three key questions:

- (13) The Mandarin *hen* puzzle:
- a. Why, under some conditions, do gradable adjectives in Mandarin require overt degree morphology for positive interpretation?
 - b. Under precisely what conditions is this requirement suspended, and why?
 - c. Why is a comparative interpretation allowed when positive interpretation fails?

For the most part, previous work on the Mandarin *hen* puzzle has focused on question (a) primarily, and to a lesser extent, question (b). Huang (2006), borrowing insights from Property Theory (Chierchia 1984), argues that gradable adjectives in Mandarin denote individuals and hence require *hen* as a type-lifter in order to be useable as predicates. In a different vein, Liu 2009, adopting the view that positive semantics is provided by a null morpheme or type-shifter POS, argues that Mandarin POS has two allomorphs: a phonologically null version, and its overt counterpart *hen*, with the former subject to licensing conditions that account for the obligatory status of *hen* in sentences like (10b) and its optional status in sentences like those in (12). Finally, Gu (2008) analyzes the phenomenon not in terms of special properties of adjectival predication in Mandarin but rather as the manifestation of a more general phenomenon of tense-licensing: in a nutshell, Mandarin Tense has a [telicity] feature that must be checked by any of a variety of functional morphemes, and when the predicate is a gradable adjective, *hen* is one way of doing so.

Although all of these works are insightful in providing plausible answers to question (a), and, to varying degrees of success, question (b), none of them offer a principled answer to question (c): why the absence of *hen* in sentences like (10a) gives rise to a comparative interpretation. The question I would like to address is: what is the crucial difference between positive semantics and comparative semantics that interacts with Mandarin grammar to yield the typologically unexpected state of affairs in (10)? I will argue that, far from challenging the universal generalization that comparatives are the marked member of the positive/comparative opposition, Mandarin data like (10) actually *support* this generalization.

To see this, we first need a way of formalizing universal markedness in morphosyntactic terms. I propose to derive the crosslinguistic markedness of the comparative form via the following universal principle:

- (14) **Universal Markedness Principle:** Universally, comparative semantics is provided by an explicit morpheme in syntax which is overt in some languages and null in others, whereas positive semantics is provided by a type-shifting rule that does not project in syntax.

This principle makes the prediction that in some languages (those with overt comparative morphology), comparatives are marked with respect to the positive form, and in other languages (those with null comparative morphology), the comparative and positive forms are homophonous, but — crucially — there can be no language in which the positive form is marked but the comparative form is not.

The Mandarin data in (10) support this view given one language-specific stipulation, to be independently motivated and derived from more general principles in due course:

- (15) **Mandarin Tense-Adjective Prohibition:** In Mandarin, the immediate complement to T cannot be AP: *[T AP]

Thus sentences like (10a), in order to satisfy the Mandarin Tense-Adjective Prohibition, must contain some null functional morphology that projects between Tense and the AP predicate. But because positive semantics is not provided by functional morphology but rather by a type-shifting rule with no syntactic realization, the constraint is satisfied through insertion of a null comparative morpheme. Hence (10a) receives a comparative interpretation. In (10b), what we see is that Mandarin has co-opted the semantically bleached degree adverb *hen* ‘very’ in order to approximate positive semantics in a way that satisfies the Mandarin-Tense Adjective Prohibition. In this way, the account simultaneously addresses questions (a) and (c) of the Mandarin *hen* puzzle.

The account also makes predictions about the conditions under which *hen* is not required for positive interpretation (question (b)) to an extent of accuracy not achieved in previous approaches (Huang 2006; Gu 2008; Liu 2009). Namely, the account predicts that *hen* is not required for positive interpretation whenever there is no potential violation of the Mandarin Tense-Adjective Prohibition. This happens in contexts in which Tense is not projected (cf. Gu 2008) and contexts in which other functional morphology intervenes between T and AP.

In addition to showing how the Universal Markedness Principle and the Mandarin Tense-Adjective Prohibition interact to correctly predict the crucial data, I show that the Mandarin Tense-Adjective Prohibition is traceable to more general principles of grammar. Building on the proposal that in some languages, the complement to Tense must be an (extended) verbal projection (Benmamoun 2000), and the proposal that adjectives in Mandarin comprise a lexical class distinct from verbs (Paul 2005), I argue that the Mandarin Tense-Adjective Prohibition results from failure to check the categorial feature [+V] on Tense, and that Mandarin degree operators and other inflectional-layer functional heads have the special property that they can combine with both adjectival and verbal projections but uniformly return verbal projections that are able to satisfy Tense. In this way, the syntactic function of *hen* is similar to that of the copula in languages like English and Irish (Doherty 1996; Grimshaw 2005), which also disallow bare adjectival predicates in matrix-level clauses, requiring the insertion of a copula to achieve a verbal projection (e.g., *John *(is) tall.*)

The primary theoretical implication of this work is that Mandarin does not counterexemplify the universal generalization that comparatives are the marked member of the positive/comparative opposition, but rather actually *depends* on this generalization for its proper analysis. This in turn suggests either that the POS approach to positive semantics is misguided, or that there is a fundamental asymmetry between the way COMP and POS get realized crosslinguistically. I elaborate on these options in the conclusion.

The organization of this paper is as follows. Section 2 reviews previous literature on the Mandarin *hen* puzzle (Huang 2006; Gu 2008; Liu 2009). Section 3 provides a brief theoretical background on the semantics of gradable adjective predication, sketches the core proposal, and motivates the Mandarin Tense-Adjective Prohibition on independent grounds. Section 4 explores data that test the prediction of the core proposal: the behavior of gradable adjectives under negation and in interrogative clauses (section 4.1), as prenominal modifiers (section 4.2), in focus constructions (section 4.3), and in embedded clauses (section 4.4). Section 5 discusses in more detail the distribution of the null comparative morpheme proposed for Mandarin. Section 6 concludes.

2 Previous literature on the Mandarin *hen* puzzle

Three theoretical approaches to the Mandarin *hen* puzzle are found in previous literature:

- (16) a. Huang 2006: *hen* is a type lifter (type $\langle e, et \rangle$), necessary with predicative adjectives because bare adjectives are type $\langle e \rangle$ in Mandarin.
- b. Gu 2008: *hen* is required for checking the [telicity] feature on Tense.
- c. Liu 2009: *hen* is required whenever there is no predicate-accessible operator_[-wh] available to license covert POS, which behaves like a polarity item.

As laid out in the Introduction, the Mandarin *hen* puzzle is a three-pronged question, repeated here:

- (17) The Mandarin *hen* puzzle:
- a. Why, under some conditions, do gradable adjectives in Mandarin require overt degree morphology for positive interpretation?
 - b. Under precisely what conditions is this requirement suspended, and why?
 - c. Why is a comparative interpretation allowed when positive interpretation fails?

In what follows, I review Huang 2006, Gu 2008, and Liu 2009 in turn. I will focus primarily on how they answer question (a), and how they fall short of providing a satisfying answer to question (c). As for the relative merits of these approaches in addressing question (b), see section 4, in which I test the predictions of my approach against specific empirical domains (including polar and *wh* questions, negation, prenominal modification, focus structures, and embedded clauses), and compare the predictions made by my account with the predictions of these previous approaches.

2.1 Huang 2006

Huang's account of the Mandarin *hen* puzzle makes use of Chierchia's (1984) Property Theory, in which properties in natural language can be realized both as propositional functions (type $\langle et \rangle$) and nominalized properties (type $\langle e \rangle$). Huang proposes that in Mandarin, bare adjectives are nominalized properties. Hence *hen* acts as a type lifter: its function is to turn the nominalized property denoted by the adjective into a propositional function so that it is useable as a predicate.

As Huang shows, an important source of independent evidence that adjectives in Mandarin are type $\langle e \rangle$ is that they can appear in bare form in argument position. This is shown in the (b) sentences below:

- (18) a. ta hen **qinfen**.
3SG very diligent
'She is very diligent.'
- b. **qinfen** shi yi ge meide.
diligent COP one CL virtue
'Diligence is a virtue.' (Huang 2006:349)
- (19) a. tamen nei ge diqu hen **pinqiong**.
3PL that CL region very poor
'Their region is very poor.'
- b. women yao zhansheng **pinqiong**.
1PL want overcome poor
'We want to wipe out poverty.' (Huang 2006:350)

In addition, a theoretical advantage of this account is that it is in harmony with previous work arguing that bare nouns in Mandarin are also type $\langle e \rangle$, requiring classifiers in order to yield functions of type $\langle et \rangle$ (Krifka 1995; Chierchia 1998).

However, Huang's account commits us to the view that in the following sentence (not considered in Huang's analysis²), there must be a covert type lifter that permits the adjective to be used as a predicate:

²In a footnote, Huang observes that placing stress on an adjective licenses its bare use in predicative position and gives rise to a contrastive reading. She suggests that this stress can be considered a kind of degree modification on a par with *hen*. As will be shown in section 4.3, however (cf. also Liu 2009), this contrastive reading available for stressed bare adjectives is not the same as the comparative reading at issue here.

- (20) zhangsan gao.
Zhangsan tall
'Zhangsan is taller (than someone known from context).'

Here, a superficially bare adjective is used as a predicate, even though, under Huang's account, it should be ineligible for this function since it is type $\langle e \rangle$. Given that (20) has a comparative interpretation, Huang's account seems to leave us with two ways of analyzing (20): either there is a covert $\langle e, et \rangle$ type lifter which renders the adjective useable as a predicate and also happens to have comparative semantics, or else there is a covert $\langle e, et \rangle$ type lifter which happens to be compatible only with adjectives that are interpreted with comparative semantics. In either case, we should wonder why there is this restriction to comparative semantics. Why is it that for positive predication, the type lifter must be realized overtly as *hen*, whereas for comparative predication, there is no (overt) type lifter? The availability of the comparative reading for bare adjectives renders problematic the neat isomorphism Huang proposes between the form of the adjective (bare vs. complex) and its semantic type ($\langle e \rangle$ vs. $\langle et \rangle$).

2.2 Gu 2008

In Gu's (2008) framework, declarative clauses in natural language, in order to have a truth value, must at minimum have a subject, a predicate, and a time anchor (tense). Gu's goal is to show that even Mandarin, in which Tense is not overtly encoded, displays overt reflexes of Tense. Gu's strategy for finding such reflexes is to look for elements in Mandarin sentences that, despite seemingly having no relation to the encoding of tense, are not omissible from the sentence.

Among the deviant sentences that Gu considers are those that consist of a subject and a bare gradable adjective as predicate:

- (21) a.??xiaoming gao.
Xiaoming tall
b.??xiaoqiang pang.
Xiaoqiang fat
c.??tamen congming.
3PL intelligent
d.??na ji ben shu gui.
that few CL book expensive (Gu 2008:13)

Gu shows that the addition of a degree adverbial renders these kinds of sentences grammatical:

- (22) a. xiaoming **hen** shuai.
Xiaoming very handsome
'Xiaoming is very handsome.'
b. xiaoqiang **xiangdang** gao.
Xiaoqiang tall
'Xiaoqiang is quite tall.'
c. tamen **jiqi** congming.
3PL extremely intelligent
'They are extremely intelligent.'
d. zhe ji ben shu **tebie** gui.
this few CL book especially expensive
'These books are especially expensive.'

- e. na zuo shan **feichang** dou.
 that CL mountain extremely steep
 ‘That mountain is extremely steep.’
- f. jintian **gewai** leng.
 today especially cold
 ‘It is especially cold today.’ (Gu 2008:13)

For Gu, one piece of evidence that the obligatory status of the degree adverbs in the above sentences is due to Tense is that when the adjective is embedded in a small clause — which is standardly though to be tenseless — no degree adverbial is necessary:

- (23) women yizhi kua [tamen congming].
 1PL unanimous praise 3PL smart
 ‘We unanimously praised them for being smart.’
- (24) ban-zhang biao yang [ta yonggan].
 team-leader commend 3SG brave
 ‘The team leader commended him for being brave.’
- (25) laoban ma [ta lan].
 boss scold 3SG lazy
 ‘The boss scolded him for being lazy.’ (Gu 2008:14)

In order to explain the connection between the degree adverbial and Tense, Gu suggests that eventualities come with a [telicity] feature (analogous to the [count] feature in the nominal domain) that must be checked in order for Tense to be licensed. When the predicate is a gradable adjective, degree adverbs are among the elements available to perform this function. Gu then goes on to suggest that other functional heads such as the negation marker *bu* and sentence-final particles also have the ability to perform this function.

Connecting the obligatory status of the degree adverb to Tense is an intriguing idea and one that I will make use of in the analysis presented below. The major shortcoming of Gu’s analysis, however, is a failure to be precise about which elements of a clause can satisfy tense. Under Gu’s account, it is not clear what licenses the use of bare adjectival predicates under a comparative interpretation:

- (26) zhangsan gao.
 Zhangsan tall
 ‘Zhangsan is taller (than someone known from context).’
 NOT: ‘Zhangsan is tall.’

If such a use is licensed by a null comparative morpheme, then it raises the question of why a null positive morpheme could not equally well satisfy Tense. Why is it that for positive predication, the Tense licenser must be realized overtly as *hen* or some other degree adverbial, whereas for comparative predication, there need not be any overt Tense licenser? The account to be developed below will address this question explicitly.

2.3 Liu 2009

To explain the Mandarin data, Liu adopts the idea that positive semantics is provided by an explicit functional morpheme POS, and proposes that POS in Mandarin has two allomorphs: the covert version as found in other languages, and the overt version *hen*. Crucially, the covert version in Mandarin is analyzed as a polarity

item subject to licensing conditions. Specifically, POS must be in the domain of a predicate accessible operator_[-wh].³ In Liu's words:

- (27) In Chinese, the covert positive morpheme only occurs in a predicate-accessible operator_[-wh] domain like [Op_{-wh} ... X⁰_[-wh-operator] [DegP [AP]]], where the head X⁰, carrying the predicate-accessible operator_[-wh] feature, not only introduces a predicate-accessible operator_[-wh] but also functions to license the occurrence of a degree phrase headed by the covert positive morpheme (i.e., Deg⁰). And this domain must be contained in the smallest clause that contains the adjectival predicate and the operator. (Liu 2009:16)

Thus in a simple matrix-level declarative sentence, there is no appropriate operator to license covert POS, and hence *hen* must be used instead. In a variety of other kinds of constructions, however, such as negation, *ma* particle questions, contrastive focus, and embedded epistemic clauses, there is an appropriate operator to license covert POS and so *hen* is not required. In a negated sentence, for example, the negation morpheme *bu* is an appropriate operator to license covert POS:

- (28) zhangsan [_{NegP} Op [[_{Neg} bu_{+operator}][_{DegP} POS [AP gao]]]].

Similarly, in cases of contrastive focus and embedded epistemic clauses, Liu proposes that they involve a null focus and epistemic operator, respectively:

- (29) zhangsan [_{FocP} Op [Foc⁰_[+operator] [_{DegP} POS [AP gao]]]]
 (30) [_{CP} zhangsan yaoshi [[_{EpistP} Op [Epist **must**_{+operator}] [_{DegP} POS gao]]] dehua] ...

Although it accounts for a wide range of data, Liu's account, similarly to Huang 2006 and Gu 2008 as reviewed in the two previous subsections, does not explain why a comparative interpretation arises when covert POS is not licensed. A related point is that nothing in Liu's theory explains why it is in particular POS and not any other morpheme, e.g., a comparative morpheme, that has two allomorphs, with the null version behaving like a polarity item. Ideally, we would want to derive the behavior of POS in Mandarin from more general properties of POS crosslinguistically.

3 The core proposal

3.1 Theoretical background on the semantics of gradable adjectives

According to an influential approach (see especially Cresswell 1976), gradable adjectives do not directly denote properties but rather denote functions from degrees to properties (type $\langle d, et \rangle$), as in (31).⁴

- (31) $[[\text{tall}_{\langle d, et \rangle}]] = \lambda d \lambda x. \text{height}(x) = d$

³The reason for the [-wh] specification in Liu's formulation is to capture the fact that in *wh*-questions, covert POS is not licensed and instead a comparative interpretation is found:

- (i) shei gao ne?
 who tall Q
 'Who is taller (than someone known from context)?'

As far as I can tell, however, there is no independent motivation for the idea that the operator that licenses covert POS should be [-wh]. See section 4.1 below, where I attempt a principled account of the interpretation of sentences like (i).

⁴There is another degree-based approach in which gradable adjectives directly encode type $\langle ed \rangle$ measure functions (Bartsch and Vennemann 1973; Kennedy 1999; Kennedy 2007). Although in this paper I will adopt the more standard $\langle d, et \rangle$ approach, this is not crucial; all the points I make could be recast in a system in which gradable adjectives are type $\langle ed \rangle$.

As seen here, a gradable adjective *tall* combines with a degree d and an individual x , maps the individual x onto a degree via the measure function **height**, and equates the resulting degree with d .

One consequence of this approach is that it becomes relatively easy to define a semantics for comparatives. In the most basic kind of comparative construction, an ordering is established between two individuals with respect to the scale associated with the adjective. In one family of approaches (Seuren 1973; Klein 1980; Schwarzschild 2008), this is captured via truth conditions in which a degree is existentially bound and asserted to hold for one individual (the target of comparison) with respect to the relevant dimension but not for the other individual (the standard of comparison).⁵ Thus we might define a comparative operator along the lines of (32), and so a sentence like (33a) will receive the meaning in (33c).⁶

$$(32) \quad [[\text{COMP}]] = \lambda g_{\langle d, et \rangle} \lambda y \lambda x. \exists d [g(d)(x) \wedge \neg g(d)(y)]$$

- (33) a. John is taller than Bill.
 b. = $[[\text{COMP}]](\llbracket \text{tall} \rrbracket)(\llbracket \text{Bill} \rrbracket)(\llbracket \text{John} \rrbracket)$
 c. = $\exists d [\text{height}(j) = d \wedge \neg \text{height}(b) = d]$

In prose, (33c) states that there is some degree d such that John is d -tall and Bill is not d -tall.

A second consequence of the degree-based approach to gradable adjective semantics is that in a sentence like (34), something special must happen to mediate the relation between the adjectival predicate and the subject; otherwise, a type mismatch would result from the direct combination of a type $\langle e \rangle$ subject with a type $\langle d, et \rangle$ predicate.

- (34) John is tall.

What is usually said about such cases is that there is a null morpheme or type-shifter POS that combines with the adjective in order to turn it into a property. In Kennedy and McNally 2005, for example, POS is given the following denotation (cf. also von Stechow 1984):

$$(35) \quad [[\text{POS}]] = \lambda g_{\langle d, et \rangle} \lambda x. \exists d [\text{standard}(d)(g)(\mathbf{C}) \wedge g(d)(x)]$$

Here, in the words of Kennedy and McNally 2005, “POS encodes the relation **standard**, which holds of a degree d just in case it meets a standard of comparison for an adjective G with respect to a comparison class determined by \mathbf{C} , a variable over properties of individuals whose value is determined contextually” (350). Thus POS encodes the context sensitivity associated with positive predication: what counts as *tall* will vary from one context to the next. This context sensitivity is not found in comparatives, which, as shown above, simply establish an ordering between two arbitrary individuals. A number of consequences follow from this context sensitivity; see Kennedy 2007 for a set of diagnostics for distinguishing positive predication from comparative predication that follow from this property. Thus the truth conditions for a sentence like *John is tall* is computed as follows:

- (36) a. John is tall.
 b. = $[[\text{POS}]](\llbracket \text{tall} \rrbracket)(\llbracket \text{John} \rrbracket)$
 c. = $\exists d [\text{standard}(d)(\llbracket \text{tall} \rrbracket)(\mathbf{C}) \wedge \text{height}(x) = d]$

⁵There is another kind of approach in which the underlying semantics involves an inequality operator rather than a negation operator (e.g., von Stechow 1984). Choosing between these two approaches is not crucial to my purposes.

⁶For the sake of simplicity I am making a controversial (but non-crucial) assumption here that the standard of comparison denotes an individual rather than a degree. Whether the standard of comparison can denote an individual versus a degree may be a matter of crosslinguistic variation (see Kennedy 2009 for discussion); in some languages, for example Mandarin, which will be the main language under investigation in this paper, it has been argued that the standard always denotes an individual (Xiang 2005; Lin 2009), and here I will assume that English and Mandarin both have individual comparison.

In prose, (36c) states that there is some degree *d* that counts as *tall* in context **C**, and John is *d*-tall.

To sum up, the crucial point of this brief theoretical overview is that there is a basic degree-based meaning for a gradable adjective which is then subject to manipulation by operators that turn that basic meaning into something useable as a property of individuals:

- (37) a. gradable adjective meaning + POS → positive predication
- b. gradable adjective meaning + COMP → comparative predication

3.2 The positive form in Mandarin

Now let us consider how Mandarin fits in. That Mandarin gradable adjectives have a degree argument is supported by the fact that they can combine with a number of different kinds of degree-related expressions. While *hen* ‘very’ is the most semantically bleached expression used for this purpose (38), a variety of other semantically contentful expressions can also be used instead, including other degree adverbs such as *feichang* ‘extremely’ (39), extent phrases (40), measure phrases (41), and intensifying reduplicative morphology (42):

- (38) zhangsan **hen** gao.
Zhangsan very tall.
‘Zhangsan is tall.’
- (39) zhangsan **feichang** gao.
Zhangsan extremely tall
‘Zhangsan is extremely tall.’
- (40) zhangsan gao **de neng mozhao tianpeng**.
Zhangsan tall DE can touch ceiling
‘Zhangsan is so tall that he can touch the ceiling.’ (Sybesma 1999:27)
- (41) zhangsan **liang mi** gao.
Zhangsan two meter tall
‘Zhangsan is two meters tall.’
- (42) zhangsan gao-**gao-de**.
Zhangsan tall-RED-DE
‘Zhangsan is really tall.’

In each of the above sentences, the bolded material can be analyzed as restricting or saturating the adjective’s degree argument.⁷

⁷A less transparent way in which a gradable adjective’s degree argument can be saturated in Mandarin is through the *you ... you* coordination construction as illustrated here.

- (i) zhangsan you gao you da.
Zhangsan again tall again big
‘Zhangsan is both tall and big.’

Here I follow Zhu 1980 (see also Liu 2009) in supposing that this coordination construction is of a kind with degree adverbials and reduplication in providing degree modification. This is evidenced by the fact that the construction is incompatible with nongradable adjectives:

- (ii) *na ke juzi you cheng you he.
that CL tangerine again orange again brown
‘That tangerine is both orange and brown.’ (Liu 2009:fn2)

As shown in (43), a gradable adjective without overt degree material results in infelicity when the sentence is uttered out of context.

- (43) #zhangsan gao.
Zhangsan tall
Intended: ‘Zhangsan is tall.’

However, it would be hasty to take this fact as evidence that Mandarin lacks a covert mechanism for achieving positive semantics. As demonstrated extensively in Liu 2009, Mandarin has a number of constructions in which positive semantics is achieved covertly, including negation (44), contrastive focus (45), *ma* particle questions (46), and embedded clauses involving epistemic modality (47)–(49):

- (44) zhangsan bu gao.
Zhangsan NEG tall
‘Zhangsan is not tall.’ (Liu 2009:17)
- (45) zhangsan gao, lisi ai.
Zhangsan tall Lisi short
‘Zhangsan is tall, but Lisi is short.’ (Liu 2009:29)
- (46) zhangsan gao ma?
Zhangsan tall Q
‘Is Zhangsan tall?’ (Liu 2009:33)
- (47) [zhangsan yaoshi gao dehua], lisi jiu bu ai.
Zhangsan if tall PRT Lisi then not short
‘If Zhangsan is tall, then Lisi is not short.’ (Liu 2009:34)
- (48) wo renwei [ta wuli].
1SG think 3SG unreasonable
‘I think s/he is unreasonable.’ (Liu 2009:38)
- (49) zhangsan xiao [ni sha].
Zhangsan laugh 2SG silly
‘Zhangsan derided you as being silly.’

Liu shows extensively that in each of these sentences, the gradable predicate is interpreted as having positive semantics, and yet there is no overt marker of the positive form. The conclusion to be drawn is that if we are to analyze languages like English as employing a covert POS operator, then the same analysis is warranted for Mandarin. The crucial difference is that in Mandarin, the covert POS operator is restricted in some way that needs to be made sense of.

3.3 The comparative form in Mandarin

Now let us consider how Mandarin comparatives fit into the picture. Mandarin gradable adjectives do not obligatorily combine with overt comparative morphology in comparative constructions; rather, in the so-called *bi*-comparative, the only overt signal that comparative semantics is involved is that the standard of comparison co-occurs with the morpheme *bi*:

- (50) zhangsan **bi** lisi gao.
Zhangsan SM Lisi tall
‘Zhangsan is taller than Lisi.’

Because of this, some scholars (Erlewine 2007; Lin 2009) have proposed that the marker *bi* is what encodes the comparative semantics. Although I will have nothing to say about whether this is the right analysis for *bi*-comparatives, what I will show below is that when we look beyond *bi*-comparatives, we will be compelled to posit a null comparative operator for Mandarin. In particular, there are at least three constructions in Mandarin that involve comparative semantics despite the lack of any overt material that can be identified as contributing the comparative semantics.

The first such construction is the so-called transitive comparative.⁸ In the transitive comparative construction, the morpheme *bi* is not used, and the standard of comparison directly follows the gradable predicate, followed by a differential measure phrase:

- (51) zhangsan gao lisi liang cun.
 Zhangsan tall Lisi two inch
 ‘Zhangsan is two inches taller than Lisi.’

Note crucially that there is nothing overt in the structure here that provides comparative morphology. Although a differential measure phrase is obligatory in this construction,⁹ it would be problematic to assume that the measure phrase itself provides the comparative semantics. As seen in the following example, when there is no overt standard of comparison, both a non-comparative and a comparative interpretation are available:

- (52) zhangsan gao yi mi.
 Zhangsan tall one meter
 ‘Zhangsan is one meter tall.’ OR
 ‘Zhangsan is one meter taller (than someone known from context).’

These facts lead us to posit a covert comparative operator for Mandarin.

The second construction that calls for a covert comparative operator is the primary construction under investigation in this paper, which, given its lack of overt standard, we might call the ‘intransitive comparative’, on analogy with the transitive comparative considered above:

- (53) zhangsan gao.
 Zhangsan tall
 ‘Zhangsan is taller (than someone known from context).’

That (53) is an instance of a true comparative (an EXPLICIT comparative in the sense of Kennedy 2009) is evidenced by the fact that it would be a felicitous response to the question in (54b) given the context in (54a).

- (54) a. CONTEXT: Zhangsan is (only) 1.1M tall, Lisi is (only) 1.0M tall.
 b. zhangsan he lisi, shei gao?
 Zhangsan and Lisi who tall
 ‘Who is taller, Zhangsan or Lisi?’

What is crucial here is that (53) simply asserts that Zhangsan’s height exceeds the height of some contextually determined individual, without requiring that Zhangsan’s height or the standard’s height meet any

⁸The term ‘transitive comparative’ is due to Erlewine 2007. See also Xiang 2005, in which the construction is called the ‘bare comparative’, and Liu 2007, in which it is called the “X A (Y) D comparative”.

⁹In addition to requiring an overt differential measure phrase, the transitive comparative is restricted to gradable predicates that are associated with a salient numerical scale. For example, it is compatible with *gao* ‘tall’ but not with *piaoliang* ‘beautiful’. See Xiang 2005 for the data, and see Grano and Kennedy (ms., University of Chicago) for a theoretical account of these restrictions.

particular absolute degree and without requiring that the difference between Zhangsan's height and the standard's height be more than minimal. These are the defining criteria of an explicit comparison (see Kennedy 2009). I assume that the standard of comparison in (53) is a contextually bound implicit argument, thus allowing us to maintain just a single comparative operator, regardless of the presence or absence of an overt standard argument.

Finally, the third construction in Mandarin that may call for a covert comparative operator is the change-of-state use of a gradable adjective, as in the following example:

- (55) zhangsan gao le (liang cun).
 Zhangsan tall PRF two inch
 'Zhangsan grew (two inches).'

Kennedy and Levin (2008) argue that change-of-state verbs derived from gradable adjectives involve comparative semantics: similarly to the way a comparative construction compares two individuals with respect to some dimension, the so-called DEGREE ACHIEVEMENT construction as in (55) compares one individual at two different points in time with respect to some dimension. If such an analysis is on the right track, then this is another case where covert comparative semantics is called for. Note that it would be problematic to encode this semantics in the perfective particle *le* itself, because as the following examples from Lin 2004 show, the change of state reading is possible even without *le* in certain contexts:

- (56) lisi xiang pang san gongjin.
 Lisi want fat three kilogram
 'Lisi wants to gain three kilograms.' (Lin 2004:87)
- (57) ta mei nian gao yi gongfen.
 3SG every year tall one centimeter
 'He grows a centimeter every year.' (Lin 2004:87)

In sum, transitive comparatives, intransitive comparatives, and degree achievement constructions all show that Mandarin has a covert comparative operator.

3.4 The Mandarin *hen* puzzle revisited

Against this backdrop, we are now ready to return to the puzzle at hand:

- (58) a. zhangsan gao.
 Zhangsan tall
 'Zhangsan is taller (than someone known from context).'
 NOT: 'Zhangsan is tall.'
- b. zhangsan **hen** gao.
 Zhangsan very tall.
 'Zhangsan is tall.' (Sybesma 1999:27)

Based on the conclusions from the previous two subsections that Mandarin has a covert positive operator (call it POS) and a covert comparative operator (call it COMP), we can reformulate the puzzle in terms of the following asymmetry:

- (59) a. *zhangsan [POS gao]. *Intended:* 'Zhangsan is tall.'
 b. zhangsan [COMP gao]. = 'Zhangsan is taller.'
 c. zhangsan [**hen** gao]. = 'Zhangsan is tall.'

Now the question becomes: in this basic matrix-level declarative context, why is it that the comparative COMP and the overt degree adverbial *hen* pattern together as grammatical to the exclusion of the positive operator POS?

As a first step toward answering this question, I propose the following principle:

- (60) **Universal Markedness Principle:** Universally, comparative semantics is provided by an explicit morpheme in syntax which is overt in some languages and null in others, whereas positive semantics is provided by a type-shifting rule that does not project in syntax.

The consequence of this principle for the syntax of Mandarin [POS *gao*] and [COMP *gao*] is shown in (61).

- (61) a. $AP_{\langle d,et \rangle} \xrightarrow{\text{pos}} \langle et \rangle$
 \triangle
gao
- b. $DegP_{\langle e,et \rangle}$
 $\swarrow \searrow$
 $Deg_{\langle \langle d,et \rangle, \langle e,et \rangle \rangle}$ $AP_{\langle d,et \rangle}$
 $\downarrow \triangle$
 \emptyset_{COMP} *gao*

Because — by (60) — POS is a syntactically invisible type-shifting rule, it does not affect the AP categorial status of an adjective.¹⁰ Rather, as shown in (61a), it merely changes the semantic type of the AP from that of a degree relation to that of a property. This is in crucial distinction to COMP, which — by (60) — corresponds to a null functional morpheme \emptyset_{COMP} which projects in syntax. Consequently, as shown in (61b), it results in the projection of DegP in addition to providing comparative semantics.¹¹

The table below puts the principle in (60) into crosslinguistic perspective.

	Positive form	Comparative form	
English	tall	taller	
Irish	ard	arda	AFFIXAL COMP
Spanish	alto	más alto	
(62) French	grand	plus grand	PERIPHRASTIC COMP
Swahili	mrefu	mrefu	
Japanese	takai	takai	
→Mandarin	gao	gao	NO CONTRAST
*Impossible language	DERIV(A)	A	DERIVED POS

As shown in this table, I analyze Mandarin as being of a kind with Swahili and Japanese in not marking any overt contrast between the positive and comparative form of an adjective. In addition, (60) makes the prediction that it would be impossible to find a language in which there is a basic comparative form A and a derived comparative form DERIV(A). Such a language would violate the claim that positive semantics is never provided overtly.

Now that this fundamental (and crosslinguistically well motivated) asymmetry between POS and COMP has been established, it is a relatively easy matter to write a Mandarin-specific syntactic constraint that derives the crucial facts in (59). In particular, I propose that Mandarin syntax obeys the following constraint against bare AP complements to T(ense):¹²

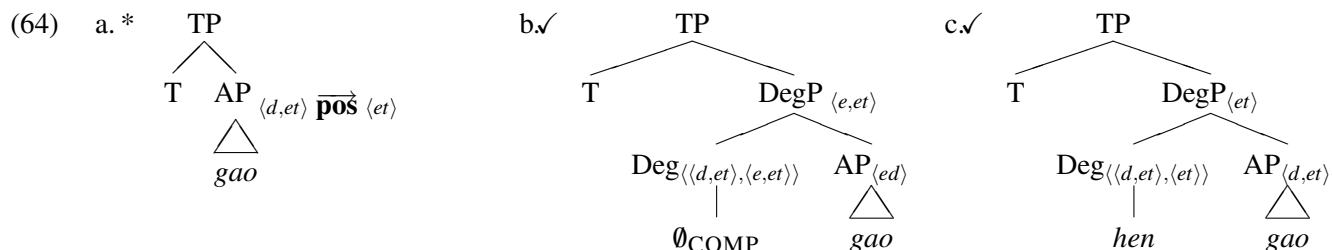
¹⁰See Kennedy and McNally 2005 and Kennedy 2007 for brief discussion of whether POS is a type-shifting rule or a null morpheme. Mandarin is sometimes cited as the only potential case of a language that marks the positive form overtly (e.g., in Kennedy and McNally 2005), though see Bogal-Allbritten 2008 for recent work on Navajo.

¹¹This account thus assumes that degree elements are heads that take AP complements—see Abney 1987; Corver 1990, 1997; and Grimshaw 2005 for explicit support of such a view.

¹²Although T in Mandarin is not overt, I will follow Sybesma 2007 and a number of other works in assuming that it is nonetheless projected in the syntax.

- (63) **Mandarin Tense-Adjective Prohibition:** In Mandarin, the immediate complement to T cannot be AP: *[T AP]

In the next subsection, I will show how this constraint can be derived from more general principles of grammar. For now, I simply demonstrate how, in its interaction with the proposed Universal Markedness Principle in (60), it derives the crucial facts. (64) recasts (59) in syntactic terms.



(64a) is ungrammatical because POS, as a mere type-shifting rule, does not affect the AP categorial status of the predicate and hence results in violation of *[T AP] when the predicate combines with T. (64b), on the other hand, is grammatical, because COMP, in addition to providing comparative semantics, results in a projection of DegP. Hence DegP rather than AP is the direct complement of T and no violation of *[T AP] arises. (64c) is similarly grammatical because *hen*, as an overt morpheme, also projects DegP and hence avoids a violation of *[T AP]. On this view, *hen* is a semantically bleached degree adverb that has been co-opted to satisfy *[T AP] in a way that approximates positive semantics.¹³

In a nutshell, then, I argue that the Mandarin *hen* puzzle is a consequence of the interaction between two principles:

- (65) **Universal Markedness Principle:** Universally, comparative semantics is provided by an explicit morpheme in syntax which is overt in some languages and null in others, whereas positive semantics is provided by a type-shifting rule that does not project in syntax.
- (66) **Mandarin Tense-Adjective Prohibition:** In Mandarin, the immediate complement to T cannot be AP: *[T AP]

As just shown, these two principles conspire to capture the crucial facts. But while there is good crosslinguistic evidence for the Universal Markedness Principle, the Mandarin Tense-Adjective Prohibition as it currently stands is just a stipulation. The next subsection shows how it can be derived from more general principles of grammar. Following this, section 4 explores the crucial predictions made by this account and compares them to the predictions of previous approaches.

3.5 Deriving the *[T AP] constraint

The *[T AP] constraint stipulated above is derivable from the following three proposals:

- (67) a. Mandarin adjectives constitute a syntactic category distinct from verbs.
 b. In Mandarin, as in many languages, the complement to T must be an (extended) verbal projection.
 c. In Mandarin, degree adverbial and other functional elements that project over lexical heads have the special property that they can combine with both verbal and adjectival projections but uniformly return verbal projections.

¹³See Liu 2009 for evidence that the meaning of *hen* is bleached only in contexts in which it is obligatory. In contexts in which it is optional, it has a mild intensifying meaning on a par with English *very*.

That Mandarin adjectives constitute a syntactic category distinct from verbs is not a novel proposal and so I will not dwell on it here. See Paul 2005 for evidence from prenominal modification (considered also in section 4.2 below) and Huang, Li and Li 2009 for evidence from direct object licensing and reduplicative morphology.

As for the proposal in (67b) that the complement to T in Mandarin must be an (extended) verbal projection, this is observable from the following data:

- (68) ta [_{VP} xihuan lisi].
 3SG like Lisi
 ‘He likes Lisi.’
- (69) ta [_{VP} he jiu].
 3SG drink wine
 ‘He drinks.’
- (70) *ta [_{AP} gao].
 3SG tall
 Intended: ‘He is tall.’
- (71) *zhuozi [_{AP} mutou].
 table wooden
 Intended: ‘The table is wooden.’
- (72) ?ta [_{NP} yingxiong].
 3SG hero
 Intended: ‘He is a hero.’¹⁴

The generalization here is that of the major lexical categories V, A, and N, only projections of V may serve as predicates of root clauses in Mandarin without the obligatory addition of functional morphology. In order to use A and N as predicates, extra functional material must be introduced:

- (73) ta **hen** gao.
 3SG very tall
 ‘He is tall.’
- (74) zhuozi **shi** mutou **de**.
 table COP wooden PRT
 ‘The table is wooden.’
- (75) ta **shi** yingxiong.
 3SG COP hero
 ‘He is a hero.’

Here, the addition of degree morphology renders the gradable adjective useable as a predicate and the addition of the copula *shi* renders nongradable adjectives and nominals useable as predicates.

Setting aside for the moment the question of how these functional heads render the constructions grammatical, I propose to explain the restriction of bare lexical predicates to V in Mandarin by saying that Mandarin T is specified as [+V]. This is the same setting that results in the generalization that in many languages, Tense combines with verbs only (see e.g. Benmamoun 2000). Although Mandarin Tense is not

¹⁴The example in (72) is taken from Huang, Li and Li 2009:25. As Huang, Li and Li note, omission of the copula with nominal predicates is possible in ‘highly colloquial speech’. However, see Tang 1998 for the argument that verbless sentences in Mandarin fall into two categories: one kind analyzable as matrix-level small clauses, and one kind analyzable as containing a null verb. In both cases, we maintain the generalization that the direct complement to T is never an (extended) nominal projection.

overt, it is still indirectly manifest in the syntax by imposing this restriction on bare predicate types. I will remain neutral on the precise syntactic mechanism involved in checking the [+V] feature on T. It is usually assumed that Mandarin T is always empty; this leaves open the possibility that it satisfies its features either through covert movement or through agreement.

Having accounted for the ungrammaticality of bare predicative adjectives, we now want to explain why it is that degree adverbs and other functional heads are able to save them from ungrammaticality. Let us begin with the observation that degree expressions in Mandarin can combine with both adjectives as in (76) and verbs as in (77) (though as shown in (77c), degree expressions are not obligatory when the predicate is verbal):

- (76) a. zhangsan **bi lisi** gao.
Zhangsan SM Lisi tall
'Zhangsan is taller than Lisi.'
- b. zhangsan **feichang** gao.
Zhangsan extremely tall
'Zhangsan is extremely tall.'
- c. zhangsan **hen** gao.
Zhangsan very tall
'Zhangsan is very tall.'
- (77) a. zhangsan **bi lisi** xihuan wangwu.
Zhangsan SM Lisi like Wangwu
'Zhangsan likes Wangwu more than Lisi does.'
- b. zhangsan **feichang** xihuan lisi.
Zhangsan extremely like Lisi
'Zhangsan likes Lisi to an extreme degree.'
- c. zhangsan (**hen**) xihuan lisi.
Zhangsan very like Lisi
'Zhangsan (very much) likes Lisi.'

Following Grimshaw 2005, I assume that normally, the projection of a functional head does not change the category of a phrase but rather merely its F value, a feature that tracks the projection of functional heads over lexical heads. Thus the facts in (77) are expected: the projection of degree morphology over a verbal head yields ultimately a phrase with a [+V] categorial status and hence is combinable with T.

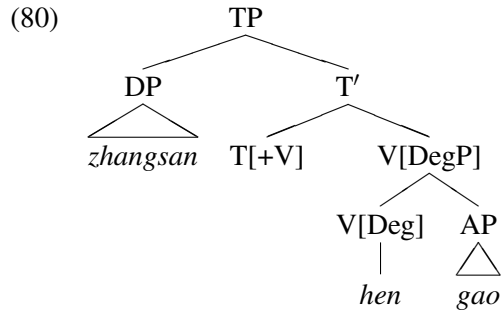
However, we also know from Grimshaw 2005 that sometimes, a functional head can project a category other than that provided by its complement. The copula in English is a canonical example: it combines with lexical nouns and adjectives yet returns a phrase that is verbal:

(78) John [_{VP} is [_{AP} tall].

(79) John [_{VP} is [_{DP/NP} a hero].

What I would like to propose is that in Mandarin, degree expressions (and other functional elements to be explored in detail in section 4) have this same special property: they can combine with multiple lexical categories (namely, verbs and adjectives), but uniformly return phrases of a single categorial type (namely, verbal).

Thus when a degree adverbial such as *hen* combines with an AP, it acts as an A→V category shifter and hence renders the projection combinable with T:



In summary, I have shown that the *[T AP] constraint stipulated in the previous subsection is derivable from three more general proposals, all of which have crosslinguistic support. First, there is the proposal that Mandarin adjectives constitute a syntactic category distinct from verbs. Such a categorial distinction is found in many languages. Second, there is the proposal that in Mandarin, complements to T must be verbal. As argued in Benmamoun 2000, the same holds for English and French, and for Arabic past and imperative Tense but not present Tense; this is a parametric setting that varies across languages and sometimes within a language across different subtypes of Tense. Finally, there is the proposal that although normally functional projections do not change the categorial status of the constituent they combine with, sometimes they do, as in the case of Mandarin degree adverbs and other elements to be explored in the next section. As shown in Grimshaw 2005, this holds as well for the copula in languages like English.

4 Independent support

The account of the Mandarin *hen* puzzle laid out in the previous section makes two important predictions about the conditions under which we expect to find bare adjectives with positive semantics. Namely:

- (81) Bare adjectives (with positive semantics) are allowed whenever structure intervenes between T and AP.
- (82) Bare adjectives (with positive semantics) are allowed whenever T is not projected (cf. Gu 2008).

When structure intervenes between T and AP, the *[T AP] constraint is satisfied. Hence there is no need to insert a null comparative morpheme, and so the type-shifting rule that yields positive semantics should be licit. This leads to the prediction in (81). When T is not projected, the *[T AP] constraint is vacuously satisfied, and so, similarly, there is no need to insert a null comparative morpheme, and the type-shifting rule that yields positive semantics should be licit. This leads to the prediction in (82). (Note that this same prediction is made by the account in Gu 2008, although not for precisely the same reason.)

In the subsection that follow, I test these predictions against particular empirical domains and compare the results to predictions made by previous approaches to the *hen* puzzle as laid out in section 2 above.

4.1 The polar/*wh* asymmetry

This subsection explores data that bear on the first prediction, namely that bare adjectives with positive semantics should be allowed whenever structure intervenes between T and AP. In particular, I argue that the following puzzling asymmetry between polar questions and *wh*-questions follows from the prediction, as long as one additional well motivated assumption is made:

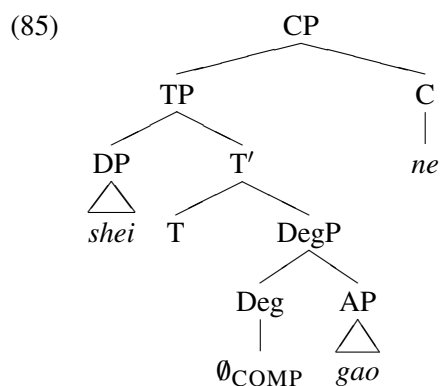
- (83) zhangsan gao ma?
Zhangsan tall Q
'Is Zhangsan tall?'

- (84) shei gao ne?
 who tall Q
 ‘Who is taller (than someone known from context)?’

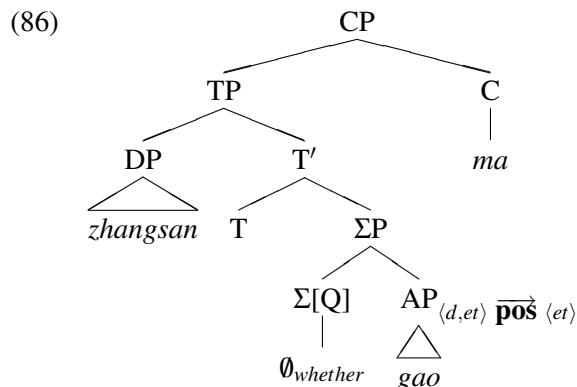
Here, we see that whereas a bare adjectival predicate in a polar question is interpreted with positive semantics, in a *wh* question it is interpreted with comparative semantics.

None of the three previous approaches to the Mandarin *hen* puzzle, as detailed in section 2 above, provide a satisfying solution to this problem. Huang’s (2006) account, in which *hen* acts as a type lifter, would, without additional stipulation, predict that clause typing should not affect the optionality vs. obligatoriness of *hen* for positive interpretation; there is no reason to believe that the syntactic type of a clause should have an effect on the semantic type of its main predicate. Gu (2008), as part of his account in which *hen* is required by Tense, explicitly states that sentence-final particles may also license Tense. Since *ma* and *ne* are both standardly considered to be sentence-final particles, his account thus erroneously predicts that both of the above sentences should be grammatical with a positive interpretation. Finally, Liu’s (2009) account, which is the only previous account to explicitly address this data, involves a stipulation that the operators that can license POS must be [-*wh*], thus accounting for why sentences like (84) do not receive a positive interpretation. But ideally, we should want this asymmetry to follow from more general principles of grammar, not stipulated as part of the licensing conditions for POS.

Now let us consider a solution within the context of the current approach. On the assumption that sentence-final particles such as *ma* and *ne* sit in a complementizer position (Cheng 1997), the interpretation of (84) is as expected. Because *ne* is outside the domain of TP, it cannot save a violation of *[T AP]. Hence the null comparative morpheme \emptyset_{COMP} is inserted, and so we correctly predict that the sentence receives a comparative interpretation. Its syntax is shown in (85).



Turning now to the polar question, the key to understanding why it gives rise to positive semantics lies in the proposal that polar questions involve a covert morpheme $\emptyset_{\text{whether}}$ whose function parallels that of *wh* words in *wh* questions (Bennett 1977; Higginbotham 1993; Guerzoni 2004): semantically, its function is to quantify over the polarity values (namely, *yes* and *no*) of the proposition. As long as we assume that this morpheme intervenes somewhere between T and AP, then it results in satisfaction of the *[T AP] constraint. Consequently, there is no need to insert a null comparative morpheme, and so the type-shifting rule that yields positive semantics can take place. For concreteness, I will assume that this morpheme $\emptyset_{\text{whether}}$ is a realization of Σ , Laka’s (1990) term for the locus of sentential negation and affirmation:



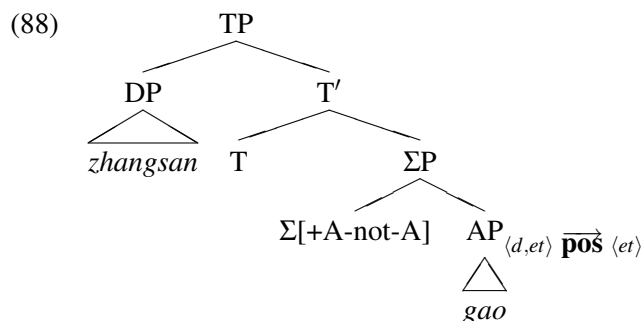
Here, although the sentence-final particle *ma* is outside the scope of TP, within TP is a silent morpheme $\emptyset_{\text{whether}}$ which intervenes between T and AP, and thereby satisfies the *[T AP] constraint.

Independent evidence for such a syntactic position in Mandarin comes from three additional constructions. First, Mandarin has another strategy for forming polar questions, namely by reduplicating some portion of the predicate and infixing *bu* between the base and the reduplicant:

- (87) zhangsan gao bu gao?
 Zhangsan tall NEG tall
 ‘Is Zhangsan tall or not?’

Importantly, as with the polar question involving the sentence-final particle *ma*, this construction also gives rise to positive semantics when the predicate is a gradable adjective. Huang, Li and Li (2009) analyze this so-called *A-not-A* construction as involving a morpheme that intervenes somewhere in the inflectional layer of the clause, beneath the surface position of the subject and above the predicate. Thus it is reasonable to conclude that it also is a realization of $\emptyset_{\text{whether}}$ — one that has the observable morphosyntactic reflex of triggering reduplication and negation infixation.¹⁵

It thereby results in satisfaction of the *[T AP] principle, and so we again correctly expect to find positive semantics with such a construction:

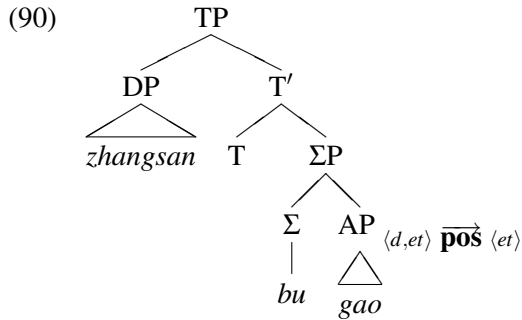


Huang, Li and Li (2009) further suggest that the [+A-not-A] morpheme sits in the same position that hosts negation. This is in harmony with my proposal that it is a realization Σ , which, as mentioned above, is the locus of sentential negation and affirmation in the framework of Laka 1990. Hence we correctly

¹⁵As made clear in Huang, Li and Li 2009 (see also earlier work in Huang 1991), the so-called *A-not-A* construction is not a uniform phenomenon but actually exists in at least three subtypes: VP-not-VP (derived by coordination), VP-not-V (derived by coordination plus anaphoric ellipsis), and V-not-VP (derived by reduplication and negation). Here for expository reasons I present only the type corresponding to what Huang, Li and Li call V-not-VP, but the crucial aspect unifying the various types is the presence of a morpheme with the feature +Q. Under my proposal, this morpheme satisfies *[T AP] regardless of its particular morphosyntactic realization.

predict that in a negated sentence, the negator *bu* satisfies *[T AP] and hence we find positive semantics. For example, the sentence in (89) has the structure in (90).

- (89) zhangsan bu gao.
 Zhangsan NEG tall
 ‘Zhangsan is not tall.’

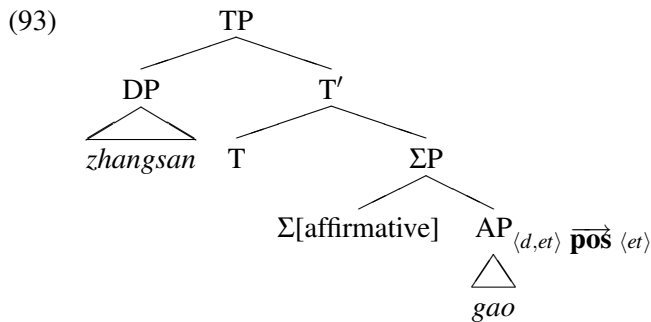


Finally, there is a curious fact that bare predicative adjectives in Mandarin do give rise to positive interpretation under a particular discourse condition: in a direct response to a polar question.¹⁶ Thus (92) is licit as a direct response to the question in (91).

- (91)A: zhangsan gao ma?
 Zhangsan tall Q
 ‘Is Zhangsan tall?’

- (92)B: zhangsan gao.
 Zhangsan tall
 ‘Zhangsan is tall.’

This fact fits in with the overall account, if we follow Laka’s (1990) proposal that Σ encodes both negation and affirmation. The sentence in (92) — in the discourse context set up by the preceding question in (91) — has the following structure:



Semantically, the function of Σ [affirmative] is to presuppose that the polarity value of the proposition is at issue. Syntactically, the important effect it has is to satisfy *[T AP], thereby obviating the need to insert a null comparative morpheme and thus indirectly giving rise to positive semantics.

This is not the only place in natural language where the discourse status of a sentence as an affirmative answer to a polar question has a bearing on its syntax. See Laka 1990 for an investigation of such phenomena in Basque, English, and Spanish, where under some conditions, Σ [affirmative] is overt. Crucially, I follow

¹⁶I thank an anonymous reviewer for drawing my attention to this fact.

Laka in supposing that Σ is not normally projected in ordinary affirmative declarative sentences that are not direct responses to polar questions.

Taken together, the facts presented in this section constitute striking evidence in support of the view that positive semantics is possible in Mandarin whenever a morpheme intervenes between T and AP.

4.2 Prenominal modification

A second important prediction of the account is that when adjectives are used in environments that do not project Tense, *hen* should not be required, since there is no potential violation of the *[T AP] constraint. In this section, I confirm this prediction by examining evidence from prenominal modifiers. In particular, I argue that my account straightforwardly explains the following contrast in the distribution of *hen* in prenominal adjectival modifiers:

- (94) yi ge (hen) congming de haizi
 one CL very smart PRT child
 ‘a smart child’
- (95) *(hen) congming de yi ge haizi
 very smart PRT one CL child
 ‘a child who is smart’

The descriptive generalization is that when the adjective appears to the right of the numeral+classifier word group, *hen* is optional, whereas when the adjective appears to the left of the numeral+classifier word group, *hen* becomes obligatory.

Before presenting the analysis, let us briefly consider the predictions made by previous accounts of the Mandarin *hen* puzzle with regard to these data. Huang (2006), in particular, explicitly addresses prenominal adjectives in her account. She observes that simple (unmodified) adjectives need not co-occur with the particle *de* when used prenominally, whereas complex (modified) adjectives obligatorily co-occur with the particle *de* when used prenominally:

- (96) zang shui
 dirty water
 ‘dirty water’
- (97) hen zang *(de) shui
 very dirty PRT water
 ‘very dirty water’ (Huang 2006:345)

Abstracting away from some complications, Huang’s basic account for these facts is that there is a type matching constraint requiring that in a modification structure, the modifier and modifiee must be of the same semantic type. Under the assumption that bare nouns in Mandarin are type $\langle e \rangle$ (Krifka 1995; Chierchia 1998), (96) is correctly expected to be grammatical. In (97), on the other hand, where the type lifter *hen* creates a type $\langle et \rangle$ expression, the particle *de* is necessary to lower the type once again to $\langle e \rangle$ so that it can modify the head noun. However, Huang’s account says nothing about the interaction between numeral+classifier placement and the (non-)obligatoriness of *hen*. Without additional assumptions, it is not clear what Huang’s account would predict regarding the grammaticality of the strings in (94)–(95).

Gu’s (2008) account does not address adjectives in prenominal position. However, because Gu’s account makes the same crucial prediction as mine that bare adjectives should be allowed whenever T is absent, the account I develop of the facts in (94)–(95) should be correctly predicted under Gu’s account as well and thus does not help us decide between Gu’s account vs. the present account.

Finally, Liu's (2009) account also does not consider adjectives in prenominal position. Without additional stipulation, Liu's account would seem to predict that *hen* should be required on all prenominal adjective regardless of their linear ordering with respect to the numeral+classifier sequence. This is because on Liu's account, covert positive semantics is allowed only when in the scope of an appropriate operator. I am not aware of any operator in sentences like (94)–(95) that would contribute to this licensing, under Liu's account.

With these remarks in place, I now turn to my account of the contrast in (94)–(95). The first thing to note is that there is debate about the syntactic status of prenominal adjectival modifiers in Mandarin. On one view, they are analyzable as relative clauses (see especially Sproat and Shih 1988). This is supported by the fact that under some conditions, they co-occur with the particle *de*, which is also required for relative clauses:

- (98) a. [pang **de**] ren
 fat PRT person
 'fat people' / 'people who are fat' (Li and Thompson 1981:122)
- b. [qi zixingche **de**] ren
 ride bicycle PRT person
 'people who ride bicycles' (Li and Thompson 1981:116)

Paul (2005), however, argues based on the distribution of a class of nongradable adjectives that not all prenominal adjectives in Mandarin can be analyzed as relative clauses. The argument is based on the observation that when used predicatively, adjectives of this kind obligatorily occur in the *shi* ... *de* pattern:

- (99) zhe ge panzi **shi** fang **de**.
 this CL plate COP square PRT
 'This plate is square.'

When used as prenominal modifiers, however, the copula is not used, and in fact, is ungrammatical:

- (100) (*shi) fang (de) panzi
 COP square DE plate
 'a square plate'

Paul's reasoning is that if *fang* 'square' as used in (100) were a relative clause, then we would expect it to require the copula *shi* just as it does when used in predicative position. But it in fact resists the copula and is therefore better analyzed as a true attributive construction. Assuming Paul's reasoning is on the right track, then, we can use adjectives like *fang* 'square' as a probe into the syntax of attributives. Note in particular that *fang* must appear to the right of the numeral+classifier word group:

- (101) a. yi ge fang (de) panzi
 one CL square DE plate
 'a square plate'
- b. *fang (de) yi ge panzi
 square DE one CL plate
 'a square plate'

This is in contrast to the pattern found with prenominal modifiers that are uncontroversially relative clauses. True relative clauses can appear either before or after the numeral+classifier sequence:

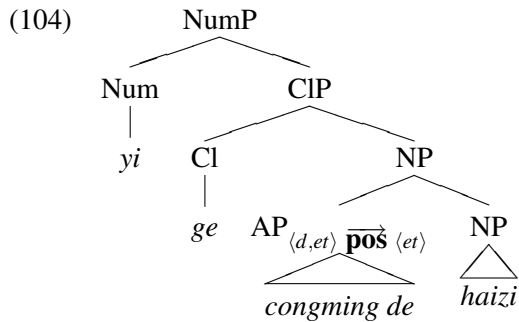
- (102) a. liang ge [xin lai de] laoshi
 two CL new come PRT teacher

- b. [xin lai de] liang ge laoshi
 new come PRT two CL teacher
 ‘two teachers who have newly arrived’ (Yip and Rimmington 2004:43)

Taken together, the data in (101) and (102) suggest the following generalization:

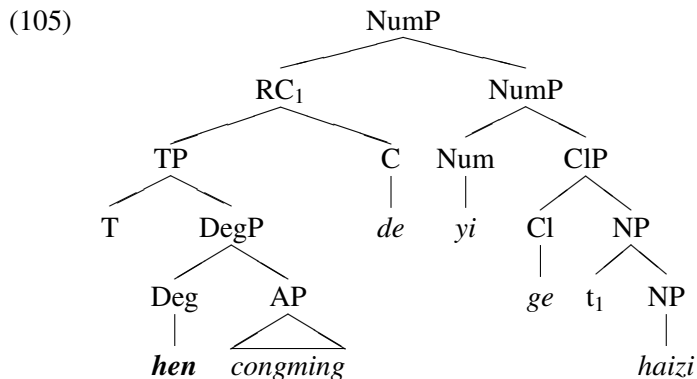
- (103) Relative clauses but not attributives can appear to the left of numeral+classifier.

This generalization, together with the prediction that bare adjectives should be allowed when T is not projected, now explain the crucial contrast in (94)–(95). When the adjective appears to the right of the numeral+classifier word group, it is parsable as an attributive. As an attributive, there is no projection of T involved, and hence a bare adjective is allowed. Thus the structure for (94) is as follows.¹⁷



Here, the pronominal adjective is simply an AP adjunct to NP. There is no projection of T and hence no need for the adjective to be modified.

When the pronominal adjective precedes the numeral+classifier sequence, on the other hand, it is necessarily parsed as a relative clause, given the generalization in (103). Since relative clauses project T, the *[T AP] constraint manifests itself by making *hen* obligatory. Following Aoun and Li (2003), I assume that relative clauses in Mandarin are created via adjunction to NP, and following Zhang (2007), I assume that when the relative clause appears to the left of the numeral+classifier word group, this is the result of focus-driven movement. Thus the final structure for (95) is as follows.



Here, the status of the pronominal modifier as a relative clause makes it eligible for leftward movement, in particular, adjunction to NumP. As a relative clause, it projects T, and hence *hen* is required to satisfy *[T AP].

Before closing this subsection, I note in passing that, as observed in Huang 2006, adjectives in secondary predicate position in Mandarin also require overt degree modification:

¹⁷I follow Cheng and Sybesma 1999 in supposing that numerals and classifiers each head their own functional projection over the Mandarin NP.

- (106) lai le yi ge ren *(hen) yonggong.
 come PRF one CL person very hard-working
 ‘There came a person who is (very) hard-working.’
- (107) ta jiao guo yi ge xuesheng *(hen) congming.
 3SG teach EXP one CL student very smart
 ‘He once taught a student who was very smart.’ (Huang 2006:351)

Zhang (2008), who terms these secondary predicates ‘coda-position existential constructions’, analyzes them as internally headed relative clauses. If such a relative clause approach is correct, then this is another environment in which we expect a projection of T and hence correctly predict the obligatoriness of degree modification.

4.3 Focus

Another context in which bare adjectives do not require overt modification for positive interpretation is in a variety of focus constructions. Liu (2009) provides the following examples of contrastive focus:

- (108) a. zhangsan gao, lisi bu gao.
 Zhangsan tall lisi NEG tall
 ‘Zhangsan is tall, but Lisi is not tall.’ (Liu 2009:29)
- b. zhangsan gao, lisi ai.
 Zhangsan tall Lisi short
 ‘Zhangsan is tall, but Lisi is short.’ (Liu 2009:29)
- c. zhe duo hua hong, na duo huang.
 this CL flower red that CL yellow
 ‘This flower is red, but that one is yellow.’ (Liu 2009:29)

Although the above examples all involve a contrast between two individuals with respect to some property, there are two reasons not to analyze them as explicit comparatives. First, an important hallmark of explicit comparatives is that they can be used even when the difference between the two individuals with respect to the property in question is very slight (the so-called CRISP JUDGMENT effect; see Kennedy 2007), and yet according to Liu (2009), (108b) is infelicitous in a context in which the difference in height between Zhangsan and Lisi is slight. This suggests that such sentences involve positive semantics. Second, as can be seen from (108c) in which the predicates are *hong* ‘red’ and *huang* ‘yellow’ respectively, the contrasted properties need not constitute opposites on a scale.

Therefore, we need a way of accounting for data like (108a)–(108c) without analyzing them as comparatives. Let us first consider how previous approaches to the Mandarin *hen* puzzle address these data. Huang (2006) observes that placing stress on an adjective licenses its bare use in predicative position and gives rise to a contrastive reading. She suggests that this stress can be considered a kind of degree modification on a par with *hen*. Gu (2008) does not address this kind of data. Finally, Liu (2009) proposes that there is a null focus operator that licenses POS, as in the following example:

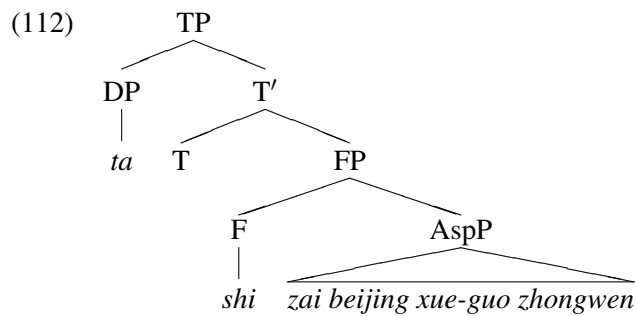
- (109) zhangsan [_{FocP} Op [_{Foc}⁰_{[+operator]] [_{DegP} POS [_{AP} gao]]]]}

Here, I will basically follow the spirit of Liu’s (2009) approach, although recast within the framework of the current proposal. There is independent reason to believe that in these focus constructions, there is a functional projection that intervenes between T and the adjectival predicate. What I propose is that this functional projection both provides the focus semantics and satisfies the *[T AP] constraint. The independent evidence for such a projection is that under some conditions, as seen in Liu 2009, focused adjectives co-occur with *shi*:

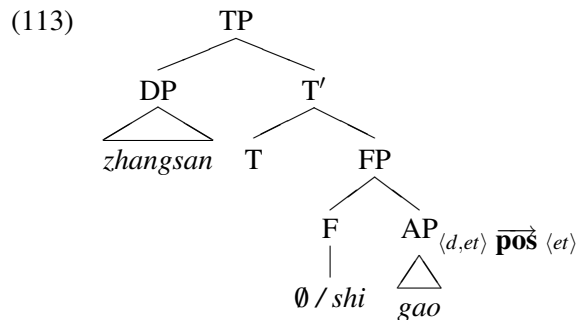
- (110) mei-cuo! wo **shi** qiong_F, dan wo kao ziji guo huo.
 no-mistake 1SG COP poor but 1SG depend self live alive
 ‘No mistake! I am poor_F, but I make a living by myself.’ (Liu 2009:31)

Although *shi* is canonically used as a copula in Mandarin, it is also well known to be a marker of focus. Paul and Whitman (2008), in particular, discern three distinct focus constructions in Mandarin that involve *shi*. One of these, which they call the *medial bare shi* pattern, involves *shi* in a position immediately after the subject. The authors argue that semantically, *shi* in this construction associates with focus, which can be any intonationally prominent constituent in its scope. Syntactically, they argue that it sits in a position below T. The sentence in (111), for example, they assign the structure in (112).¹⁸

- (111) ta shi zai beijing xue-guo zhongwen.
 3SG COP at Beijing study-EXP Chinese
 ‘She studied Chinese in Beijing.’ (Paul and Whitman 2008:444)



We can unify Paul and Whitman’s *medial bare shi* pattern with the bare contrastive focus examples by supposing that both involve the same projection, which is sometimes realized overtly as *shi* and sometimes is null:



What is important is that whether it is overt or null, this projection satisfies *[T AP] and hence explains why *hen* is not necessary in focus constructions.

4.4 Embedded clauses

Finally, there are certain kinds of embedded clauses that allow bare adjectival predicates with positive interpretation. An important class of such clauses is found as complements to verbs that involve a subjective judgment on the part of the subject, as in the following data taken from Liu 2009 (see also Tang 1998, Huang 2006, Gu 2008, and Huang and Li 2008 for similar data). The embedded clauses containing the bare adjectival predicate appear in brackets.

¹⁸Paul and Whitman (2008) use the node label Mod for the position of *shi* in this construction. I use F to remain neutral about its category.

- (114) a. zhangsan xiao [ni sha].
Zhangsan laugh 2SG silly
'Zhangsan derided you as being silly.'
- b. zhangsan ma [ni ben].
Zhangsan scold you stupid
'Zhangsan scolded you for being stupid.'
- c. zhangsan kua [wo congming].
Zhangsan praise 1SG smart
'Zhangsan praised me for being smart.'
- d. zhangsan xian [wo zang].
Zhangsan disfavor 1SG dirty
'Zhangsan disfavors me for being dirty.'
- e. zhangsan xiwang [ni xingfu].
Zhangsan hope 2SG happy
'Zhangsan wishes you happiness.'
- f. zhangsan yuanliang [ni wuzhi].
Zhangsan forgive 2SG ignorant
'Zhangsan forgave your being ignorant.' (Liu 2009:39–40)

Each of the three previous approaches to the Mandarin *hen* puzzle has its own take on such data. Huang (2006) analyzes such sentences as involving a bare adjective as the complement to a verb. She takes this ability to function as an argument as further evidence for her claim that bare adjectives in Mandarin are type $\langle e \rangle$. The problem with this reasoning, however, is that if the bare adjectives in these sentences are type $\langle e \rangle$, it is not clear how they compose semantically with their logical subject, and in fact, it seems more reasonable to say that the argument of the verb is not the bare adjective itself, but rather the entire bracketed phrase including both the subject and the bare adjective (see Tang 1998). Gu (2008), on the other hand, argues that these embedded clauses are small clauses. Hence there is no projection of Tense, and so bare adjectives are licensed. Finally, Liu (2009) argues that because all of the embedding verbs involve subjective evaluation, they introduce an epistemic operator which licenses POS.

Here I will follow Gu's proposal in arguing that the crucial property of the bracketed clauses in (114) that allows bare adjectival predicates with positive interpretation is the lack of a Tense projection. There are at least three independent reasons for believing that the bracketed clauses in (114) do not project Tense.

The first reason is based on crosslinguistic evidence. In all of the English translations of the sentences in (114), the portion corresponding to the Mandarin bracketed clause is not tensed but is rather a gerundive form. Whereas in Mandarin, Tense is covert and hence its presence is more difficult to detect, the English data provide crosslinguistic support for the claim that these matrix verbs embed tenseless complements.

The second reason is that at least some of the matrix verbs in (114) also embed complements in which the predicate is a bare nominal. The following example is taken from Tang 1998:

- (115) zhangsan ma [ta huaidan].
Zhangsan scold 3SG bastard
'Zhangsan called him a bastard.' (Tang 1998:145)

In section 3.5 above, I showed that in matrix-level contexts, nominal predicates require the copula *shi*, and I argued that this is a requirement imposed by T. In (115), we see nominal predicates do not require an overt copula when embedded under *ma* 'scold', suggesting that this matrix verb embeds a tenseless complement.

Finally, the third reason comes from the fact that not all clause-embedding verbs allow bare adjectival predicates in their complements. This is a point made in Gu 2008 and illustrated with the following two examples:

- (116) a. women faxian [ta *(hen) congming].
 1PL discover 3SG very smart
 ‘We discovered he’s smart.’
 b. women ting-shuo [ta *(hen) congming].
 1PL hear-say 3SG very smart
 ‘We heard he’s smart.’ (Gu 2008:fn16)

A natural way to explain the contrast between the sentences in (114) and those in (116) is to propose that — just as in English — some verbs embed tenseless clauses and others embed tensed clauses. Although in Mandarin this is not directly observable since Tense is covert, it is indirectly observable through its effect on the grammaticality of bare adjectival predicates. A particularly striking minimal pair that illustrates this same point is the following (Xin Zu p.c.):

- (117) a. wo renwei ta (hen) gao.
 1SG think 3SG very tall
 ‘I think he’s tall.’
 b. wo yiwei ta *(hen) gao.
 1SG thought 3SG very tall
 ‘I thought/took for granted that he’s tall.’

Among its epistemic verbs, Mandarin lexicalizes a contrast between expression of current belief (*renwei*) and expression of past (erroneous) belief (*yiwei*). The above minimal pair — in which we see that *renwei* allows a bare adjectival predicate in its complement whereas *yiwei* does not — suggests that whereas *renwei* embeds a tenseless clause, *yiwei* embeds a tensed clause. Such a contrast invites a very natural explanation under the current approach. Namely, because *renwei* is used for current belief, there is only one projection of Tense which is at the matrix level. *yiwei*, on the other hand, involves a more complex temporal relation between the time of belief and the time of the situation described by the embedded clause, and hence requires two projections of Tense: one for the matrix clause and one for the embedded clause. This is further supported by the observation (Xin Zu p.c.) that only *yiwei* and not *renwei* can embed clauses denoting a past episodic description:

- (118) a. *wo renwei ni zou le.
 1SG think 2SG leave PRF
 ‘I think you left.’
 b. wo yiwei ni zou le.
 1SG thought 2SG leave PRF
 ‘I thought you left.’

Since the embedded clause *ni zou le* ‘you left’ denotes a past episodic event, it presumably contains a projection of T. Since *renwei* embeds tenseless clauses, it is not an appropriate complement to such a verb.

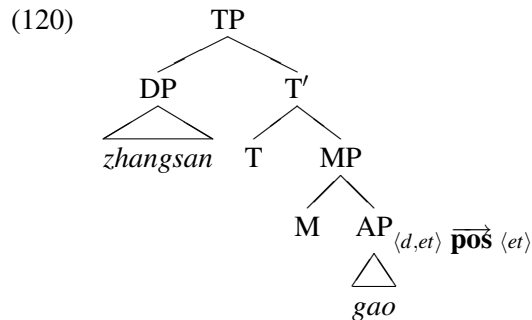
I conclude, then, based on the above considerations, that the embedded clauses in (114) do not project Tense and this is why they allow bare adjectival predicates with positive interpretation.¹⁹

The second and final kind of embedded clause I will consider here is exemplified by the following three sentences taken from Liu 2009 (see also Huang and Li 2008). Here we see that if-clauses, when-clauses, and concessive clauses all allow adjectives with no overt degree morphology:

¹⁹Liu 2009 presents three arguments against the view in Tang 1998 that the bracketed clauses in sentences like (114) are bare lexical projections, containing only the subject and a bare AP. Note that the current approach is committed only to the weaker claim that these clauses do not project Tense. Whether or not they contain other null functional projections is an independent question and one that I will not take a stance on here.

- (119) a. [zhangsan yaoshi gao dehua], lisi jiu bu ai.
 Zhangsan if tall PRT Lisi then not short
 ‘If Zhangsan is tall, then Lisi is not short.’ (Liu 2009:34)
- b. [dang laowang gaoxing de shihou], ta jiu hui qing pengyou chi fan.
 when Laowang happy PRT moment 3SG then will invite friend eat rice
 ‘When Laowang is happy, he always treats his friends to a meal.’ (Liu 2009:37)
- c. [zhangsan suiran qiong], danshi ta yizhi kao ziji guo huo.
 Zhangsan although poor but 3SG always depend self pass life
 ‘Although Zhangsan is poor, he makes a living by himself.’ (Liu 2009:38)

There are two ways of analyzing such data. First, we could take the approach adopted for the complements to embedding verbs and above and say that these adjunct clauses are tenseless. Second, we might suppose that although the adjunct clauses are tensed, they contain a covert modal projection between T and the AP predicate which satisfies the *[T AP] constraint. Liu’s approach is closest in spirit to the latter approach: following Kratzer’s (1986) proposal that the semantic function of an if-clause is to restrict a (possibly covert) necessity modal, Liu proposes that the adjectives in these examples are embedded under an epistemic operator that licenses covert POS. (As for Huang 2006 and Gu 2008, neither consider this kind of data). Here I will basically follow Liu’s approach, with the important qualification that the relevant modal operator must project below T and hence satisfy *[T AP]. Thus I propose the following basic structure for the adjunct clause, where M is the projection of epistemic modality that satisfies *[T AP] and hence allows for bare adjectives with positive semantics:



A possible line of support for this analysis is that in some cases, the modality is spelled overtly with an adverb, as in the following examples from Liu 2009:

- (121) zhangsan huoxu / keneng / kongpa / xiangbi wuzhi, cai hui zuo chu zhe zhong
 Zhangsan perhaps / possibly / probably / most-probably ignorant then will do out this CL
 shi lai.
 thing come
 ‘Perhaps/Possibly/Probably/Most probably, Zhangsan is ignorant; therefore, he has done such a thing.’ (Liu 2009:39)

Following Cinque’s (1999) proposal that adverbs are specifiers of functional heads, we may say that the adverbs in this example sit in the specifier position of a null modal head M that satisfies T and hence allows bare adjectives.²⁰

²⁰An anonymous reviewer points out that *hen* seems to be required even in the presence of a VP-external adverbial:

- (i) ta keneng *(hen) gao.
 3SG maybe very tall

Finally, as the following data from Sybesma 1997 show, unmodified adjectives can be felicitously used with modals:

- (122) ta **neng** gao.
3SG can tall
'He can become tall.'
- (123) ta **hui** pang.
3SG can fat
'He may become fat.'
- (124) ta **yao** hao.
3SG will good
'He will get better.' (Sybesma 1997:230)

These modals are overt realizations of M.²¹

5 More on the distribution of the null comparative morpheme

The purpose of this section is to explore in more detail the distribution of the covert comparative morpheme in Mandarin. Above, I argued that all of the following constructions involve a null comparative morpheme:

- (125) zhangsan gao.
Zhangsan tall
'Zhangsan is taller (than someone known from context).' INTRANSITIVE COMPARATIVE
- (126) zhangsan bi lisi gao.
Zhangsan SM Lisi tall
'Zhangsan is taller than Lisi.' *bi*-COMPARATIVE
- (127) zhangsan gao lisi liang cun.
Zhangsan tall Lisi two inch
'Zhangsan is two inches taller than Lisi.' TRANSITIVE COMPARATIVE

Both the *bi*-comparative and the transitive comparative can be negated in the normal way, by placing the negation marker *bu* between the subject and the predicate:

-
- 'He may be tall.'
- (ii) ta yiqian *(hen) gao.
he before very tall
'He was tall before.'
- (iii) ta ye *(hen) gao.
he also very tall
'He is tall as well.'

As for (i), a comparison with (121) suggests that at least some modal adverbials do support bare adjectival predicates, though a certain amount of context may be necessary in order for it to be felicitous. As for (ii), it seems likely that temporal adverbials such as *yiqian* 'before' may sit in an extended projection of T, and hence it is expected that *hen* should be required in this kind of sentence, given the *[T AP] constraint. Finally, as for (iii), it may be the case that certain adverbs like *ye* 'also' are adjuncts not associated with any particular functional head. As an adjunct, *ye* would not have an effect on the categorial status of the AP and hence not save a violation of *[T AP].

²¹As pointed out by Chris Kennedy (p.c.), the adjectives in (122)–(124) might not actually be bare, given their interpretation as degree achievements (cf. Kennedy and Levin 2008). Thus although they confirm that modals can project over adjectives in Mandarin, it may not be the modal per se that allows for a (superficially) bare adjective but rather the null degree morphology that gives rise to the dynamic interpretation.

- (128) zhangsan **bu** bi lisi gao.
Zhangsan NEG SM Lisi tall
'Zhangsan is not taller than Lisi.'
- (129) zhangsan **bu** gao lisi duoshao.
Zhangsan NEG tall Lisi how-much
'Zhangsan is not much taller than Lisi.'

The intransitive comparative, however, cannot be negated in this way. The following can only be a negation of the proposition that Zhangsan is tall (to a positive degree):

- (130) zhangsan **bu** gao.
Zhangsan NEG tall
'Zhangsan is not tall.'
NOT: 'Zhangsan is not taller (than someone known from context).'²²

Rather, as shown in Chao 1968, the intransitive comparative is negated by using *bu shi* at the left edge of the clause, as in the following hypothetical dialogue between A and B:

- (131)A:tamen shei gao?
3PL who tall
'Which of them is taller?'
- (132)B:lao er gao.
Lao Er tall
'Lao Er is taller.'
- (133)A:bu, wo xiang **bu shi** lao er gao.
NEG 1SG think NEG COP Lao Er tall
'No, I don't think Lao Er is taller.' (Chao 1968:683)

Polar questions display a similar asymmetry. Both *bi*-comparatives and transitive comparatives can be questioned using the *ma* particle:

- (134) zhangsan bi lisi gao **ma**?
Zhangsan SM Lisi tall Q
'Is Zhangsan taller than Lisi?'
- (135) zhangsan gao lisi liang cun **ma**?
Zhangsan tall Lisi two inch Q
'Is Zhangsan two inches taller than Lisi?'

To question an intransitive comparative, however, one must insert *shi* at the left edge of the clause:

- (136)A:zhangsan gao haishi lisi gao?
Zhangsan tall or Lisi tall
'Who is taller, Zhangsan or Lisi?'
- (137)B:zhangsan gao.
Zhangsan tall
'Zhangsan is taller.'

²²See also Liu 2009:10 for this and similar data.

(138)A:zhende ma? #(shi) zhangsan gao ma?
 really Q COP Zhangsan tall Q
 ‘Really? Zhangsan is taller?’

These facts raise two related questions. First, what rules out a comparative interpretation in the absence of sentence-initial (*bu shi*)? Second, why does sentence-initial (*bu shi*) give rise to a comparative interpretation?²³

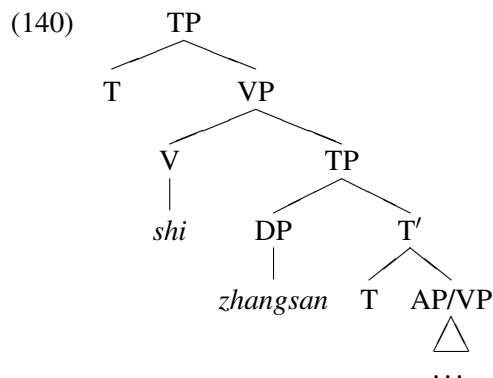
Toward an answer to the first question, what these facts suggest is that Mandarin \emptyset_{COMP} has a more limited distribution than its overt English counterpart *-er/more*. Namely, when there is no overt signal of comparative semantics, such as a standard of comparison, it can be inserted only in order to satisfy the *[T AP] constraint. Thus for most surface representations, either the *[T AP] constraint is satisfied and POS type-shifting has taken place, or the *[T AP] constraint is violated and the sentence is either ungrammatical or the null comparative morpheme is inserted. There is, however, at least one construction in which there is an ambiguity between positive and comparative interpretation, namely when the adjective is followed by a measure phrase:

(139) zhangsan gao yi mi.
 Zhangsan tall one meter
 ‘Zhangsan is one meter tall.’ OR
 ‘Zhangsan is one meter taller (than someone known from context).’

Thus when there is an overt degree expression that is compatible with both positive and comparative semantics, we find ambiguity.

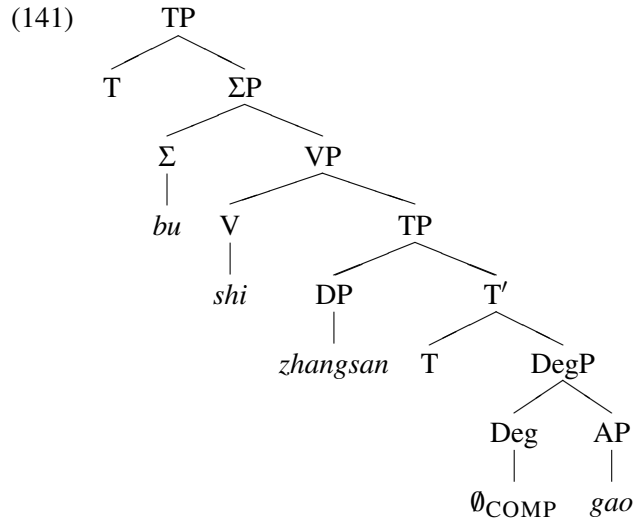
As for the second question — why sentence-initial *bu (shi)* gives rise to a comparative interpretation — this is in fact automatically predicted under the current approach to the Mandarin *hen* puzzle. In particular, I follow Paul and Whitman 2008 in supposing that sentences with sentence-initial *shi* involve two projections of Tense: one associated with sentence-initial *shi*, and one associated with the main predicate. Since negation and polar questioning apply at the matrix level, what this means is that although the higher projection of Tense will not incur a violation of *[T AP], the lower projection of Tense will incur such a violation. Hence a null comparative morpheme is inserted to save the structure, and we correctly predict the comparative interpretation.

According to Paul and Whitman 2008, the discourse function of sentence-initial *shi* is to strongly assert the proposition, or to focus the subject. Paul and Whitman 2008 propose the following basic structure for sentence-initial *shi*:

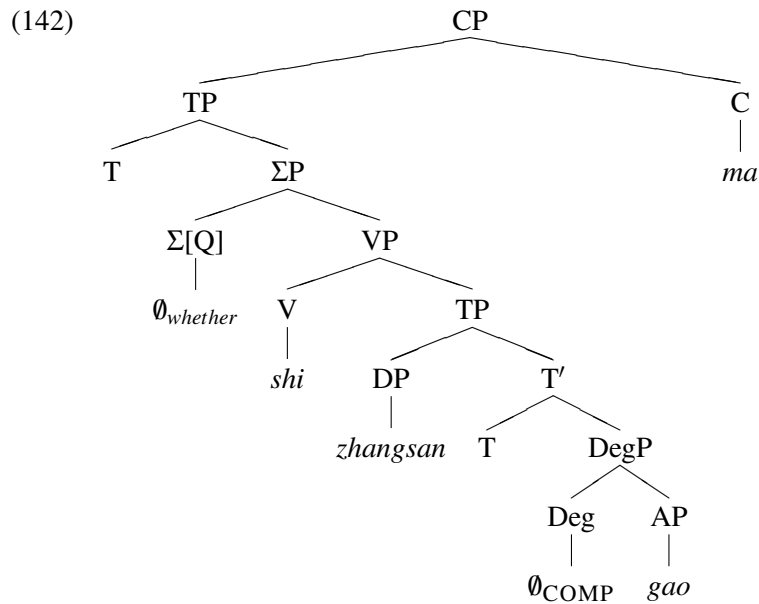


²³See also Liu 2009:35 for similar data (involving sentence-initial modal adverbials rather than negation and polar questioning). Liu argues that the copula *shi* blocks the licensing relation between the operator and POS and this is what gives rise to the comparative interpretation.

Notice that the higher instance of T does not give rise to a violation of the *[T AP] constraint since its immediate complement is V, whereas the lower instance of T potentially does, namely when the main predicate is an AP. The addition of the negation marker *bu* or the question particle *ma* will not save the structure, since in both cases Σ intervenes just below the higher T, not the lower T. Hence a null comparative morpheme is posited to save the structure. For negation, the structure is as follows:



For polar questions, the structure is as follows:



In each case, the insertion of θ_{COMP} is necessary to satisfy *[T AP]. Hence we automatically predict that the interpretation of *bu shi zhangsan gao* and *shi zhangsan gao ma?* involve comparative semantics.

6 Conclusions

A primary theoretical implication of the analysis presented in this paper is that Mandarin does not counterexample the universal generalization that comparatives are the marked member of the positive/comparative opposition; on the contrary, I have shown that the proper analysis of the Mandarin facts actually depends

on the idea that the comparative form involves additional structure, even when it is not overt. This fundamental asymmetry in the way positive and comparative semantics is realized in turn suggests that one of the following two statements must be true:

- POS is a type-shifting rule with no visibility in syntax; more generally, natural languages employ both (syntactic) null morphemes and (syntactically invisible) type-shifting rules.

—OR—

- POS does not exist; gradable adjectives directly encode properties, and their meaning in comparatives and other contexts must be derived on this basis (as in Klein 1980).

The first option is the one that I have been assuming throughout the paper; it forces us to admit in the grammar of natural languages both null syntactic morphemes (such as that providing comparative semantics) and syntactically invisible type-shifting rules (such as that providing positive semantics). If this approach is on the right track, then the analysis of any given operator as a true morpheme or syntactically invisible type-shifting rule must rely on very indirect evidence, and this raises questions about how such a system could be acquired by a language learner. One possibility is that such settings are hardwired; this is consistent with the proposal that the realization of positive and comparative semantics as a type-shifter and null morpheme respectively is universal to all languages. The second option, on the other hand, represents a more radical departure from the standard view of gradable adjective semantics, but seems an equally plausible alternative from the perspective of the data presented in this paper, and also obviates the need for the kind of complex grammar just discussed.

Aside from this crosslinguistic theoretical question, a second goal of this paper was to formulate precisely the conditions under which Mandarin allows bare adjectives with positive semantics, and to propose a principled explanation thereof. In particular, I argued that Mandarin allows bare adjectives with positive semantics just in case the adjective is not the direct complement of Tense, which happens when structure intervenes between T and the adjective, and when T is not projected. I showed that this generalization captures the data to an extent of accuracy not achieved in previous accounts of the Mandarin *hen* puzzle (Huang 2006; Gu 2008; Liu 2009). The explanation I proposed for this generalization is that Tense in Mandarin admits only verbal complements, and that although Mandarin adjectives constitute a lexical class distinct from verbs, degree adverbials and other functional heads that project over lexical predicates in Mandarin have the special property that they can combine with adjectives yet yield verbal complexes. I further showed that all of these proposals have both language-internal and crosslinguistic support.

In the end, then, the Mandarin *hen* puzzle is reduced to a conspiracy between two quite unrelated components of grammar: a universal principle governing the realization of positive and comparative semantics, and a Mandarin-specific cluster of properties that disallows bare adjectives — but allows DegPs and other functional complexes — as direct complements to Tense. Given the high crosslinguistic atypicality of the Mandarin *hen* puzzle, I believe this is a desirable result: it is only when a number of factors line up in a particular way that a distribution like Mandarin *hen* emerges.

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