Intransitive Change of State Predicates and the Notion of Acquired State in Mandarin *

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Abstract

A distinction between property concepts and result states has been observed to be relevant for distinguishing basic and deverbal adjectives in different languages (Dixon 1982, Koontz Garboden 2005). Mandarin raises interesting questions for this distinction because (i) the existence of a class of adjectives in the language has been controversial, and (ii) Mandarin has few, if any, causative change of state verbs, often a source of deverbal result state adjectives in other languages. This paper argues that the property concept/result state contrast is also relevant for lexicalization patterns in Mandarin. Recognizing a class of adjectives distinct from verbs, I identify a class of basically inchoative (intransitive) verbs. I then show, using degree modification and negation contexts, that apparent adjective+*le* sequences have inchoative interpretations because the predicate here is actually a deadjectival inchoative verb. I demonstrate that basically inchoative verbs and deadjectival inchoatives only encode (change to) result states. To emphasize that these result state predicates are not derived from causative verbs, I use the term "acquired state" here instead of "result state", which is often associated with the notion of "result of a causing action".

1 Introduction

Dixon (1982) identifies two kinds of states: property concepts, which do not arise as a result of a preceding event, and states which arise as "the result of some action" (p.50). Dixon suggests that the former kind of states is the natural province of adjectives in languages that distinguish them. The second kind of states, which can be called "result states", are, however, derived from verbs in some languages. This seems to be the case in English, where the adjectives *broken* and *loose* suggest just such a contrast. The state of being broken typically results from a breaking event, and in English, *broken* shows the participial form of *break*, suggesting that it is derived from the verb. The adjective *loose*, however, shows a morphologically simple form in contrast to the verbal form *loosen*. This suggests, in turn, that *loose* is the basic form of the adjective from which *loosen* is derived (Haspelmath 1993, Koontz-Garboden 2005).

(1) a. The window is broken.

b. The window broke.

c. Pat broke the window.

(2) a. The knot is loose.

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b. The knot loosened.

c. Sandy loosened the knot.

Mandarin raises interesting implications about the distinction between property concepts and result states, for the following reasons. First, whether Mandarin distinguishes a class of adjectives has been a topic of some controversy (Tai 1982, McCawley 1992). Second, in languages with deverbal result state adjectives, the base verb can be a causative change of state verb, with the derived adjective describing the result of that caused change of state. For instance, Levin and Rappaport Hovav (1995) argue that the causative version of *break* is basic to the state/inchoative/causative paradigm in (1).

In Mandarin, however, causative verbs that entail a change of state are few, and may only entail that some change occurred without specifying that a particular state was attained (Chief 2007). For instance, the verb *sha* 'kill', which in discussion of other languages, is often mentioned as a causative change of state verb par excellence, has been consistently noted in the literature on Mandarin, as not entailing that the patient died (Tai and Chou 1975, Sybesma 1997, Tai 2003, Chief 2007, Chief and Koenig 2007). These generalizations about Mandarin then pose the question of whether the property concept/result state distinction is universally distinguished in grammatical terms, and if so, how it is realized in a language without a clear class of adjectives, and without a clear class of caused change of state verbs.

In this paper, I show that Mandarin does indeed make a distinction between property concept and result state in its lexicalization patterns. The particular morpholexical resources available to Mandarin, however, constrains the encoding of these semantic categories to certain possibilities. As part of the argument, I demonstrate how these categories are realized in Mandarin. The resulting picture will consist of the following components:

1. In accordance with recent works e.g. Paul (2005), I assume that Mandarin does have a class of adjectives.

2. I show further that Mandarin has (at least) two classes of inchoative (intransitive) verbs, one basic and one deadjectival. That is, adjectives may lend themselves to the derivation of inchoative verbs.

3. Both basically inchoative and deadjectival inchoative verbs encode result states in the general sense of a state arising (often spontaneously) from a preceding eventuality or preceding conditions. Because discussions of result states often include states derived from causative predicates, I adopt the term "acquired state" to distance the current discussion from such an association. This distinction has no theoretical import, however, and the reader should feel free to substitute "result state" for "acquired state" in this paper.

4. Adjectives may encode both property concept states and acquired states.

The paper is structured as follows: In the next section, I lay out some background concerning the long-standing debate on adjectives in Mandarin, and, adopting arguments in Paul (2005), among other reasons, propose to recognize a class of adjectives. In section 3, I address one of the reasons for the controversy over adjectives: the inchoative interpretations associated with adjectival predicates. By first identifying a hitherto largely unnoticed class of basically inchoative verbs with no stative counterparts, I argue that the inchoative interpretations of adjectival predicates arise because the predicate here is really a deadjectival inchoative verb. I outline in section 4 a possible semantic analysis for adjectives and inchoative verbs based on Kennedy and Levin's (2008) use of measure functions and measure of change functions to capture adjectival and change of state meanings. In section 5, I consider the other side of the question: whether basically

inchoative verbs have adjectival counterparts, and argue against this possibility. Section 6 discusses the semantic basis of inchoative verbs in Mandarin, showing that these encode a change to an acquired state. I also show that the notion of "acquired state" is distinct from the notion of "external causation" posited to underlie the English causative alternation (Levin and Rappaport Hovav 1995). Section 7 concludes the paper.

2 Adjectives in Mandarin

The status of a category of adjectives in Mandarin has been an issue of some controversy, with some arguing against this category (Tai 1982, McCawley 1992), and some for (Paul 2005, Huang *et al.* 2009:21-26). Some researchers recognize adjectives as a subclass of verbs (Chao 1968, Zhu 1956/1980, 1982, Li and Thompson 1981:142). In many cases, researchers not directly dealing with the topic have simply made the necessary assumptions and left the matter unresolved. In this section, I briefly recapitulate arguments on either side, and argue that it is indeed possible to assume a category of adjective in Mandarin.

2.1 Similarities between verbs and adjectives

Three major points, well-documented in the literature, serve to obscure the verb/adjective distinction. First, only adjectives are typically expected to allow modification by intensifying adverbials, and to participate in comparative structures. In Mandarin, putative adjectives such as *gao* 'tall, high' (3a) do combine with intensifiers such as *hen* 'very', *feichang* 'extremely', which is unsurprising. In addition, however, stative verbs such as *xihuan* 'like' (3b) can also be modified with these adverbials (McCawley 1992). This suggests there may be no real distinction between adjectives and verbs. A related issue is that in (3a), the presence of *hen* 'very' or some other degree modifier seems necessary to obtain a positive interpretation of the predicate. If no such modifier is present, as in (3c), the sentence takes on a comparative interpretation. I discuss this in the next subsection.

(3) a. Sanmao hen gao
Sanmao very tall
Sanmao is (very) tall.

b. Sanmao hen xihuan mao
Sanmao very like cat
Sanmao likes cats very much.

c. Sanmao gao
Sanmao tall
Sanmao is *taller*.

Second, many putative adjectives also show verb-like behaviour. In particular, they allow an inchoative, or change of state, interpretation, most notably in the presence of the perfective marker *-le* (4b). This may be part of the reason for their being treated as a subclass of verbs (Chao 1968, Zhu 1956/1980, 1982); i.e. Li and Thompson's (1981) (1981:142) "adjectival verbs".

(4) a. bing-ren xue-ya hen gao
patient blood-pressure very high
The patient's blood pressure is high.

b. bing-ren xue-ya gao-le
patient blood-pressure high-PERF[1]
The patient's blood pressure has risen.

Third, Mandarin adjectives often show some degree of unpredictability in nominal modification contexts when the associative marker *de* is absent. This has led some to conclude that putative Adj+Noun sequences are instances of word formation (potentially with verbs), rather than phrasal modification (McCawley (1992:233-235), Duanmu (1998:157)), with the presence of *de* being treated, for instance, as indicating a relative clause (Sproat and Shih 1991). If there is no productive process of adjectival modification of nominals, it suggests that these potential adjectives could still be treated as verbs.

2.2 Degree modification is not necessary for verbs

In recent work, however, observations have been made to counter (or that can counter) at least the first and third claims.

As noted above, some kind of degree modification seems to be needed in simple adjectival predication sentences such as (3a), to obtain a positive interpretation for the adjective. If no modifier is present, as in (3c), a comparative reading arises (Zhu 1956/1980, Sybesma 1999). As Francis and Matthews (2005) show for Cantonese, however, although both stative verbs and potential adjectives *allow* degree modification, only the latter seem to require it in a simple predication context. This points to some kind of contrast between the two classes. The same generalization holds in Mandarin: In (3a), *hen* 'very' is needed for a positive interpretation, but in (3b), it is optional. Although Francis and Matthews (2005) do not argue for a class of adjectives in Cantonese distinct from verbs, the observations they provide, applied to Mandarin, can be seen to indicate some kind of distinction between adjectives and verbs.

Researchers have been careful to note that the comparative reading without degree modification, seen in (4c), arises only in certain contexts. In other contexts, e.g. embedding, negation, or where two adjectival predication sentences are juxtaposed, etc. the positive reading is available without degree modification (Zhu 1956/1980:26). Several recent works have dealt in detail with identifying the kinds of contexts that license the positive interpretation of an unmodified degree adjective (Huang 2006, Gu 2008, Liu 2010, Grano 2010). Nonetheless, it remains true that stative verbs such as *xihuan* 'like' do not show this restriction, and the observation is still relevant to distinguishing verbs and adjectives.

2.3 Non-predicative adjectives

With regards to nominal modification, Paul (2005) argues against the compounding analysis of all Adj+Noun sequences unmediated by *de*, and against an across-the-board relative clause analysis of those in which *de* is present. Citing work by Lü and Rao (1981), Paul (2005:759) notes first, that there is in Mandarin "a large class of nonpredicative adjectives which cannot function as predicates on their own but only as modifiers". In predicate position, these adjectives require the copula *shi* and the particle *de* (5a), but *shi ... de* cannot occur in a modification structure, thus showing that at least in this context, the modifying adjective does not constitute a relative clause.

(5) a. zhei ge panzi shi fang de
this CL plate be square DE
This plate is square.

[1]Abbreviations used: ASSOC = associative marker; CL = classifier, PERF = perfective, NEG = negation.

b. wo mai-le yi ge (*shi) fang (de) panzi
1sg buy-PERF one CL be square DE plate
I bought a square plate.
(Paul 2005:760, (4a, b))

Moreover, in attributive contexts with these adjectives, the presence of *de* is optional, which casts doubt on the assumption that Adj+Noun in the absence of *de* are lexical compounds.

(6) yi ge fang (de) panzi
one CL square DE plate
a square plate
(Paul 2005:760, (6))

Finally, Paul demonstrates a contrast between lexical versus phrasal instances of adjectives in modifier position. In phrasal modification structures, the head noun is accessible to phrase structure operations, whereas in cases of lexical compounding, it is not, in accordance with the lexical integrity hypothesis (Huang 1984). Paul argues that in (7a), the head noun *meigui* 'rose' modified by *huang* 'yellow' is visible to rules at the phrasal level. This allows an identity relation to be construable with the head noun in a following NP, licensing that empty head. In (7b), *cha-hua* 'camellia, *lit.* tea flower' is a compound. Its head noun is not visible to phrasal operations, thus it cannot participate in an identity relation with the head of a following NP, which in turn cannot be empty.

(7) a. Amei bu xihuan huang meigui, hong-de hai keyi.
Amei NEG like yellow rose red-DE still acceptable
Amei doesn't like yellow roses, red ones are still ok.
(Paul 2005: 763, (19))

b.*Amei bu xihuan cha-hua, hong-de hai keyi.
Amei NEG like tea-flower [=camellia] red-DE still acceptable
Amei doesn't like camellias, red ones are still ok.
(Paul 2005:763, (23))

These arguments show that it is possible, and indeed useful, to distinguish a class of adjectives in Mandarin. One issue remains unresolved, however. The ability of putative adjectives such as *gao* 'tall/high' to take on inchoative interpretations must still be accounted for. It is possible, for instance, that Paul's arguments are correct for non-predicative stative predicates, but that words such as *gao* 'tall/high', which show both predicative and modification uses, are verbs. In the next section, I address this issue, showing how the adjectival status of *gao* 'tall/high' can be reconciled with its inchoative interpretation.

3 Distinguishing stative and inchoative predicates

Across languages, the class of adjectives encodes states. If the word *gao* 'tall, high' is an adjective, this raises the question of how the *change of state* meaning in (4b) arises.

(4) b. bing-ren xue-ya gao-le
patient blood-pressure high-PERF
The patient's blood pressure has risen.

The obvious solution would be to attribute the inchoative meaning to the perfective marker *-le*. In this section, however, I argue that the change of state meaning arises from *gao* itself: In (4b) *gao* 'tall/high' is an inchoative verb. That is, the form *gao* 'tall/high' is ambiguous between a gradable adjective that is stative, and an inchoative verb, which I assume is derived from the adjective. I argue for this conclusion by comparing the inchoative interpretations of these deadjectival predicates with a group of verbs that I show to be basically inchoative, a class that has received little, if any, attention so far. Because a gradable adjective and its inchoative verb counterpart share the same form, I will sometimes use the term "adjectival predicate" in contexts where the category of the predicate is unclear.

3.1 A brief background

In the debate over whether to recognize a class of adjectives in Mandarin, another distinction in the language has been obscured: This is the contrast between basically stative and basically inchoative predicates. One side-effect of the verb-adjective debate is that assumptions about the lexical category of predicates relevant to the issue are often made without argument. These assumptions might not have strong consequences for a certain work, and indeed, are often correct (based on criteria I argue for below), but this lack of empirical criteria has given rise to conflicting assumptions about various predicates between researchers. In particular, it has obscured a distinction between basically stative and basically inchoative predicates. For perspective, it should be noted that, just like the verb/adjective distinction, the distinction between stative and inchoative predicates is also non-obvious. This is due in part to the frequent association of the aspectual marker *-le* with inchoative interpretations of adjectival predicates such as *gao* 'tall/high' (4b), as noted in the discussion of (4), repeated below:

(4) a. bing-ren xue-ya hen gao
patient blood-pressure very high
The patient's blood pressure is high.

b. bing-ren xue-ya gao-le
patient blood-pressure high-PERF
The patient's blood pressure has risen.

This pervasive pattern could well be why some inconsistencies in classification are to be found in the literature. For instance, while both sentences in (8a, b) share the same form (also shared by (4b) above), Li and Thompson (1981) treat each predicate differently. They assume *hua* 'melt' in (8a) to be "an adjective with an end point as part of its meaning", but take *si* 'die' to be a change of state verb (p.251).

(8) a. bing dou hua-le
ice all melt-PERF
The ice has all melted.

b. ta qu-nian si-le
3sg last-year die-PERF
(S)he died last year.

It does not seem controversial that dying, which involves a change of state, should be described by an inchoative verb. Yet as much as dying, melting also involves a change of state (hence an endpoint). Yet *hua* 'melt' is assumed to be an adjective, which implies that *hua* is stative at some level. Its change of state status

in (8) would then be a derived one. It is not clear, however, what empirical criteria enter into this distinction. Similar questions arise with the assumption in Ross (2002: 348-351) that *bing* 'sick' corresponds to a state, whereas *si* 'die' describes a change of state.

Below, I show that in fact *bing* 'sick' and other verbs like it (see section 6.1), are basically inchoative.[2] They can be distinguished from adjectives such as *gao* 'tall/high' in (4a).

3.2 Diagnosing inchoatives

It should first be reiterated that (4b), which contains what I shall argue to be a deadjectival verb, shares the same *Pred+le* form as the examples in (8) above and (9) below. The predicates in (8) and (9) are, however, basically inchoative verbs.

(4) b. bing-ren xue-ya gao-le
patient blood-pressure high-PERF
The patient's blood pressure has risen.

(9) a. ta bing-le
3sg sick-PERF
(S)he got sick.

b. huo mie-le
fire extinguish-PERF
The fire went out.

Aspectually, these examples all encode a change of state, and are compatible with the telic contexts, as shown by their ability to occur with an *in X amount of time* adverbial (10)-(11).

(10) bing-ren (da-le zhen hou,) xue-ya liang xiaoshi (nei) jiu gao-le
sick-person hit-PERF needle after blood-pressure two hours within JIU high-PERF
The patient's blood pressure rose in two hours (after getting the injection).

(11) ta (lin yu hou,) liang tian (nei) jiu bing-le
3sg wetted rain after two day (within) JIU sick-PERF
(S)he got sick in two days (after getting wet in the rain).

This observation is not new, and the telicity of these examples could well be attributed to the presence of *-le*. For instance, Smith (1997) notes that examples such as (9a) are inchoative, but treats the verb itself as stative, taking the inchoative interpretation to be a "shifted" one (p.265). It is not clear from the discussion whether it is the aspectual class of the verb or the entire sentence that has shifted. I argue below that in all of the cases in (4b), (8), and (9), the inchoative interpretation should be attributed to the verb rather than to *-le*, and for (9a) in particular, I argue that the verb itself is actually inchoative and has no stative counterpart.

[2] Although *hua* 'melt' also seems to have a causative use (Gu 1992):
(i) ta-men hua-le yi kuai bing
3-pl melt-PERF one piece ice
They melted a piece of ice.
(Gu 1992:99, (18d))
The question of causative verbs not formed through the resultative construction is complex, and the topic for another project, so although *hua* 'melt' is presumably also basically inchoative, I do not argue for this specifically, and for the most part, exclude it from the following discussion.

3.2.1 Degree modification contexts

Despite their shared compatibility with perfective *-le*, deadjectival and basically inchoative predicates differ in the kinds of degree modification contexts they are compatible with. The classic kind of degree modification with intensifiers such as *hen* 'very', *feichang* 'extremely', and post-predicate *ji-le* 'to the utmost', can combine only with stative predicates, including adjectives (12).

(12) a. shu-ye hen/feichang hong
tree-leaf very/extremely red
The leaves are (very)/extremely red.

b. shu-ye hong ji-le
tree-leaf red to.the.utmost
The leaves are extremely red.

This is not possible for a basically inchoative predicate such as *zui* 'intoxicated', as (13a, b) show. The same is true of the abovementioned predicates such as *hua* 'melt', *bing* 'sick'.[3]

(13) a.*Sanmao hen/feichang zui/bing
Sanmao very/extremely intoxicated/sick
Intended: Sanmao is (very)/extremely drunk/sick.

b.*Sanmao zui/bing ji-le
Sanmao intoxicated/sick to.the.utmost
Intended: Sanmao is extremely drunk/sick.

This is not because *zui* 'intoxicated' is say, non-gradable. Rather, degree modification must be encoded in another structure. To encode the attainment of excessive intoxication, a *-de* complement structure is employed, with the modifying phrase *hen lihai* 'seriously' (14).

(14) Sanmao zui-de/bing-de hen lihai
Sanmao intoxicated-DE/sick-DE very serious
Sanmao is intoxicated/sick to a serious extent.

Now consider again the adjectival predicates such as *gao* 'tall, high', *hong* 'red', *bai* 'white', etc., which we saw above are compatible with *hen* 'very', *feichang* 'extremely' etc. Like verbs such as *zui* 'intoxicated', *bing* 'sick', etc., these adjectival predicates can also combine with *-de hen lihai* (15a). Importantly, however, in this case they can only take on an inchoative interpretation, as the contrast between (15b, c) demonstrates. When modified with *hen* 'very' (15b), the predicate *bai* 'white' can encode a congenitally high degree of whiteness in hair. When *bai* 'white' it occurs with *-de hen lihai*, it must encode a change to a high degree of whiteness, and (15c) is infelicitous because the context indicates the improbable situation of a baby's hair somehow either turning white or having turned white at birth.

(15) a. Sanmao de toufa bai-de hen lihai
Sanmao ASSOC hair white-DE very serious
Sanmao's hair turned drastically white.

[3]Ross (2002:348, (11)) shows *bing* 'sick' modified by *hen* 'very'. This is ungrammatical for me and other speakers I have consulted, but suggests there may be speaker variation on the representation of *bing* 'sick'.

b. Sanmao yi sheng-xia-lai toufa jiu hen bai
Sanmao one born-down-come hair JIU very white
Sanmao's hair was white since birth.

c.#Sanmao yi sheng-xia-lai toufa jiu bai-de hen lihai
Sanmao one born-come-down ASSOC hair white-DE very serious
Intended: Sanmao was born with very white hair.
Can only mean: Sanmao's hair turned drastically white as soon as he was born.

What does this pattern of interpretation indicate? Only the stative interpretation of adjectival predicates such as *hong* 'red', *bai* 'white' etc. can combine with degree modifiers such as *hen* 'very'. Verbs such as *zui* 'intoxicated', etc. cannot occur with these modifiers, but rather, must be modified with *de hen lihai* 'to a serious extent'. The same is true of the inchoative interpretation of *hong* 'red', *bai* 'white' etc. This indicates that *zui* 'intoxicated' and the inchoative interpretation of *bai* 'white must share some property. Furthermore, this property cannot be shared between *zui* 'intoxicated' and the stative interpretation of *bai* 'white', since the former cannot occur with *hen*. I propose this property is simply that of being an inchoative verb. Adjectival predicates such as *bai* 'white' are ambiguous between an adjective and an inchoative verb, while *zui* 'intoxicated' can only be an inchoative verb.

3.2.2 Negation

The preceding conclusion receives support from how deadjectival and basically inchoative predicates interact with negation marking. Researchers have noted that the two negation morphemes in Mandarin, *bu* and *mei*, combine with predicates of different aspectual categories, although different explanations have been proposed for these distinctions (Li and Thompson (1981: 421-440), Huang (1988), Ernst (1995), Lin (2003a)). In particular, *bu* is associated with negating the presence of some state, whereas *mei* is associated with negating the occurrence of an event (Lin 2003a). This point is demonstrated by Lin with the examples in (16), with *lao* 'old'. With *bu*, *lao* 'old' has a stative meaning (16a), and with *mei*, it indicates a change of state (16b) (see also Liu (2010: 1036)).

(16) a. ta kan-shangqu yi dian dou bu lao
3sg look-appear one little all not old
He is not old at all in appearance.
(Lin 2003a:437, (23))

b. ta kan-shangqu yi dian dou mei lao
3sg look-appear one little all not old
He hasn't become old at all in appearance.
(Lin 2003a:437, (24))

Turning to basically inchoative predicates, we find that they cannot be negated using *bu* in declarative contexts (17a). Rather, to claim that someone isn't drunk, *mei* must be used (17b). Although *bu* can be found with *zui* 'intoxicated' in idiomatic expressions such as (17c), the verb is still interpreted as inchoative in the example. I assume *bu* is able to occur here because it takes scope over the polarity of the proposition *women zui* 'we become drunk' in the conditional clause, and not over the event of becoming drunk denoted by *zui* 'intoxicated'.

(17) a.*Sanmao **bu** zui
Sanmao not intoxicated
Intended: Sanmao isn't/didn't get drunk.

b. Sanmao **mei** zui
Sanmao not intoxicated
Sanmao isn't/didn't get drunk.

c. wo-men bu zui bu gui
1-pl not intoxicated not return
If we don't **get drunk** we won't go home.

Converging with this contrast, Lin (2003a) notes that predicates describing individual level states cannot be negated by *mei* (18b). This would mean that individual level state-denoting adjectives such as *congming* 'intelligent' do not alternate with inchoative meanings.

(18) a. ta bu congming
3sg not intelligent
He is not clever.

b.*ta mei congming
3sg not intelligent
He has not turned clever.
(Lin 2003a: 437, (25))

The negation patterns support the hypothesis that verbs such as *zui* 'intoxicated' are basically inchoative, and thus also eventive, and allowing negation by *mei* but not by *bu*. They also support the related hypothesis that predicates such as *lao* 'old' (also *gao* 'tall/high', and *hong* 'red', discussed above) have both state and inchoative meanings. Finally adjectives that describe individual level states such as *congming* seem to be stative only, as suggested by their incompatibility with *-le* (Liu 2010:1035): [4]

(19)*Zhangsan congming/ben le
Zhangsan smart/stupid PERF
Zhangsan got smart/stupid.
(Liu 2010:1035 (83a))

Summary and discussion

To sum up briefly, adjectival predicates such as *lao* 'old', *hong* 'red', *gui* 'expensive', *zang* 'dirty', *pang* 'plump, fat', etc. occur with degree modifiers such as *hen*, *feichang*, and are negated with *bu*, on a stative interpretation. These predicates may also occur with *mei* 'not' and be modified with *-de hen lihai* 'to a serious extent', but only on a change of state interpretation. In contrast, verbs such as *zui* 'intoxicated', *bing* 'sick', *mie* 'extinguish', as well as others listed below (section 6.1), etc. are basically inchoative. They cannot be modified with *hen* 'very', *feichang* 'extremely', but only with *-de hen lihai* 'to a serious extent'. They can only be directly negated by *mei*, and not by *bu*. These patterns are laid out in (20):

[4]There may be speaker variation on the (un)acceptability of examples such as (19). For myself, (19) is acceptable, but in agreement with Lin's judgement, (18b) is not. I speculate that the change of state reading of (19) could be due to pragmatic coercion (Koontz-Garboden 2007), rather than a derived inchoative status for *congming* 'intelligent' Thus the generalization that individual level adjectives do not alternate to inchoative readings would still hold.

(20)

	basic stative, e.g. *lao* 'old', *hong* 'red'	basic inchoative, e.g. *zui* 'intoxicated', *bing* 'sick'
hen 'very'	ok	*
-de hen lihai 'to a serious extent'	ok as change of state	ok
bu 'not'	ok	*
mei 'not'	ok as change of state	ok

These patterns allow us to conclude that adjectives such as *hong* 'red', *gao* 'tall/high', etc. also have inchoative verbal counterparts, whereas predicates such as *zui* 'drunk', *bing* 'sick' etc. are simply inchoative verbs.

An important consequence of this proposal is the conclusion that in inchoative sentences containing gradable predicates with a final *-le*, the inchoative interpretation cannot be attributed to the presence of *-le*. In research on *-le*, the status of sentences such as (4b) has always been somewhat controversial.

(4) b. bing-ren xue-ya gao-le
patient blood-pressure high-PERF
The patient's blood pressure has risen.

In works that take verb-final *-le* as a perfective marker that occurs with bounded situations, *-le* should not be compatible with states (Li and Thompson 1981:185-216, Ross 1995, Smith 1997, Soh and Gao 2007), with the consequence that if *gao* in (4b) describes a state, as most researchers have assumed so far, *-le* here cannot be the verb-final one. Thus within this approach, the *-le* in (4b) has been treated as a case of sentence-final *-le* (Ross 1995, Soh and Gao 2007), which can indicate that a new situation obtains (Li and Thompson 1981:240–290, Ross 1995:111). For works that take *-le* to be a realization marker (Liu 1988, Sybesma 1997, Lin 2003b) stative predicates are allowed to combine with perfective *-le*, with *-le* contributing the inchoative interpretation.

Yet as Sybesma (1997) notes, the inchoative interpretation of adjectival predicates is available in the absence of *-le*, e.g. when a modal is present, as the following examples, from Sybesma (1997), 230:(21) show.[5]

(21) a. ta neng gao
3sg can tall
He can become tall.

b. ta hui pang
3sg can fat
He may become fat.

c. ta yao hao
3sg will good
He will get better.

Moreover, as examples such as (8) and (9) show, even basically inchoative verbs such as *bing* 'sick' in simple predication sentences, occur with *-le*. This opens the possibility that sentences such as (4b) contain an inchoative verb. My proposal that adjectival predicates such as *gao* 'tall/high' can also take on inchoative

[5] All glosses and free translation from original.

verb status is consistent with the possibility of examples such as (21).[6] For examples such as (4b), my proposal means that the predicate occurring with *-le* here is itself inchoative. It does not need to draw upon *-le* for the inchoative interpretation. It also means that the *-le* in (4b) could well be the verb-final *-le*. This conclusion would dovetail with the observations that verb-final *-le* is not compatible with states. Therefore, it is not necessary to treat *-le* in (4b) as sentence-final *-le* (contra Li and Thompson (1981), Ross (1995), Soh and Gao (2007)), nor is it necessary to explain around the ability of verb-final *-le* to yield an inchoative interpretation with what seems to be an adjective (see e.g. the discussion in Sybesma (1997: 233-237)).

4 Sketching an analysis

In this section, I adopt major elements of Kennedy and Levin's (2008) recent treatment of degree achievements in English to describe the meanings of gradable adjectives and inchoative verbs in Mandarin. This treatment relies on the notions of measure functions (Kennedy 1997, Kennedy and McNally 2005) and measure of change functions (Kennedy and Levin 2008). In this approach, adjectives in Mandarin, as posited for English, denote measure functions, whereas inchoative verbs, whether basic or derived from adjectives, denote measure of change functions.

4.1 Apparatus

To account for the degree modification contrasts between adjectives and inchoative verbs discussed above, I adopt the semantics for adjectival meanings and related comparative and inchoative meanings proposed in Kennedy and Levin (2008). This approach makes use of: (i) a domain of ordinary individuals (type e), represented with variables such as x, y, z; (ii) a type of events (type v, variables e, e', e''); (iii) the notion of scales, which are sets of totally ordered points, defined by some dimension (Kennedy 1997, Kennedy and McNally 2005); (iv) degrees (d), which are intervals on a scale, and (v) times (type i, variables t, t', t'').

Kennedy and Levin (2008) treat gradable adjectives as directly corresponding to measure functions: These are functions from individuals and times, returning a degree on the scale associated with the adjective. The meaning of a gradable predicate **G** has the form in (22), further exemplified with the meaning for *red* in (23) below:[7]

(22) $\lambda x \lambda t\ \mathbf{G}(x)(t)$

(23) $[\![\textit{red}]\!]$: $\lambda x \lambda t.\mathbf{red}(x)(t)$

A consequence of the current approach is that adjectives do not themselves constitute predicates. They must be converted into predicates by some other function, typically by combining with degree expressions such as intensifiers or comparative morphology. In the absence of overt degree morphology, Kennedy and Levin (2008) assume the presence of a null degree head or a semantic type shifting operation that also provides a contextually-dependent interpretation of the degree of the particular adjectival property encoded. This is performed by the function **pos**, which combines with the meaning of a gradable adjective, yielding a degree

[6] Note, however, that we still cannot conclude from this discussion that *-le* in sentences such as (4b) can only be verb-final *-le*, only that it could be.

[7] An alternative, and more traditional approach, is to treat adjectives as relations between degrees and individuals (type $< d, < e, t >>$) (Cresswell 1976, von Stechow 1984, Heim 2000, Kennedy and McNally 2005). The following discussion could equally well be couched in such terms.

that provides a standard of comparison for the adjective in the context of utterance (p.168), where **stnd** is "a function from gradable adjective meanings to degrees that returns a standard of comparison for the adjective in the context of utterance: the minimum degree required to 'stand out' in the context relative to the kind of measurement expressed by the adjective".

(24) **pos** = λ **G** $\in D_{<i,<e,d>>}\lambda t\lambda x.\mathbf{G}(x)(t) \succeq$ **stnd(G)**

So (23) would correspond to the meaning of the adjective *red*, while (25) would give the meaning of an AP containing only the adjective *red*.

(25) **pos**($[\![red]\!]$) = **pos**($\lambda t\lambda x.$**red**$(x)(t)$)

= $\lambda t\lambda x.$**red** $\succeq$ **stnd(red)**

This approach to adjectival predication will provide a convenient way to capture the degree modification contrasts discussed above. [8]

Based on this treatment of gradable adjectives as measure functions, Kennedy and Levin (2008) define a family of measure functions that encode the semantic core of adjectival predicates and their related comparative and inchoative counterparts. These consist of a plain vanilla measure function **m**, discussed above, a difference function $\mathbf{m}_d{}^{\uparrow}$, relevant for a comparative meaning, and importantly for this paper, a measure of change function $\mathbf{m}_{\Delta}$, which figures in change of state meanings.

Although I shall not be discussing comparative meanings here, difference functions merit a brief introduction as a bridge to introducing measure of change functions. A difference function is also a measure function, and as such also returns a degree. This degree, is, however, a difference value: The difference between the degree to which the relevant property holds of an entity, and an arbitrary degree provided by the comparative standard. If a positive difference exists, this returns a positive value, otherwise the difference function returns zero. Difference functions are formalized as below:

(26) *Difference functions*

For any measure function **m** from objects and times to degrees on a scale S, and for any $d \in S$, $\mathbf{M}_d{}^{\uparrow}$ is a function just like *m* except that

i. its range is $\{d' \in S | d \preceq d'\}$

ii. for any x, t in the domain of **m**, if $\mathbf{m}(x)(t) \preceq d$, then $\mathbf{M}_d{}^{\uparrow}(x)(t) = d$

The intuition behind difference functions is that they are associated with a scale that is identical to the scale of the basic measure function, but with a minimal element (Kennedy and Levin's (2008)'derived zero') set by the comparative standard. So in the expression *wider than the carpet* (to use the example in Kennedy and Levin (2008)), the scale against which the entity at hand is measured has a minimal element corresponding to the width of the carpet. When applied to some individual with a width greater than the width of the carpet, it returns a positive degree (and zero otherwise). With this brief discussion of difference values, we can now turn to measure of change functions.

[8] It also raises a host of questions regarding the need for *hen* in predicative contexts to prevent a comparative reading (see discussion around (3). Fortunately, much recent work has centred around precisely this issue (Huang 2006, Gu 2008, Liu 2010, Grano 2010), which show that a positive interpretation for predicative adjectives is possible with *hen* in the right contexts, and so a null **pos** function is plausibly still available in Mandarin (see especially Liu (2010) and Grano (2010) for this last point).

A measure of change function is a special kind of difference function, so it also yields a difference value, but as its name suggests, this difference value is drawn from the change an individual undergoes — by way of participating in an event. A measure of change function applies to an individual and an event, yielding the difference in degree of the relevant property holding of that individual at the beginning and the end of the event, as a result of participating in that event:

(27) Measure of change: For any measure function **m**, $\mathbf{m}_{\Delta} = \lambda x \lambda e.\mathbf{m}_{m(x)(init(e))}{}^{\uparrow}(x)(fin(e))$

Here, the individual is mapped onto a scale also with a derived minimal element. In this case, the 'derived zero' is the degree to which m holds of x at the initial point of e. The function yields the positive difference between this degree and the degree to which m holds of x at the final point of e, and zero if there is no positive difference (*init* and *fin* are functions returning the initial and final temporal intervals of an event).

In this approach, the measure of change function lies at the heart of the semantics of change of state verbs. The meaning of a verb such as *redden*, for instance, would correspond to the measure of change $\mathbf{red}_{\Delta}$, with the meaning in (28) below.

(28) $[\![redden]\!] = \mathbf{red}_{\Delta} = \lambda x \lambda e.\mathbf{red}_{\mathbf{red}(x)(init(e))}{}^{\uparrow}(x)(fin(e))$

Since a measure of change function also returns a degree, a function analogous to **pos** for adjectives is needed to convert it into a predicate of individuals. Kennedy and Levin (2008) provide $\mathbf{pos}_v$ below:

(29) $\mathbf{pos}_v = \lambda g \in D_{m\Delta}\ \lambda x \lambda e.g(x)(e) \succeq \mathbf{stnd}(g)$
where $D_{m\Delta}$ indicates the domain of measure of change functions.

Applying $\mathbf{pos}_v$ to a measure of change function yields the form of an inchoative verb:

(30) $\mathbf{pos}_v(\mathbf{m}_{\Delta}) = \lambda x \lambda e.\mathbf{m}_{\Delta}(x)(e) \succeq \mathbf{stnd}(\mathbf{m}_{\Delta})$

A more concrete example is given below using the verb *redden*:

(31) $\mathbf{pos}({}_v[\![redden]\!]) = \lambda g \in D_{m\Delta} \lambda x \lambda e.g(x)(e) \succeq (g)(\mathbf{red}_{\Delta})$
$= \lambda x \lambda e.\mathbf{red}_{\mathbf{red}(x)(init(e))}{}^{\uparrow}(x)(fin(e)) \succeq \mathbf{stnd}(\mathbf{red}_{\Delta})$

This predicate, when applied to an individual and an event, will yield a truth value: So the sentence *John's face reddened* will be true will be true just in case John participated in an event such that the difference between how red John's face is at the end of the event, and how red it is at the beginning of the event, is at least as much as what is considered standard for reddening in that context.

4.2 Scalar predicates in Mandarin

Returning to Mandarin, I assume, following Kennedy and Levin (2008), that gradable adjectives are associated with a scale, and they project measure functions which combine with a **pos** function to become predicates. Following proposals in Liu (2010) and Grano (2010), I also assume that **pos** may be null, or realized by *hen* 'very'.

(32) *gao*: Adj 'tall/high'

$[\![gao_{Adj}]\!]$: $\lambda x \lambda t.\textbf{tall}(x)(t)$

(33) **pos**($[\![gao_{Adj}]\!]$) = **pos**($\lambda x \lambda t.\textbf{tall}(x)(t)$)

= $\lambda x \lambda t.\textbf{tall}(x)(t) \succeq$ **stnd(tall)**

In addition, I also assume that gradable adjectives describing stage-level properties (Carlson 1977) are systematically polysemous as inchoative verbs which denote the corresponding measure of change function. That is, an adjective such as *gao* 'tall/high' also has an inchoative verb counterpart *gao* 'to become taller/higher'. Alternatively, it can also be assumed that some lexical operation, effectively analogous to Dowty's (1979) BECOME, derives inchoative verbs from these adjectives. The distinction is not crucial for my purposes, and I leave the exact nature of this alternation as a topic for future research.

(34) *gao*: V 'to become taller/higher'

$[\![gao_V]\!]$ = $\textbf{tall}_{\Delta}$

= $\lambda x \lambda e.\textbf{tall}_{\textbf{tall}(x)(init(e))} \uparrow (x)(fin(e))$

In contrast, basically inchoative verbs such as *zui* 'intoxicated', while also associated with a scale, only project a measure of change function.[9]

(35) *zui*: V 'to become intoxicated'

$[\![zui_V]\!]$ = $\textbf{intox}_{\Delta}$

= $\lambda x \lambda e.\textbf{intox}_{\textbf{intox}(x)(init(e))} \uparrow (x)(fin(e))$

The reason *hen* 'very' cannot modify *zui* 'intoxicated', then, is because *zui* 'intoxicated' is of the wrong semantic type, and not because it is a verb. As noted in section 2, *hen* can modify verbs as long as they describe (gradable) states, as exemplified by verbs describing mental states such as *xihuan* 'like':

(3) b. Sanmao hen xihuan mao
Sanmao very like cat
Sanmao likes cats very much.

Unlike *hen* 'very', the adverbial *-de hen lihai* 'to a serious extent', combines with a measure function. Following Kennedy and Levin (2008), degree modifiers of verbs, like those for adjectives (Kennedy and McNally 2005), impose a standard on the degree returned by the measure function when applied to its individual and event arguments. A meaning for *-de hen lihai* 'to a serious extent' can be posited along the lines of (36), where **large** is a function that returns a large degree of change based on the measure of change function.

[9] As the representation of the verb *zui* below shows, and as is implied by this approach to inchoative meanings, measure of change functions are defined based on measure functions. This means a measure function must be available to any scalar predicate, even if the measure function itself is not lexicalized. I assume this to be the case for basically inchoative verbs such as *zui* 'intoxicated'. That is, I assume that being associated with a scale automatically provides an associated measure function based on that scale. (See also Kennedy and Levin 2008:167, n9.)

(36) $[\![-de\ hen\ lihai]\!]$ 'to a serious extent'
= $\lambda g \in D_{m_\Delta} \lambda x \lambda e.g(x)(e) \succeq \textbf{large}(g)$

-de hen lihai combines with a measure of change function, and relates its output after combining with its individual and event arguments (a difference degree), to the standard of being a large degree of change. *zui-de hen lihai* will then apply to an individual and an event argument, and the resulting sentence will be true just in case the degree returned by saturating the individual and event argument of the measure of change function $\textbf{zui}_\Delta$, is at least as much as what is considered a large increase in drunkenness.

(37) [[*zui-de hen lihai*]] 'seriously drunk'
= $\lambda x \lambda e.\textbf{intox}_\Delta(x)(e) \succeq \textbf{large}(\textbf{intox}_\Delta)$

That *-de hen lihai* combines with a measure of change function means that it will only be able to combine with the inchoative verb counterparts of adjectives such as *gao* 'tall/high', and not with the adjectives themselves, which denote measure functions. This explains why a phrase such as *gao de hen lihai* 'tall/high to a serious extent' can only mean that the height of some entity grew by a large amount, and not that it is very tall/high.

Regarding negation, I follow the distinction made by Lin (2003b) that *bu* negates that a certain state holds, whereas *mei* negates occurrence of an event. I assume that *bu* and *mei* combine with predicates. That is, here they would combine with the relevant products of **pos** applied to a measure function or a measure of change function. Since *bu* negates states, it will not combine with a predicate with a $\textbf{pos}_v(\text{m}_\Delta)$ meaning, since this predicate has an event variable. It can, however, combine with an adjectival predicate. Kennedy and McNally (1999) note that adjectival predication based on a scalar semantics has the effect that expressions of the form *x is* α and *x is not* α have the truth conditions in (38) below, where $d_{(s(\alpha))}$ identifies the degree standard for α.

(38) a. [[*x is* α]] = 1 iff $\alpha(x) \succeq d_{(s(\alpha))}$

b. [[*x is not* α]] = 1 iff $\alpha(x) \prec d_{(s(\alpha))}$

Following this approach, I assume that for a sentence like (39), *bu* combines with the meaning of $\textbf{pos}[\![gao]\!]$ in (40a), and the truth conditions of *Sanmao bu gao* 'Sanmao is not tall' are given in (40c). That is (39) is true just in case the degree to which Sanmao is tall is lower than the standard degree of tallness, which seems to be what we want.

(39) Sanmao bu gao
Sanmao not tall
Sanmao is not tall.

(40) a. $\textbf{pos}[\![gao_{Adj}]\!] = \lambda x \lambda t.\textbf{tall}(x)(t) \succeq \textbf{stnd}(\textbf{tall})$

b. $[\![Sanmao\ gao]\!] = \lambda t.\textbf{tall}(s)(t) \succeq \textbf{stnd}(\textbf{tall})$

c. $[\![Sanmao\ bu\ gao\ (at\ t)]\!]$ = 1 iff $\textbf{tall}(s)(t) \preceq \textbf{stnd}(\textbf{tall})$

In contrast to *bu*, *mei* will combine only with predicates with an event argument, including those obtained from applying **pos** to a measure of change function. I assumed above that *gao* 'tall, high' has a verbal counterpart gao_V, which encodes a measure of change function (see (42a) below). This is the version of *gao* I assume to be heading the sentence in (41).

(41) Sanmao mei gao
Sanmao not tall
Sanmao didn't get taller.

The predicate based on this verb (42b) is obtained by applying $\mathbf{pos}_v$. The sentence *Sanmao gao* 'Sanmao got taller' (which would require *-le* or some auxiliary (see (21) above) to be a good sentence), would denote the set of events in which the increase in degree of height holding of Sanmao at the end of the event from that at the beginning of the event, is at least that of the standard degree of growing taller)(42c). Allowing existential binding over the event argument, I assume that *mei* applies to this result, yielding the truth conditions in (42e) for (41).

(42) a. $[\![gao_V]\!]$ = $\mathbf{tall}_\Delta = \lambda x \lambda e.\mathbf{tall}_{\mathbf{tall}(x)(init(e))} \uparrow (x)(fin(e))$

b. $\mathbf{pos}[\![gao_V]\!]$ = $\lambda x \lambda e\ \mathbf{tall}_\Delta(x)(e) \succeq \mathbf{stnd}(\mathbf{tall}_\Delta)$

c. $[\![Sanmao\ gao_V]\!]$ = $\lambda e\ \mathbf{tall}_\Delta(s)(e) \succeq \mathbf{stnd}(\mathbf{tall}_\Delta)$

d. $[\![Sanmao\ gao_V\ (-le)]\!]$ = 1 iff $\exists e\ \mathbf{tall}_\Delta(s)(e) \succeq \mathbf{stnd}(\mathbf{tall}_\Delta)$

e. $[\![Sanmao\ mei\ gao_V\ ]\!]$ = 1 iff $\neg\exists e\ \mathbf{tall}_\Delta(s)(e) \succeq \mathbf{stnd}(\mathbf{tall}_\Delta)$

To summarize, I hope to have shown that an analysis of Mandarin gradable adjectives and their inchoative verb counterparts, as well as basically inchoative scalar verbs, can be productively pursued with the theoretical apparatus of measure functions and measure of change functions provided in Kennedy and Levin (2008). Below, I turn to other issues raised by my proposal.

5 Basic inchoatives are not adjectives

Above, it was argued that (stage level) gradable adjectives are polysemous with, or can form the derivational base of, inchoative verbs describing the corresponding measure of change function. I now argue that the opposite direction of the change does not obtain in Mandarin: Basically inchoative verbs do not have (form-identical) derived adjectival counterparts.

5.1 More on diagnosing adjectives

Section 2 reviewed arguments that have been put forth in support of a class of adjectives in Mandarin. These allow us to develop some diagnostics for identifying adjectives, although these may not apply equally across different adjectives. According to the preceding discussion, however, adjectives should show some combination of the following behaviours:[10,11]

[10] A traditional criterion for adjectives is that they do not take complements (Zhu 1982:55-57). Given that my goal is to distinguish adjectives from intransitive inchoative verbs, and not simply from verbs in general, this is not a useful diagnostic for my purposes.

[11] My discussion is limited to what Zhu (1956/1980, 1982) terms "simple adjectives".

(i) If a word is an adjective, and if it encodes a gradable meaning, it should allow modification by *hen*, *feichang* etc. (Chao 1968, Zhu 1982:55)

(ii) If degree modification for a gradable predicate in simple predication sentences out of context, is obligatory for a positive interpretation of the predicate, that predicate is an adjective (Liu (2010), Grano (2010)).

(iii) Adjectives, but not verbs, can occur in the modifier position of a noun phrase with productivity and in a semantically transparent fashion, without the mediation of *de* (Paul (2005)).

(iv) If a word (heading a non-branching projection) can syntactically modify a noun, and is able to form a predicate in the *shi* . . . *de* structure, it is an adjective (Paul 2005).

There is some unavoidable amount of conventionality in the use of adjectives in Mandarin (Zhu (1956/1980), Zhu (1982:55-57)), which perhaps may turn out to be more rule-governed with further research drawing together the properties of scalar predication and adjectival meanings across languages, as well as the language-specific syntax-semantics (e.g. Huang 2006, Paul 2005, Liu 2010, Grano 2010), and morphophonological constraints (e.g. Duanmu 1998, Feng 2005) imposed by Mandarin. For current purposes, however, it is still possible to diagnose an adjective in Mandarin with some constellation of the generalizations proposed above.

Below, I briefly demonstrate each of the above diagnostics with the adjective *lao* 'old'. Points (i) and (ii) are standard in the literature, and easily demonstrated with *lao* 'old': The presence of *hen* (43a) is necessary for a positive interpretation of the predicate, otherwise *lao* 'old' exhibits a comparative interpretation (43b). (43a, c) both show that modification with *hen* 'very' is possible for *lao* 'old'. These show both that *lao* 'old' is not a verb such as *xihuan* 'like' which allows but does not require degree modification for a positive interpretation, and that it is a gradable predicate.

(43) a. zhe dong fangzi hen lao
this CL house very old
This house is (very) old.

b. zhe dong fangzi lao
this CL house old
This house is *older*.

c. hen lao de fangzi
very old DE house
a very old house

(44a) shows that *lao* 'old' can modify nouns in a semantically transparent fashion, where the presence or otherwise of *de* does not make a difference. (44b) shows that *lao* can form a predicate in the *shi* ... *de* structure.[12]

(44) a. lao (de) ren / fangzi / chuantong / guiju
old DE person / house / tradition / rule
old person / house / tradition / rule

[12] Although it should be noted that this is less productive for *lao* 'old' than for some other predicates, e.g. those discussed in Paul (2005).

b. zhe ge xinghao shi lao de
this CL model be old DE
This model is old/this is an old model.

This does not, of course, prevent *lao* adjectives from forming semantically opaque compounds, as the examples in (45) show. (45a, b) show that in *laoshi* 'teacher', *lao* 'old' does not contribute compositionally to the meaning of *laoshi* 'teacher, thus a young *laoshi* is perfectly acceptable. Similarly for (45c, d): *lao* does not indicate age in tigers, thus a newborn *laohu* is also perfectly acceptable. Modification by *nianqing* 'young' is, unsurprisingly, not acceptable for (45c). What (44) shows us is simply that *lao* 'old' can participate in transparent modification contexts.[13]

(45) a. lao shi
old master
teacher

b. nianqing (de) laoshi
young DE teacher
young teacher

c. lao hu
old tiger
tiger

d. chu sheng de laohu
new born DE tiger
a newborn tiger

e. lao ren
old person
old person

f.*nianqing (de) lao ren
young DE old person

5.2 Basically inchoative verbs have no adjectival counterpart

As shown in section 3.2 above, verbs such as *zui* 'intoxicated', *bing* 'sick', etc. cannot be modified by *hen*, even though they can participate in degree modification contexts, with *-de hen lihai* 'to a serious extent'. This should be sufficient to disqualify them from adjective status, but given the possibility of deriving adjectives from participle verb forms in languages such as English (Dixon 1982, Bresnan 1982, Levin and Rappaport 1986) one might perhaps be moved to ask whether basically inchoative verbs in Mandarin can do the same, e.g. in modification contexts. In this section, I show that basically inchoative verbs such as *zui* 'intoxicated' also cannot be analyzed as adjectives in modifier position. I argue for this by showing that basically inchoative verbs do not participate productively in nominal modification contexts. This is shown below for *zui* 'intoxicated', and *bing* 'sick'. This generalization may suggest that are no derived result state adjectives in Mandarin, or at least, that there may be no productive way of deriving adjectives from eventive verbs.

As the examples in (46)-(48) show, it is possible to find basically inchoative verbs such as *zui* 'intoxicated', and *bing* 'sick' in nominal modification contexts. But in these cases, inserting *de* is not usually possible, and the sequences are often semantically opaque. The meanings of (46a,b) seem compositional, but as (46c) shows, *zui* 'intoxicated' cannot modify other nouns (describing humans) productively. It is possible to find other nouns modified by *zui*, e.g. (46c), but *zui quan* (*lit.* 'intoxicated fist') is not a fist that is drunk. It is, in fact, not a fist at all, but a style of martial arts that uses fists, and any drunken qualities associated with it may be faked.

[13]This discussion raises several issues, long noted in the literature (see e.g. Duanmu (1998) for detailed discussion). In particular, appealing to the transparency of Adj-N sequences implies that sequences such as *lao ren* 'old person' are cases of phrasal modification [$_{NP}$[$_{AdjP}$*lao*]*ren*]. Yet this assumption would allow ungrammatical structures such as **hen lao ren*, which presumably have the following structure *[$_{NP}$ [$_{AdjP}$ *hen lao*] *ren*] 'very old man'. A possible solution to this problem is proposed in Huang (2006), using a Property Theory analysis. Huang treats the bare adjective as type e and the degree modified adjective as of type $< e, t >$, and assumes that type e words can directly modify nouns, whereas those of type $< e, t >$ require the mediation of *de*, which converts them to type e.

(46) a. zui (*de) han
intoxicated DE man
an intoxicated man

b. zui (*de) weng
intoxicated DE old.man
an intoxicated old man

c.*zui fu/tong/hai(zi)/ren
intoxicated woman/child/child/person
an intoxicated woman/child/person

d. zui quan
intoxicated fists
'drunken fists': fighting style simulating intoxication

In addition, as (47a) shows, even with *de*, *zui* is not always felicitous in nominal modifier position. Rather, nominal modification is preferred with what is presumably a relative VP (47b, c). As expected, compounds such as *zui quan* 'drunken fists' cannot be obtained via phrasal modification contexts.

(47) a.? zui de ren dou you dian da shetou
intoxicated ASSOC person all have a.little big tongue
Intoxicated people usually have slurred speech (*lit. a big tongue*).

b. he-zui de ren dou you dian da shetou
drink-intoxicated ASSOC person all have a.little big tongue
Drunk people usually have slurred speech (*lit. a big tongue*).

c. zui-jiu de ren
intoxicated-wine DE person
an intoxicated person

d. he-zui-jiu de ren
drink-intoxicated-wine DE person
an intoxicated person

e.*(he-)zui(-jiu) de quan
drink-intoxicated-wine ASSOC fist

Like *zui* 'intoxicated', *bing* 'sick' is also restricted in nominal modification contexts, although compounding structures with *bing* are frequently found. Although (48a), like (46a, b) above, appears compositional, it describes more of a relationship between a person and a doctor or a caregiver, rather than the condition of a person, and the insertion of *de* in (48b) clarifies this distinction. In (48c-e), the head noun bears a different relation to sickness each time, and does not describe something that is sick. In each case, insertion of *de* is ungrammatical.

(48) a. bing ren
sick person
a patient (not necessarily sick)

b. (sheng)bing de ren
sick DE person
a sick person (necessarily sick)

c. bing (*de) jun
sick DE germ
germs/bacteria causing illness

d. bing (*de) fang
sick DE room
room for sick people

e. bing (*de) li
sick DE history
medical record

(48b) shows further that, like *zui* 'intoxicated', *bing* 'sick' is not entirely felicitous in modification contexts. The related verb *sheng-bing* 'to be sick' is preferred here. Although I am unclear as to the reason for why at least these basically inchoative verbs are dispreferred in modification contexts, even with *de*, it seems clear enough that there we should not mistake these verbs for adjectives.

6 A semantic basis for inchoative verbs

In this section, I return to the question we started out with: Are notions such as property concept and result state grammatically distinguished in a language such as Mandarin, where the adjective class is not easily distinguishable from verbs, and where verbs that describe a caused change of state are rare? I argue here that Mandarin does make some distinction along these lines, and one crucial part of the picture is exactly the state and inchoative distinction that has been described above. The evidence for this distinction consists of three points. First, I argue that basically inchoative verbs describe a change to a result state (Koontz-Garboden 2005), though I will call these "acquired states" to emphasize that these predicates are not derived from a causative verb (see discussion in the following subsection). Second, I show that if an adjective has an inchoative verb counterpart, the inchoative verb describes an acquired state. Third, if an adjective describes an acquired state, it should also have an inchoative verb counterpart. I consider each of these in turn.

6.1 A change to an acquired state

I first show that the Mandarin verbs such as *zui* 'intoxicated', *bing* 'sick', that can be identified as basically inchoative, share a conceptual core: They describe the change to a state that is not typically conceptualized as being inherent to an entity, and in many cases, states which are defined in relation to a preceding state that is different from it. I will call this kind of state an "acquired state". Acquired states are stage level states that are not typically true of entities in their original 'pristine' form, unlike, for instance, states of being new, or being raw (which are presumably also stage level). This contrasts with, for example, the state of being faulty or damaged, which typically results from some preceding condition or event. It is possible that a new car may leave the assembly plant faulty, but that is not the typical state of new cars. With wear and tear, however, it is quite natural for cars to become faulty, even if the owner takes pains to prevent the onset of such a state. Indeed, in the following discussion, I show that *xin* 'new' and *sheng* 'raw' do not have inchoative verb counterparts, whereas *jiu* 'used, old' does.

The kinds of meaning I hope to capture with "acquired state" is not really different from the notion of "result state" in Koontz-Garboden (2005), where it is described as "states entailing an event giving rise to that state". This includes both causative and non-causative changes of state, and thus covers the same ontological ground as my "acquired state". In the larger typological context in Koontz-Garboden (2005), a predicate describing a result state can be derived from an eventive predicate (which could also be causative or non-causative). In section 7 below, however, I speculate on the possibility that Mandarin has no adjectives derived from eventive verbs. I employ the term "acquired state" simply to highlight the point that the predicates describing these states are not derived from predicates describing the causing or enabling event.

Besides *zui* 'intoxicated' and *bing* 'sick', verbs that can be identified as basically inchoative include the following:[14]

(49) *fulan* 'fester, rot'
(diao-)xie 'wither'
xiu 'rust'
lie 'crack'
sui 'shatter'
duan 'snap and break'
mie 'extinguish'
xing 'wake'

Some inchoative verbs share the same form with an adjective, but are not the result of systematic polysemy or deadjectival derivation in the way discussed in section 4.2. That is, the adjectival form describes a different state from the state resulting from the change described by the inchoative verb. This class includes members such as those in (50), which I discuss in some detail below.

(50) *po* 'broken, tattered, shabby'
huai 'broken, faulty',
hao 'good, recover'
feng 'crazy'

A quick examination of the conceptual content expressed by these verbs lends initial plausibility to my claim that basically inchoative verbs describe a change to some kind of non-inherent state, an acquired state. Dixon (1982:16) identifies seven properties as potentially universal to the conceptual space of adjectives: dimension (including size, height, weight, width etc.), physical property (e.g. relating to texture, taste, temperature), colour, human propensity (e.g. character traits), age, value (whether something is judged to be good, bad etc.), speed. The verbs in (50) clearly do not describe meanings in these categories. Rather, they describe events resulting in a change, that can (but of course do not have to) come about due to simple neglect, or to natural changes, e.g. humidity (*lie* 'crack': which can describe ground that has cracked due to lack of moisture, and *xiu* 'rust', which happens to iron when there is too much moisture), pressure (*duan* 'snap and break', which is what tree branches may do when say, too much snow falls on them), etc. In the next section, I turn to the examples in (50).

[14] I exclude change of location verbs such as *diao* 'drop', *luo* 'fall' etc. from this discussion to keep things centred around change of state meanings.

6.2 Adjectives vs. inchoative verbs

The effect of an acquired state meaning is neatly demonstrated by distributional asymmetries in predicates that are ambiguous between an acquired state sense and an inherent state sense. The examples provided in (50) above can be treated as being ambiguous between adjectives and inchoative verbs, with distinct though related senses.

For instance, the predicate *huai*, which can very generally be translated as 'bad' has two senses. It can mean 'bad' in the sense of faulty machinery, which I claim is an acquired state. It can also mean 'bad' in the sense of a human character trait, as in someone who is mischievous or unkind. Although people can become bad due to say, the bad company they keep (see discussion of (62) below), or some traumatic experience, this trait is not typically expected to come about simply with the passage of time. Thus I would argue that the wickedness of a person is not conceptualized as an acquired state (at least in Mandarin). As the following examples show, the 'faulty machinery' sense of *huai* is a basically inchoative predicate: It cannot be modified with *hen* 'very' (51a), whereas the 'wicked person' sense of *huai* is only stative, and cannot occur with perfective *-le* to encode a change of state (52b). Nor can it be modified with *-de hen lihai* 'to a serious extent' (53b), consistent with its proposed adjectival and stative classification, whereas the faulty machinery sense (53a) allows this.[15]

(51) a.*zhe zhi nao-zhong hen huai
this CL alarm-clock very bad
Intended: This alarm clock is very faulty.

b. zhe ge ren hen huai
this CL person very bad
This person is wicked.

(52) a. zhe zhi nao-zhong huai-le
this CL alarm-clock bad-PERF
This alarm clock broke/is broken.

b.*zhe ge ren huai-le
this CL person bad-PERF
Intended: This person became wicked.

(53) a. zhe zhi nao-zhong huai-de hen lihai
this CL alarm-clock bad-DE very serious
This alarm clock is badly broken.

b.*zhe ge ren huai-de hen lihai
this CL person bad-DE very serious
Intended: This person became seriously wicked.

In similar fashion, though somewhat more subtly, if someone or something is described as *hen hao* 'very good', this must be a claim about the inherent qualities of the individual described. So if my TV set is *hen*

[15]Note that not all inchoative verbs can be modified by *-de hen lihai* 'to a serious extent', only those with a gradable meaning.

hao, it is good in terms of its features, picture quality etc. If my TV set *hao-le* 'good-PERF", then it can only mean that my TV set has become usable again from having been broken before. It cannot mean that the TV set has become a good TV, e.g. by being able to perform new functions after an upgrade . Parallel contexts can be constructed to demonstrate the same point for the other predicates in (50).

I conclude, therefore, that words such as *hao* 'good' and *huai* 'bad' are ambiguous between an adjectival, inherent state sense, and a verbal, acquired state sense. My hypothesis that inchoative verbs describe acquired states predicts that we should not find the opposing pattern: If a form is ambiguous between an inchoative verb and an adjective, we should not expect the adjective to encode an acquired state, while the inchoative verb encodes the attainment of some trait pertinent to its physical, mental, age etc. characteristics.

Analogous patterns have been observed in the relationship between English adjectives and change of state verbs derived from them. Levin and Rappaport Hovav (1995:96) show that, for adjectives ambiguous between two senses, one of which is stage level and one of which is individual level, only the former will form a base for a change of state verb. They exemplify this point with the adjective *smart*, which may mean "intelligent", or "well and fashionably dressed", noting that only the latter sense is encoded by the verb *smarten*. Other cases of deadjectival verbs, e.g. *toughen* which show only a particular sense of the base adjective (here, only *tough* in the sense of 'difficult to tear' and not in the sense of being difficult to please) were noted in Dowty (1979:129, n.4). Levin and Rappaport Hovav (1995) propose these reflect the stage versus individual level distinction. While the possible alternations discussed here can also be understood as reflecting the distinction between stage and individual level states, the next subsection will suggest that the adjective/inchoative verb distinction in Mandarin is also sensitive to whether a state can be inherent to an individual or can be acquired.

6.3 Adjectival acquired states

The generalization over inchoative verbs and acquired states is only unidirectional, however: A basically inchoative verb is predicted to describe a change to an acquired state. It is not the case that any acquired state meaning should only be encoded by a basically inchoative verb. For instance, the state of being old and used, described by *jiu* (54), shows both stative and inchoative interpretations.

(54) a. zhe liang che hen jiu
this CL car very old
This car is very old.

b. zhe liang che jiu-le
this CL car old-PERF
This car has got old.

Other adjectives that can be identified as describing acquired states include:

(55) *e* 'hungry'
bao 'full'
lao 'old'
shu 'ripe, cooked'
jiao 'burnt (as in food)'
zang 'dirty'

Consistent with these patterns, and in direct contrast to them, is the further generalization that adjectives describing states associated with the original, pristine condition of entities do not show inchoative counterparts. Note that their intended English counterparts are similarly infelicitous.

(56) a. wo de che hen xin
1sg DE car very new
My car is new.

b.*wo de che xin-le
1sg DE car new
Intended: My car has become new.

(57) a. zhe pan cai hen sheng
this plate vegetable very raw
This plate of vegetables is very raw.

b.*zhe pan cai sheng-le
this plate vegetable raw-PERF
Intended: This plate of vegetables has become raw.

Summing up, I have shown in this section that the adjective/inchoative verb distinction in Mandarin is sensitive to the notion of acquired state. Indeed, inchoative verbs are crucial to the picture. If these are not considered, adjectives alone do not seem to reflect this sensitivity, as both property concepts and result states can be encoded by underived adjectives. Recalling Dixon's observation that result states may be encoded by the participial form of a verb describing the causing action, simply observing the form of an adjective in Mandarin will not show the relevance of this contrast. Rather, the property concept/result state distinction reveals itself in what kinds of adjectives can have an inchoative verb counterpart.

6.4 Acquired state is not external causation

Before leaving the discussion, I address a related issue that has been found to be relevant for the causative alternation in English (58).

(58) a. Pat broke the window.

b. The window broke.

(Levin and Rappaport Hovav 1995:79, (1a))

Levin and Rappaport Hovav (1995) propose that the causative alternation in English is sensitive to the semantic property of external causation. One argument they raise in support of this hypothesis is that the intransitive variant of causative alternation verbs is a subset of the transitive variant (p.86). They show further that an intransitive variant is not possible just in case the event entails an agentive causer, hence the contrast between (58) and (59).

(59) a. He broke the world record.

b.*The world record broke.
(Levin and Rappaport Hovav 1995:105, (59))

In Mandarin, there is no direct parallel to the causative alternation in English, but the ubiquitous resultative verb compound (RVC) (60c) (Li and Thompson 1981:54-59, Gu 1992) is known to play a role equivalent to transitive caused change of state verbs in other languages. But in such cases, it is clear that the inchoative verb is basic, and not derived from a transitive causative, hence the contrast between (60a, b).

(60) a. beizi po-le
cup break-PERF
The cup broke.

b.*Sanmao po-le beizi
Sanmao break-PERF cup
Intended: Sanmao broke the cup.

c. Sanmao da-po-le beizi
Sanmao hit-break-PERF cup
Sanmao broke the cup.

Yet the question does arise for my proposal, of whether the acquired state category is simply a variant of an externally caused state. That is, although acquired state predicates cannot be said to be derived from causative verbs, it is still possible that the semantic property of external causation is what they express: That is, perhaps basically inchoative verbs in Mandarin encode situations that *can be* externally caused. Such a position would be consistent with the ability of inchoative verbs to encode the result in RVCs, as in (60c) above. I show below, however, that this conclusion may not be appropriate.

Clearly, Mandarin, like English, is sensitive to whether an agentive causer is entailed for an event, hence the parallel between (61) and (60) above.

(61) a. Liu Xiang da-po-le shijie jilu
Liu Xiang hit-break-PERF world record
Liu Xiang broke the world record.

b. shijie jilu da-po-le
world record hit-break-PERF
The world record has been broken.

c.*shijie jilu po-le
world record break-PERF
*The world record broke.

But certain states that cannot be conceptualized as acquired states show themselves able to participate in an RVC, with the desired causative interpretation. It was noted above that *huai* 'bad' in the personal characteristic sense of the word, does not show an inchoative version (62a). Yet this change can be expressed when the cause of the change of state is explicitly expressed with an RVC as in (62b, c).

(62) a.*zhe ge haizi huai-le
this CL child bad-PERF
This child has turned bad.

b. zhe ge haizi xue-huai-le
this CL child learn-bad-PERF
This child has learnt to be bad.

c. ta-men dai-huai-le zhe ge haizi
3-pl lead-bad-PERF this CL child
They led this child astray.

What (61) and (62) seem to suggest, then, is that the notion of external causation could be relevant for RVCs: In case an event must be encoded as being externally caused, an RVC is employed. But there are states such as *huai* 'bad' in (62), that can be encoded as being externally caused by an event (62b, c), but not as a change to an acquired state (62a). (62) suggests that the notion of acquired state could still have relevance apart from the notion of external causation.

Summing up, I have argued in this section that the notion of "acquired state" forms the semantic (or conceptual) basis for inchoative verbs in Mandarin: A basically inchoative verb encodes a change to an acquired state. This hypothesis is supported by words ambiguous between an inherent state sense and an acquired state sense, such as *huai* 'bad/faulty, broken'. The former sense is encoded by an adjective, whereas the latter is realized by an inchoative verb. Although acquired states can also be realized as adjectives, these adjectives are able to alternate with inchoative verb status. In contrast, adjectives encoding inherent states expected of the original condition of entities, such as newness and rawness, do not have corresponding inchoative verbs.

7 Conclusions and future directions

In this paper, I have proposed an account for the ability of gradable adjectives in Mandarin to show both stative and inchoative interpretations. I argued that such predicates are adjectives in their stative sense, but are verbs in their inchoative interpretation. This was demonstrated by comparing these predicates with a class of basically inchoative verbs. Basically inchoative verbs fail adjective tests, whereas gradable adjectives can participate in inchoative verb contexts with inchoative interpretations. I showed further that a predicate that takes on inchoative verb status should be conceptualizable as an acquired state, and furthermore, that the notion of acquired state is distinct from that of external causation.

Specifically to Mandarin, this proposal clarifies the status of different intransitive predicates, sorting them into adjectives, deadjectival inchoatives, and basic inchoatives, while addressing the longstanding adjective/verb debate. From a more general standpoint, this paper offers a view into how cross-linguistically relevant semantic or conceptual categories are encoded with the particular morpholexical resources available to a certain language. The paper began by asking whether the distinction between property concepts and result state made in Dixon (1982) was relevant for a language for which the verb/adjective distinction is murky, and in which caused change of state verbs can be difficult to find. I have shown that the distinction between different kinds of states is relevant in Mandarin, but the distinction is made in a particular way. First, the relevant notion of result state here does not involve causation: That is, adjectives and verbs describing result or acquired states are not derived from causative verbs describing the causing action of the result state. Second, the distinction between these states is made not in terms of whether an adjective is basic or derived, but in terms of whether a situation can be encoded by an inchoative verb, whether basic or deadjectival.

This work still leaves many questions unresolved. For instance, how are other kinds of result state, e.g. those that must arise from a causing action, encoded in Mandarin? What is the status of deverbal adjectives

in Mandarin? In section 5, I argued that basically inchoative verbs such as *zui* 'intoxicated' do not have adjectival counterparts. If this claim is supported by future work, we might also wonder whether the claim can be extended to resultative verb compounds of the sort discussed in section 6.4. Dixon (1982) notes that result states in English are encoded by the participial form of the verb describing the causing action. Many of these participial forms are also adjectives (Bresnan (1982), Levin and Rappaport (1986), Kennedy and McNally (1999), Kennedy and McNally (2005)). If it turns out that verbs and verb compounds encoding state changes in Mandarin do not lend themselves to adjective derivation, one could well ask whether this might be related to the lack of some correlate of participial morphology in Mandarin. It could also suggest that another reason the class of adjectives seems so elusive in Mandarin is the lack of a way of systematically deriving adjectives, at least from verbal sources.

Fleshing out the answers to these questions could lead us to a more comprehensive picture of how the semantic notions of state, change of state, and causation are encoded across languages, and how they are distributed among the categories of verb and adjective.

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