On the (A)Telicity of Verb-Adjective Compounds in Mandarin

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This paper examines the aspectual properties of the “degree achievements” verbs in Mandarin, and indicates that degree achievements (henceforth DAs) in Mandarin also reveal the variability in (a)telicity. Furthermore, following the previous works on DAs in English (Hay, Kennedy and Levin (1999), Kearns (2005) and Winter (2006) and Kennedy & Levin (2008)), we suggest that the scale structure of adjectives significantly contributes to the determination of (a)telicity of degree achievement verbs in Mandarin as well. Finally, based on the data in Chinese, we propose that a telic DA denotes “become maximally A” rather than “become A”, which cross-linguistically supports the study of Kennedy & Levin (2008), while contradicts that of Kearns (2005) and Winter (2006).

Key words: degree achievements, telicity, scale structures, adjectives

1. Introduction

One of the fascinating aspects of telicity is its relation with non-verbal categories. Whether a given predicate is telic or atelic does not only depend on the verb, but can also be affected by the count/mass quantification in the NP object, by the prepositions that the predicate may contain, and by the lexical semantics of related adjectives. The last factor is in the focus of this paper. In English, the category “degree achievements” such as lengthen, cool, dry, and straighten, is notorious for its variability of aspectual classification, since they constitute one area in which the traditional Vendler/Dowty system breaks down. As first observed in Dowty (1979), these verbs reveal both telic and atelic properties. The aspectual inconsistency of DAs is illustrated with respect to several standard tests for (a)telicity. First, atelic predicates are known to be entailed by their progressive forms, while telic predicates are not.

(1) a. Kim is singing. → Kim has sung.
   b. Kim is writing a song. /→ Kim has written a song.
(2) a. Kim is lengthening the rope.  ➔ Kim has lengthened the rope.
b. Kim is straightening the rope.  ➔ Kim has straightened the rope.

The example of (2) suggests that different DAs reveal different aspectual properties with respect to the test. Secondly, for-adverbials modify only atelic predicates, while in-adverbials occur only with telic predicate. Many DAs, however, can occur with both for-adverbials and in-adverbials, as in (4).

(3) a. Pug snoozed for/ in an hour.
b. Pug destroyed the couch for/ in an hour.

(4) a. The soup cooled for an hour.
b. The soup cooled in an hour.

Thirdly, a telic predicate modified by almost is ambiguous between a reading in which the described event is claimed to have occurred, but not quite been completed, and one in which it is asserted not to have occurred at all (Dowty 1979). However, an atelic predicate modified by almost has only the latter type of reading.

(5) a. Dan almost drew a circle.  (ambiguous)
b. Dan almost pushed a cart.  (non-ambiguous)

(6) a. They almost widened the road. (ambiguous)
b. They almost dry the clothes.  (non-ambiguous)

Now turning to Mandarin, as pointed out by Jonah Lin (2001: 43), Mandarin Chinese doesn’t permit deadjectivals (i.e., degree achievements) of the English type, as evidenced by Lin’s examples below:\(^1\):

(7) a. *da  zhe-ge  dongxi
    big   this-CL  thing
    ‘to make this thing big’

    b. *kuan  na-ge  churu-kou
    wide  that-CL  entrance
    ‘to widen that entrance’

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\(^1\) In this paper, CL abbreviates for classifiers, PROG abbreviates for the progressive aspect marker, PERF abbreviates for the perfective aspect marker.
c. *hong zhe-fu hua
   red this-CL painting
   ‘to redden this painting’

d. *gan na-jian yifu
   dry that-CL cloth
   ‘to dry that cloth’

In (7a-d), the adjectives *da ‘big’, *kuan ‘wide’, *hong ‘red’ and *gan ‘dry’ are intended as the main verbs of the predicates, but the resulting expressions are all ungrammatical. For grammatical expressions, we must insert some verbal elements such as *nong ‘manipulate’, *hua ‘paint’ and *chui ‘blow’.

\[
(8) \begin{align*}
\text{a. nong-da zhe-ge dongxi} & \quad \text{manipulate-big this-CL thing} \\
& \quad \text{‘to make this thing big’} \\
\text{b. nong-kuan na-ge churu-kou} & \quad \text{manipulate-wide that-CL entrance} \\
& \quad \text{‘to widen that entrance’} \\
\text{c. hua-hong zhe-fu hua} & \quad \text{paint-red this-CL painting} \\
& \quad \text{‘to paint this painting red’} \\
\text{d. chui-gan na-jian yifu} & \quad \text{blow-dry that-CL cloth} \\
& \quad \text{‘to blow that cloth dry’}
\end{align*}
\]

According to Lin, the verb such as *nong ‘manipulate’ are the lexical realization of the light verb.\(^2\) In addition, this cross-linguistic variation between Mandarin and English

\(^2\) Remarkably, there are morpho-syntactic complications here. Consider examples below:

(i) Zhe duo hua bian-hong le, keshi haishi bu gou hong.
   This CL flower become-red PERF but still not enough red
   ‘This flower has become redder, but it is not red enough.’

(ii) ?Zhe duo hua hong le, keshi haishi bu gou hong.
    This CL flower red PERF but still not enough red
    ‘This flower has become red, but it is not red enough.’
stems from the different syntactic levels where arguments are licensed in a structure. Briefly, in Mandarin Chinese, arguments are licensed in the structure via the merger of a light verb in Syntax (i.e., S-Syntax), while in English arguments are licensed via the realization of an argument role from the argument structure in Lexicon (i.e., L-Syntax). Given space limit, we shall not pay any further attention to review previous literature on phrase structures. I refer the readers to Lin (2001) for more detailed discussions about the cross-linguistic variation on phrase structures between Mandarin and English (see also Hale and Keyser 1991, 1993, 1997 for discussions).

What is more important to us here is that although the deadjectivals in Mandarin are distinguished from those in English in their morphological forms (due to some morpho-syntactic reasons as suggested by Jonah Lin), the verb-adjective compounds in question patterns with degree achievements in English in that they also intriguingly reveal the notorious variability in telicity. Consider the examples below:

(9) quanqiu qiwen zhengzai sheng-gao
    global temperature PROG rise-high
    ‘The temperature in globe is rising.’

(10) muqian kexuejie renwei diqiu de yi-tian zhengzai jia-zhang
    so far scientist think earth De one-day PROG add-long
    ‘So far, the scientist think that one single day in earth is lengthening.’

As the contrast between (i) and (ii) indicates, the presence or the absence of verbal element bian ‘become’ surprisingly affects our understanding of the telicity of predicates. Example (ii) would be acceptable only when the second conjunct is to be understood as some contextually salient standard of being red. However, the truth conditions of (ii) is surprising to us as well, since color adjectives are considered as an upper closed scale adjective under the view of Kennedy and Levin (2008) in analyzing the semantics of degree achievements such as darken. Honestly, we do not have an adequate explanation here, and thus leave this intriguing fact for further research.

Logically speaking, in Mandarin, there are three structural possibilities for the combination of verb, adjectives and the aspect marker le. Take bian-hong le ‘something have/has become red/redder’ for example.

(i) [ASP [VP bian hong] le]
(ii) [VP bian [AP hong le]]
(iii) [IP Subj [VP bian hong le] le]

Briefly, in (i) the verb and the adjective form a compound verb and then it combine with the aspect marker le. In (ii), the adjective combines with the aspect marker first, and then they combine with the verb. In (iii), the verb combine with the adjective as a compound verb, but it combine with the subject first and then with the aspect marker le. There are different theoretical implications with these three structural possibilities. Although we have plenty of reasons and examples supporting for the structure (i), given the space limit, we shall not digress our attention and we thus tacitly assume the structure (i) in this paper.
Intuitively, the verb-adjective compounds in (9)-(11) seem to be atelic, while those in (12)-(14) seem to be telic, though all of them are in identical morphological forms of the verb-adjective compound. Such an intuition is further supported by the evidence coming from variations on the entailments from their progressive forms, as shown in (15)-(20).

(15) zhengzai sheng-gao → yijing sheng-gao le
    PROG rise-high already rise-high PERF

(16) zhengzai jia-zhang → yijing jia-zhang le
    PROG add-long already add-long PERF

(17) zhengzai suo-xiao → yijing suo-xiao le
    PROG shrink-small already shrink-small PERF

(18) zhengzai ning-gan ↔ yijing ning-gan le
Examples (15)-(17) form a sharp contrast to those in (18)-(20). To be more specific, the verb-adjective compounds in examples (15)-(17) behave like atelic predicates in that they are entailed by their progressive forms, while those in examples (18)-(20) act like telic predicates since they are not entailed by their progressive forms. For one thing, if the observed contrast is real, it follows that verb-adjective compounds in Mandarin does not constitute a homogeneous linguistic category in terms of their aspectual telicity. Note that verb-adjective compounds are a subcategory of the famous resultative verb compounds. The conclusion above would be significant since it surprisingly contradicts our intuition that the first member of compounds (i.e., usually a verb) denotes an event of activity and the second member of compounds (i.e., the resultative) denotes an end state of the relevant event, and therefore a combination of the two in principle should be of an event type such as accomplishment which is telic in essence.

For another, given the observed contrast, many important questions immediately emerge: Why does this contrast exist? What contributes to this variation on the telicity of verb-adjective compounds in Mandarin? An even more important question emerges: given the different morpho-syntactic forms of degree achievements in Mandarin and in English respectively, there must be some deeper reasons for DAs in Mandarin to pattern with those in English. But, what is/are the deeper reason(s) leading to this cross-linguistic pattern? Put differently, what is/ are the linguistic level(s) responsible for this cross-linguistics pattern? In this paper, we attempt to provide a preliminary answer to these questions.

The remaining of paper is structured as follows: section two we briefly review the previous literature on the types of gradable adjectives and their ontological scale structures, and then demonstrate that the observed contrast seems to correlate with different types of gradable adjectives and their associated scale structures. Finally, we end section two with reviewing some previous analyses on the telicity of degree achievement in English. In section three, following the previous works on DAs in English, we propose that the scale structure of adjectives significantly contributes to the determination of (a)telicity of degree achievement verbs in Mandarin. Section four
is the conclusion of this paper. Specifically, based on the data in Chinese, we suggest that the study of this paper cross-linguistically supports the study of Kennedy & Levin (2008), while contradicts that of Kearns (2005) and Winter (2006).

2. Variable Telicity in Degree Achievements in English
2.1 Telicity and Scale Structure

Although some DAs in English indeed reveals a notorious variation on the telicity, many DAs have default telic interpretations. Such verbs have atelic uses, but in the absence of explicit morpho-syntactic or contextual information forcing such interpretations, they are treated as telic. This is illustrated in (21), which is borrowed from Kennedy & Levin (2008).

(21) a. The sky is darkened (?but it didn’t become dark).
   b. The shirt dried (?but it didn’t become dry).
   c. The sink emptied (?but it didn’t become empty).

As observed by Kearns (2007), the most natural interpretations of examples like these are ones in which the affected object reached the endstate named by the positive form the adjective, as indicated by the oddity of the completion in parenthesis. According to Kennedy & Levin, these completions do not result in true contradictions, showing that the telic interpretation is not obligatory, but they do result in degraded acceptability. In particular, they have the feel of “garden path effects”, suggesting that the verbs in (21) have default telic positive interpretations, and the completions require reanalysis to the atelic, comparative one.\(^4\)

However, there are other DAs which appears to have only atelic interpretations. For instance, (22a-b) show that DAs derived from the dimensional adjectives \textit{wide} and \textit{deep} accept only durative temporal modifiers:

(22) a. The gap between the boats widened for/?? in a few minutes.
   b. The recession deepened for/?? in several years.

In addition, entailment from the progressive to the perfect is automatic, as shown by the fact that (23a-b), unlike e.g. (24a-b), are contradictory.

\(^4\) Kearns suggests that this effect is gradient, with some verbs (like \textit{darken}) showing it mildly and others (like \textit{empty}) showing it quite strongly. However, according to Kennedy & Levin, even verbs like \textit{empty} can take on atelic interpretations, when context is rich enough or other component of the sentence force such reading. I refer reader to Kennedy & Levin (2008: f.n. 4) for discussion.
Finally, the measure phrases seem to play a role in determining the telicity of the sentence as well. Consider the examples below,

(25) a. The tea cooled 10 degrees.
    b. The door widened 5 inches.

The measure phrases in these examples specify the amount that the respective subjects change in temperature and width as a result of participating in the event described by the verb, and in doing so, render the predicates telic. In addition, these measure phrases in DAs express “differential amounts” just like measure phrases in comparatives. Put it differently, instead of specifying the total amount to which an object possesses some measurable gradable property, such measure phrases convey the extent to which two objects (or the same object at different times) differ along some gradable continuum. This point is illustrated in (26a-b), which are the paraphrases of (25a-b).

(26) a. The tea became 10 degrees cooler (than it was at the beginning of the event).
    b. The door became 5 inches wider (than it was at the beginning of the event).

In short, given our discussion above, it is obvious that any account of DAs in English must explain three factors: (a) the (strong) default telic/positive interpretation of verbs like darken; (b) the lack of a telic/positive meaning for verbs like widen; (c) the differential interpretation assigned to measure phrase arguments. Before turning to previous analysis on DAs, let us briefly introduce previous works on types of gradable adjectives and their associated scale structure and then indicates out their correlation with the telicity.

Kennedy & McNally (2005) argue for the linguistic relevance of a semantic typology of gradable predicates, by demonstrating that the distribution and interpretation of the degree modifiers is sensitive to the following two parameters: (a) Whether a degree modifier is associated with an OPEN or CLOSED scale; (b) Whether the standard of comparison of the gradable predicate is ABSOLUTE or RELATIVE to a context. Kennedy & McNally (2005) present the first parameter by
providing linguistic data involving PROPORTIONAL MODIFIERS like completely, partially, and half, which are compatible with some gradable adjectives but incompatible with others.

(27) Closed Scale Adjectives
   a. completely {empty, full, open, closed}
   b. partially { empty, full, open, closed }
   c. half { empty, full, open, closed }

(28) Open Scale Adjectives
   a. ??completely {long, short, interesting, inexpensive}
   b. ??partially { long, short, interesting, inexpensive }  
   c. ??half { long, short, interesting, inexpensive }

Namely, adjectives in (27) seem to involve properties that have both the maximal and minimal value, while those in (28) have neither the maximal nor the minimal value on the scale. Due to this contrast, Kennedy & McNally (2005) call adjectives like those in (27) are closed scale adjectives, while those in (28) are open scale adjectives.

In addition, Kennedy & McNally (2005) further predict that there are logically possible variations: (a) A scale may neither have both the minimal and maximal element (i.e. open scale); (b) it may have the minimal but no maximal element (i.e. partially closed scale); (c) it may have the maximal but no minimal element (i.e. partially closed scale); (d) it may have both the minimal and maximal element (i.e. totally closed scale). In fact, these expected patterns are empirically supported by the examples involving the degree modifier absolutely (i.e. which takes the maximal value on the scale), as shown in (29) ~ (32).

(29) Open Scale Adjectives
   a. ??absolutely {tall, deep, expensive, likely}
   b. ??absolutely {short, shallow, inexpensive, unlikely}
   c. ??completely {long, short, interesting, inexpensive}
   d. ??partially { long, short, interesting, inexpensive }
   e. ??half { long, short, interesting, inexpensive }

(30) Lower Closed Scale Adjectives
   a. ??absolutely {possible, bent, bumpy, wet}
   b. absolutely {impossible, straight, flat, dry}
(31) Upper Closed Scale Adjectives
   a. absolutely {certain, safe, pure, accurate}
   b. ??absolutely {uncertain, dangerous, impure, inaccurate}

(32) Closed Scale Adjectives
   a. absolutely {full, open, necessary}
   b. absolutely {empty, closed, unnecessary}
   c. completely {empty, full, open, closed}
   d. partially {empty, full, open, closed}
   e. half {empty, full, open, closed}

Recall that in English some DAs permit only a comparative/atelic meaning and lack
the telic/positive meaning such as widen and deepen, and other DAs prefer the (strong)
default telic/positive interpretation such as darken and straighten. Interestingly, the
adjectival base in the former group seem to involve those associated with open scale,
while that in the latter group those associated with closed scale. With this background
information, now, we are in a position to evaluate those previous analyses on DAs in
English.

2.2 Previous Analyses
2.2.1 Hay et al. (1999)

The first explicitly scalar analysis of DAs is provided by Hay et al. (1999). Hay
et al. (1999) provide a purely comparative semantics for DAs, treating them as
predicates of events that are true of an object if the degree to which it possesses the
gradable property encoded by the source adjectives at the end of the event exceeds the
degree to which it possesses that property at the beginning of the event by some
positive degree. The difference value, in the terminology of Hay et al., is a measure of
the amount that an object changes as a result of participating in the event described by
a DA.

In some cases, such as the examples with measure phrases above, the difference
value is explicit and the predicate is telic. When the difference value is implicit,
contextual and lexical semantic factors determine its value and in turn the telicity of
the predicate. According to Hay et al., verbs derived from closed scale adjectives are
default telic due to a preference for fixing the difference value in such a way to entail
the maximal value on the scale must be reached. In fact, since the structure of the
scale allows the possibility of increasing the adjectival scale to maximal degree
(“maximal change”), and such meaning is stronger than (entails) all other potential
meanings, it should be selected, hence resulting in a telic interpretation.

On the other hand, to account for the obligatory atelicity for DAs derived from open scale, Hay et al. suggests that the adjectival root like *wide* uses a scale that does not have a maximal degree; there is no possibility for an interpretation involving maximal change, so the difference value is existentially closed. The result is that *widen* is true of an object as long as it undergoes some increase in width, which derives an atelic interpretation.

However, such an analysis suffers a serious challenge. Since they do not provide an explicit mechanism for fixing the difference value, they would thus have no explanation of why it is possible to fix the difference value to a degree that entails movement to the end of the scale in the case of DAs derived from the adjectival base with closed scale, but not possible to fix the difference value to a degree that entails movement to the end of the scale in the case of DAs derived from the adjectival base with open scale (see Kearns 2007 for a similar criticism).

### 2.2.2 Kearns (2007) and Winter (2006)

Seeing the challenge that Hay et al.’s analysis faced, Kearns suggests that the contextual standard associated with adjectives like *wide* is “insufficiently determined” to serve as a telos. Further, she argues that the telos for the verbs derived from closed scale adjectives need not be a maximum value on the relevant scale, but is rather the standard used by the corresponding adjective, whatever it is. Put it differently, she argues that the DAs derived from closed scale adjectives denote the meaning of “become A” rather than “become maximally A”. Kearns demonstrates the following examples in support of her argument.

(33) a. The sky darkened in an hour, but it wasn’t completely dark.
   b. The fruit ripened in five days, but it wasn’t completely ripe.

However, as pointed out by Kennedy & Levin (2008: 164), Kearns’ suggestion is problematic due to the fact that speakers must have access to the contextual standard in order to assign truth conditions to sentences containing the positive form of adjective. Furthermore, the data like (33) does not constitute a real counterexample to the claim regarding the maximal value on the relevant scale. According to Kennedy & Levin, the apparent non-maximality of the adjectival standards in the second conjunct is an artifact of the fact that the definite descriptions that introduce the affected arguments in the first conjuncts can be interpreted imprecisely, allowing for the possibility that the verbs do not apply to subparts of the objects that the descriptions
are used to refer. In other words, what is being denied in the second conjuncts is that all parts of the sky are dark, not that parts of the sky that the verb does not in fact apply to fail to become maximally dark. Kennedy & Levin illustrate this point by demonstrating the following examples.

(34) a. *All of the sky darkened in hour, but it wasn’t completely dark.
    b. *The entire fruit ripened in five days, but it wasn’t completely ripe.

(35) a. The sky darkened in an hour, but no part of it was completely dark
    b. The fruit ripened in five days, but no part of it was completely ripe

Example (34) indicates that we get a contradiction with a not completely interpretation if we eliminate the possibility of an imprecise interpretation of the definite in the first conjunct by making it explicit that the entire object is affected. In a similar line, examples (35) shows that we get contradiction if we modify the second conjunct to make it explicit that the intended interpretation is on in which a maximal degree is not achieved.

Let us turn to the analysis of Winter (2006) now. Winter (2006) takes a different approach, he defines the mapping from scalar adjectives to (corresponding) DAs in such a way that the verb form has a telos based on a lexically specified adjectival standard, if one is specified, and (building on proposals in Rotstein and Winter 2004) postulates that such standards are specified only for closed scale adjectives.

While this analysis achieved the desired result, as suggested by Kennedy & Levin, it brings some undesirable results. First, it simply eliminates the possibility of a contextual standard by stipulation. Second, it predicts that DAs based on closed scale adjectives like straighten should have only the telic interpretation. Furthermore, at a more general level, it raises the question why it is just the closed scale adjectives that are conventionally associated with fixed standards. In short, all the analyses mentioned above suffered from some serious challenges coming either from theoretical or from empirical grounds, or even from both. Now, let us shift our attention to the study of Kennedy & Levin (2008).

2.2.3 Kennedy & Levin (2008)

Kennedy & Levin (2008) provide a comparative analysis for the semantics of DAs, which is one version of degree-based analysis in the literature. To begin with, recall that the telicity of degree achievements seems to closely correlate with the types of scale structure of adjectives. However, as suggested by Kennedy & Levin (2008: ),
scale structure explains why the endpoints of closed-scale adjectives are potential standards (only closed scale adjectives have scales with endpoints), but it does not explain why they are the actual standards, and so the fact that closed scale adjectives default to endpointed-oriented must follow from some other constraint. According to them, this constraint is the principle of Interpretative Economy stated in (36).

(36) Interpretative Economy

Maximizing the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions.

The effect of Interpretative Economy is to make a contextual standard a “last resort”, since the natural transitions provided by the endpoints of a closed scale provide a basis for fixing the standard of comparison strictly on the basis of the conventional (lexical) meaning of a closed scale adjective, they should be favored over a context-dependent standard. In contrast, nothing inherent to the meaning of an open-scale adjective beyond its dimension of measurement (e.g., width vs. depth) provides a basis for fixing the standard. In other words, contextual factors such as the domain of discourse, the interests and expectations of the discourse participants, and so forth must be taken into consideration when determining how much of the measured property is enough to stand out.

Bear that constraint in mind; now shift to the core part of the analysis of Kennedy and Levin. Their analysis of DAs is built on a non-standard semantics of comparatives discussed in Kennedy and McNally (2005). Kennedy and McNally propose that comparatives should be analyzed as derived measure functions, which re just like the functions expressed by the base adjective except that they use scales whose minimum value are determined by the denotation of the than-constituent, namely, the comparative standard. Kennedy and Levin generalize this idea in that they can define any measure function \( m \) a corresponding DIFFERENCE FUNCTION \( m^\uparrow_d \), which are just like \( m \) except that the degrees it returns for objects in its domain represent the difference between the object’s projection on the scale and an arbitrary degree \( d \) (the comparative standard): a positive value when there is a positive difference, and zero otherwise. This generalized idea is demonstrated in (37).

(37) Difference functions

For any measure function \( m \) from objects and times to degrees on a scale \( S \), and for any \( d \in S \), \( m^\uparrow_d \) is a function just like \( m \) except that:

i. its range is \( \{ d' \in S \mid d \leq d' \} \), and

ii. for any \( x, t \) in the domain of \( m \), if \( m(x)(t) \leq d \) then \( m^\uparrow_d(x)(t) = d \).
According to Kennedy and Levin, in the cases of comparatives, the hypothesis is that the comparative morphology turns a basic measure function into a difference function with a scale whose minimal element — the “derived zero” — corresponds to the degree introduced by the comparative standard. Furthermore, by applying this generalized idea in (37) to the semantics of DAs, they propose that the adjectival core of a degree achievement is a special kind of difference function: one that measures the amount that an object changes along a scalar dimension as a result of participating in an event. They make this idea explicitly in (38), which defines for any measure function $m, \Delta$ from objects and times to degrees on a scale $S$, a new MEASURE OF CHANGE function $m \Delta$.

\[ (38) \text{Measure of change} \]

For any measure function $m, m \Delta = \lambda x \lambda e. m^\uparrow_{m \Delta(int(e))(x)(fin(e))}$

In brief, a measure of change function $m \Delta$ takes an object $x$ and an event $e$ and returns the degree that represents the amount that $x$ changes in the property measured by $m$ as a result of participating in $e$. It achieve this by mapping its individual argument $x$ onto a derived scale whose minimal element is the degree to which $x$ measures $m$ at the initiation of $e$. The output is a degree that represents the positive difference between the degree to which $x$ measures $m$ at the beginning of $e$ and the degree to which it measures $m$ at the end of $e$: if there is no positive difference, it returns zero.

In addition, in assuming that just like other measure function, a measure of change function must combine some degree morphology, Kennedy and Levin posit a verbal positive form morpheme $pos_v$, and a semantic combination of the two is shown in (39).

\[ (39) \ pos_v(m \Delta) = \lambda x \lambda e. m \Delta(x)(e) \geq stdn(g) \]

According to Kennedy and Levin, the semantic formula in (39) represents the core (inchoative) meaning of a DA: a DA based on a measure of change function is true of an object $x$ and an event $e$ just in the degree to which $x$ changes as a result of participating in $e$ exceeds the standard of comparison for $m \Delta$.

Now we are equipped with enough knowledge to evaluate the cases of DAs in English, let us first consider the group of DAs whose corresponding adjectival base utilizes a scale with a maximum value such as straighten, darken, empty and so forth. Since the measure of change function is derived the scale for the adjectival measure
function, it will always “inherit” a maximal value if there is one; the crucial difference between the adjectival measure function and the verbal measure of change function involves the obligatory presence of a (derived) minimum value in the latter. Take the DA *darken* for example, the scale for the measure of change function *darken*$_A$, on which the DA *darken* is based, is that the subpart of the *dark* scale whose minimum value is the degree to which the (internal) individual argument of the verb is dark at the beginning of the event. But since the darken scale has a maximum value (the degree that represents complete darkness), the *darken*$_A$ scale does, too.

An important feature of this analysis is that the availability of the maximum standard/telic interpretation is a consequence from more general principles governing the interpretation of the positive form, which apply equally to a gradable adjective like *dark* and a DA like *darken*. To make it more explicitly, for DAs, there are two potential standards of comparison that are consistent with Interpretative Economy: one based on the minimal value of the derived scale, resulting in the comparative truth conditions and an atelic predicate; the other based on the maximal value of the scale, resulting in truth conditions similar to positive interpretation (i.e., an interpretation of the positive form corresponding adjective) and a telic predicate. Obviously, this analysis deriving default telicity of DAs based on closed-scales fares better than those analyses discussed above. First, it explicitly provides a direct connection between the telic interpretation of the DA and the maximum standard interpretation of the adjective. So there is no stipulation on lexical semantics of closed-scale adjectives in any imaginable aspects. Secondly, this analysis directly captures Kearns (2007)’s intuition that the telos of the verbs equals the standard of the adjective, without encountering those problems hidden in the analysis of Kearns.

Now, consider another group of DAs related to adjectives that denote measure function to open scales such as widen, deepen, lengthen and so forth. Take the DA *lengthen* for example, since there is no maximal degree on the *long* scale, there is no maximal degree on the *long*$_A$ scale, which eliminates the possibility of a maximum standard/telic interpretation. Nevertheless, there is a minimum value on the *long*$_A$ scale: the degree to which the affected argument is long at the beginning of the event. This value supports a minimum standard/atelic interpretation on the basis of the lexical semantics (scalar) properties of the verb. Further, as suggested in Kennedy and Levin (2008: 178), given the option of a conventionalized, scale-based standard and a contextual, norm-based one, Interpretative economy forces the former to be chosen. In doing so, it thus rules out the possibility of a contextual standard and an interpretation equivalent to *become long*.

Finally, consider how this analysis derives the desired interpretation of measure phrases combining with DAs. First of all, building on the analysis of measure phrases
Svenonius and Kennedy 2006, Kennedy and Levin assume that measure phrases saturate degree arguments that are introduced by a special degree morpheme \( \mu \) which combines with a measure function to produce a relation between degrees and individuals, as illustrated below. Here (40b) is semantics of degree morpheme \( \mu \), and the interpretation of the phrase in (40a) is (40c), which requires that it is true of an object if its length is at least as great as 3 meters.\(^5\)

\[
(40) \begin{align*}
\text{a. } & \left[ \text{DegP 3 meters [A long]} \right] \\
\text{b. } & [\mu] = \lambda g \in D_{se, o} \lambda d \lambda x \lambda t. g(x)(t) \geq d \\
\text{c. } & [\mu](\text{[long]})(\text{[3 meters]}) = \lambda x. \text{long}(x) \geq 3 \text{ meters}
\end{align*}
\]

In addition, in order to extend this semantics to those measure phrases combining with DAs, they assume that there is a verbal version of \( \mu \) to go along with the verbal version of \textit{pos} (as mentioned above), with the denotation in (41a) and its application to example (26b) in (41b) below.

\[
(41) \begin{align*}
\text{a. } & [\mu_v] = \lambda g \in D_{mx, \Delta} \lambda d \lambda x \lambda e. g(x)(e) \geq d \\
\text{b. } & \lambda e. \text{widen}_A \text{ (the door)(e)} \geq 5 \text{ inches}
\end{align*}
\]

(41b) requires that it is true of an event \( e \) if the degree returned by applying the measure of change function \( \text{widen}_A \) to \textit{the door} and \( e \), which represents the amount that the door decreases in width as a result of participating in the event, is at least great as 5 inches. Indeed, this is the desired interpretation of measure phrases when combining with DAs — the differential interpretation.

To sum up, in this section we demonstrate how the analysis of Kennedy and Levin not only satisfyingly derives the interpretations of DAs associated with different types of scale structure (i.e., open vs. closed), but also explicitly provides a direct connection between the telicity and scale structures of adjectives. Remarkably, such an analysis of DAs even allows measure phrases to play a role on the determination of telicity of predicates. In next section, we would examine the patterns of DAs in Mandarin. Specifically, we suggest that the scale structure of adjectives also significantly contributes to the determination of (a)telicity of predicates, and based on Mandarin data, we argue that a telic DA denotes “become maximally A” rather than “become A”, which cross-linguistically supports the study of Kennedy & Levin (2008).

\(^{5}\) For simplicity, Kennedy and Levin (2008: 179) assume that measure phrases denote degrees, though they claim that their analysis is consistent with alternative assumptions in which they are quantifiers over degrees or predicates of degrees. See Schwarzhild (2002 and 2005) for alternative view on measure phrases.
3. DAs in Mandarin

As mentioned above, due to some morpho-syntactic reasons, the DAs in Mandarin generally must be verb-adjective compounds in their morphological forms. Importantly and intriguingly, notwithstanding the different morphological forms, the DAs in Mandarin cross-linguistically pattern with the DAs in English in that they reveal a variation on telicity of the predicates. First of all, as is well-established in the contrast between examples in (15)-(17) and in (18)-(20), atelic predicates permit the entailment form their progressive forms to the perfect while telic ones do not. The examples (15)-(20) are repeated as (42)-(47) below.

(42) zhengzai sheng-gao → yijing sheng-gao le
   PROG rise-high already rise-high PERF

(43) zhengzai jia-zhang → yijing jia-zhang le
   PROG add-long already add-long PERF

(44) zhengzai suo-xiao → yijing suo-xiao le
   PROG shrink-small already shrink-small PERF

(45) zhengzai ning-gan ↔ yijing ning-gan le
   PROG twist-dry already twist-dry PERF

(46) zhengzai shen-zhi ↔ yijing shen-zhi le
   PROG stretch-straight already stretch-straight PERF

(47) zhengzai chui-gan ↔ yijing chui-gan le
   PROG blow-dry already blow-dry PERF

Secondly, resembling their counterparts in English, DAs derived from the closed scale adjectives reveals a variation on the telicity. In other words, they permit both the comparative, atelic interpretation (i.e., become A-er) and the positive, telic interpretation (i.e., become A).\textsuperscript{6} Consider the example below:

\textsuperscript{6} Regarding the comparative, atelic reading for DAs in (48) and (49), it seems to be subtle for some native speakers to obtain the atelic meaning. In other words, in some cases the context is obligatory to make native speakers accessible to this comparative, atelic reading. As discussed in Kennedy and Levin (2008: 169), it is possible for DAs such as straighten and darken to be accessible to atelic reading by
Whether or not the perfect form in (49a) entails the state of being dark in (49b) depends on whether we understand bian-hei ‘become-dark’ only as implying that the darkness of the sky increased to some degree but this increased degree, crucially, does not reached the standard of being dark (i.e., atelic reading); or as implying that the darkness of the sky increased and this increased degree crucially reached an understood endstate of being dark (i.e., telic reading). Similarly, whether or not the endstate of being cool is reached, depends on our understanding of the telicity of predicates. Furthermore, by manipulating the sentential context, we can make the comparative, atelic reading become more salient or preferred. See the examples below:

(50) Tian bian-hei le, keshi haishi youdian liang.
      sky become-dark PERF but still a little bit bright
      ‘The sky has become darker, but it is still a little bright’

(51) a. Hua bian-hong le, danshi hai bu gou hong.
      Flower become-red PERF but still not enough red
      ‘The flower has become redder, but it is still not red enough.’
In these examples, a comparative, atelic reading is preferred, as indicated by the second conjunct which denies an understood endstate of being dark and that of being red.

In a sharp contrast to (48) and (49), however, DAs derived from the open scale adjectives crucially permit only the atelic reading, as shown below.

(52) a. Zhangsan bian-gao le.
   Zhangsan become-tall PERF
   ‘Zhangsan has become taller.’
   *‘Zhangsan has become tall.’

b. Zhangsan shi gao de.
   Zhangsan be tall DE
   ‘Zhangsan is tall.’

As the glossary indicated, the DA bian-gao ‘become tall’ does not entail the state of being tall. An intended telic reading is impossible.

Thirdly, in Mandarin, measure phrases also play an important role on the telicity of predicates.

(53) a. Zhe tiao lu tuo-kuan le wu gongchi.
   This CL road expand-wide PERF five meter
   ‘This road has widened five meters.’

b. Zhe tiao lu bi zhiqian kuan wu gongchi.
   This CL road BI original wide five meter
   ‘This road has become five meter wider than before.’

(54) a. Zhangsan zhang-gao le san gongfen.
   Zhangsan grow-tall PERF three centimeter
   ‘Zhangsan has grown three centimeters taller.’

b. Zhangsan bi zhiqian gao san gongfen.
   Zhangsan BI original tall three centimeter
   ‘Zhangsan has become three centimeters taller than before.’

(55) a. Zhe chang bisai yan-chang le shi fenzhong.
   This CL game extend-long PERF ten minute
   ‘This game has been extended 10 minutes longer.’
b. Zhe chang bisai bi zhiqian chang shi fenzhong.
   This CL game BI original long ten minute
   ‘This game has become ten minutes longer than before.’

As expected, the measure phrases in the examples (a) specify the amount that the respective subjects change in temperature and width as a result of participating in the event described by the verb, and in doing so, render the predicates telic. In addition, these measure phrases in DAs express “differential amounts” just like measure phrases in comparatives. To put it differently, instead of specifying the total amount to which an object possesses some measurable gradable property, such measure phrases convey the extent to which two objects (or the same object as different times) differ along some gradable continuum. This is verified by the examples (b), where all the examples (b) are expectedly entailed by the corresponding examples (a).

Fourth, in line with the study of Kennedy and Levin, we suggest that DAs in Mandarin denote a “become maximally A” meaning, rather than a “become A” meaning. Consider examples below:

(56) a.*Zhe liang jian qunzi yijing wanquan hong-gan le, dan zuo
   This two CL skirt already completely roast-dry PERF but left
   bian na jian bi you bian na jian geng gan.
   side that CL BI right side that CL more dry
   ‘These two skirts have completely dried by roasting, but the left one is drier than the right one.’

b. ?Zhe liang mian qiang yijing wanquan tu-hei le, dan zuo
   This two CL wall already completely paint-dark PERF but left
   bian na mian qiang bi you bian na mian qiang geng hei.
   side that CL wall BI right side that CL wall more dark
   ‘These two walls have darkened by painting, but the left one is darker than the right one.’

In these examples, the perfect form in the first conjunct has indicated an understood endstate of being dry and being dark. Further, crucially, under Kennedy and Levin’s analysis which we assume here, the degree to which the skirts are dry and the walls are dark must be the maximal value one the relevant derived scale. Therefore, the

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7 Some native speakers consider (56b) as a perfect sentence (without any degraded acceptability). If this is indeed the case, then it suggests that it may be necessary to make a distinction between color adjectives and those traditionally classified as closed scale adjectives such as dry and straight in the literature. This fact may in turn suggest that cooler adjectives in Mandarin may behave differently from those in English. We leave this line of research on another occasion.
addition of the second conjunct expressing an explicit comparison immediately renders the degraded acceptability or ungrammaticality.

Before leaving this section, recall that we have two important question raised in section one, which need to be answered. (a) What contributes to the variation on the telicity of verb-adjective compounds in Mandarin? (b) what is/ are the linguistic level(s) responsible for this cross-linguistics pattern? For the first question, we adopt the analysis of Kennedy and Levin and suggest that it is the measure of change function $m_A$ and the types of scale structure of the corresponding adjectival base that cooperate to “determine” the telicity of DAs, the verb-adjective compounds (when in the absence of measure phrases). Concerning the second question, under our proposal, it is the lexical semantics of gradable adjectives (e.g., scale structures, degree arguments and measure of change function) that underlies this cross-linguistic pattern of degree achievements. In other words, adjectives in Mandarin and those in English share some basic linguistic properties, which in turn lead to this cross-linguistic pattern.

4. Concluding Remarks

This paper examines the aspectual properties of the “degree achievements” verbs in Mandarin, and indicates that degree achievements (henceforth DAs) in Mandarin also reveal the variability in (a)telicity. Furthermore, adopting the analysis of Kennedy and Levin (2008), we suggest that it is the measure of change function $m_A$ and the types of scale structure of the corresponding adjectival base that cooperate to “determine” the telicity of DAs, the verb-adjective compounds (when in the absence of measure phrases). Finally, based on the data in Chinese, we propose that a telic DA denotes “become maximally A” rather than “become A”, which cross-linguistically supports the study of Kennedy & Levin (2008), while contradicts that of Kearns (2005) and Winter (2006).

Our study in this paper is both theoretically and empirically significant in three aspects. First of all, from a cross-linguistic perspective, our study cross-linguistically supports the work in Kennedy & Levin (2008). This suggests that adjectives in Mandarin and those in English share some basic linguistic properties, which in turn lead to those cross-linguistic patterns. Seeing this way, for better understanding of the essence of adjectives in natural languages, it would be helpful and insightful to
examine those formal properties that Chinese adjectives behave different from those in English.

Secondly, from a perspective of Mandarin, since verb-adjective compounds are a subcategory of the famous resultative verb compounds, our study is significant due to the fact that it surprisingly contradicts our intuition that the first member of compounds (i.e., usually a verb) denotes an event of activity and the second member of compounds (i.e., the resultative) denotes an end state of the relevant event, and therefore a combination of the two in principle should be of an event type such as accomplishment which is telic in essence. This in turn suggests that resultative verb compounds are not homogeneous in terms of their aspectual telicity.

On the other hand, it is well-known that in the Chinese literature some linguists consider all adjectives as state verbs. On their view, there is no syntactic category of adjectives in Mandarin. Importantly, our study contradicts such kind of view. If there are no adjectives in Mandarin, how do we adequately accommodate those observed linguistic facts in this paper? Obviously and imaginably, any analysis, which denies the existence of adjectives in Mandarin while attempts to account for the observed linguistic facts in this paper, would encounter tremendous difficulties and thus unnecessarily increase the burden of proof. Therefore, our study in this paper also serves as a piece of evidence for the existence of adjectival category in Mandarin.
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