Sentiment Classification of Chinese Grammatical Constructions

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Abstract

In this paper, we discuss two types of constructions that contribute to sentiment computation: degree constructions and sentiment constructions. While degree constructions can alter sentiment intensity, sentiment constructions can convey sentiment independently. We gathered a grand total of 208 instances of both types, including 32 degree constructions and 176 sentiment constructions. For the sake of extracting sentiment information, we further divided sentiment constructions into two subtypes, namely those expressing speaker-oriented sentiments and those expressing subject-oriented sentiments. As for the former, the sentiment holder is the speaker who utters the construction; as for the latter, the sentiment holder is the entity stated and described by the construction, typically acting as the subject of the sentence in question. Altogether there are 159 instances of the former subtype (accounting for roughly 90% of all sentiment constructions) and 17 instances of the latter subtype (accounting for roughly 10%). By presenting a preliminary description of sentiment characteristics of each type, we hope that the findings of this study would be conducive to sentiment computation.

Keywords

Sentiment analysis, Degree construction, Sentiment construction, Constructions expressing speaker-oriented sentiments, Constructions expressing subject-oriented sentiments

1. Introduction

Sentiment computation is a trending topic in today's field of natural language processing (NLP). Generally speaking, sentiment analysis in its broad sense concerns the speaker's

psychological attitudes contained in the text; in its narrow sense, sentiment analysis makes a distinction between approval and disapproval expressed by the speaker with regard to an entity or event (Zhou, 2008). The broad definition is adopted here.

Sentiment analysis can target such levels as words, phrases, sentences, texts, and multi-texts, depending on the granularity of text processing (Zhao,2010). Studies of word-level sentiment analysis are relatively abundant and focus on automatic retrieving of sentiment words and constructing of sentiment lexicons. Although sentiments of phrases can in general be derived via sentiment words plus rules, it is impossible for certain phrases to have their sentiment derived. Wiebe et al.(2002) mines a lot of English subjective phrases and build a lexicon of subjective phrases. Many scholars analyzing Chinese also noticed the importance of such phrases. As stated in (Hou,2013), evaluative phrases whose sentiments are incapable of being derived should be included into evaluative phrase lexicons, such as:

(1)   是   男人   吗[1]
       be   man   SFP

       can be counted as a decent man?

(2)   还   是   人   吗
       still   be   human   SFP

       can still be counted as a decent human?

Moreover, many of the existing sentiment lexicons, including Word Sets for Sentiment Analysis by *HowNet* and Sentiment Lexicon Ontology Database by Dalian University of Technology, have also included a few such phrases. However, phrases collected by these sentiment lexicons are insufficient in number and type, and no sentiment knowledge database specifically designed for gathering such phrases is known to exist at present in China. Given such background, this study made an initial exploration on the basis of *Contemporary Chinese Construction Database*.

As Goldberg(1995) stated, C is a CONSTRUCTION iffdef C is a form-meaning pair <Fi, Si> such that some aspect of Fi or some aspect of Si is not strictly predictable from C's component parts or from some other previously established constructions. *Contemporary Chinese Construction Database* has collected 1035 instances of constructions and described multiple characteristics of each construction. Among these constructions, some contribute

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[1] Abbreviations used in this paper are listed as follows:
DE: structural particle. ZHE: structural particle. ZHAO: structural particle. BA: structural particle. SFP: sentence final particle. NEG: negative marker. ASP: aspectual marker. -CL: classifier. -suffix: bound suffix. DI: prefix for ordinal numbers. v:verb. n:noun. a:adjective. vp: verb phrase and adjective phrase. np: nominal phrase.

none to sentiment analysis, such as: [2]

(3) v   来   v   去   (看   来   看   去)
     v   come   v   go   (look come look go)
     v repeatedly   *(look at it repeatedly)*

Such construction conveys "repetition", and by "look come and go" is meant "look repeatedly". It neither conveys any sentiment nor alters sentiment intensity, hence out of consideration of this study. Two types of constructions, instead, are of primary concern here: (i) degree constructions, which express "degree" and are capable of altering sentiment intensity, such as:

(4) 要   多   a   有   多   a   (要 多 好 有 多 好)
     need how   a   have   how   a   (need how good have how good)
     as a as   *(as good as)*

and (ii) sentiment constructions, which express sentiment without having sentiment words present, such as:

(5) 心   都   提   到   嗓子眼儿   了
     heart almost race   to   throat-suffix   ASP
     one's heart is in one's mouth

In sentiment computation, the function of a degree construction is akin to a "degree modifier" and that of a sentiment construction is similar to a sentiment word.

The ultimate goal of constructing a sentiment knowledge database is to serve for extraction of sentiment information, classification of sentiment information, etc. Thus in analyzing sentiment constructions, it is very essential to examine how the holder and target of sentiment could be determined by virtue of sentiment constructions. Since sentiment constructions are, in general, predications or complete propositions, identifying the holder of sentiment is typically easy. Based on different holders of sentiment, sentiment constructions can fall into two categories: those expressing speaker-oriented sentiments and those expressing subject-oriented sentiments. In the former category, the holder of sentiment is the speaker who utters the construction, as in (6):

(6) 小王   说：" 小李   算   什么   男人？"
     Xiaowang say*: " Xiaoli count what   man?"*
     Xiaowang said: "Can Xiaoli be counted as a decent man?"

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[2] Constructions include those with variables and those without variables. The former can be instantiated by "要多 a 有多 a" (*as good as*) where "a" stands for the variable. The latter can be instantiated by "心都提到嗓子眼了" (*one's heart is in one's mouth*). When it comes to constructions with variables, lower case letters are used if all variables belong to the same category, or otherwise, upper case letters such as X and Y will be adopted..

(7)   小王   说：" 小李   站 也 不 是， 坐 也 不 是。"

　　　Xiaowang   say*: " Xiaoli   stand also NEG be,   sit also NEG be.*"

Xiaowang said: "Xiaoli <u>doesn't know whether he should stand or he should sit</u>."

In (6), "Xiaowang" is the one uttering the construction and meantime the holder of sentiment such that "Xiaowang does not count Xiaoli a decent man". The sentiment of "Xiaoli", as the target of sentiment, is nonetheless undeterminable. In (7), "Xiaoli" is the subject of the sentence and also the holder of sentiment such that "Xiaoli feels rather awkward", whereas the sentiment of "Xiaowang" is undeterminable.

Sentiments, by classification, can either have a positive-negative split or be divided into more classes. For example, *HowNet*'s Word Sets for Sentiment Analysis has divided sentiment words into four classes including words of positive sentiment, words of negative sentiment, words of positive evaluation, and words of negative evaluation. In comparison, the Sentiment Lexicon Ontology Database proposed by Dalian University of Technology has categorized the spectrum of sentiments into happiness, fondness, anger, grief, fear, disgust, and surprise, and specified each into 20 subclasses in the light of sentiment intensity and complexity. A fine granularity of classification was pursued as a principle in this study. In sections that follow, we presented a fine-grained analysis on degree constructions and sentiment constructions.

2. Degree Constructions

In contemporary Chinese, the most common way of expressing degree is through the use of degree adverbs. *HowNet*'s Word Sets for Sentiment Analysis has included lists of frequently used words expressing various degrees (219 Chinese words and 170 English ones) and distinguished 6 levels of degree, viz. 极其/最(*extremely/most*), 很(*very*), 较(*more*), 稍 (*-ish*), 欠(*insufficiently*), and 超(*too*).

As stated in (Lv,1956), in addition to degree adverbs, 6 more ways of expressing degree including: (i) exclamatives, as in:

好   快！

How   fast！

So fast!

(ii) reduplication of adjectives, as in:

少   而   又   少

few and   again few

very few

(iii) analogy to typical entities, as in:

白　　似　　雪

white　like　snow

as white as snow

(iv) enhancement by contrast with results:

哭　得　石　人　落　泪

cry　DE　stone　man　shed　tears

cry so hard that even a stone man would shed tears

(v) use of comparison and hypothesis to express extremes, as in:

要　多　高　有　多　高

need　how　tall　have　how　tall

as tall as

and (vi) exploitation of implicitness to express extremes, as in:

说　不　出　的　妙

utter　NEG　out　DE　excellence

unutterable excellence

Viewed from the ways of expressing degree, all degree constructions listed in *Contemporary Chinese Construction Database* can, by and large, be encompassed into the 6 types above.

In accordance with *HowNet*'s classification of degrees in Word Sets for Sentiment Analysis, among the six types of constructions stated above, constructions classed under such types of "use of comparison and hypothesis to express extremes" and "exploitation of implicitness to express extremes" should come at the level of "extremely/most". Constructions belonging to the type of "exclamatives", while conveying degrees not high enough to reach extremes, should nonetheless be able to stay at the level of "very". The degrees expressed by constructions under "analogy to typical entities" and "enhancement by contrast with results" may hinge upon the kinds of "typical entities" and "results", but the bottom line could be no lower than the level of "very". In particular, constructions such as the following ones:

(8)　a　到/得　不　能　再　a

　　　a　to/DE　NEG　can　further　a

　　　could not be a (a in its comparative form)

contain results that culminate in "不能再 a" (*could not be a (a in its comparative form)*). Therefore, the two constructions should fall at the level of "extremely or mostly". Constructions such as:

(9)　a　不　到　哪儿　去

　　　a　NEG　to　where-suffix　to

not very a

contain negative words such that they have a level of degree lower than "very". This is also
true in:

(10)   不   怎么   a
       NEG   how   a

not so a

Other types of constructions express a level of degree which is high but not high enough as
to reach the level of "extremely or most", and hence can only stay at the level of "very".
Besides, constructions such as:

(11)   看   (把)   np   vp   得
       see   (BA)   np   vp   DE

see how np vp

express "过于 a (*too a*)", and should fall at the level of "too". In this view, the levels of
degree conveyed by degree constructions are not as clearly demarcated as those conveyed
by degree adverbs. Thus, we may simplify *HowNet*'s 6 levels of degree into 4 levels,
resulting in a new version of "extremely/most", "very", "insufficiently", and "too".
Appendix 1 presents the analysis results of 32 constructions according to these four levels.

3. Constructions Expressing Speaker-Oriented Sentiments
3.1. Categories of Constructions Expressing Speaker-Oriented Sentiments
The sentiment contained within a construction bears a close relation to its meaning.
Constructions sharing similar meanings tend to express similar sentiments. As stated in
(Zheng,2010) idiomatic constructions expressing pejorative sentiments can be classified
into those containing negative comment, those containing blame, and those containing
refutation, and idiomatic constructions expressing pejorative sentiments significantly
outnumber those expressing commendatory sentiments. In (Zheng,2014), formal
characteristics of idiomatic constructions expressing pejorative sentiments are summarized:
idioms expressing pejorative sentiments, when containing second person pronouns, express
pejorative sentiments to a higher degree of fossilization; idioms expressing pejorative
sentiments often carry interrogative markers; idioms expressing pejorative sentiments are
usually restructured constructions; idioms of sluicing structures typically express pejorative
sentiments; and most pejorative idioms contain polarity words (summary adverbs, negative
words, and words with small subjective quantity).

We argued that negative comment and blame, as comments in a broad sense, could be
lumped together for elaboration. In our view, constructions expressing threat that were
classed under constructions expressing blame along with constructions expressing

anti-interference and a hands-off attitude according to (Zheng,2014) are far from being constructions expressing comments, and should be analyzed separately. For this reason, we divided constructions expressing pejorative sentiments into four categories: constructions expressing negative comment or blame, constructions expressing anti-interference or a hands-off attitude, constructions expressing threat, and constructions expressing refutation. Moreover, although constructions expressing commendatory sentiments are relatively few, this does not mean they should deserve any less attention. In general, constructions expressing commendatory sentiments can be classed into those expressing positive comment and those expressing approval or support. The formal characteristics proposed in (Zheng,2014), though crucially important, still call for further specification. A detailed analysis was provided below.

3.2.Constructions Expressing Pejorative Sentiments
3.2.1.Constructions Expressing Negative Comment or Blame
Negative comment and blame are acts of evaluation. A complete evaluation is supposed to include such elements as an holder of evaluation, an evaluative word, a target of evaluation, and a conclusion, for instance, holder of evaluation (*I*), evaluative word (*think*), target of evaluation (*Xiaowang*), and conclusion (*is a good kid*). However, certain constructions may explicitly encode only one or a few of those elements. We offered a classification of constructions based on different encoded elements.

Holder of evaluation + evaluative word + target of evaluation, as in:

(12) 不　　　是　　　我　　　说　　　你
　　　NEG　　be　　　I　　　blame　you

I don't intend to blame you, but …

"我(*I*)", "说(*blame*)", and "你(*you*)" are holder of evaluation, evaluative word, and target of evaluation respectively. Usually, the holder of evaluation and evaluative word can be omitted, but are nonetheless explicitly encoded in these constructions. Since the maxim of Quantity under the Cooperative Principle (Grice,1975) is violated, conversational implicature is thus generated, typically giving rise to negative sentiments.

Explicitly marking the target of evaluation, as in:

(13)	好	你	个	np	(好	你	个	李云龙　　)
	well	you	-CL	np	(well	you	-CL	Li Yunlong)
	np, how dare you do that				*(Li Yunlong, how dare you do that)*			

In this construction, the target of evaluation is preceded by "你个(*you such*)", hence explicitly marked. This violation of the Maxim of Quantity also brings about conversational implicature which is primarily negative sentiment.

Target of evaluation + conclusion, as in:

(14)	不过	就	是	X	(不过	就	是	个	科长	)
	after all	just	be	X	(after all	just	be	-CL	section chief)	

be just a X after all   *(be just a section chief after all)*

Such constructions normally contain an adverb "就(*just*)" that conveys small subjective quantity[3], and in so doing, they contain a conclusion made by the holder of evaluation with respect to the target of evaluation, viz. that the target of evaluation is too "small, or inferior in rank". Since "small" is easily related to contempt and pejorative meaning, such constructions are endowed with negative sentiments.

There are also counter-expectation[4] constructions, for example:

(15)	早	不	vp	晚	不	vp
	early	NEG	vp	later	NEG	vp

should have vp-ed earlier or should have vp-ed later

	早	不	来	晚	不	来
	early	NEG	come	later	NEG	come

should have come earlier or should have come later

The utterance "He should have come earlier or should have come later" means "(the speaker) has not expected that 'he came at such a time". The conclusion made by the holder of evaluation pertaining to the target of evaluation is that "this does not meet the speaker's expectation". Counter-expectation, in most cases, is bad, and this is why such constructions tend to carry with them negative sentiments.

Questioning the target of evaluation: including mainly constructions with interrogative words such as:

(16)	你	以为	你	是	谁

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[3] Subjective quantity refers to quantity of contained subjective evaluation, vis-à-vis objective quantity. Subjective quantity includes both small subjective quantity and large subjective amount. The former can be instanced by:
  才+三+天/就+三+天
  only+three+day/ just+three+day
  just three days/only three days
The latter can be instanced by:
  都+三+天+了
  already+three+day+SFP
  three days already
Readers may refer to (Chen,1994) for a detailed discussion.
[4] Expectation refers to an abstract world that bears a link with human knowledge and conception. Usually, it is closely bound up with certain social conventions, state of knowledge of the speaker and hearer in a speech event, and specific context of an utterance. Counter-expectation information refers to utterance information contrary to a particular expectation. Readers may refer to Wu Fuxiang (2004) for a detailed discussion.

you	think	you	be	who

who do you think you are

Such constructions achieve the effect of negative evaluation through questioning a particular aspect of the target of evaluation. In the above instance, the effect that "you have done things that sort ill with your status" is illustrated by means of "questioning your status", and certainly "doing things that sort ill with your status" is bad.

Objectively describing the target of evaluation: These constructions objectively describe the target of evaluation. Now that aspects pertinent to the target of evaluation are in violation of the general expectations of society, negative sentiments thus ensue. They include the following types:

Atypicality. Constructions of this sort usually contain words like "是(*be*)", "算(*count*)", "像(*resemble*)", "叫(*call*)" as well as negative or interrogative words, as in:

(17) 算　　什么　　n　　　　　(算　　什么　　厨师)

count　what　n　　　　　(count　what　chef)

cannot be counted a typical n　　*(can not be counted a typical chef)*

"Cannot be counted a typical chef" means "not a typical chef, or ineligible as a chef". Human beings are apt to favor the typical and disfavor the atypical, so it is natural these constructions embody negative sentiments.

Irregularity, as in:

(18) 东　X　西　Y　　(东　　张　　西　　望)

east　X　west　Y　(east　look　west　gaze)

X/Y about　　　　*(look/gaze about)*

"Look/gaze about" means "look/gaze in all directions". Humans crave for disciplined actions and regular things; consequently, irregularity is associated with negative sentiments. The major formal characteristic of such constructions is juxtaposition.

Deficiency, as in:

(19) 要　np1　没　np1，　要　np2　没　np2

need　np1　NEG np1,　need　np2　NEG　np2

np1 is needed, but one does not have one, and np2 is needed, but one does not have one.

要　房　没　房，　要　车　没　车

need　house　NEG house,　need　car　NEG　car

A house is needed, but one does not have one, and a car is needed, but one does not have one.

Normally, humans desire a sense of possession, hence deficiency is closely coupled with negative sentiments.

Excess, as in:

(20) 张口   X   闭口   X   (张口   钱   闭口   钱   )
      speak   X   shut up   X   (speak   money   shut up   money)
      be always in a state of talking   *(be always in a state of talking about*
      about X   *money)*

The construction means "be always in a state of talking about X". This would arouse in people a sense of excess that easily bores them.

Constructions of negative comment and blame mainly convey a meaning of reproach.

3.2.2. Constructions Expressing Anti-Interference and a Hands-off Attitude

Constructions expressing anti-interference prevail in contexts where the speaker is intended to do something but interfered by the hearer. They often deliver a sense of "you leave me alone", as in:

(21) 你   管   得   着   吗
      you   control   DE   ZHAO   SFP
      you can't make me

Constructions expressing a hands-off attitude generally appear at a time when the speaker gets rejected after an attempt at reasoning with the hearer, and chiefly convey a meaning of "won't bother to get in your way", as in:

(22) 爱   v   不   v   (爱   去   不   去)
      wish   v   NEG   v   (wish   go   NEG   go)
      v if you wish to, and don't v if   *(go if you wish to, and don't*
      you wish not to   *go if you wish not to)*

The above two constructions mainly display the speaker's sentiments of dissatisfaction and impatience, and occasionally may express resignation.

3.2.3. Constructions Expressing Threat

In constructions expressing threat, the speaker conveys dissatisfaction about the on-going behavior of the hearer by means of threat or warning in order to stop the hearer from doing it. Constructions expressing threat are realized in mainly four ways:

   (i) By emphasizing the importance of the speaker's words and instructing the hearer to listen carefully, as in:

(23) 你   (们)   听   着
      you   -suffix   listen   ZHE
      listen, you (all of you)

   (ii) By using a complete hypothesis compound sentence, as in:

(24) 再　　　X　　我　　就　　不　　客气　　了
continue　X　I　then　NEG　polite　SFP
continue to X, and I will set you straight
再　　　说话　我　就　不　　客气　了
continue　speak　I　then　NEG　polite　SFP
one more word, and I will set you straight

(iii) By using the first half of a complete hypothesis compound sentence to indicate what the hearer is expected to do right now, as in :

(25) 放　　X　　点儿　　　/些
behave　X　-CL-suffix　/-CL
X a little

(iv) By using the second half of a complete hypothesis compound sentence to indicate possible severe consequences, as in:

(26) X　可　　不　　是　　闹着玩　　的
X　ever　NEG　be　trifle with　DE
don't you ever trifle with X
打架　可　不　是　闹着玩　的
fighting　ever　NEG　be　trifle with　DE
don't you ever trifle with fighting

Constructions expressing threat mainly display the speaker's sentiment of dissatisfaction.

3.2.4. Constructions Expressing Refutation

Most constructions expressing refutation contain such interrogative words as "什么(*what*)" and "哪儿(*where*)". Rhetorical questions, as often happens in contemporary Chinese, are accompanied by a sense of refutation. The formal characteristics of such constructions were listed below.

"什么(*what*)" constructions, as in:

(27) X　什么　呀　　（好　　什么　呀）
X　what　SFP　(good　what　SEP
what is X about it anyway (what is good about it anyway)

"哪儿(*where*)" constructions, as in:

(28) 哪儿　跟　　哪儿　　　啊
where　with　where-suffix　SFP
what does this have to do with that

"Even" constructions, as in:

(29) 还   np   呢   (A：我 想 吃 苹果。   B：还   香蕉   呢。)
      even   np   呢   (A：I want eat apple.   B：even   banana SFP.)
      Isn't np an even better idea?   *(A: I want to eat an apple. B:* <u>*Isn't a banana an*</u>
                                              <u>*even better idea?!)*</u>

Constructions containing words that convey distance and finality (e.g. "去(*go*)", "得 (*stop*)") or certain pejorative words (e.g. "死(*die*)", "头(*head*)", "球(*ball*)", "鬼(*ghost*)", "梦(*dream*)"), as in:

(30) 去   你   的   (31) 鬼   才   知道   呢
      go   you   DE   ghost   only   know   SFP
      you go to hell   *who the hell knows*

(32) 不   X   能   死   啊   (不   说话   能   死   啊)
      NEG   X   can   die   SFP   (NEG   talk   can   die   SFP)
      would you die if you do not X   *(would you die if you do not talk)*

(33) X   个   头   (吃   个   头)   (34) 做梦   吧   你
      X   -CL   head   (eat   -CL   Head)   dream   SFP   you
      don't X   *(don't eat)*   *you just dream on*

Constructions expressing refutation mainly convey the speaker's sentiments of dissatisfaction and impatience.

3.3. Constructions Expressing Commendatory Sentiments
3.3.1. Constructions Expressing Positive Comment

There is a far fewer number and type of constructions that express positive comment than constructions that express negative comment. Based on the classification of evaluation constructions described in 3.2.1, constructions expressing positive comment should belong to the case of "objectively describing the target of evaluation". Constructions expressing positive comment take core verbs such as "是(*be*)", "像(*resemble*)", "够(*qualify*)", "有 (*have*)", etc. Constructions with core verbs of "是(*be*)" or "像(resemble)" are, for example:

(35) X   是   X，   Y   是   Y   (鼻子 是 鼻子， 眼睛   是   眼睛)
      X   be   X，   Y   be   Y   (nose be nose， eye   be   eye)
      X is exactly what X should be, and Y   *(the nose is exactly what a nose should be,*
      is exactly what Y should be   *and the eyes are exactly what a pair of*
                                              eyes should be)

Constructions with "够(*qualify*)" as the core verb include:

(36) 够   n   (够   爷们)
      qualify   n   (qualify true man)
      qualify as n (qualify as a true man)

Constructions with "有(*have*)" as the core verb include(37).There are some constructions that cannot be classed into any of the aforementioned types, such as(38).

(37)	真	有	你	的		(38)	没	的	说
	truly	have	you	DE			NEG	DE	blame

you really have capability to do sth   *there is nothing to blame*

Constructions containing positive comment function mainly to express approval.

3.3.2.Constructions Expressing Approval or Support

Constructions expressing approval or support are of two types: those showing approval for the intention of the hearer and removing his/her suspicion, and those showing approval for the opinion of the hearer. When a hearer intends to do something but still entertains doubts, a speaker may express several types of meaning to dispel the hearer's doubts. (i) What concerns you is a mere trifle, as in:

(39)	X	没	什么	大	不	了	的
	X	NEG	what	big	NEG	SFP	DE

X is no big deal

	这	事儿	没	什么	大	不	了	的
	this	matter-suffix	NEG	what	big	NEG	SFP	DE

this matter is no big deal

(ii) I will help you with your concern, as in:

(40)	X	有	我	呢	(这	事	有	我	呢)
	X	have	me	SFP	(this	matter	have	me	SFP)

on X you have my back   *(on this matter you have my back)*

(iii) Do if you wish, as in:

(41)	爱	vp	就	vp	(你	爱	去	就	去)
	wish	vp	then	vp	(you	wish	go	then	go)

vp if you wish   *(go if you wish)*

Constructions expressing approval for the hearer's knowledge usually contain both interrogative and negative words, as in:

(42)	谁	说	不	是	呢
	who	say	NEG	be	SFP

who would deny …

4.Constructions Expressing Subject-oriented Sentiments

In respect of number, constructions expressing subject-oriented sentiments are comparatively fewer than constructions expressing speaker-oriented sentiments, and mainly

express sentiments of the following types:

    Awkwardness, such as:

(43)   X   也   不   是，   Y   也   不   是
         X   also   NEG   be,   Y   also   NEG   be
         don't know whether one should X or one should Y
         坐   也   不   是，   站   也   不   是
         sit   also   NEG   be,   stand   also   NEG   be
         don't know whether one should sit or one should stand

    Frustration, such as:

(44)   X   也   得   X，   不   X   也   得   X
         X   also   have to   X,   NEG X   also   have to   X
         have no choice but to X
         去   也   得   去，   不   去   也   得   去
         go   also   have to   go,   NEG   go   also   have to   go
         have no choice but to go

    Contempt, such as:

(45)   不   把   X   当   回   事   (不   把   学习   当   回 事)
         NEG   BA   X   take   -CL   matter   (NEG BA   study   take   -CL matter)
         do not take X seriously…   *(do not take study seriously)*

    Amazement, such as:

(46)   做梦   也   没   想   到
         dream   also   NEG   think   -to
         have never dreamed of

    Nervousness, such as:

(47)   心   提   到   嗓子眼   儿   了
         heart   race   to   throat   -suffix   ASP
         one's heart is in one's mouth

    Sadness, such as:

(48)   心   凉   了
         heart   cold   SFP
         one's heart sinks

    Reassurance, such as:

(49)   一   块   石头   落   了   地
         one   piece   stone   fall   ASP   ground
         as a piece of stone has fallen onto the ground

    Complicated sentiment, such as:

(50) 心   里   不   是   滋味

      heart in   NEG   be   taste

     harbor mixed feelings

    In terms of origin, some of the above constructions originate from metaphor and exaggeration. An instance of metaphor is "as a piece of stone has fallen onto the ground" in which "a piece of stone" is a metaphor for "one's concern" and "has fallen onto the ground" means "would no longer worry". The whole construction means "totally relieved". An instance of exaggeration is "one's heart is in one's mouth". As one's heart accelerates under exceedingly stressful conditions, it follows that "one's heart is in one's mouth" can deliver the meaning of "accelerating heartbeats", which would further indicate "an extremely nervous state". Other constructions involve negative words and words conveying people's thoughts or knowledge, as in:

(51) 不   知   怎么   X   才   好

      NEG know how   X   then   good

     have no idea how to X

Some constructions also involve double negation, as in(43).

5.Conclusion and Future Work

In this study, we examined a variety of constructions that contribute to sentiment computation based on *Contemporary Chinese Construction Database*, and made preliminary attempts at classifying relevant constructions according to their formal or semantic commonalities. Among 32 degree constructions collected in this study, 11 fall at the level of "extremely or most", 16 at the level of "very", 2 at the level of "insufficiently", and also 2 at the level of "too". Table 1 summed up the constructional meaning, sentiment category, and number of instances of sentiment constructions.

Constructional meaning	Sentiment category	Number (percentage)
negative comment/ blame	reproach	52 (30%)
anti-interference/ a hands-off attitude	dissatisfaction/impatience/frustration	36 (20%)
threat	dissatisfaction	11 (6%)
refutation	dissatisfaction/impatience	28 (15%)
positive comment	approval	17 (10%)
approval/support	approval/support	15 (9%)
subject-oriented sentiment	awkwardness, frustration, contempt, amazement, nervousness, sadness, reassurance, etc.	17 (10%)

Table 1   A Synopsis of Sentiment Constructions

In future study, we would continue to specify our descriptions of construction sentiments, explore their distributional characteristics in different genres (vernacular discourse or narrative), and investigate their co-occurrence with sentiment words. It was hoped that findings of this study would draw attention to such constructions in an effort to push forward sentiment computation through further researches into sentiment constructions.

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Appendix 1:A Classification of Degree Constructions at Different Levels

Levels	Constructions	Number
extremely /most	a+得+不+能+再+a（好得不能再好） a+DE+NEG+can+further+a (good+DE+NEG+can+further+good) *could not be a (a in its comparative form) (could not be better)* a+到+不+能+再+a（好到不能再好） a+to+NEG+can+further+a (good+to+NEG+can+further+good) *could not be a (a in its comparative form) (could not be better)* 要+多+a+有+多+a（要多好有多好） need+how+a+have+how+a (need how good have how good) *as a as (as good as)* 再+a+不+过（再好不过） further+a+NEG+over (further good NEG over) *could not be a (a in its comparative form) (could not be better)* 再+a+也+没有+np+a（再好也没有他好） further+a+well+NEG+np+a (further good well NEG he good) *not as a as np be (not as good as he is)* 见+过+X+的，没+见+过+这么+X+的（见过差的，没见过这么差的） see+ASP+X+DE, NEG+see+ASP+so+X+DE (see ASP bad DE,	11

	NEG see ASP so bad DE)	
	have known of X, but never of X as such (have known of the bad, but never of the bad as such)	
	别+提+多+vp+了（别提多差了）	
	not+mention+how+vp+SFP (not+mention+how+terrible+SFP)	
	do not mention the extent of vp (do not mention how bad it is)	
	说+不出+的+vp（说不出的好）	
	utter+NEG+DE+vp (utter NEG DE good)	
	unutterably vp (unutterably good)	
	X+就+别+提+了（那高兴劲就别提了）	
	X+then+not+mention+SFP (that joyfulness then not mention SFP)	
	no need to mention X (no need to mention that joyfulness)	
	把+np+vp+得（把他气得）	
	BA+np+vp+DE (BA he irritate DE)	
	how it vp np(how he is irritated)	
	vp+得+np（气得我）	
	vp+DE+np (irritate DE I)	
	vp np to the great extent of (irritate me to the great extent)	
very	vp+得+X（好得很）	17
	vp+DE+X (good DE very)	
	very vp (very good)	
	vp+到+X（好到爆）	
	vp+to+X (good to burst)	
	very vp (very good)	
	比+np+还+np（比专家还专家）	
	than+np+even+np (than expert even expert)	
	more of np than np (more of an expert than an expert)	
	比+np+更+np（比专家更专家）	
	than+np+more+np (than expert more expert)	
	more of np than np (more of an expert than an expert)	
	n+中+的+n（专家中的专家）	
	n+among+DE+n (expert among DE expert)	
	n of n (expert of experts)	
	你+说+a+不+a（你说坏不坏）	
	you+say+a+NEG+a (you say bad NEG bad)	

very a, I think you will also agree with me a+着+呢（好着呢） a+ZHE+SFP (good ZHE SFP) *very a (very good)* 那+个+X+啊（那个好啊） that+-CL+X+SFP (that-CL good SFP) *very X (very good)* 那+叫+一+个+a（那叫一个好） that+call+one+-CL+a (that call one-CL good) *how a it can be called (how good it can be called)* 像+np+一样|似的（像仙女一样） like+np+the same|alike (like fairy the same) *exactly like np (exactly like a fairy)* np+一样|似的（仙女一样） np+the same|alike (fairy the same) *like np (like a fairy)* np+vp（仙女下凡） np+vp (fairy descend to the earthly world) *as np vp (as a fairy descends to the earthly world)* 赛+np（赛华佗） match+np (match Huatuo) *good enough to match np (good enough to match the legendary Chinese surgeon Huatuo)* 小+np（小华佗） little+np (little Huatuo) *someone as good as np (someone as good as the legendary Chinese surgeon Huatuo)* np1+的+np2（中国的乔丹） np1+DE+mp2 (China DE Jordan) *np1's np2 (China's Jordan)* np+第+二（乔丹第二） np+DI+two (Jordan DI two) *np number two (Jordan number two)* 够+a（够好） enough+a (enough good) *a enough (good enough)*	

insufficiently	不+怎么+a（不怎么好）	2
	NEG+how+a (NEG how good)	
	not so a (not so good)	
	a+不+到+哪里+去（好不到哪里去）	
	a+NEG+to+where+to (good NEG to where to)	
	not very a (not very good)	
too	看+把+np+vp+得（看把他高兴得）	2
	see+BA+np+vp+DE (see BA he please DE)	
	see how vp np be (see how pleased he is)	
	看+np+vp+得（看他高兴得）	
	see+np+vp+DE (see he please DE)	
	see how vp np be (see how pleased he is)	
Total		32