# Experimental Research on the Modal function of Two Adverbs *Dao* and *Que*

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## Abstract

While voice information processing is moving from static and physical research towards dynamic and functional research, experimental research on mood has become a necessity. Based on experiment on the modal function of the two adverbs *Dao* and *Que*, this thesis proposes the following points:1. Both *Dao* and *Que* can effectively express mood, which is supported by the change of F0 and volume increase of the phonological words before and after Dao and *Que* in the experimental sentences. 2. In normal cases, *Que* is more effective than *Dao* in expressing a strong mood, which is proved by how each of them affect the F0(including pitch range) of a sentence, the duration of a whole sentence and the pause between clauses. 3.The different performances of the two words in regard to their modal function are represented by F0, intense, duration etc.

## 1. Introduction

In natural verbal communication, the appropriate use of modal words or phrases is one of the important means to achieve communicative effects. Similarly, in the processing of voice information, both speech recognition and synthesis, the research of mood is also an important part in improving naturalness. In Second Language Acquisition, the acquisition of mood is also a threshold of acquiring a native spoken language.

As a universal language phenomenon, intonation has been a focus in research. Although there is not a clear distinction between the micro-school and the macro-school in Mandarin intonation research, micro-method is preferred than macro-method. Micro intonation is the sentence pitch; As for macro intonation, some scholars use the concept mood to differentiate it from intonation (Wu Zongjie, 1990) and even regard intonation as a key part of spoken Chinese. (Zhao Yuanren, 1979).

Many scholars propose their own views on the relation between Chinese tone and intonation.(Zhao Yuanren, 1933; Shen jiong, 1992 17: Wu Zongji, 1995; Cao Jianfen, 2002) Though at present there is fewer research on the relation between Chinese intonation and mood, a few achievements have also been made. (Wu Zongji, 1995; Lin Maocan, 2002; Wang Haibo Li Aijun, 2002; Jiang Danning、Cai Lianhong, 2002)

Many foreign scholars have conducted research on mood and reach the following conclusion: Mood expresses the attitude that is held by the speaker towards the content of the sentence. Mood is just a grammatical category expressed by verbal morphology. Any language that is not selected by verbal morphology to express mood expresses no mood.

Some Chinese scholars also have explored Chinese mood from different perspectives and achieve some results. We can approach mood from two perspectives. In a broad sense, mood includes intention and speech momentum. Intention can be positive or negative, definite or indefinite, abstract or real. Speech momentum means the quick or slow progress of speech and the gentle or serious attitude of the speaker. In a narrow sense, intention is resulted from " the difference between sentences with the same concept and content but used for different purposes". (Lu Shuxiang, 1982) "The ways used to express all kinds of emotions are called mood."(Wang Li, 1985) "On one hand, the mood of a sentence is based on the intonation of the sentence, which is a voice representation of the mood of the sentence; On the other hand, it is based on the speaker's emotions and attitudes, which is the substance of the mood of the sentence." (Wang Kuijing, 1996) "Mood is virtually a kind of modality, which represents the speaker's attitudes, intention and emotions towards the communicative content. (Xu Jingnin, 2000) "Mood is the representation of the sentence proposition and the presented content is either the purpose for which the speaker expresses the proposition or the attitudes and evaluation the speaker held towards the proposition and those emotions related to the proposition." (He Yang, 1992) " Mood is a subjective consciousness expressed by the speaker in grammatical form which aims at the sentence proposition. (Qi Huyang, 2002)

Mainly based on experiments, the thesis adopts the methods of quantitative analysis and validation to explore the function of expressing mood of the two adverbs *Dao* and *Que* from a micro perspective and the difference between the two words in this regard.

## 2. Methodology

In the following 3 experiments, ten speakers were asked to read aloud the following three groups of sentences unaffectedly.

**Group A**

*Ni shuo shuo kan!*
*Ni Dao shuo shuo kan!*

**Group B**

*Ren de shen ti ke yi bei qiu jin, ren de xin bu ke yi.*
*Ren de shen ti ke yi bei qiu jin, ren de xin Que bu ke yi.*

**Group C**

*Ying gai lai de mei you lai, bu gai lai de Dao lai le.*
*Ying gai lai de mei you lai, bu gai lai de Que lai le.*

Ten speakers include 5 boy students and 5 girl students whose Mandarin is standard and fluent. To avoid strong comparison, which might bring clues to the speakers, we shuffled the six sentences and let them read aloud unaffectedly. We recorded the voices and used PRAAT software to extract each sentence's F0 and measured the highest and lowest points of

each F0. At the same time we measured the maximum volume of the phrases before and after *Dao* and *Que*. Finally each parameter was derived from the measurement is averaged by tens.

## 3. Results

### 3.1 Results of Group A

Table 1: A comparison of the results A

| Statistics parameter | | Without *Dao* (*Ni shuo shuo kan!*) | With *Dao* (*Ni Dao shuo shuo* kan!) | D-value |
|---|---|---|---|---|
| F0 of the whole sentence | The lowest poit（Hz） | 209.91 | 228.12 | 18.21 |
| | The higest poit（Hz） | 403.83 | 453.18 | 49.35 |
| | Pitch range（Hz） | 193.92 | 225.06 | 31.14 |
| Intensity of the character *Ni*（Db） | | 64.51 | 65.48 | 0.97 |
| Intensity of the character *Shuo*（Db） | | 65.33 | 66.61 | 1.28 |

The results of Group A present that the lowest point of the whole sentence's F0 is increased by 18.21 Hz on average by the use of the adverb *Dao*, the highest point 49.35Hz and the pith range 31.14Hz. The Intensity of character Ni before Dao is increased by 0.97Db and that of the character *Shuo* after *Dao* 1.28Db. In addition, the increase of intensity of *Shuo* which is after Dao is greater than that of *NI* which is before *Dao*.

### 3.2 Results of Group B

Table 2: A comparison of the results B

| Statistics parameter | | Without *Que* (*Ren de shen ti ke yi bei qiu jin, ren de xin bu ke yi.)* | With *Que* (*Ren de shen ti ke yi bei qiu jin, ren de xin Que bu ke yi.)* | D-value |
|---|---|---|---|---|
| the whole | The lowest poit（Hz） | 145.16 | 169.51 | 24.35 |
| | The highest point（Hz） | 441.59 | 505.75 | 64.16 |
| | Pitch range（Hz） | 296.43 | 336.24 | 39.79 |
| Pause between clauses（s） | | 0.21 | 0.40 | 0.19 |
| The maximum intensity of the character *Xin*（Db） | | 64.13 | 65.58 | 1.45 |
| The maximum intensity of the character *Bu*（Db） | | 63.67 | 66.09 | 2.42 |

The results of Group B present that the lowest point of the whole sentence's F0 is increase by 24.35 Hz on average by the use of the adverb *Que*, the highest point 64.16Hz and the pitch range 39.79Hz. The intensity of *Xin* is increased by 1.45Db and that of *Bu* 2.42 Db. In addition, the increase of intensity of *Bu* which is after *Que* is greater than that of *Xin*. The pause between clauses is increased by 0.19s on average.

3.3 Results of Group C

Table 3: A comparison of the results C

| Statistics parameter | | With *Dao* | with *Que* | D-value |
|---|---|---|---|---|
| F0 of the whole sentence | The lowest point（Hz） | 163.76 | 177.21 | 13.45 |
| | The highest point（Hz） | 466.87 | 504.08 | 37.21 |
| | Pitch range（Hz） | 303.11 | 326.87 | 23.76 |
| Duration of the whole sentence（s） | | 4.65 | 5.03 | 0.38 |
| Pause between clauses（s） | | 0.91 | 1.09 | 0.18 |
| Intensit of *Bu Gai Lai*（Db） | | 66.81 | 67.35 | 0.54 |
| Intensit of *Lai le*（Db） | | 65.03 | 65.74 | 0.71 |

The results of Group C presents that the lowest point of the F0 of a sentence with *Que* is higher than that of a sentence with Dao on average by 13.45Hz and the highest point of the F0 37.21Hz. The pitch range is increased by 23.76 Ha. The average intensity of the two prosodic phrases *Bu Gai La*i and *lai le* are increased by 0.54Db and 0.71Db respectively. In addition, duration of a sentence with *Que* is longer than one with *Dao* by 0.38s and the pause of the former is also longer than the later by 0.18 on average.

## 4. Discussion

### 4.1 Influence on F0

From the perspective of mood expression, different methods are adopted, such as intonation, modal particles, exclamations, adverbs and grammatical forms. (Lu Shuxiang, 1982; Li Qi,1987; Hu Mingyang, 1991; He yang, 1992; Chu Cheng Zhi, 1994; xu Jingini, 2003)Among them f0 is the basic information of transferring emotions (that is the substance of the mood). The F0 of Groups A,B,C is no exception. Therefore the change of F0 in the three groups represents the change of the speaker's mood. In the experiment of group A, both the lowest and the highest points of F0 are increased by the use of the word *Dao*. That is to say the mood of a sentence is stronger after the use of the character *Dao*. As such, in group B, when *Que* is used, both the lowest and highest points of F0 increase, which indicates that with *Que*, the sentence denotes a much stronger mood.

From the perspective of factors affecting fundamental frequency contours, the factors, as varied as they are, fall into two basic categories, namely, objective and subjective. The control of objective factors over fundamental frequency contours is achieved by realizing various pitch targets and pitch ranges. Pitch range is the range of pitch targets and determined by advanced linguistic functions such as intonation and emotions (Xu Yi, 1999). In our experiments, each participant articulates the three groups of sentences at the same time and in the same environment; furthermore, except for the words *Dao* and *Que*, the sentences in each group employ the same words, intonations, and structures. Therefore, the change of F0 and the expansion of pitch range in our experiment can only be caused by the use of *Dao* and *Que*. Interestingly, in group C, both the F0 points and pitch range of the sentence with *Que* are higher than those of the sentence with Dao, suggesting that though both with modal function, *Que* helps convey a stronger mood than *Dao*.

### 4.2 Influence on intensity and duration

In the experiment of Group A, when *Dao* is used, volume intensity of *Ni*, which is before *Dao*, and *Shuo*, following *Dao*, goes up. The lowest and highest points of F0 also increase. Both mean that the sentence with *Dao* expresses a stronger mood than the other. As such, in group B, when *Que* is used, the intensity of the prosodic phrases before and after *Que* :"*bu gai lai*" and *"lai le*" rises respectively and the pause between clauses stays longer. As we now know, intensity and duration are both acoustical representation of accent (modal information) (Wang Hongjun, 2002). Just as what is with F0, the increase of intensity and duration is the result of the use of D*a*o and *Que*. Comparing the intensity, durations and pauses of the two sentences in Group C, we also find that adverb *Que* helps denote a stronger mood than *Dao*.

### 4.3 Supplementary evidence

Some Chinese syntax scholars have conducted qualitative researches on the expressive mood function of *Dao* and *Que* based on some relevant syntax theories and drawn the conclusion that both *Dao* and *Que* can effectively express mood, which is basically consistent to the founding of our experimental research (liu Shuxiang, 1980; Peng Xiaochuan, 1999; Zong Shouyun, 2001; Mei Lichong, 1998; Yang Yuerong, 2000; Liu Qingping, 2000).

The proposition that *Que* is more effective than *Dao* in expressing mood can be accounted for from phonetic perspective. Firstly, the phonet of *Que* is an aspirata while that of *Dao* is a plosive. Generally speaking, the intensity and the frequency of aspiratas are higher than those of non-aspiratas, which supplementary supports that *Que* helps convey stronger mood than *Dao*. Secondly, from the tongues height, the vowel of *Que* produces a higher tongue position than that of *Dao*. It indicates that the articulation of the former is more intense than the latter while in most cases F0 of intense vowels is higher compared with that of lax vowels. Finally, if we look at the tongue backness, the vowel of *Que* is relatively in the front side of the tongue while *Dao* is more backwards. As a result, the former sounds more acute than the latter and generally the F0 of acute vowels is higher than that of blunt vowels, which once again corresponds to our research result that the adverb *Que* helps convey stronger mood than *Dao*.

## 5. Conclusions

Based on the experiment, this thesis comes to 3 conclusions:

1. Both *Dao* and *Que* can effectively express mood, which is supported by the change of F0 and volume increase of the

phonological words before and after *Dao* and *Que* in the experimental sentences.

2. In most cases, *Que* is more effective than *Dao* in expressing a strong mood, which is proved by how each of them affect the F0(including pitch range) of a sentence,the duration of a whole sentence and the pause between clauses.

3. The different performances of the two words *Dao* and *Que* in regard to their modal function is represented by F0, intense, duration etc.

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