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Tone sandhi, prosodic phrasing, and focus marking in Wenzhou Chinese

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Chapter 3

The tone sandhi domain of Wenzhou Chinese

3.1 Introduction

The research on tone sandhi, specifically on the type of tone sandhi that is found in many (southern) dialects of Chinese, has mainly been concerned with two types of research questions: (i) what is the correspondence between the lexical tones on the syllables and the tone sandhi contours, and how can it be explained phonologically and/or phonetically, and (ii) what is the domain of application for the tone sandhi changes, and which linguistic sub-domains affect its formation? This chapter aims to give an answer to the second question for the tone sandhi found in the speech of young speakers of Wenzhou Chinese.

3.1.1 Literature predictions on the tone sandhi domain in Wenzhou Chinese

The most clear-cut domain for the application of tone sandhi in Wenzhou Chinese is the disyllabic compound. Descriptions of the tone sandhi properties of Wenzhou either start with the tonal contours in disyllabic words (Chen 2000; Hou 1998; Qian 1992; Zhengzhang 1964a, 2008) or are even limited to this domain (Rose 2000, 2001, 2002, 2004). The compounds which are given as examples come from different word classes, encompassing nouns, verbs, adjectives, and adverbs (examples in (1)).⁵

(1)	Hanzi	Citation forms	Tone sandhi	Translation	Type
a.	天堂	<i>t^hi33 du31</i>	42.31	‘paradise’	noun
b.	封口	<i>hoŋ33 k^hau35</i>	44.22	‘seal’	noun
c.	开始	<i>k^hi33 sz35</i>	44.22	‘to begin’	verb
d.	经理	<i>tcaŋ33 lei24</i>	22.33	‘manager’	noun

⁵ There is a general assumption in Chinese linguistics that an expression which is a compound in Standard Chinese will also be a compound in other dialects, going back to Chao 1968.

e.	干旱	<i>kə33</i>	<i>jə24</i>	22.33	‘dry’	adj.
f.	音乐	<i>jaŋ33</i>	<i>lu212</i>	35.31	‘music’	noun
g.	偏要	<i>p^hi33</i>	<i>ɿ212</i>	35.31	‘insistently’	adverb

Aside from disyllabic compounds, disyllabic structures of the type modifier-head or head-complement have also been described as tone sandhi application domains under certain conditions. Thus, both the lexicalized disyllabic adjective-noun constructions in (2a-b) and the more phrasal adjective-noun construction in (2c) are predicted to be treated as words in Wenzhou both prosodically and syntactically according to Chen 2000.

(2)	Hanzi	Citation forms	Tone sandhi	Translation
a.	热度	<i>ni212</i> <i>də11</i>	33.22	‘heat’ (lit. ‘hot degree’)
b.	白眼	<i>ba212</i> <i>ŋa24</i>	22.35	‘disdain’ (lit. ‘white eye’)
c.	大树	<i>dou11</i> <i>zɿ11</i>	35.22	‘big tree’

Other modifier-head constructions such as adverb-verb may also be treated like lexical words, or be realized with phrasal prosody, or even fluctuate between the two states. Chen (2000: 483) concludes that “lexicalization is a gradient process, and makes allowance for free variants”. He reaches a similar conclusion with respect to head-complement constructions, such as the verb-object constructions in (3), but remarks that “verb + object expressions [...] do not typically undergo [lexical tone sandhi]” (ibid). Thus, while there are some verb-object constructions which are lexicalized and therefore undergo tone sandhi, the majority is predicted to be realized with phrasal prosody.

(3)	Hanzi	Citation forms	Tone sandhi	Phrasal prosody	Translation
a.	打水	<i>tiɛ35</i> <i>sz35</i>	44.22	11.35	‘to fetch water’
b.	开会	<i>k^hɛi33</i> <i>vai212</i>	35.31	11.21	‘to attend a meeting’
c.	请客	<i>t^hsɿŋ35</i> <i>k^ha313</i>	35.42	11.31	‘to throw a party’

The “phrasal prosody” realization, as described by Chen, entails that the prosodically strong position retains its citation tone, whereas the prosodically weak position is “tonally reduced to zero “o”, phonetically interpreted as [a low tone].” (ibid). In compliance with the rule of “Tonic prominence” (Chen 2000:

500), the prosodically strong position is generally assumed by the syntactic non-head. This means that in the verb-object constructions in (3), the verb (as a syntactic head) is reduced to a low tone (11), whereas the object (as a syntactic non-head of the VP) assumes the prosodically strong position and is realized with its lexical tone in phrasal prosody.

The observation that disyllabic verb-object constructions sometimes may resist lexical tone sandhi has also been made for other dialects, such as Shanghai Chinese (Duanmu 1998), and relates to the general research question whether to classify verb-object constructions in Chinese as compounds or phrases (Chao 1968; Chi 1985; Dai 1998; Huang 1984). It is often agreed in Chinese linguistics that a single criterion for word- or phrasehood, such as syntactic mobility (*ba*-fronting) or the ability to take another object, is not sufficient to characterize all verb-object constructions. It is even the case that some disyllabic verb-object constructions might function as compounds in one context and as phrases in another (Huang 1984). Reversing the argument, it has even been proposed that the ability to undergo tone sandhi is the most stable criterion for wordhood of disyllabic verb-object constructions (Duanmu 1998).

What seems clear is that the status of verb-object constructions is difficult to define, and that there is a grey area in which specific examples may allow for both phrasal and lexicalized status. For this reason, the current chapter will experimentally investigate the ways in which young Wenzhou speakers realize verb-object constructions.

3.1.2 Influence of focus on the tone sandhi domain in Wenzhou Chinese

Outside of the syntactic status of specific words or phrases, it has also been proposed that “focus” may influence the formation of tone sandhi domains, and thereby “block” tone sandhi in contexts where it would apply outside the influence of focus. Specifically, in his description of Wenzhou, Chen 2000 describes that under the influence of focus, both the default prominence assignment and the default phrasing can be overridden. In his example (57), replicated as (4) below, the initial negation particle forms a prosodic domain of its own under focus in order to attract prosodic prominence (indicated by an asterisk).

- (4) not eat rice
 BU *chi* *fan*
- a. () (*) default reading
 b. (*) () () “focus” on BU

The claim that focus may “break up” tone sandhi domains and block tone sandhi has also been made for other dialects, such as Tianjin Chinese (Li & Liu 1985), Mandarin (Shen 1990a), and to a certain extent Shanghai Chinese (Selkirk & Shen 1990). For this reason, the current investigation will also test the influence of focus on the realization of disyllabic verb-object constructions in Wenzhou. If there is a focus effect on tone sandhi application, it can be expected that this effect should be even more clearly visible in disyllabic forms which naturally fluctuate between word and phrase status.

3.1.3 Current experiments

In order to separately test the two hypotheses that were put forward in previous research, two experiments were conducted. The first experiment was specifically concerned with the realization of disyllabic verb-object constructions with different degrees of lexicalization. The second experiment furthermore tested the influence of different contextual factors on the realization of disyllabic verb-object constructions, by putting them together in a list with disyllabic compounds. In addition, the recording condition of the stimuli in the second experiment was also varied between recording in isolation, in medial position in a carrier sentence, and in contrastive focus. In this way, it was attempted to exactly determine the influence of each of the contextual factors separately.

3.2 Experiment 1: Verb-object constructions and lexicalization

3.2.1 Stimuli

The first experiment was designed to specifically test whether the degree of lexicalization of a disyllabic verb-object construction correlates with its likelihood to be realized with tone sandhi contours in Wenzhou. For this purpose, 45 disyllabic verb-object constructions were first rated for their degree of lexicalization. The criteria used for the classification were taken from standard descriptions of Mandarin Chinese (Chao 1968; Li & Thompson 1981),

according to which a verb-object construction can be classified as a compound (i.e. lexicalized) if it fulfills any of the three following criteria.

- (5) **Criteria for lexicalization of verb-object constructions**
- a. One or both of the constituents [are] bound morphemes
 - b. Idiomaticity of the meaning of the entire unit
 - c. Inseparability or limited separability of the constituents

With the help of a native speaker and teacher of Chinese, the 45 verb-object constructions for experiment 1 were classified to fulfill none, one, or two of the lexicalization criteria in (5). None of the verb-object constructions were rated to fulfill all three criteria. The classification resulted in an almost even tripartite split of the examples, with 16 examples (35.6%) being classified as non-lexicalized, 13 examples (28.9%) being classified as lexicalized according to one of the criteria, and the remaining 16 examples (35.6%) being classified as lexicalized according to two of the criteria. The full list of examples and their lexicalization rating can be found in appendix 3.1.

3.2.2 Speakers

The speakers who participated in the two experiments were ten speakers (five male, five female) of the Wenzhou dialect of Chinese, aged between 18 and 20. They were high school graduates of the same high school in central Wenzhou and all born and raised in the central district of Lucheng in Wenzhou. None of them reported to have lived outside of Wenzhou for a significant amount of time within the last five years, and all of them considered themselves fluent speakers of the Wenzhou dialect. They were also fluent speakers of Standard Chinese, which they learned in school and were encouraged to use in conversations with each other on a daily basis. Of the ten speakers, three (two female, one male) participated in the elicitation experiment on verb-object constructions (experiment 1).

3.2.3 Experimental procedure

The recordings were made in a quiet recording studio in the TV and radio station in Wenzhou on an M-Audio Microtrack II portable digital recorder (44.1kHz, 16bits). The speakers were given a Sennheiser pc130 headset, and the position of the microphone was adjusted by the experimenter to ensure it was about 3 cm away from the corner of the mouth and outside of the immediate direction of aspiration. The speakers were seated at a table with about 50 cm distance to a

laptop screen (ACER TravelMate 280XCi), on which the stimulus sentences were presented in Chinese characters. All speakers confirmed they could read the sentences properly. The stimulus sentences were automatically randomized for every speaker and every trial, and presented one by one, with the experimenter determining the pace of succession.⁶

Before the start of the experiment, the speakers were told that they would see sentences on the computer screen, and asked to read them out aloud in Wenzhou dialect in a clear and natural way. If the speakers had long hesitation pauses within a sentence, they were asked to repeat the sentence, and if they spoke too softly, they were encouraged by the experimenter to speak up. All speakers were presented with the randomized stimulus sentences three times in a row, with a speaker-determined break in between trials. They were informed that they could interrupt or abort the experiment at any point. They received a small payment for their participation.

3.2.4 Data analysis

Before data analysis, any token which contained an error or mispronunciation was discarded. This concerned one token in experiment 1, and 22 tokens in experiment 2. The remaining tokens were analyzed acoustically and visually for their tone contour. Since the speakers themselves are not conscious of the tone sandhi process, the decision whether tone sandhi had taken place or not was based on the acoustic inspection of the tone contour. In both experiments, all stimuli were selected so as to ensure that this task would be reasonably straightforward. This means that the selected stimuli all had a tone sandhi contour that differed considerably from the citation tones on both syllables.

To decide whether tone sandhi had taken place or not, the recorded stimuli were compared to recordings of disyllabic compounds with the same combinations of citation tones. To illustrate the decision process, Figures 3.1 to 3.3 give examples of realizations of the stimuli in (6) by the same speakers as tone sandhi contour (left) and phrasal prosody (right).

(6)	Hanzi	Citation forms	Tone sandhi	Phrasal pr.	Translation
a.	跑马	<i>p^huɔ35 mu24</i>	44.22	11.35	‘to ride a horse’
b.	坐车	<i>zuɔ24 ts^hu33</i>	35.22	11.33	‘to go by car’
c.	开门	<i>k^hei33 maŋ31</i>	42.31	11.31	‘to open a door’

⁶ The script that randomized and presented the stimuli was written by Jos Pacilly.

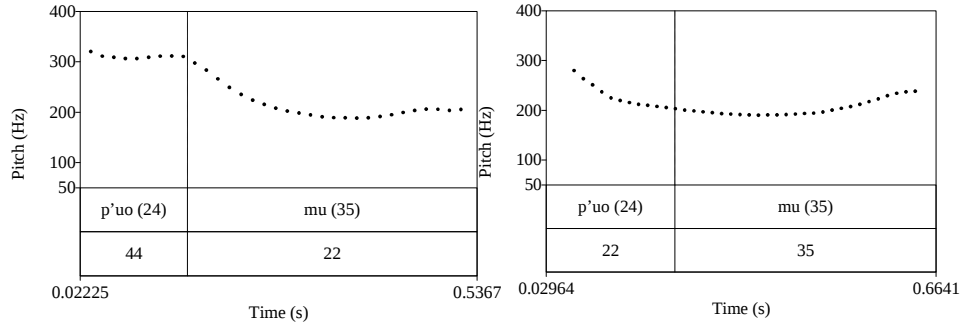


Figure 3.1: Realizations of stimulus (6a) by a female speaker.

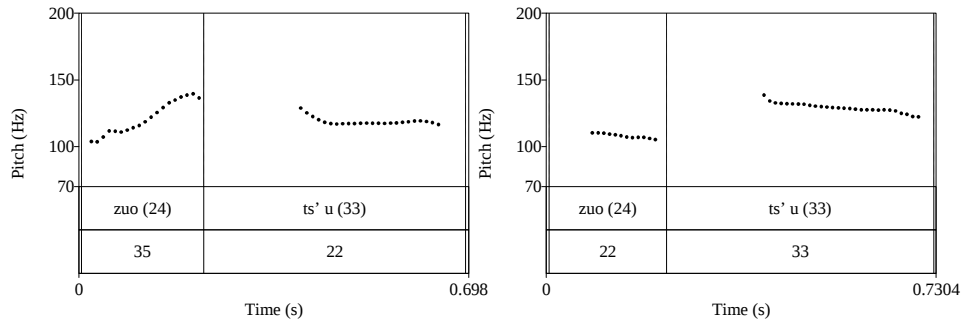


Figure 3.2: Realizations of stimulus (6b) by a male speaker.

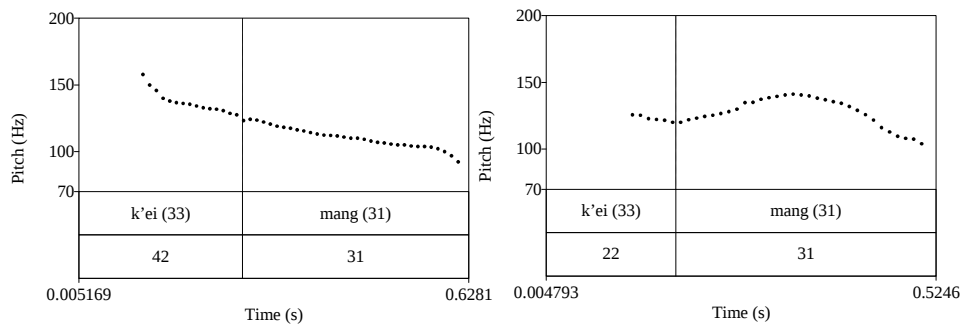


Figure 3.3: Realizations of stimulus (6c) by a male speaker.

3.2.5 Results

In the first experiment, a list of 45 verb-object constructions was read by three speakers three times. Acoustic inspection of the recorded tokens showed that the speakers varied the realization of the verb-object constructions not only between examples, but also sometimes produced the same example with tone sandhi contour in one recording, and with phrasal prosody in the next. For this reason, the realizations of the examples could not be averaged per speaker, but each realization entered as one token into the analysis.

Table 3.1 gives an overview of the observed realizations of the stimulus tokens, split by degree of lexicalization (0, 1, 2, according to the criteria laid out in section 2.1.1) and type of realization. Outside of the tone sandhi realization (TS) and the phrasal prosody realization (P), some tokens were also realized with a tonal contour that simply juxtaposed the citation tone values of the respective syllables. This type is classified as “other” in Table 3.1.⁷

Table 3.1: Absolute and relative (in parentheses) frequencies of realizations of verb-object constructions in experiment 1.

Degree of lexicalization	Observed contours			
	Phrasal prosody	Tone sandhi	Other	Total
0	123 (85.4%)	10 (6.9%)	11 (7.6%)	144
1	94 (80.3%)	17 (14.5%)	6 (5.1%)	117
2	90 (62.9%)	45 (31.5%)	8 (5.6%)	143
Total	307 (76.0%)	72 (17.8%)	25 (6.2%)	404

As can be seen in Table 3.1, there is indeed a connection between the degree of lexicalization and the tonal realization in the stimuli in experiment 1. More precisely, the speakers produced more tone sandhi contours on the lexicalized

⁷ Since the overall token counts for the “other” contour are very low, it could be suspected that the inclusion of this type in the statistical analysis influenced the results of the comparison. For this reason, the statistical analysis was also performed on the dataset in which all “other” contours had been excluded. A Pearson Chi-square analysis still shows a statistically significant difference between the tone sandhi vs. phrasal prosody realizations in dependence on the degree of lexicalization [$\chi^2(2) = 30.4, p < 0.001$].

examples than on the non-lexicalized examples. Within the lexicalized examples, there was a further split between those examples that are lexicalized according to one of the criteria, and those that are lexicalized according to two of the criteria, with the latter being realized with tone sandhi contours more often than the former.

At the same time, it is true for all three types of examples that they are realized with phrasal prosody in the majority of cases. Even the examples that are clearly lexicalized receive phrasal prosody in 62.9% of the cases in experiment 1, and overall, more than three quarters of the tokens are realized with phrasal prosody, even though almost two thirds of the examples have been classified as “lexicalized”. A Pearson Chi-square analysis confirms that this distribution is significantly different from chance [$\chi^2(4) = 31.18, p < 0.001$].⁸

3.3 Experiment 2: Verb-object constructions and context

3.3.1 Stimuli

A second experiment tested the influence of different contextual factors onto the realization of disyllabic verb-object constructions. Eight of the verb-object constructions from the first experiment were selected and alternated in a list with 34 disyllabic compounds, the latter of which are expected to be realized with tone sandhi contours in all cases. The eight verb-object examples in experiment 2 were classified into lexicalized and non-lexicalized according to the same (morphological, syntactic, and semantic) criteria used for the verb-object constructions in experiment 1. The division between lexicalized and non-lexicalized verb-object constructions turned out to be similar to that of the stimuli in experiment 1, namely 37.5% non-lexicalized examples (three of eight), and 62.5% lexicalized examples (five of eight). Of the lexicalized examples, three (37.5%) were lexicalized according to one of the criteria outlined in (5), and two (25%) were lexicalized according to two of the criteria.

The complete stimulus list was presented to the speakers in three different conditions: the disyllabic forms were elicited (i) in isolation, (ii) in

⁸ Technically, Chi-square analysis is not possible for the data presented here, since this test is based on the assumption of independence between observations, which is not warranted in the current dataset (since multiple tokens were collected from the same individual). Nonetheless, this test allows for categorical variables, and therefore it can still give a useful indication for the reliability of the counts.

medial position in a carrier sentence as in (7), and (iii) in medial and final position in a carrier sentence which induced contrastive focus, as in (8).

- (7) 我是说 TARGET 1 这个词。
ŋ zɿ kuɔ TARGET 1 *kai zɿ*
 I ASP say TARGET 1 this word
 'I said the word TARGET 1.'
- (8) 我不是说 TARGET 1 这个词，我是说 TARGET 2。
ŋ nau zɿ kuɔ TARGET 1 *kai zɿ ŋ zɿ kuɔ* TARGET 2
 I not ASP say TARGET 1 this word I ASP say TARGET 2
 'I did not say the word TARGET 1, I said TARGET 2.'

In the last condition, the verb-object constructions and disyllabic compounds were paired such that two segmentally and tonally similar stimuli would appear in the same sentence, in order to further encourage the speakers to differentiate the stimuli by use of contrastive prosody. The order of the paired items was varied per sentence, so that each speaker saw the same item twice per list, once in medial and once in final position. A full list of the stimulus pairs of experiment 2 can be found in appendix 3.2.

3.3.2 Speakers, experimental procedure, and data analysis

Of the ten speakers introduced in section 3.2.2, two speakers recorded the stimuli of experiment 2 in isolation (one male, one female) and two in medial position in a carrier sentence (one male, one female). All ten speakers, including the three speakers from experiment 1, participated in the elicitation of the stimuli of experiment 2 in contrastive focus carrier sentences. The experimental procedure and data analysis were identical to those of the first experiment, as outlined in sections 3.2.3 and 3.2.4.

3.3.3 Results

In the second experiment, a list containing eight verb-object constructions and 34 disyllabic compounds was read by different groups of speakers in isolation, in medial position in a carrier sentence, and in a carrier sentence inducing contrastive focus. First of all, an analysis of the prosodic realizations of the disyllabic compounds showed that they were realized with tone sandhi contours in the vast majority of cases. In the cases when they were not realized with tone

sandhi contours, the speakers either produced the citation tones on both syllables, or adopted a realization strategy which was clearly different from the tone sandhi prosody observed in the verb-object constructions in both experiments. These cases are counted as “other” in Table 3.2.

Table 3.2 gives an overview over the realizations of the disyllabic compounds in experiment 2, split by three positional conditions: individual (isolation + medial position in a carrier sentence), medial (medial position in a contrastive focus carrier sentence), and final (final position in a contrastive focus carrier sentence). Statistical analysis shows that there is no statistically significant difference between the realization ratios in the three different conditions [$\chi^2(2) = 4.6$, $p = 0.1$, ns].

Table 3.2: Absolute and relative (in parentheses) frequencies of realizations of disyllabic compounds in experiment 2, compared between different recording situations.

Position	Observed contours		
	Tone sandhi	Other	Total
Individual	381 (96.2%)	15 (3.8%)	396
Medial	970 (96.4%)	36 (3.6%)	1006
Final	955 (94.6%)	55 (5.4%)	1010
Total	2306 (95.6%)	106 (4.4%)	2412

The eight verb-object constructions of experiment 2 were analyzed separately for their realizations in the three recording situations, and the realizations were compared to the degree of lexicalization of the examples. Tables 3.3, 3.4, and 3.5 show the results for the verb-object constructions of experiment 2 in isolation (Table 3.3), in medial position in a carrier sentence (Table 3.4), and in a contrastive focus sentence (Table 3.5).

Table 3.3: Absolute and relative (in parentheses) frequencies of realizations of verb-object constructions in experiment 2 in isolation.

Degree of lexicalization	Observed contours		
	Phrasal prosody	Tone sandhi	Total
0	4 (22.2%)	14 (77.8%)	18
1	0 (.0%)	17 (100%)	17
2	0 (.0%)	12 (100%)	12
Total	4 (8.5%)	43 (91.5%)	47

Table 3.4: Absolute and relative (in parentheses) frequencies of realizations of verb-object constructions in experiment 2 in a carrier sentence.

Degree of lexicalization	Observed contours		
	Phrasal prosody	Tone sandhi	Total
0	5 (27.8%)	13 (72.2%)	18
1	0 (.0%)	12 (100%)	12
2	0 (.0%)	12 (100%)	12
Total	5 (11.9%)	37 (88.1%)	42

Table 3.5: Absolute and relative (in parentheses) frequencies of realizations of verb-object constructions in experiment 2 in a carrier sentence inducing contrastive focus.

Degree of lexicalization	Observed contours			
	Phrasal prosody	Tone sandhi	Other	Total
0	37 (20.8%)	133 (74.7%)	8 (4.5%)	178
1	0 (.0 %)	165 (98.8%)	2 (1.2%)	167
2	19 (15.8%)	101 (84.2%)	0 (.0%)	120
Total	56 (12.0%)	399 (85.8%)	10 (2.2%)	465

As can be seen in the above tables, there is a clear trend in all three recording contexts to have more phrasal prosody realizations for the non-lexicalized examples (0) than for the lexicalized examples (1, 2), and more tone sandhi in the lexicalized compared to the non-lexicalized examples. The distributions are significantly different from chance for all recording situations: isolation [$\chi^2(2) = 7.04$, $p = 0.03$], carrier sentence [$\chi^2(2) = 7.57$, $p = 0.023$], and contrastive focus [$\chi^2(4) = 46.55$, $p < 0.001$].⁹

At the same time, when pooling over the different degrees of lexicalization and comparing only the overall amount of realizations between recording situations, the distributions are similar in all three recording situations. Statistical analysis confirms that there is no significant difference between recording situations [$\chi^2(4) = 2.54$, $p = 0.637$, ns], as can be seen in Table 3.6.¹⁰

Table 3.6: Absolute and relative (in parentheses) frequencies of realizations of verb-object constructions in experiment 2, compared between different recording situations.

Recording situation	Observed contours			
	Phrasal prosody	Tone sandhi	Other	Total
Contrastive focus	56 (12.0%)	399 (85.8%)	10 (2.2%)	465
Carrier sentence	5 (11.9%)	37 (88.1%)	0 (.0%)	42
Isolation	4 (8.5%)	43 (91.5%)	0 (.0%)	47
Total	65 (11.7%)	479 (86.5%)	10 (1.8%)	554

Furthermore, there is no significant difference in the observed realizations when comparing the occurrences of the verb-object constructions in medial position in the contrastive focus carrier sentences with those in final position in contrastive

⁹ For the statistical analysis of the contrastive focus carrier sentence, again the presence of the category “other” does not change the statistical result much. In a comparison of only the tone sandhi vs. phrasal prosody realizations, the Pearson Chi-square analysis still returns a statistically significant difference for the different degrees of lexicalization [$\chi^2(2) = 38.63$, $p < 0.001$].

¹⁰ Again, excluding the “other” condition does not change the statistical results much [$\chi^2(2) = 0.58$, $p = 0.747$, ns].

focus carrier sentences. Pooled over the different degrees of lexicalization, the amount of tokens that are realized with tone sandhi or phrasal prosody is not statistically significantly different from chance [$\chi^2(2) = 1.99$, $p = 0.37$, ns], as can be seen in Table 3.7.¹¹

Table 3.7: Absolute and relative (in parentheses) frequencies of realizations of verb-object constructions in experiment 2 in contrastive focus carrier sentence, compared for medial vs. final position.

Position in focus carrier sentence	Observed contours			
	Phrasal prosody	Tone sandhi	Other	Total
Final	33 (14.2%)	195 (83.7%)	5 (2.1%)	233
Medial	23 (9.9%)	204 (87.9%)	5 (2.2%)	232
Total	56 (12%)	399 (85.8%)	10 (2.2%)	465

3.4 Discussion

To account for the realization of verb-object constructions in tone sandhi languages like Wenzhou Chinese, two predicting factors have been put forward in the literature. It was proposed that a disyllabic verb-object construction is more likely to undergo tone sandhi and to be treated like a compound if it is lexicalized, and more likely to be realized with phrasal prosody if it is not lexicalized or subject to focus.

The current experiment confirms the first hypothesis: in both experiments described above, a significant connection was found between the number of tokens that were realized with a tone sandhi contour by the speakers, and the classification of these tokens as lexicalized according to grammatical factors (syntax, semantics, morphology). For the second factor of focus on the other hand, the prediction was not borne out. The ratio of tokens realized with phrasal prosody vs. tone sandhi prosody was similar in isolation and in a condition that induced contrastive focus on the target stimuli.

¹¹ Again, excluding the “other” condition does not change the statistical results much [$\chi^2(1) = 1.99$, $p = 0.159$, ns].

However, the results presented in the previous section show that the relative number of tone sandhi vs. phrasal prosody realizations differed substantially between the two experiments, even though the list of verb-object construction stimuli in the two experiments was similar with respect to the factor of lexicalization. Nonetheless, it can be observed that when the speakers are presented with a list of stimuli which exclusively contains verb-object constructions, they predominantly realize them with phrasal prosody, and even the clearly lexicalized examples receive phrasal prosody in the vast majority of cases (71.6% on average).

On the other hand, if the speakers are presented with a list which contains some verb-object constructions, but predominantly consists of disyllabic compounds, the speakers use the same tone sandhi realization for the verb-object constructions that they use for disyllabic compounds in the majority of cases, irrespective of the degree of lexicalization of the verb-object construction examples (86.5% on average). This is true regardless of the recording context (isolation versus carrier sentence), the presence versus absence of contrastive focus, and the position of the target word within the contrastive focus carrier sentence (medial versus final).

While lexicalization therefore has some influence on the realizations of verb-object constructions by the young Wenzhou speakers, accounting for an average of 20% difference between the lexicalized and the non-lexicalized examples, it seems that the composition of the stimulus list, and thereby the prosodic context in which the verb-object constructions appear, has a much greater influence on how these verb-object constructions are realized by the speakers (71.6% phrasal prosody in verb-object context vs. 86.5% tone sandhi in lexical compound context).

In order to show that this effect is not dependent on the specific speakers recorded in the two experiments, or on the size of the speaker pool which was recorded for each experiment, Table 3.8 compares the realizations of the verb-object constructions in experiment 2 between two speaker groups. The first group (1) consists of the three speakers which were also recorded for experiment 1, and the second group (2) consists of the remaining seven speakers who were only recorded for experiment 2. If the speakers who recorded experiment 1 are overall more likely to realize any verb-object construction with phrasal prosody rather than with tone sandhi contours, their realizations of the verb-object constructions in experiment 2 should differ markedly from the realizations by the other seven participants.

A statistical analysis on the findings in Table 3.8 shows that this prediction is not borne out. There is no statistically significant difference between the relative number of tone sandhi vs. phrasal realizations of the stimuli of experiment 2 by the speakers of experiment 1, compared to the remaining seven speakers of experiment 2 [$\chi^2(2) = 4.79$, $p = 0.09$, ns].¹²

Table 3.8: Absolute and relative (in parentheses) frequencies of realizations of verb-object constructions in experiment 2 pooled over all recording conditions, compared between the three participants of experiment 1 and the remaining seven participants.

Speaker group	Observed contours			
	Phrasal prosody	Tone sandhi	Other	Total
Experiment 1 & experiment 2	27 (14.1%)	158 (82.7%)	6 (3.1%)	191
Experiment 2 only	38 (10.5%)	321(88.4%)	4 (1.1%)	363
Total	65 (11.7%)	479 (86.5%)	10 (1.8%)	554

The findings of this study suggest that the variability in the prosodic realization of verb-object constructions is even greater than previously assumed, and that it not only depends on the exact grammatical function that a verb-object construction plays in a given sentence, but also on the prosodic context in which it is uttered. It appears that in recording situations in which speakers are applying tone sandhi to a list of compounds, they are much more likely to extend this tone sandhi application to disyllabic constructions which are not lexically compounded. In contrast, in a context where all stimuli share a certain grammatical analysis of their components, speakers are more likely to be biased by this analysis in their prosodic realization of the examples, and less likely to just treat them like any other disyllabic structure.

¹² Again, excluding the “other” condition does not change the statistical results much [$\chi^2(1) = 1.87$, $p = 0.172$, ns].

3.5 Conclusion

This study set out to investigate two claims which have been put forward in the discussion concerning the tone sandhi domain of Wenzhou Chinese. The first claim, which could be confirmed in this study, predicted that disyllabic constructions which are grammatically ambiguous between word and phrase status will also be treated ambiguously in their prosodic behavior. More specifically, it was found that the degree of lexicalization of verb-object constructions in Wenzhou Chinese according to semantic, syntactic, and morphological criteria was significantly correlated with the likelihood of the verb-object construction receiving a tone sandhi realization. If a verb-object construction was lexicalized, it was realized with tone sandhi contours more often, and thereby treated alike to lexical compounds, than if it was not lexicalized.

The second prediction from the literature, however, could not be confirmed by the dataset presented in this study. In the data recorded here, the presence of contrastive focus on the target stimuli had no statistically significant effect on the speakers' choice of realization of the verb-object constructions as compounds or as phrases. In this light, the prediction that focus would induce a prosodic boundary which would in turn block the application of tone sandhi was not borne out. Rather, the same set of stimuli was (on average) realized with a comparable ratio of tone sandhi and phrasal prosody realizations in isolation and under focus.

However, a comparison of the results of the two experiments reported in this study showed that another factor significantly affected the realizations of the verb-object constructions. As it turned out, the verb-object constructions in experiment 2, which were recorded in a list that majorly contained disyllabic compounds, were realized with tone sandhi prosody in most cases, whereas in a comparable list of verb-object constructions with no disyllabic compounds interspersed, the examples were realized predominantly with phrasal prosody. Since the ratio of lexicalized and non-lexicalized verb-object constructions was similar in both lists, it appears that it is most likely the prosodic context itself which biased speakers towards treating the verb-object constructions as disyllabic lexemes in the context of disyllabic compounds.

These findings show that for the young speakers of Wenzhou recorded here, it is indeed true that their realizations of verb-object constructions are highly variable and contextually dependent. At the same time, it could be shown that the contextual factors which play the most important role for their

realization, are different from what has been assumed in the literature so far. While lexicalization plays a partial role for the prosodic realization of the verb-object construction, the observed variability appears to be dependent on the prosodic context in which a specific construction is uttered.