

# How Do Pauses Reveal Linguistic Plans by L2 Learners of Chinese?

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## Abstract

This study explores L2 learners' linguistic plans through silent and filled pauses, such as "uh". Seven native speakers and seven American learners of Chinese participated in this study. They produced speech naturally on pre-provided topics. One minute and fifteen seconds of speech on a single topic produced by each participant was used for analysis in the present research. First, the distribution of pauses was calculated. Then a qualitative analysis of the L2 learners' speech data was conducted. The results indicate that most chunks that native speakers plan ahead of time are larger than those that L2 learners do. The combinations of silent and filled pauses, and combinations of pauses and other prosodic features provide additional time for L2 learners to plan their speech and to make their speech more natural. During the first-time planning or self-monitoring, L2 learners spend much more time on planning chunks that only involve a single linguistic entry.

**Index Terms:** L2 acquisition, production, psycholinguistics

## 1. Introduction

The production of speech is a complex process (Figure 1 below). This includes macroplanning that generates preverbal messages, microplanning which includes grammatical encoding and phonological encoding, articulation and self-monitoring [9]. The lemma in Figure 1 is the nonphonological part of an item's lexical information. In production research, a pause which is a temporal feature is widely used to explore speech microplanning and self-monitoring. Earlier studies [1] revealed that the alternation between fluent speech and silent pauses reflects linguistic planning within the sentence. Meanwhile, silent and filled pauses also help speakers monitor their utterances to facilitate comprehension [9, 13].

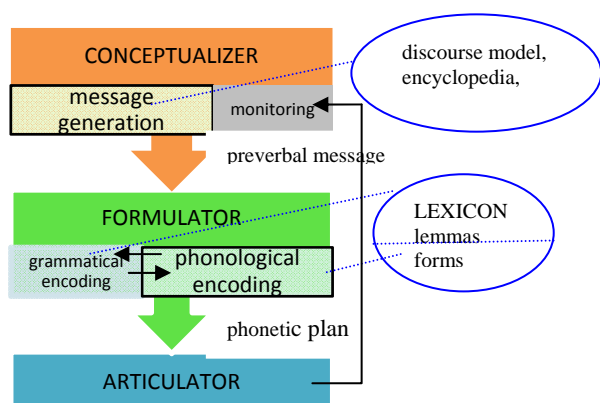


Figure 1: Levelt's production model (adapted from Levelt, 1989:9).

In the field of second language acquisition, some researchers have employed L1 production models to study L2 speech production, including speech planning [4, 7]. A

number of studies [5, 6, 8, 10, 11] have measured temporal variations, mainly the numbers of silent and filled pauses per minute, to explore non-native speakers' fluency development. However, a small number of studies have investigated the relationship between temporal features, such as pause duration, and linguistic variations. Riggensbach's study [12] considered a linguistic variation, i.e. the location of pauses. This indicated that pauses were considered native-like if they occurred at clause boundaries, and not grouped with other pauses. Nonfluent-sounding pauses occurred with or close to other pauses or in the middle of clauses. Yet, similar to other studies, Riggensbach also focused on assessing L2 fluency, but did not explore linguistic plans based on temporal features. The current study focuses on the prosody of second-language discourse, exploring how pauses reveal linguistic plans by L2 learners of Chinese according to linguistic contexts and types of self-monitoring.

## 2. Method

### 2.1. Subjects

Fourteen participants including seven native speakers (NS) participated in this study. Seven non-native speakers (NNS) are American learners of Chinese who have studied Chinese in the United States for two years and in China for two months participated. None had any previous Chinese language background. Their ages ranged from 20 to 25.

### 2.2. Procedure

Participants took the 20-minute speaking test individually. Their speech was recorded using an Olympus LS-10 Linear PCM Recorder and a Sony ECMMS907 Digital Recording Microphone. A test sheet with instructions and elaborations of the speech topics was presented to each participant. Meanwhile, each participant could also hear the instructions through earphones via the computer. Five topics were tested. The current study only uses the speeches on the third topic, whether to eat at home or in a restaurant. The participants are required to discuss whether s/he prefers to eating at home or in a restaurant. S/he also needs to provide some reasons such as advantages and disadvantages of eating at home or in a restaurant to support the arguments. Each participant had 20 seconds to plan their speech. After that, s/he was asked to speak for 1 minute and 15 seconds.

### 2.3. Analysis

#### 2.3.1. Transcription

Two native speaker of Chinese transcribed the speech into Chinese characters. Some symbols are used to note pause features, such as duration. The following symbols are used.

A number in single brackets, e.g. (0.25) indicates an exact time interval in seconds. A full stop in single brackets, i.e. (.) indicates an interval of tenth of a second or less. A colon indicates an extension of a sound or syllable. E.g. "oh:". An equals sign marks a zero interval between adjacent utterances.

Degree signs (°) indicate a passage of talk which is quieter than surrounding talk. Lesser than/greater than signs indicate sections of an utterance delivered at a greater speed than the surrounding talk.

Filled pauses are also transcribed in Chinese characters, e.g. 呃 (uh), 嗯 (en).

In order to transcribe exact pause duration, the Audacity program is used to measure each pause. However, only silent pauses of 400 ms or more are considered as silent hesitation pauses in the current study. The researcher checked the transcription against the recordings before coding the data.

### 2.3.2. Coding systems

Two types of coding systems appear in the present study. The first is based on linguistic features. Seven categories indicate the location of pauses. A “clause” pause occurs at a clause boundary, including a sentence boundary. A “phrase” pause is located at a phrase boundary. A “verb” pause occurs between two verbs. A “conjunction” pause follows conjunctions and precedes a clause. A “predicate” pause occurs between a subject pronoun and a predicate. A “word” pause precedes a word in something other than the above listed contexts. A “start” pause occurs at the beginning of speech.

The second coding system traces four kinds of self-monitoring. In “repetition”, the speaker repeats the whole language unit, such as a word, a phrase, etc. In “instant repairs”, the speaker retraces back to a single troublesome word, which they replace with a different word. In an “anticipatory retracing” the speaker retraces back to some prior point. A “restart” occurs when the speaker drops the original syntactic structure and simply starts over.

## 3. Results

The distribution of pauses is presented in this section regarding both native speech and non-native speech. Quantitative and qualitative analyses examine how L2 learners plan their speech.

### 3.1. The distribution of pauses in NS and NNS speech

Some 143 pauses occur in the seven native speech samples. These include 109 silent pauses of 400 ms or more, and 33 filled pauses. Three types of pauses occur, including combinations of silent and/or filled pauses. There are 79 single silent pauses, 11 single filled pauses, and 21 combinations. In the seven non-native speech samples, some 241 pauses occur. These include 149 silent pauses of 400 ms or more, and 92 filled pauses. We find 64 single silent pauses, 27 single filled pauses, and 53 combinations. The pauses that occur in non-native speech are significantly more than those that occur in native speech.

Table 1 indicates the distribution of pauses in native and non-native speech. When comparing native pauses with non-native pauses, several differences between NS and NNS are found. First, more single silent pauses occur at clause boundaries in native speech than those in non-native speech, yet more pause combinations occur at clause boundaries in non-native speech than those in native speech. Second, native speakers produce more pauses at phrase boundaries than non-native speakers do. Third, NNS use all types of pauses between verbs, before a predicate, and between or within words, while NS seldom produce pauses in these contexts. In

terms of pauses preceding conjunctions and at the beginning of a discourse, there is not much difference between NS and NNS.

Table 1. *Distribution of pauses in native and non-native speech.*

	Single silent		Single filled		Combination	
	NS	NNS	NS	NNS	NS	NNS
clause	39	18	8	2	13	23
phrase	24	7	1	6	3	2
verb	3	8	0	6	3	6
conj	10	5	0	3	2	5
predicate	0	7	0	2	0	3
word	3	19	0	5	0	13
start	0	0	2	4	0	1
total	79	64	11	27	21	53

Figure 2 illustrates pauses according to the linguistic locations between NS and NNS. The vertical axis indicates the percentage of pauses used in each linguistic category. Similar to Table 1, NS use more pauses at the clause boundaries and phrase boundaries, while NNS use more pauses between verbs, before a predicate, and between or within words.

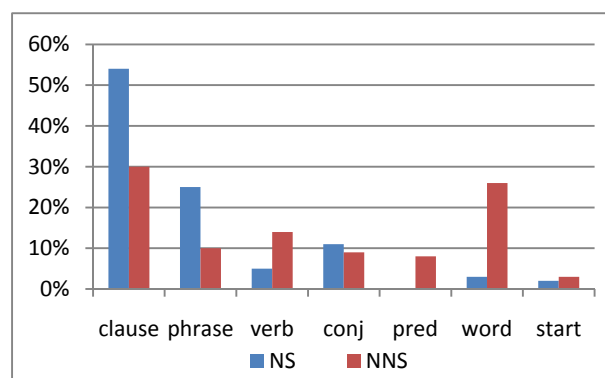


Figure 2: *Distribution of pauses based on linguistic coding.*

The results indicate that the differences between NS and NNS speech lie not only in the pauses at clause or phrase boundaries, but also in the pauses between verbs, before predicates, and between or within words. The differences reveal that chunks that NS plan ahead of time are larger than those of NNS. For example, NS’s clauses versus NNS’s verb structure without a subject or NS’s phrases versus NNS’s words or morphemes.

### 3.2. Qualitative analysis of pauses between or within words

The qualitative analysis focuses on pauses in the category of “word”. We found that the pauses between words or within words could help L2 learners generate messages, encode grammar, or access lemma. Various types of pauses sometimes occur together. Pauses also occur with other temporal features, such as sound extension. These combinations elongate pause duration to give learners more time for planning.

Table 2. Examples of L2 speech

line	transcription
2-6	>可<(0.57)呃(0.73)在家里>((吃))<-(0.53)呃做饭 >but<(0.57)uh(0.73) at home > ((eat)) <-(0.53) uh make rice but, uh, at home, eat, uh, cook
2-8	=所以(0.74)呃你°的°-(0.78)你>做的<饭(0.46) =so(0.74)uh you° r° -(0.78)you>make particle<rice (0.46) So, uh your, what you cook
2-9	>°可°<能(0.79)不如:(1.60)呃(0.48) >°po°<ssible(0.79)not as:(1.60)uh(0.48) It is possible (that the foods is) not as good as uh
2-10	餐厅>的<饭(0.27)°好吃°(1.39) restaurant>'s<rice(0.27)° good eat°(1.39) foods in restaurants.
2-11	那(0.27)>餐厅的<-(1.04)饭>好°吃°<-(0.42)呃 that(0.27)>restaurant's<-(1.04)rice>good° eat° <-( (0.42)uh Foods in that restaurant are good. Uh.
2-12	>°((的))°<(0.52)是(0.38)>很好<吃 >°((particle))°<(0.52)is(0.38)>very good<eat ((particle)) is very delicious.
4-4	比如°h(0.37)呃:在:(0.31)呃>你°的°<-(.)呃(0.34) e.g. °h(0.37)uh:at:(0.31)uh>you° r° <-(.)uh(0.34) e.g. uh, at, uh, your, uh
4-5	在>你°的°<(0.42)呃:>吃<饭很便宜(0.34) at>you° r° <(0.42)uh:>eat<meal very cheap(0.34) at your uh have a meal is very cheap
4-6	很方便(0.56)呃(0.33) 我>很喜<欢(0.34) very convenient (0.56)uh(0.33) I>very li<ke(0.34) very convenient. uh I like it.
4-7	呃在>(°我°)<-呃晚>°饭°<-(.)呃(0.37) uh at>(°I°)<-uh evening>°meal° <-(.)uh(0.37) uh at my uh, dinner, uh
4-8	吃晚饭在>我°的°<家(0.76)呃(1.78)呃 have dinner at>m° y° <home(0.76)uh(1.78)uh Having dinner at my home.

In Table 2, there is a pause between “your” and “you” in line 2-8 (Subject2-line8). The structure of “your NP” which is supposed to be “your rice” here and the structure of “the rice you cook” that occurs later are a little different. Since the noun “rice” and the verb “make” already occurred in line 2-6, it is unlikely that it is hard for S2 to access the lemma of these two words. The pause reveals that S2 is planning the syntactic structure of “the rice you cook” in the formulator.

In 2-11, there is a silent pause between “restaurant’s” and “rice”. The pause does not show that it is hard for S2 to access “rice” since S2 produces “restaurant’s rice (foods in restaurants)” well in 2-10. Meanwhile, after this pause, other pauses occur in 2-11 and 2-12 in the same clause. In this case, the pause preceding “rice” indicates that S2 either accesses a lemma other than “rice” or plan the following chunk. In the former, S2 failed to access a lemma, and have to use the serial pauses to re-plan the following chunk. In the latter, the long silent pause is used to plan the chunk after “rice”. Therefore, the planning could occur within a clause. Meanwhile, the

pause is not isolated. It relates to several pauses nearby and affects other components in the clause.

From 4-4 to 4-8 (Table 2), most silent and filled pauses occur after “your” or “I”, or precede “at”. In 4-4, 4-5 and 4-7, the pause combinations or the single filled pause following pronouns “your” and “I” occur when S4 is not able to produce a noun. According to the context, the most probable noun is the word “home”, because S4 finally accesses both the lemma and the form of “home” in line 4-8. In this case, pauses across sentences or phrases frequently are used to access a single lemma. Meanwhile, the data also show that other temporal features occur in combination with pauses, such as an extension of the sound or a filled pause in line 4-4 (“uh:at:uh”) and line 4-5 ((0.42)“uh:”). These combinations elongate pause duration so that learners have more time to plan. It is different from that happens in native speech. In the example of native speech (Table 3), a long single silent pause occurs between “very high” and “to” (line 7-19). “Very high” here does not match the previous noun “oil” semantically, and no other nouns that are modified by this chunk are found. There are two possibilities. S7 plans to say that either there is a high component in oil, such as cholesterol, or something relates to high blood pressure. In whichever case, S7 is not able to produce the noun that comes after the phrase “very high”, meaning that the lemma access is failed. However, the native speaker here only uses one pause to access lemma, although the duration of the pause is very long. Meanwhile, the chunk after the pause is planned well, and there are no other pauses within it.

Table 3. Example of native speech.

line	transcription
7-18	>=而且<(.)一般餐馆(.)都用很(.)多油 >=additionally<(.)common restaurant(.)all use very(.)many oil Additionally, general restaurants all use many oil.
7-19	(1.14)呃::(:)很高的:(1.07)对(.)高血压 (1.14)uh::(:)very high particle:(1.07) to(.) high blood pressure Uh, very high, to high blood pressure (people)
7-20	这种<(0.20)人群(0.23)>不好< This kind<(0.20)person group(0.23)>not good< (for) this kind of people, it is not good.

Comparing S4 with S7, we find at least two differences between NS’s lemma access and NNS’s. First, the word NNS’s accessing is a commonly used word, “home”, while the word NS’s accessing is related to medical terms. Second, NNS’s lemma access is harder and more time-consuming than NS’s regarding the number of pauses and other temporal features.

### 3.3. Self-monitoring

Monitoring occurs in two stages. In the first a speaker monitors his speech when generating preverbal messages. In the second the speaker monitors his speech after articulation. The data in the current study illustrate monitoring in the second stage.

Table 4 describes the total number of each kind of self-monitoring (column 2 and 3) and what percent of the monitoring involves pauses. It demonstrates that the number of NNS’s monitoring is larger than that of NS’s. Meanwhile,

much more repetition and instant repairs by NNS involve pauses, while those by NS involve significantly less. According to Table 4, NS and NNS retrace and restart their language less frequently than repetition and instant repairs. Thus it is a little hard to determine whether NNS use more pauses than NS do in terms of these two types. However, since restart involves both semantic meaning and syntactic structures, and retracing includes both repetition and repairs, these two types are more complicated than repetition and instant repairs. This probably is the reason that both NS's and NNS's retracing and restart involve more pauses than repetition and instant repairs.

Table 4. *Distribution of pauses related to monitoring.*

	Total no.		Involve pauses	
	NS	NNS	NS	NNS
Repetition	9	15	22%	47%
Instant repairs	4	9	0	78%
Anticipatory retracing	2	3	50%	33%
Restart	3	4	67%	100%
Total	18	31	28%	61%

#### 4. Discussion

The distribution of pauses reveals that NS plan larger chunks than NNS do. Some early research also indicated native speakers' large chunk plans [2, 3]. This is in accordance with Riggenbach's finding [12] that pauses were considered native-like if they occurred at clause boundaries. Yet, further analysis of different linguistic categories indicates the kind of chunks NNS plan are smaller, including words, phrases and verbal chunks.

The results of the qualitative analysis show that L2 learners need time to plan. The combination of silent and filled pauses, and the combination of pauses with other prosodic features that elongate the pause duration, provide more planning time for L2 learners, especially within smaller linguistic units. These strategies also help L2 learners produce speech which sounds more natural, rather than that filled with long, awkward, silent pauses.

A similarity between native speakers' linguistic plans [13] and L2 learners' is that both groups use pauses to help monitor and edit speech. However, the results illustrate that L2 learners use more pauses to monitor their speech while few pauses occur during NS self-monitoring. According to Levelt's model (Figure 1), monitoring happens after articulation or within the conceptualizer. In our study, monitoring occurs after articulation. In other words, NS and NNS who monitor their speech have to go through the model twice. After first planning, the speech is produced; then during self-monitoring, a specific chunk is re-planned and produced. NNS need more time for the second-time planning, especially during repetition and instant repairs.

Levelt's model shows that NS's speech plan involves message generation, grammatical encoding and phonological encoding as well as lexical access. In the current study, the evidence that most pauses come before clauses indicates that NS plan the whole clauses ahead of time, which is supposed to be related to message, grammar, lexicon, phonology, etc. However, qualitative analysis indicates that NNS use pauses to access syntactic structure or lemma. This kind of single-entry access occupies over half of NNS speech which is

different from NS speech. Moreover, NNS's self-monitoring also demonstrates that NNS spend more time on repetition and instant repairs than NS's. According to the definitions of monitoring types, we can find that both of repetition and instant repairs do not need to plan the multiple linguistic entries together. These indicate that NNS spend much more time on planning chunks that only involve single linguistic entry, during the first-time plan or self-monitoring.

#### 5. Conclusion

The results of this study indicate that most chunks that NS plan ahead of time are larger than those of NNS. During the first-time planning or self-monitoring, NNS spend much more time on planning chunks that only involve a single linguistic entry. L2 learners use pauses to plan their speech, correct their errors, search structure and lemmas, and make their speech sound smoother.

#### 6. Acknowledgements

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