

## Exploring the Use of *Bu* and *Mei* in Taiwan Mandarin: A Developmental Perspective\*

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### Abstract

Negative sentence expressions are common across languages as negation is a fundamental concept in logic. A negator can scope over verbs and non-verbal elements like adverbials. This study investigated children's acceptability of *bu* and *mei* in negative sentences using two tasks. The first task assessed children's acceptability rates of *bu* and *mei* in isolated negative sentences. The second task provided context to see if it increased acceptability rates. Age differences were analyzed across four groups: kindergartners, Grade 2, Grade 4, and Grade 6, with eighteen adults as a control group. The results showed age differences in acquiring *bu* and *mei* in negative sentences. Kindergartners and second graders did not exhibit an adult-like preference for *bu* and *mei* with different verb types. By Grade 4, children began to show adult-like preferences, favoring *bu* with atelic verbs and *mei* with telic verbs. By Grade 6, children displayed a stronger adult-like preference for *bu* and *mei* in single and double negative sentences, reflecting the development of logical reasoning skills. Finally, it was also found that providing context increased the acceptability rates of negative

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sentences among participants. These findings suggest that understanding the developmental trajectory of negation in a first language can lead to more effective teaching strategies for negation in a second language.

**Keywords:** contextual influence, first language acquisition, negation, verb types

## 1. Introduction

Negative sentence expression is universal among humans since negation is a basic concept in logic (Nordmeyer and Frank 2013; Zhou et al. 2014b). It is used to reverse the truth value of a statement. To illustrate, consider sentence (1).

- (1) Xiaohua bu chi haixian.  
 Xiaohua not eat seafood  
 ‘Xiaohua doesn’t eat seafood.’

The verb phrase *chi haixian* ‘eat seafood’ is within the scope of the negator *bu* ‘not,’ which denies the positive feature of *chi haixian* and results in a negative meaning. A negator can take the scope not only of a verb but also over non-verbal elements such as adverbials and manner expressions (Ernst 1995; Jackendoff 1969). Thus, the scope of a negator determines the meaning of sentences (Ernst 1995; Jackendoff 1969). Regarding double negative sentences, the first negator takes scope over the second negator, as shown in (2).

- (2) Xiaohua bu hui bu lai.  
 Xiaohua not will not come  
 ‘Xiaohua will come.’

In (2), the second negator *bu* denies the verb phrase *bu lai* ‘not come’ and generates an affirmative meaning.

Carpenter *et al.* (1999) contended that negative forms take more time to process than affirmative forms. In the acquisition of a language, it is essential to understand the relationship between language forms and their corresponding meanings. This relationship is associated to iconic quantity<sup>1</sup>, which posits that the length and complexity of an expression influence the complexity of cognitive perspective (Haiman 1983; Sun 2011). Therefore, double negative sentences are less preferable than positive sentences. From a pragmatic perspective, previous research (Givón 1978) argues that

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<sup>1</sup> Iconic quality is one of the components of iconicity, along with iconic sequencing and iconic proximity.

double negatives are still used to express a positive meaning, but they make the positive meaning weaker than an affirmative sentence.

Children's acquisition of single negatives and double negatives has been discussed in previous studies (Jou 1988; Zhou et al. 2014a and 2014b). A common issue in first language acquisition is age. The development of negation has been studied by previous researchers (Bloom 1970; Pea 1980; Nordmeyer and Frank 2013). Pea (1980) found that English-native children, as early as 12 month-olds, produced negative expressions for nonexistence and rejection<sup>2</sup>. However, children were found to have difficulty with negative terms such as *less* when they were 4 years old (Klatzky, Clark and Macken 1973).

In addition to the age issue, some empirical studies considered context an important cue for acquisition (i.e., de Villiers and Flusberg 1975; Romain 1988; Glenberg et al. 1999; Zhou et al. 2014b). For instance, de Villiers and Flusberg found that negatives were not difficult for English children to process after they were provided with contexts. Therefore, the present study has taken context into account.

Research into first language (L1) and second language (L2) acquisition has highlighted numerous parallels in language development, with both fields benefiting from mutual insights. Studies show that L1 and L2 learners both navigate through systematic developmental stages, emphasizing the significance of input and interaction (Ellis 1994; Long 1996). Cognitive processes such as memory and pattern recognition play a crucial role in language acquisition across both domains (Pinker 1994). A particularly influential L1 study by Slobin (1971) on error analysis and developmental sequences has greatly informed L2 research. Selinker's (1972) concept of interlanguage, inspired by Slobin's findings, suggests that L2 learners also evolve through predictable stages, shaped by their native language and the target language. This has led to the development of teaching strategies that align with these natural learning stages, thereby enhancing the effectiveness of L2 acquisition. Moreover, studies on overgeneralization in L1 (Clark 1987) have helped L2 teachers predict and address similar errors in L2 learning, aiding in the design of targeted instructional

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<sup>2</sup> Children might express nonexistence by saying "no more juice" and convey rejection by saying "no go outside" (Bloom 1970; Pea 1980).

methods. By comparing these findings with second language (L2) acquisition patterns, we can identify both similarities and differences in language development processes. For instance, while L1 learners may acquire linguistic structures intuitively through exposure, L2 learners often require more explicit instruction and may face additional challenges due to interference from their native language. However, understanding how children naturally acquire negatives in their first language can provide valuable insights into effective teaching strategies for L2 learners. By examining how context and linguistic complexity affect comprehension in L1, teachers can better tailor L2 instruction, making this L1 study a crucial reference for developing pedagogical approaches in second language education.

Hence, this study explores the first language (L1) acquisition of *bu* and *mei* by children in Mandarin Chinese, specifically focusing on the ages at which they acquire single and double negatives. To address gaps in previous research, the study considers the effects of context, verb types, and age. Below are the three research questions to be addressed:

- (1) Can Mandarin-speaking children distinguish aspectual clauses of verbs with *bu* from those with *mei*?
- (2) Are Mandarin-speaking children aware that the compatibility of negators and lexical aspect in double negatives is different from that in single negatives?
- (3) Can the comprehension of single negative sentences and double negative sentences in Mandarin Chinese be enhanced when appropriate contexts are provided?

## 2. Literature Review

In this section, we review some important empirical studies on first language acquisition focusing on single and double negative sentences. The development of children's understanding of single and negative sentences in Mandarin and English is presented (Jou 1988; Romain 1988; Zhou et al. 2014a and 2014b).

Jou (1988) investigated the comprehension of double negation in Chinese children, focusing on when they can correctly interpret double negatives and the developmental process involved. Participants, divided into eleven age groups (4 to 14 years old) with ten subjects per group, acted out actions using dolls based on sentences they heard. The

sentences were categorized into affirmative, negative, and double negative types, with eight transformations applied within each set. The findings revealed that sentence type significantly influenced children's interpretations, with notable differences between single and double negatives. Age also played a crucial role; younger children often misinterpreted double negatives as single negatives, while older children understood them correctly. Children were categorized into three stages: those younger than 7 (Stage 1) equated double negatives with single negatives, those in Stage 2 recognized the difference but did not fully understand double negatives, and by age 8 (Stage 3), children correctly interpreted double negatives as affirmative statements and mastered their use.

Rumain (1988) investigated how children interpret negative sentences, highlighting the influence of article usage and sentence position. The study involved three experiments: The first experiment included 20 children (average age 7), 28 children (average age 10), and 20 adults, who matched 16 test sentences in four variations with pictures. Findings showed that reliance on article cues increased with age, with 10-year-olds using positional cues more than articles, unlike adults who depended on articles. Seven-year-olds relied less on positional cues compared to 10-year-olds. The second experiment replicated the first with written sentences, revealing that the mode of presentation (written or oral) did not affect performance. In the third experiment, participants described scenarios based on negative sentences, with results mirroring the first two experiments and showing significant article and positional effects, especially among 10-year-olds. Rumain concluded that understanding negative sentences is aided by article and positional cues, with 10-year-olds relying more on positional cues and adults on article cues.

Zhou, Crain, and Thornton (2014a) studied how Mandarin-speaking children understand the interplay between lexical aspect and negation, building on prior research by Li and Thompson (1981) and Lü (1980). Mandarin uses two negative markers: *bu* for habitual or volitional actions and *mei* for completed actions. The research is based on Vendler's (1957) categorization of verbs into states, activities, accomplishments, and achievements, differing in dynamicity, durativity, and telicity. The study involved 46 children from Beijing Language and Culture University, with one excluded for not responding correctly. Using a two-choice forced-judgment task, children listened to a

story and identified the puppet that used the correct negation marker in sentences featuring state and accomplishment/achievement verbs. Results indicated an age-related increase in correct responses: for state verbs, correct responses rose from 54.29% in children aged 3;5 to 3;11 to 72.50% in children aged 4;7 to 5;0. Older children also performed better with accomplishment or achievement verbs. The findings suggest that by age 4;7, Mandarin-speaking children understand and can apply the relationship between negation markers and lexical aspect similarly to adults, though younger children may struggle with the interaction between negation markers and lexical aspects.

Zhou et al. (2014b) examined the comprehension of double negation in Mandarin-speaking children to determine when they grasp and use this structure. In the first experiment, involving thirty kindergarten children, a truth value judgment task revealed that children around 5 years and 6 months understood the positive implication of double negatives, unlike younger children. The second experiment, an elicited production task with children aged 5 years and 6 months to 6 years and 5 months, and adults, demonstrated that by age 6, children were proficient in using double negatives, indicating full understanding by this age. Context played a crucial role in mastering double negatives, suggesting the need for further research with older children. Their studies, along with those by Jou (1988), Romain (1988), and Zhou et al. (2014a), primarily discussed the age effect on comprehension. Jou (1988) and Zhou et al. (2014b) found that children aged 4;2 treated double negatives as single negatives, and while children began producing double negatives at age 5 and interpreting them as positive from 5;6, Jou (1988) noted that children couldn't interpret double negatives as affirmative until age 8. Zhou et al. (2014a) found that children aged 4;7 understood the interaction between negative markers and lexical aspects in single negative sentences. Regardless of their first language, children relied on cues to understand single and double negatives. English-speaking children under 7 relied less on positional cues than 10-year-olds, while adults depended more on article cues (Romain 1988). Mandarin-speaking children also required strategies and felicitous contexts to interpret double negatives (Zhou et al. 2014b).

Hu et al. (2018) investigated the challenges faced by Chinese children with reading difficulties in comprehending affirmative and negative sentences. The study

noted that a significant percentage of schoolchildren struggle with reading due to phonological deficits, which also impact their comprehension of morphosyntax, including negation processing. Dyslexic children struggle with interpreting negative sentences, but it was unclear if these difficulties extended to affirmative sentences or were specifically triggered by negation. To address this, the study examined Chinese children with reading difficulties by analyzing phonological and morphological awareness, and rapid naming skills. The aim was to determine if negation processing could predict reading difficulties in Mandarin Chinese. The study involved 44 participants, 22 poor readers, and 22 typical readers, assessed through various literacy tests. Poor readers were identified based on significant deviations from grade averages and observed reading and writing difficulties. Assessments included phonological and morphological awareness tests, rapid number naming, and a comprehension task involving affirmative and negative sentences. Results showed that poor readers had lower accuracy in phonological and morphological awareness tasks compared to typical readers, but both groups performed similarly in rapid number naming. In sentence comprehension, poor readers were less accurate and slower across all conditions, with negative sentences being particularly challenging for both groups. While negation processing was not a significant predictor of dyslexia, poor readers processed negation differently, indicating a reliance on linguistic impairment. The findings supported the Simulated Sentences Hypothesis (SSH), which posits that negative sentences are more demanding to process than affirmative ones. However, no difference was found between false affirmatives and false negatives, suggesting the need for further investigation using online methods.

Li et al. (2022) explored how Mandarin Chinese (MC) speakers use the negative response particles *mei(you)* and *bu* when responding to negative yes-no questions, focusing on distinguishing Single Negation from Rejection interpretations. The study involved ten native MC speakers and analyzed their responses for prosodic variations and gestures. Results showed significant prosodic differences: Rejection interpretations had longer duration, higher and more variable pitch, and greater intensity than Single Negation responses. Gestures also played a crucial role, with nods more associated with Rejection meanings and head shakes with Single Negation interpretations. In a follow-up experiment with 16 participants, the role of gestures was examined further. Gestures



often led to Single Negation interpretations even when the intended meaning was Rejection, especially with ambiguous gestures like head nods, shakes, or tilts. Almost all responses indicating Single Negation featured a head shake, aligning with their intended interpretation. Experiment 3, involving 26 participants, aimed to understand the impact of prosody and gesture on interpreting fragmentary responses to negative polar questions in MC. Various presentation formats (audio-only, video-only, and audio-visual) were used to assess interpretation speed and accuracy. Findings indicated that combining audio and visual cues facilitated quicker understanding, with audio-visual stimuli leading to faster processing of Rejection interpretations. The study highlights the intricate interplay between prosody, gesture, and interpretation in MC, emphasizing the importance of multimodal communication in conveying meanings.

Nevertheless, these studies still have some limitations. First, the contextual effect was not investigated in these previous studies (Jou 1988; Romain 1988). Second, Zhou et al. (2014a) did not investigate the situations when two negators occur with activity verbs. Lastly, a varied age group was not recruited in these studies (Romain 1988; Zhou et al. 2014a and 2014b), and the subject pool of each age group was small (Jou, 1988; Li, et al. 2022) or consisted of children with reading difficulties (Hu et al. 2018; Li et al. 2022). Therefore, the present study takes the effect of context, verb types, and age into consideration. The participants will be asked to judge whether each test sentence, containing either single negators or double negators, is acceptable with or without contexts. Regarding the relationship between negators and lexical aspect in Mandarin Chinese, the present study examines at what age children acquire the knowledge of semantic differences between “*bu* + activities” and “*mei(you)* + activities”. Additionally, the age of the subjects in this study will range from 4 to 11 years old.

### 3. Methods

#### 3.1 Participants

Previous research investigated children's acquisition of negative sentences at various ages: children at ages 4-5 were found to acquire the compatibility of lexical aspects and negative markers for single negatives (Zhou et al. 2014a), while children at age 6 understood double negatives in an adult-like manner (Zhou et al. 2014b).

Conversely, Jou (1988) found that children did not grasp the meaning of double negative sentences until age 8. The present study focused on ages 5 to 12 to examine if children at age 5 possess knowledge of lexical aspect and negators, and if children aged 12 can interpret double negative sentences as affirmative ones.

This study explored the developmental process of *bu* and *mei* in negative sentences among children. A total of ninety children of various ages were recruited and divided into five age-based groups. Group 1 included preschoolers aged 5 to 6 years old. Group 2 consisted of children aged 7 to 8 years old, Group 3 included those aged 9 to 10, and Group 4 comprised students aged 11 to 12, all attending second, fourth, and sixth grades in elementary schools in Taipei City, respectively. Group 5 consisted of adults. Each group had eighteen participants who were native Mandarin Chinese speakers. The child participants have limited English proficiency, which will not impact the study's results. The adult group included eighteen native Mandarin-speaking college students, aged 20 to 21.

### 3.2 Materials

In contrast to previous studies (Jou 1988; Romain 1988; Zhou et al. 2014a and 2014b), which conducted judgment tasks, interpretation tasks, and production tasks to investigate first language acquisition of single negatives and double negatives, this study used a three-point scale acceptability judgment task to collect intuition data. It employed a cross-sectional approach, collecting data through controlled measurements.

This study not only explores the interpretation of *bu* and *mei* in negative sentences among children but also incorporates certain considerations when devising test items. One key factor considered is verb types. Following Vendler's (1957) classification, we categorized verbs into four types based on their features: state (Type 1), activity (Type 2), achievement (Type 3), and accomplishment (Type 4). Comrie (1976) refers to these verb types as lexical aspects since they are inherently linked to time. The collocation of negative markers is associated with lexical aspect in English and Chinese (Ernst 1995; Zhou et al. 2014a). Zhou *et al.* (2014a) note that *bu* typically accompanies state and activity verbs, while *mei* is used with accomplishment, achievement, and activity verbs. Test items in this study were designed to include eight sentence types with

different lexical aspects, and each further classified into two subtypes based on the number of negators.

Type 1 pertains to negative sentences with state verbs, categorized into two subtypes based on sentence patterns: Type 1-1 and Type 1-2. The distinction lies in the use of a single negative, as in (3) for the former, and a double negative, as in (4) for the latter.

- (3) Xiaoji bu/\*mei zhidao zhe shou ge.  
 chick not know this CL song  
 ‘The chick doesn’t know this song.’

- (4) a. Xiaoji bu neng bu zhidao zhe shou ge.  
 chick not can not know this CL song  
 ‘The chick must know this song.’

- b. \*Mei you ren mei zhidao zhe shou ge.  
 not have person not know this CL song  
 ‘Everyone knows this song.’

According to earlier studies (Teng 1974; Li and Thompson 1981; Zhou et al. 2014a), *bu* can be used with state verbs, whereas *mei* cannot. The verb *zhidao* ‘know’ is a state verb, and, as indicated in (2b) above, it cannot co-occur with *mei* ‘not.’

Type 2 pertains to negative sentences with activity verbs, further divided into two subtypes. Type 2-1 involves single negatives with activity verbs, while Type 2-2 consists of double negatives with activity verbs. Both *bu* and *mei* can co-occur with activity verbs in Mandarin Chinese, as illustrated in (5) and (6).

- (5) Xiaotu bu/mei shuijiao.  
 Bunny not sleep  
 ‘Bunny didn’t/ just wouldn’t sleep.’

- (6) a. Xiaotu bu shi bu shuijiao.  
 Bunny not be not sleep  
 ‘It is not that Bunny wouldn’t sleep.’

- b. Mei you ren mei shuijiao.  
not have person not sleep  
'Everyone slept.'

Type 3 pertains to negative sentences with achievement verbs, which are further divided into single negatives (Type 3-1) and double negatives (Type 3-2). Only *mei* can be used for negation with achievement verbs (Zhou et al. 2014a), as demonstrated in (7) for a single negative and (8) for a double negative.

- (7) Xiaohua \*bu/mei kanjian lushang de shitou.  
Xiaohua not see road Poss rock  
'Xiaohua didn't see the rock in the street.'

- (8) a. Xiaohua bu shi bu kanjian lushang de shitou.  
Xiaohua not be not see road Poss rock  
'It is not that Xiaohua didn't see the rock in the street.'

- b. Mei you ren mei kanjian lushang de shitou.  
Not have person not see road Poss rock  
'Everyone saw the rock in the street.'

Type 4 pertains to negative sentences with accomplishments and includes two subtypes: single negative sentences (Type 4-1), illustrated in (9), and double negatives (Type 4-2), demonstrated in (10).

- (9) Xiaozhu \*bu/mei chi bao.  
piggy not eat full  
'The piggy was not full.'

- (10) a. Xiaozhu bu-de-bu chi bao.  
piggy not must not eat full  
'The piggy must eat until he is full.'

- b. Mei you ren mei chi bao.  
not have person not eat full  
'Everyone was full.'

Sentence (9) indicates that *bu* cannot co-occur with accomplishment verbs, whereas *mei* can (Zhou et al., 2014a). Interestingly, both *bu* and *mei* can accompany accomplishment verbs in double negative sentences.

Table 1 shows the differences between *bu* and *mei* with the above four types of verbs in negatives:

Table 1: Differences between *bu* and *mei* in negative verbs

|        |                          | <i>bu</i> | <i>mei</i> |
|--------|--------------------------|-----------|------------|
| Type 1 | Type 1-1 single negative | v         | x          |
|        | Type 1-2 double negative | v         | x          |
| Type 2 | Type 1-1 single negative | v         | v          |
|        | Type 1-2 double negative | v         | v          |
| Type 3 | Type 1-1 single negative | x         | v          |
|        | Type 1-2 double negative | v         | v          |
| Type 4 | Type 1-1 single negative | x         | v          |
|        | Type 1-2 double negative | v         | v          |

In addition to lexical aspect, another factor that may influence children's interpretation of a single negative and a double negative is context. While Zhou et al. (2014b) discussed a contextual effect, few studies have investigated both context and lexical aspect simultaneously. Some researchers (Glenberg et al., 1999; de Villiers & Flusberg, 1975; Zhou et al., 2014b) have asserted that contexts are helpful for interpretation. Therefore, the present study conducted two acceptability judgment tasks: a context-free task and a context-provided task. In total, eight types of test items were designed based on their acceptability of co-occurring with lexical aspect, as illustrated in Table 2.



Table 2: Distribution of test items across the two tasks

| Verb Type       | Type  | No. | Context-free Task | Context-provided Task |
|-----------------|---|-----|-------------------|-----------------------|
| Type 1: State   | Type 1-1 single negation: <i>bu/mei</i> + state verb            | 2   | Q4, Q10           | Q6, Q12               |
|                 | Type 1-2 double negation: <i>bu...bu/mei...mei</i> + state verb | 2   | Q2, Q19           | Q1, Q10               |
| Type2: Activity | Type 2-1 single negation: <i>bu/ mei</i> + activity verb        | 2   | Q9, Q17           | Q5 ,Q15               |

|                           |   |   |                  |                  |
|---------------------------|---|---|------------------|------------------|
|                           | Type 2-2 double negation:<br><i>bu...bu/mei...mei</i> + activity verb       | 2 | Q8, Q18          | Q16, Q19         |
| Type 3:<br>achievement    | Type 3-1 single negation:<br><i>bu/mei</i> + achievement verb               | 2 | Q5, Q13          | Q9, Q20          |
|                           | Type 3-2 double negation:<br><i>bu...bu/mei...mei</i> + achievement verb    | 2 | Q3, Q15          | Q2, Q17          |
| Type 4:<br>accomplishment | Type 4-1 single negation:<br><i>bu/mei</i> + accomplishment verb            | 2 | Q14, Q20         | Q4, Q14          |
|                           | Type 4-2 double negation:<br><i>bu...bu/mei...mei</i> + accomplishment verb | 2 | Q7, Q11          | Q7, Q11          |
| Fillers                   |   | 4 | Q1, Q6, Q12, Q16 | Q8, Q3, Q13, Q18 |
| Total                     |   |   | 20               | 20               |

In both tasks, a three-point scale for acceptability judgment was designed for each type. Table 3 presents a sample of test items in a context-free task.

Table 3: A sample question in the Context-free Task





| Participants saw:  | Participants heard:   |
|--|---|
| <p>Scene 1</p>  | <p>Xiaomao shuo, “<i>Xiaozhu bu chi bao.</i>”<br/>‘Kitty said, “Piggy is not full.”’</p>                          |
| <p>Scene 2</p>  | <p>“<i>Xiaopengyou, qingwen Xiaomao keyi zheyang shuo ma?</i>”<br/>‘Little boys and girls, can Kitty say so?’</p> |

In this task, participants listened to either a single negative or a double negative uttered by an American kitty. Following the presentation of the sentence, participants were instructed to choose the corresponding light to indicate their judgment. A checkmark on the green light signified that the sentence is acceptable in Mandarin

Chinese. The yellow light suggests that the sentence is somewhat strange but still acceptable. The red light signals that the sentence is entirely unacceptable.

A sample question for the Context-provided Task is illustrated in Table 4. Similarly, participants were asked to mark their acceptability judgement. The only different was that participants were presented with a context before hearing the target test item.

Table 4: A sample question in the Context-provided Task

| Participants saw:  | Participants heard:   |
|--|---|
| <p>Scene 1</p>    | <p><i>Xiaozhu yinwei wanshang yao canjia shengri paidui, paidui yao hen duo shiwu, suoyi Xiaozhu zhongwu zhi yao-le yi kou mianbao.</i><br/> ‘Piggy only ate a piece of bread for lunch because he had been invited to a birthday party where lots of food was served.’</p> |
| <p>Scene 2</p>  | <p><i>Dan changchang chi hen duo de Xiaozhu, yixiazi jiu jue de duzi e-le.</i><br/> ‘However, the little pig who often ate a lot suddenly felt hungry.’</p>   |
| <p>Scene 3</p>  | <p>Suoyi, Xiaomao shuo, “<i>Xiaozhu bu chi bao.</i>” ‘Kitty said, “Piggy is not full.”’</p>   |
| <p>Scene 4</p>  | <p>“<i>Xiaopengyou, qingwen Xiaomao keyi zheyang shuo ma?</i>”<br/> ‘Little boys and girls, can Kitty say so?’</p>  |

Both tasks were displayed using PowerPoint. The designed scenarios and test items were presented with accompanying pictures.

### 3.3 Procedures

A consent form was prepared and provided to the parents of children attending a public elementary school in northern Taiwan, which also houses a kindergarten. This form outlined the purpose of the study and the tasks their children would be undertaking. Notably, the consent form explicitly emphasized the confidentiality of the data collected. After receiving completed consent forms from parents, the school administration offered their assistance by arranging logistical details. This included providing a private and suitable room on school premises for data collection sessions. Additionally, the research team maintained regular communication with school administrators to address logistical concerns and ensure smooth coordination throughout the data collection process. With the combined support of teachers and school administrators, the recruitment and data collection procedures were efficiently managed while adhering to ethical standards and prioritizing participant comfort and safety. Both context-free and context-provided tasks were employed, comprising 8 test items for single negatives, 8 for double negatives, and 4 filler items, respectively. Clear instructions were given at the beginning of each task, where participants were asked to imagine teaching a kitty from America to learn Mandarin. Each test sentence was accompanied with a suitable picture. Before the experiment, a training session was conducted to ensure participants understood the requirements for the formal experiment. Rules for a three-point scale were explained in advanced. During the experiment, participants had to judge the acceptability of the test sentences they heard. The Context-free Task was conducted first, followed by the Context-provided Task. Each task took participants approximately 15-20 minutes to complete.

In terms of scoring, correct answers were not applicable to items in both tasks since this study focused on comparing participants' acceptability of each test item. The rating for each question was determined on a three-point scale, with a red light signifying 1 point, a yellow light indicating 2 points, and a green light representing 3 points. A score higher than 2 indicated that the single or double negative sentence with a certain verb type was highly acceptable. Conversely, if the average score was close



to 1, it suggested that the participants tended to reject the single negative or double negative sentences with a certain verb type. The average scores of each group were then compared with that of the adult group. If the average score was close to that of the adult group, it indicated that the participants had performed in an adult-like manner. All the data were entered into the computer and processed using SPSS.

## 4. Results and Discussion

### 4.1 Verb Type Effects

The first research question of the present study concerns whether children acquire the compatibility of negators and verb types, which can be classified into states (Type 1), activities (Type 2), achievements (Type 3) and accomplishments (Type 4) (Vendler 1957). These four verb types can further be grouped into telic verbs and atelic verbs according to [ $\pm$  endpoint] (Garey 1957).

As Figure 1 illustrates, the mean scores show that negators with Type 2 (activities) were more acceptable than those with other types. The tendency of participants' acceptability was as follows: Type 2 ( $M=2.38$ ) > Type 4 ( $M=1.89$ ) > Type 3 ( $M=1.85$ ) > Type 1 ( $M=1.74$ ), indicating that different types of verbs influenced the compatibility of negators and verbs, though no significant difference was found.

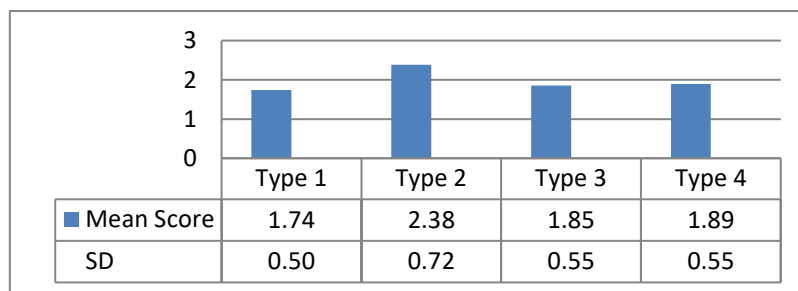


Figure 1: Participants' overall acceptability rates of negators with different verb types

To examine whether the compatibility of *bu* or *mei* and verb types followed the same tendency as the participants' overall acceptability, Table 5 presents the overall acceptability rates of *bu* and *mei* with verb types.

Table 5: Participants' overall acceptability rates of *bu* and *mei* with different verb types

| Verb<br>Negator | Type 1 |      | Type 2 |      | Type 3 |      | Type 4 |      |
|-----------------|--------|------|--------|------|--------|------|--------|------|
|                 | M      | SD   | M      | SD   | M      | SD   | M      | SD   |
| <i>bu</i>       | 2.12   | 0.22 | 2.51   | 0.63 | 1.50   | 0.15 | 1.81   | 0.27 |
| <i>mei</i>      | 1.35   | 0.25 | 2.24   | 0.56 | 2.20   | 0.53 | 1.97   | 0.32 |

As for *bu*, the results showed that Type 2 was more acceptable than other verb types. The overall tendency of verb type preferences for *bu* was as follows: Type 2 (M=2.51) > Type 1 (M=2.12) > Type 4 (M=1.81) > Type 3 (M= 1.50), but there was no significant difference. As for *mei*, the sequence of verb types was Type 2 (M= 2.24)> Type 3 (M= 2.20)> Type 4 (M= 1.97) > Type 1 (M=1.35), with no significant difference found. Activities were the most preferred verb type for both *bu* and *mei*.

According to previous studies (Li and Thompson 1981; Lang 1983; Lin 2003; Zhou et al. 2014a), *bu* is a neutral negator, which negates volitional, habitual, and future situations. However, *mei* is a negator used to deny existential meanings and the completion of an event. Zhou (1988) further argues that *mei* denies facts or situations that require no mental processing. It can only negate events that have happened or do not imply a personal attitude. By contrast, *bu* negates events that need mediation and do not occur.

States, activities, achievements, and accomplishments can be grouped into telic and atelic, as proposed by Garey (1957), according to the feature [ $\pm$  endpoint]. States and activities are atelic verbs due to the [-endpoint] property, while achievements and accomplishments are telic since they exhibit the [+endpoint] property. Examining the properties of each verb type and participants' acceptability rates reveals that participants preferred atelic verbs with *bu*, while they favored telic verbs with *mei*. This finding can be explained as follows: Atelic verbs are the most acceptable to occur with *bu* because of their [-endpoint] property, indicating that an action is not complete or has not occurred. By contrast, telic verbs are the most preferred type with *mei* because of their [+endpoint] property, which is compatible with *mei*'s feature of denying the completion (i.e., having an endpoint) of an event. Based on our results, the preferred sequence for *bu* was Type 2> Type 1> Type 4> Type 3, while that for *mei* was Type 2> Type 3> Type 4> Type 1. These tendencies correspond to the compatibility of *bu* and *mei* with verb types for both the child participants and adults.

Our results also revealed that Type 2 verbs were the most acceptable for both *bu* and *mei* for all participants, as activity verbs often involve dynamic actions and processes, making them semantically compatible with these two negators. Cognitive ease in processing linguistic structures can also influence preferences, and activity verbs may be more straightforward for speakers to negate, given that the negation of actions often involves the absence or prevention of the action. Additionally, activities possess properties such as [-endpoint], [+durative], and [+dynamic]. A sentence with activities can be perceived as an event that has occurred or has not happened due to its [+dynamic] nature. When an action occurs, it exists in the real world. Therefore, it can be negated by *mei*. Nevertheless, when an action does not occur, *bu* can be used to deny its volitional meaning. Thus, sentences with Type 2, influenced by these two negators (Li & Thompson, 1981; Zhou, 1988; Lin, 2003) convey different meanings.

Figures 2 and 3 presents different age groups' acceptability for *bu* and *mei* with different verb types, respectively.

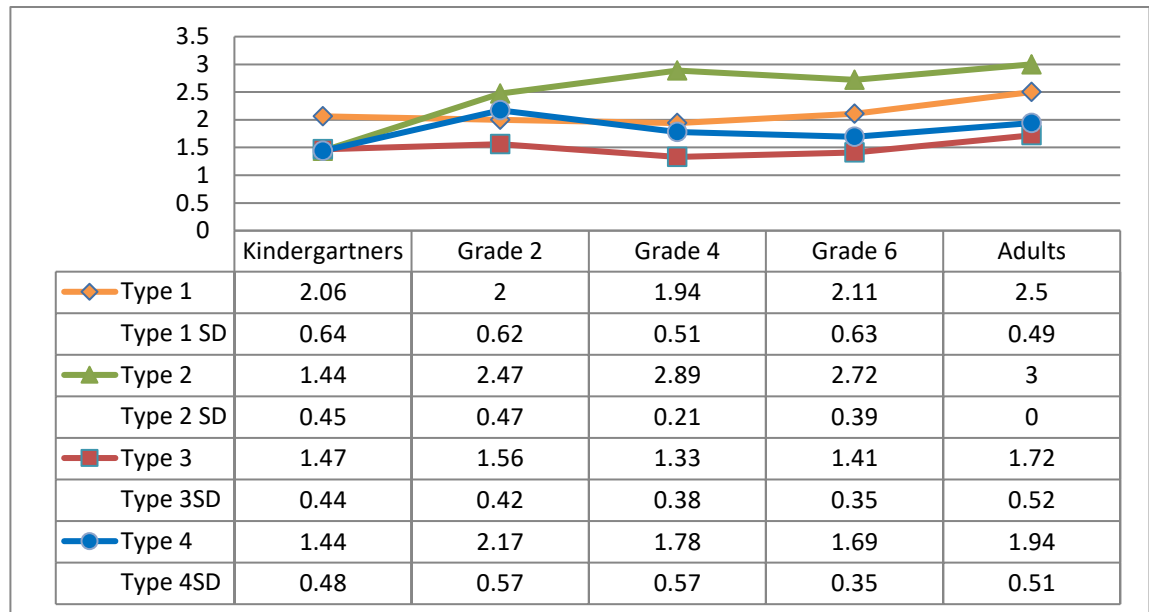


Figure 2: Each group's acceptability rating for verb types with *bu*

Figure 3 displays the acceptability rates of *mei* with each verb type for each age group.

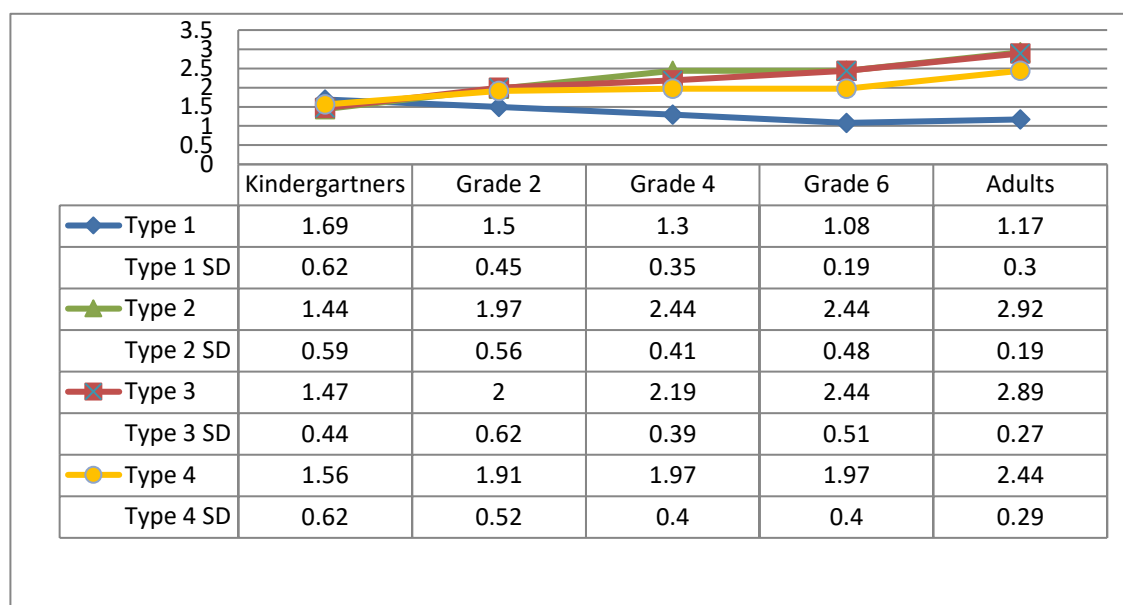


Figure 3: Acceptability rating for verb types with *mei* for each age group

The results revealed a shared preference among Grade 4, Grade 6, and adults for *bu* verb types in the order of Type 2 > Type 1 > Type 4 > Type 3. They showed awareness that *bu* aligns with activities, achievements, and accomplishments. However, kindergartners and Grade 2 did not exhibit this tendency, suggesting a lack of acquisition in the compatibility of *bu* and verb types. Concerning *mei*, Grade 4, Grade 6, and adults preferred Type 2 > Type 3 > Type 4 > Type 1. Type 2 with *mei* was more acceptable, while Type 1 was least preferred. Compared to adults, Grade 2 and kindergartners significantly differed in their preference for *mei* with Type 3 ( $p < 0.01$ ) and Type 4 ( $p < 0.01$ ). This indicates that neither kindergartners nor Grade 2 had acquired the compatibility of *mei* and verb types.

In summary, it was found that Grade 4 (age 10) had acquired the knowledge of the compatibility of negators (*bu* and *mei*) and verb types in the present study. According to Piaget's (1964) theory, children aged 10 are in the Concrete Operational Stage (7 to 11 years), where they begin to think more logically and become more

capable of understanding and using complex language structures. The ability to understand and use complex grammatical structures, including negatives, is closely tied to cognitive development. Children may continue to refine their cognitive abilities well into adolescence, impacting their mastery of more advanced linguistic features. Negatives, especially when combined with specific verb types or structures, can be linguistically complex. The acquisition of more intricate language features often takes longer as children progress through different developmental stages. At age 10, children would typically be in the later part of the concrete operational stage, transitioning to the formal operational stage. During this period, it is expected that children demonstrate more advanced logical thinking and improved language skills. However, our findings differ from the results of Zhou et al. (2014a), who argued that children acquired the compatibility of negators and verb types at the age of 4;7, the Preoperational Stage (2 to 7 years), when, according to Piaget, children begin to use language more effectively to represent objects and ideas. However, their thinking is often egocentric and lacks logical reasoning. One possible explanation for this discrepancy may result from the research design of the study. It is important to note that double negatives in our study are more complicated for participants to process than in their research.

Our findings suggest that Grade 4 students (around age 10) have grasped the compatibility of Chinese negators (*bu* and *mei*) with verb types, aligning with Piaget's theory on cognitive development. As L2 Chinese teachers, it is vital to recognize this link between complex grammar and cognitive growth, adjusting teaching methods accordingly. Considering the linguistic complexity of negatives, especially when combined with specific verbs, targeted instruction and practice are crucial. Recognizing variations in L2 learners' cognitive development and linguistic exposure, teachers can tailor teaching approaches effectively to support L2 learners' acquisition of Chinese negatives.

#### 4.2 Single Negatives and Double Negatives

The second research question discusses whether children's acceptability rates of *bu* and *mei* are different when they are in single and double negative sentences. The overall mean scores for single and double negatives are presented in Figure 4. The

results show single negative sentences ( $M= 2.03$ ) were significantly more acceptable than double negative sentences ( $M= 1.88$ ) ( $p< 0.01$ ).

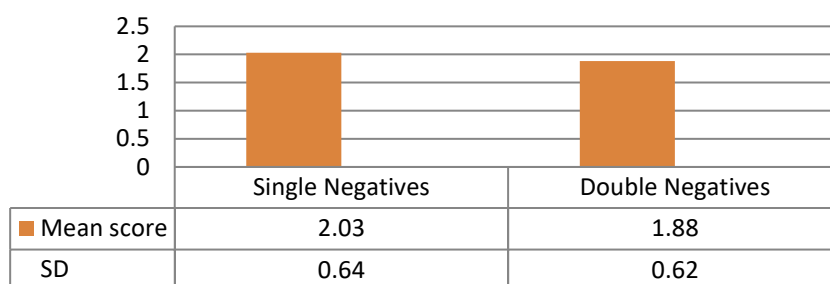


Figure 4: Participants' overall acceptability rates of single and double negatives

This finding supports the claims made by previous researchers (Wason 1959; Jou 1988; Fan and Xiao 2010; Sun 2011; Zhou et al. 2014b). Single negatives are often simpler structures, involving the use of a single negating element like *no* or *not*. They occur frequently in everyday language, providing more opportunities for children to encounter and internalize them. Children are exposed to these single negative structures from a young age, facilitating earlier learning. According to Wason (1959) and Jou (1988), an affirmative statement is first decoded, and then this statement is negated through additional mental processes to derive the meaning of a single negative. However, as Fan and Xiao (2010) pointed out, the derivational process of a double negative is more intricate, involving the coordination of multiple grammatical elements, introducing an additional layer of complexity to sentence structure. Semantically, single negatives often convey clear and straightforward negation, and the meaning is explicit and less ambiguous. Double negatives can introduce complexity and ambiguity in interpretation, requiring more advanced cognitive and linguistic skills. Hence, children typically progress from simpler to more complex linguistic structures as their cognitive abilities develop. Understanding and producing sentences with multiple negations may impose a higher cognitive load on language learners, as they may be used for emphasis or rhetorical effect, requiring a more sophisticated understanding of language. In contrast to single negatives, extra mental processes have to be applied twice to interpret double negatives. Consequently, we can infer that a double negative

is more complex than a single negative, and as a result, they are acquired later than single negatives (Jou, 1988; Zhou et al., 2014a, 2014b).

To investigate whether a similar pattern emerges with *bu* and *mei* in single and double negatives, let us analyze the overall acceptability rates of *bu* and *mei* across single and double negative sentences, as shown in Table 6.

Table 6: All participants' overall acceptability rates of *bu* and *mei* in single and double negatives

| Negator \ Construction | Single |      | Double |      | <i>p</i> -value |
|------------------------|--------|------|--------|------|-----------------|
|                        | M      | SD   | M      | SD   |                 |
| <i>bu</i>              | 1.91   | 0.38 | 2.06   | 0.51 | 0.00**          |
| <i>mei</i>             | 2.18   | 0.48 | 1.71   | 0.46 | 0.00**          |

As shown in Table 5, the mean score for *bu* in double negatives (M= 2.06) surpassed that in single negatives (M=1.91). Conversely, the mean score for *mei* exhibited the opposite trend. To thoroughly examine whether the preference of each group aligns with that of the overall participants, Figures 5 and 6, illustrate the acceptability rates of *bu* and *mei* in single and double negatives for each group, respectively.

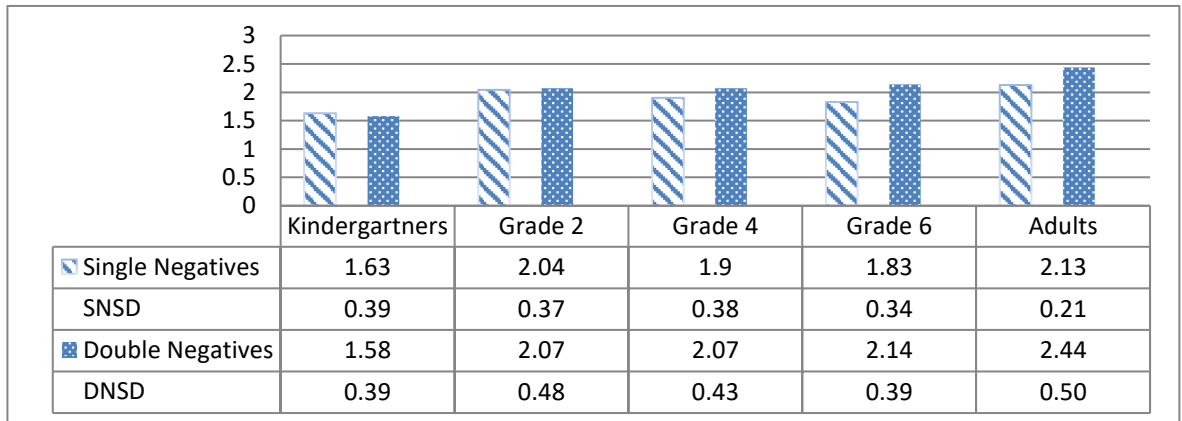


Figure 5: Each group's acceptability rates of *bu* in single and double negatives

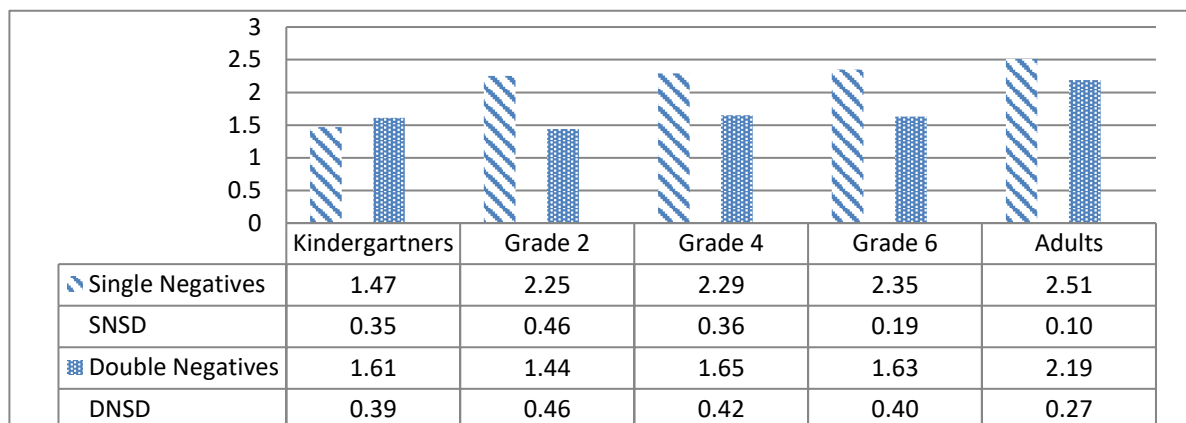


Figure 6: Each group's acceptability rates of *mei* in single and double negatives

As depicted in Figure 5, *bu* in double negatives exhibited a higher acceptability rate for each group, except for kindergartners. Similarly, the results shown in Figure 6 indicate that, except for kindergartners who exhibited reverse preferences, *mei* in single negatives was more acceptable than in double negatives for each group.

Regarding within-group differences, Table 7 presents *p*-values indicating disparities in the acceptability rates of *bu* and *mei* in single and double negatives.

Table 7: The *p*-value for the within-group differences between the acceptability rates of *bu* and *mei* in single and double negative sentences

| Group      |                 | Kindergartners | Grade 2 | Grade 4 | Grade 6 | Adults |
|------------|-----------------|----------------|---------|---------|---------|--------|
| Negator    | <i>bu</i>       | 0.30           | -0.22   | -1.32   | -2.88   | -2.44  |
|            | <i>p</i> -value | 0.77           | 0.83    | 0.20    | 0.01*   | 0.03*  |
| <i>mei</i> | <i>t</i>        | -1.43          | 5.04    | 4.92    | 8.97    | 4.81   |
|            | <i>p</i> -value | 0.17           | 0.00**  | 0.00**  | 0.00**  | 0.00** |

Note: \*\* indicates the *p*-value is smaller than 0.01 ; \* indicates the *p*-value is smaller than 0.05.

Regarding *bu*, a significant preference was observed in Grade 6 ( $p < 0.05$ ) and adults ( $p < 0.05$ ), indicating that a stronger preference for *bu* in double negatives among the older group (Grade 6) and adults. By contrast, kindergartners, Grade 2, and Grade 4 did not show significant preferences for *bu* in single and double negatives ( $p > 0.05$ ).



Concerning *mei*, a significant difference was observed in Grade 2, Grade 4, Grade 6, and adults ( $p < 0.01$ ). This result suggests that *mei* in single negatives was more acceptable to most participants, except for kindergartners, who did not exhibit a significant preference for *mei* in single and double negative sentences ( $p > 0.05$ ).

Interestingly, our findings indicate that the acceptability rates of *bu* in single negatives were lower than those in double negatives, while the acceptability rates of *mei* exhibited a reverse tendency. This result can be elucidated by considering the scope of a negator. A closer examination of the test items for *bu* and *mei* in double negative sentences reveals that a double negative structure is derived from one negator, which negates the negative meaning of the other negator (Fan and Xiao 2010). The scope of the first negator *bu* in a double negative extends over the second negator (i.e., *bu*) in IP, as illustrated in the test item.

- (1) [CP[NP Xiaozhu [NegP bu [IP de [NegP bu [VP chi bao.]  
 = Xiaozhu dei chi bao.  
 ‘Piggy must eat until he is full.’ (Q11 taken from the Context-free Task)

Since the first *bu* in (1) c-commands the second negator, it negates the meaning of the second negator and generates an affirmative meaning. Since the negative feature is removed, the statement becomes affirmative. In this case, it is the auxiliary in (1) that is adjacent to *bu*, not the verb. Hence, compatibility with an auxiliary verb and a verb is no longer an issue to be concerned about. By contrast, a test item with *mei* in a double negative sentence like (2) demonstrates that the first negator *mei* has scope over a noun phrase, and the second negator is also within the scope of the first negator. Thus, the two negators negate the negative features of each other to generate an affirmative meaning, as shown in (2).

- (2) [CP[IP[NegP Meiyong [NP ren [NegP mei [VP shuizhao].  
 not-have person not sleep  
 ‘Everyone slept.’ (Q8 taken from the Context-free Task)

However, *mei* in double negatives was less preferred than *bu* in double negatives. This can be explained by the distance between the two negators. The negators of *bu*-

*de-bu*<sup>3</sup> ‘can’t help but’ are in close proximity, whereas those of *meiyou ren mei shuijiao* ‘Everyone slept.’ are at a longer distance. The former has been treated as a chunk by native speakers, while the latter sounds more wordy and awkward to native speakers. Hence, it is more marked.

Regarding the within-group differences between the acceptability of *bu* in single negative sentences and double negative sentences, Grade 2 ( $p > 0.05$ ) and Grade 4 ( $p > 0.05$ ) did not significantly prefer *bu* in double negatives, as adults did ( $p < 0.01$ ). This result can be explained by the complexity of double negatives, which require mental process twice, resulting in children’s late acquisition of double negatives.

Nonetheless, the finding of the present study differs from the results of previous research (Jou 1988; Zhou et al. 2014b). Jou (1988) investigated whether sentence types influenced children’s interpretations of negative sentences and found that children at 7 years old still could not decode the meaning of double negatives. In Zhou et al. (2014b), the results indicated that children at 5-6 years old could interpret double negative sentences as affirmative. However, two negators in double negatives of Jou’s study were more like a fixed expression (i.e., *ta meiyou bu...*) and the test items in Zhou et al.’s study were all in the same pattern ‘*meiyou ren mei...*’ without taking into consideration the compatibility of negators and verb types. Since the test items in the present study were more challenging than those in previous studies, our participants’ performances were different in that Grade 6 started to show a stronger adult-like preference for *bu* and *mei* in negative sentences. They all significantly preferred *bu* in double negatives and *mei* in single negatives.

Our findings suggest that double negatives should be introduced after single negatives due to their structural complexity. Chinese language teachers should provide clear explanations and ample practice opportunities focusing on the usage and comprehension of double negatives to help L2 learners overcome difficulties associated with this linguistic feature. Additionally, understanding children’s preference for specific negators in different contexts, such as *bu* in double negatives and *mei* in single negatives, can inform instructional strategies and materials development. Incorporating

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<sup>3</sup> The present study only discussed *bu-de-bu* and *bu-neng-bu* though there are still other types of double negatives.

activities and materials that reinforce these preferences can enhance L2 learners' engagement and comprehension.

#### 4.3 Contextual Effect

The third research question concerns whether the acceptability rates of *bu* and *mei* will increase when contexts are provided. Figure 7 displays the mean scores of negative sentences in the context-free and context-provided tasks. It was found that the participants' overall acceptability rates of negative sentences in the context-provided task ( $M=2.18$ ) were significantly higher than those in the context-free task ( $M=1.97$ ) ( $p < 0.01$ ).

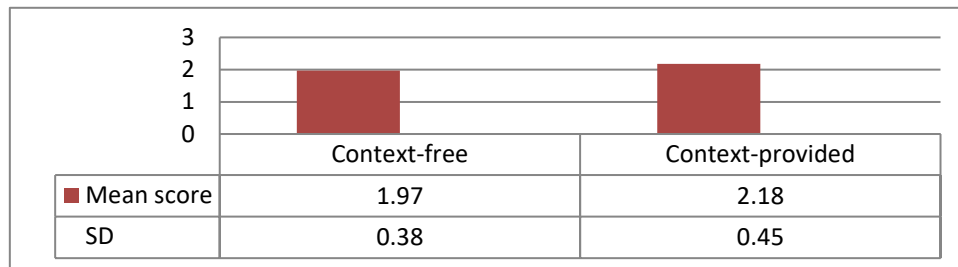


Figure 7: Participants' acceptability rates of negative sentences in the Context-free and Context-provided Tasks

To determine whether the tendency is the same when *bu* and *mei* occur in negative sentences, the participants' overall acceptability rates of *bu* and *mei* in the two tasks are presented in Table 8.

Table 8: Participants' overall acceptability rates of *bu* and *mei* in the Context-free and Context-provided Tasks

| Task<br>Negator | Context-free |      | Context-provided |      | p-value |
|-----------------|--------------|------|------------------|------|---------|
|                 | M            | SD   | M                | SD   |         |
| <i>bu</i>       | 1.99         | 0.35 | 2.19             | 0.41 | 0.00*   |
| <i>mei</i>      | 1.94         | 0.37 | 2.17             | 0.41 | 0.00*   |

Note: \*\* indicates the p-value is smaller than 0.01 ; \* indicates the p-value is smaller than 0.05.

As can be seen in Table 8, the acceptability rates of *bu* and *mei* in the context-provided task ( $bu= 2.19$ ,  $mei= 2.17$ ) were significantly higher than those in the context-

free task ( $bu = 1.99$ ,  $mei = 1.94$ ) ( $p < 0.01$ ). Figures 8 and 9 respectively show each group's acceptability rates of *bu* and *mei* in the two tasks.

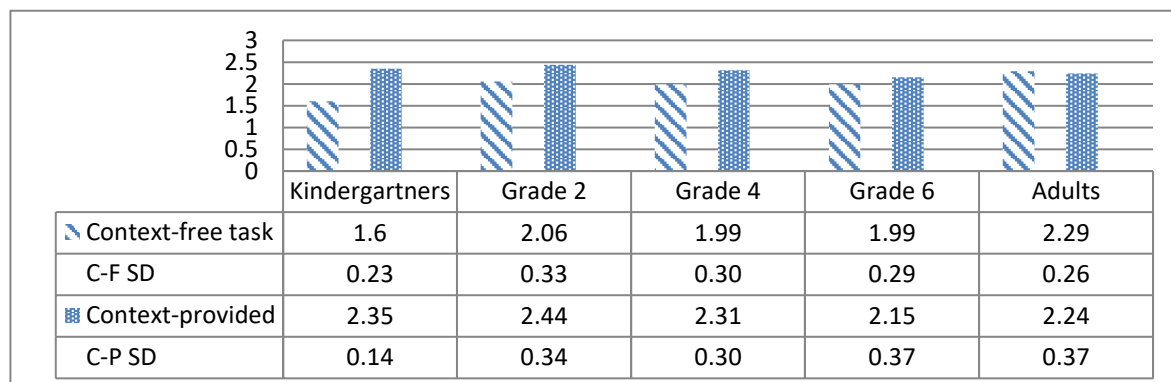


Figure 8: Each group's acceptability rates of *bu* in the Context-free and Context-provided Tasks

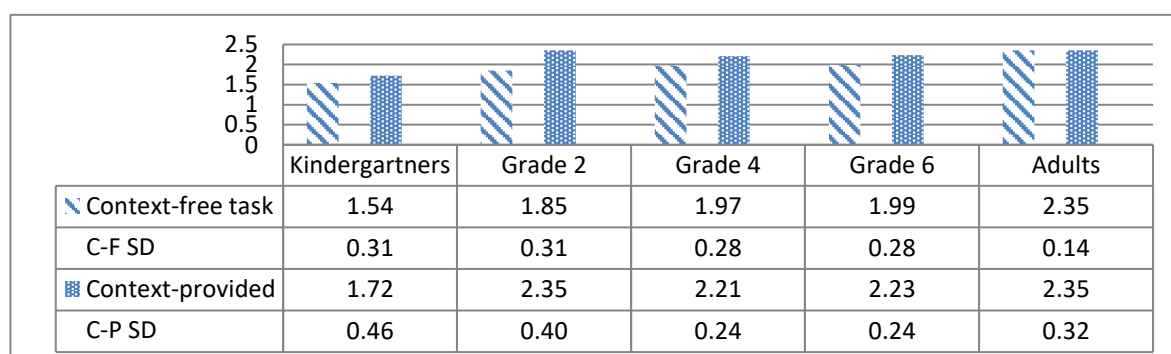


Figure 9: Each group's acceptability rates of *mei* in the Context-free and Context-provided Tasks

In Figure 8, adults marginally favored *bu* in the context-free task ( $M = 2.29$ ) over *bu* in the context-provided task ( $M = 2.24$ ). Conversely, the remaining age groups exhibited a higher acceptance of *bu* in the context-provided task compared to the context-free task (Kindergartners:  $M_{cf} = 1.6 < M_{cp} = 2.35$ , Grade 2:  $M_{cf} = 2.06 < M_{cp} = 2.44$ , Grade 4:  $M_{cf} = 1.99 < M_{cp} = 2.31$ , Grade 6:  $M_{cf} = 1.99 < M_{cp} = 2.15$ ). In Figure 9, the results indicated a similar trend in the acceptability rates of *mei* in the two tasks as observed for *bu*. For adults, contextual clues had no discernible impact on the

interpretation of *mei* in negative contexts (Adults:  $M_{cf} = 2.35 = M_{cp} = 2.35$ ), given their native speaker status and existing understanding of negative concepts.

To present the within-group differences in the acceptability rates of these two negators in the two tasks, the detailed results are provided in Table 8.

Table 9: The *p*-value for the within-group differences between the acceptability rates of *bu* and *mei* in the Context-free and Context-provided Tasks

| Negator    |                 | Kindergartners | Grade 2 | Grade 4 | Grade 6 | Adults |
|------------|-----------------|----------------|---------|---------|---------|--------|
| <i>bu</i>  | <i>t</i>        | -11.56         | -4.54   | -2.86   | -1.78   | 0.54   |
|            | <i>p</i> -value | 0.00**         | 0.00**  | 0.01*   | 0.09    | 0.59   |
| <i>mei</i> | <i>t</i>        | -1.33          | -4.89   | -2.58   | -3.35   | 0.07   |
|            | <i>p</i> -value | 0.20           | 0.00**  | 0.01*   | 0.00**  | 0.94   |

Note: \*\* indicates the *p*-value is smaller than 0.01 ; \* indicates the *p*-value is smaller than 0.05.

Regarding *bu* in negative sentences, a significant difference was observed among Kindergartners, Grade 2 and Grade 4. This suggests that they markedly favored *bu* in negative sentences in the Context-provided Task to a significantly higher degree than in the context-free task (Kindergartner:  $p < 0.01$ , Grade 2:  $p < 0.01$ , Grade 4:  $p < 0.05$ ). However, Grade 6 and the adults did not significantly demonstrate a strong preference for *bu* in the Context-provided Task, even though their acceptability rates were slightly higher than those in the Context-free Task. Concerning *mei* in negative sentences, a significant difference was noted in Grade 2, Grade 4 and Grade 6, indicating that, for these participants, negative sentences with *mei* in the Context-provided Task were more acceptable than those in the Context-free Task (Grade 2:  $p < 0.01$ , Grade 4:  $p < 0.05$ , Grade 6:  $p < 0.01$ ). However, the provision or absence of contexts did not significantly affect the interpretation of negative sentences with *mei* for Kindergartners and adults. This lack of impact can be attributed to the fact that adults had already acquired the concept of negatives. By contrast, Kindergartners still encountered difficulties in interpreting negatives at the sentence level; hence, contexts were not helpful for them.

The impact of context on the interpretation of negative sentences has been explored by previous researchers (deVilliers and Flusberg 1975; Romain 1988; Glenberg et al. 1999; Zhou et al. 2014b). Several studies have suggested that contextual

cues assist children in interpreting sentences, while others present a different perspective. deVilliers and Flusberg (1975) observed that negative sentences were no longer challenging for English-speaking children when contexts were provided. Similarly, Zhou et al. (2014b) found that Mandarin-speaking children did not face significant difficulty in interpreting double negatives when contexts were available. However, contrasting viewpoints exist, with some researchers arguing that contextual cues are unreliable. For instance, Schatz and Baldwin (1986) conducted an experiment to investigate whether contextual clues could help students infer the meanings of unknown words. The results indicated that contexts were not always reliable, as they did not provide sufficient clues for subjects to infer the meanings of low-frequency words. Additionally, contextual clues sometimes failed to assist students in directly accessing word recognition (Swinney 1979).

Our findings suggest that contextual support generally increased the acceptability rates of *bu* and *mei* in negative sentences. Specifically, for Grade 2 and Grade 4, the acceptability rates of *bu* and *mei* in the context-provided task surpassed those in the context-free task. Among Kindergartners, contextual clues significantly raised the acceptability rates of *bu* in negative sentences, while Grade 6 students accepted *mei* more than *bu* when contexts were provided. However, for adults, there was no significant difference in the preference for *bu* or *mei* in negative sentences in the context-provided task.

Several factors may contribute to these results. First, syntactic information may play a role, as sentences with *mei* are infrequent and involve marked expressions, with the two negators at a longer distance. Corpus studies of Mandarin Chinese have shown that *mei* is used less frequently in negation contexts compared to *bu*. Additionally, *mei* often appears in more complex or marked expressions, which are less common in everyday language use. Psycholinguistic studies, such as those by Jurafsky (1996), have shown that infrequent syntactic structures demand more cognitive resources for processing. Consequently, Kindergartners, facing difficulty in interpreting negatives at the sentence level, may still struggle to accept *mei* in negative sentences even with provided contexts. Second, Grade 2 and Grade 4 students, at the concrete operational stage, rely on concrete hints for logical reasoning. Appropriate contexts with pictures offer them concrete clues to interpret negative sentences, potentially increasing their

acceptability rates. Third, for Grade 6, the acceptability rates of *mei* in the context-provided task may not significantly increase because double negatives with two *mei*'s resemble a marked expression for native speakers. Lastly, since adults have already acquired the concept of negatives, contextual influences may not be significant.

Our findings regarding L1 acquisition of Mandarin Chinese negatives, particularly the support for contextual clues in aiding participants' comprehension, underscore crucial implications for teaching L2 Chinese. Chinese language teachers should prioritize the incorporation of contextualized learning activities and materials to enhance learners' understanding and usage of negatives. Drawing from previous research that supports the efficacy of contextual cues in language acquisition, such as DeVilliers & Flusberg (1975), Romain (1988), Glenberg et al. (1999), and Zhou et al. (2014b), teachers can design lessons that provide learners with meaningful contexts for encountering and practicing negative structures. By immersing learners in authentic language situations where negatives are naturally used, teachers can help learners develop a deeper understanding of how negatives function in real-life communication.

## 5. Conclusion

This study focused on children's acquisition of *bu* and *mei* in Mandarin, investigating type, clausal, contextual, and age effects. Key findings include differing verb type preferences for *bu* and *mei*, with Type 2 (activities) being the most favored for both. Double negatives were less accepted than single negatives, particularly for *mei* due to its wordiness. Contextual clues generally increased acceptability rates of negative sentences. Participants' acceptability rates and verb type sensitivities increased with age, showing more adult-like preferences by Grade 4 and enhanced understanding of double negatives by Grade 6.

Based on this research on how Chinese children learn to use single and double negatives, it is recommended that teachers guide L2 Chinese learners through the following steps to understand negating words, as illustrated in Figure 9:

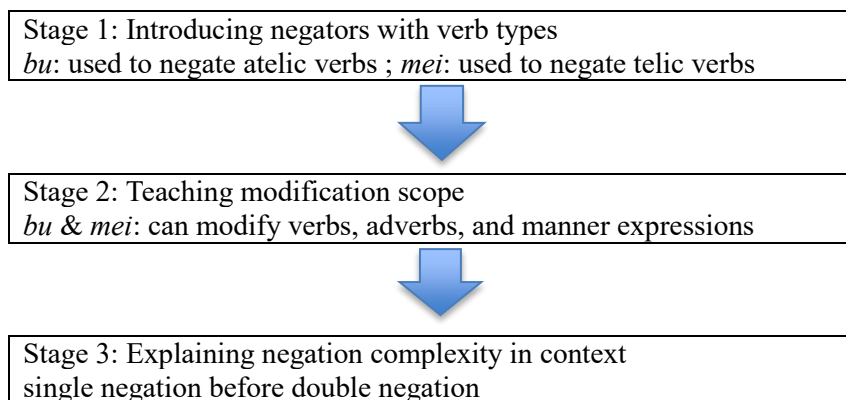


Figure 10: Stages for teaching *bu* and *mei* in Mandarin Chinese<sup>4</sup>

Teachers can instruct students that *bu* and *mei* in Mandarin Chinese can modify not only verbs but also other linguistic elements such as adverbs and manner expressions. Additionally, L2 learners should understand the distinctions between different verb types when choosing between *bu* and *mei*. For example, knowing that *bu* is preferred with atelic verbs and *mei* with telic verbs can help them use negators correctly in their speech and writing. Moreover, single negatives should be introduced before double negatives due to their observed difficulty level. Introducing context can also enhance L2 learners' mastery of negative sentences. Teachers can incorporate contextual learning activities into their lessons to help L2 Chinese learners effectively grasp the appropriate usage of *bu* and *mei* across various contexts.

However, the current research has its limitations, prompting suggested directions for future studies. First, the children in the present study may have had some exposure to Min Taiwanese. This bilingual background could theoretically influence their interpretations of Mandarin structures. However, it is essential to note that the *bu-de-bu* structure in Mandarin Chinese is quite similar to its counterpart in Min Taiwanese. Therefore, any potential interference or facilitation effects would likely be minimal.

<sup>4</sup> Although our study sheds light on the developmental stages of L1-L2 acquisition, it is important to be cautious when applying these findings to broader teaching strategies for L2 learners. We recognize the complexities in identifying effective teaching sequences and methods for L2 learners from diverse L1 backgrounds. The difficulties encountered by L1 children may not exactly match those faced by L2 learners, and it is crucial to acknowledge these distinctions.



Future research may recruit monolingual participants to avoid any potential bias. Second, we did not prompt participants to assess the grammaticality of negative sentences. Recognizing that a low acceptability rate does not necessarily indicate grammatical incorrectness (Otero 1972; Langendoen 1973), future research could investigate the correlation between acceptability and grammaticality by incorporating a grammaticality task. Third, our focus on sentence patterns like *bu...bu* and *mei...mei* excluded other patterns such as *bu...mei* or *mei...bu* due to constraints on test items. Future research may consider incorporating these additional sentence patterns for a more comprehensive exploration of negative structures.

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# 臺灣華語中「不」和「沒」的使用研究： 語言發展觀點

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## 摘要

否定是邏輯中的一個基本概念，因此否定句表達在各語言中皆很常見。否定詞可限定動詞和非動詞元素(如副詞)。本研究透過兩項任務探討兒童對「不」和「沒」在否定句中的接受度。第一項任務評估兒童對「不」和「沒」在孤立否定句中的接受度；第二項任務則提供上下文，以觀察受試者之接受度是否提高。年齡差異在四個組中進行了分析：幼稚園、二年級、四年級和六年級，並以十八名成人為對照組。研究結果顯示，在否定句中習得「不」和「沒」的年齡差異。幼稚園和二年級學童未表現出成年人對不同動詞類型使用「不」和「沒」的偏好。從四年級開始，學童開始顯示出成人般的偏好，傾向將「不」與非完成動詞和「沒」與完成動詞搭配。到六年級，學童在單一否定句和雙重否定句中表現出更強的成人偏好，反映出邏輯推理能力的發展。最後，研究亦發現，提供上下文增加了受試者對否定句的接受度。這些研究結果建議，了解第一語言中否定的發展軌跡可為第二語言中否定的教學策略提供更有效的指導。

**關鍵詞：**母語習得 否定 語境影響 動詞類型