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Requirement of Variable-Introducing Elements on Event Quantification in Chinese: A case study of 每 *měi*–vp sentences

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SENIOR THESIS

Requirement of Variable-Introducing Elements on Event Quantification in Chinese

A case study of 每 *měi*–VP sentences

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Por fim,	eu	agradeço	imensamente	aos	meus	pais		por	todo	o	apoio	que
Lastly,	I	thank	immensurably	to	my	parents	for	all		the	support	that
me	deram	e	pela	liberdade	que	me	concederam	para	explorar	qualquer	um
me	gave	and	for the	freedom	that	me	granted	to	explore	any	one
dos	meus	interesses.
of	my	interests.

4

Overview of the Thesis

In Section 1, we present minimal background on Mandarin Chinese, with focus on the Mandarin Chinese verb phrases, and we introduce a non-exhaustive list of common verb phrase constructions in Mandarin Chinese.

In Section 2, we present minimal background on universal quantification using the universal quantifier 每 *měi* 'every'. We then present the Central Hypothesis under discussion in this thesis, which proposes a necessary condition on the use of 每 *měi* 'every' in verb phrases, the existence of a variable-introducing element in the verb phrase.

In Section 3, we test the Central Hypothesis presented in Section 2 against sentences with and without indefinite expressions in the verb phrase. We test the Central Hypothesis against the non-exhaustive list of common verb phrase constructions in Mandarin Chinese presented in Section 1.

In Section 4, we again test the Central Hypothesis presented in Section 2, but now against sentences with the reflexive pronoun 自己 *zìjǐ* 'self' in the verb phrase. We test the Central Hypothesis against the non-exhaustive list of common verb phrase constructions in Mandarin Chinese presented in Section 1.

In Section 5, we finish the thesis with a general discussion about the topic. We discuss the Central Hypothesis in a broader context, highlight a general question in Chinese syntax and semantics that is relevant for our topic, remark an implication of our findings for the 把 *bǎ* construction related to specificity, and present some ideas for future research.

Disclaimer on Grammaticality Judgments

The grammaticality judgments featured in this thesis are derived from a small group of three native Mandarin Chinese speakers. Notably, there has been significant variation in these judgments. For instance, some speakers have considered certain sentences grammatical, while others have deemed the same sentences ungrammatical. This variation is not limited to new sentences but also extends to some sentences from the literature, where speakers' judgments sometimes conflict with the judgments of the original authors. Furthermore, some speakers have even shown inconsistency with their own judgments over the course of this research.

As someone who is not a native speaker of any Chinese language and has not pursued the study of any Chinese language with the aim of language acquisition, my understanding and interpretation rely heavily on the judgements of native speakers.

As a linguist, my goal is to accurately capture and represent the speakers' judgments, yet I recognize that this variability represents a limitation of my research. Such variability is somewhat anticipated, given that thesis focuses on sentences that, while potentially acceptable, are not necessarily the most commonly used forms in Mandarin Chinese. Despite these limitations, I believe that the discussion offered in this thesis contributes valuable insights into universal quantification in Mandarin Chinese, and more broadly, sheds light on unresolved questions concerning Chinese syntax and semantics.

Interlinear Glossed Text

Throughout this thesis, we use the Leipzig glossing rules to provide interlinear glossed text for Mandarin Chinese sentences. The first line of each example is the original sentence in Chinese characters. The second line is the pinyin romanization of the sentence. The third line is the English gloss of each morpheme or word in the sentence. The second

and third lines are aligned to match the pinyin romanization with the English gloss. The fourth line is a natural-sounding English translation of the sentence.

Chinese characters are not always provided in the cited works, but added here for convenience and consistency. The pinyin romanization is not always provided with tone marks in the cited works, but added here for convenience and consistency. The English gloss might be slightly different from the gloss provided in the cited works, for the sake of consistency and relevance to the discussion in this thesis.

Moreover, grammaticality judgements are recorded by a symbol (or lack thereof) immediately before the first line of each example. The lack of a symbol indicates that the sentence is grammatical, the symbol * indicates that the sentence is ungrammatical, the symbol $^?$ indicates that the sentence is marginally grammatical, and the symbol $^{??}$ indicates that the sentence is marginally ungrammatical.

The following abbreviations are used in the glossed text: N, NP: noun, noun phrase. V, VP: verb, verb phrase. X, XP: arbitrary category, arbitrary phrase. CL: classifier. POSS: possessive marker. LE: perfective aspect marker 了 *le*. BA: 吧 *bǎ*. DOU: 都 *dōu*.

1 Background on Mandarin Chinese and its verbal structure

This thesis examines Mandarin Chinese. Mandarin Chinese is a highly analytic language (Huang, 2014). It doesn't have inflectional morphology, which results in words maintaining a consistent grammatical form. The language does not use grammatical means to express categories like number and tense; but instead there are particles that articulate verbal aspect and mood. The basic word order is subject-verb-object (SOV), as in English (Huang, Li, & Li, 2009).

Mandarin Chinese, akin to other East Asian languages, necessitates the use of classifiers in numeric noun phrases. There's a vast array of specific classifiers for countable nouns, yet in informal contexts, it is common to use the general classifier 个 *gè* as a stand-in for more specific classifiers (Huang, Li, & Li, 2009).

Mandarin Chinese verb phrases are a central topic of this thesis, therefore we provide a brief overview of the structure of Mandarin Chinese verb phrases. This covers the basic structure of verb phrases, the structure of double-object constructions, the structure of verb phrases with verb copying, and the structure of the 把 *bǎ* construction.

1.1 Typical verb phrase structure

In this subsection, we provide a brief overview of the structure of Mandarin Chinese verb phrases, based on Huang, Li, and Li (2009, Chapter 3). The reader is referred to Huang, Li, and Li (2009, Chapter 3) for a detailed analysis of Mandarin Chinese verb

phrases, if they are so inclined.

Consider sentence (1a), which is an example of a typical Mandarin Chinese sentence, and its structure in (1b).

(1) a. 他大声唱民歌。   (Huang, Li, & Li, 2009, p. 77)
         tā dàshēng chàng míngē
         he loud   sing   folk.song
         'He sings folk songs loudly.'

     b.   (Huang, Li, & Li, 2009, p. 78)

```
              VP
            /    \
          NP      V'
          |     /    \
          |   AdvP    V'
          |    |     /   \
          |    |    V     NP
          |    |    |      |
          he  loud sing folk.song
```

Sentence (1a) illustrates the fact that a verb in Chinsese takes its complement in its right, while taking adjuncts in its left. This fact is known as the Phrase Structure Constraint, explicitly stated in Huang (1984). As a result of this branching directionality, one should only expect to find only one constituent to the right of the verb, its complement.

Phrase Structure Constraint. Within a given sentence in Chinese, the head (the verb or VP) may branch to the left only once, and only on the lowest level of the expansion.

(Huang, 1984, p. 54)

1.2 Two apparent post-verbal constituents

1.2.1 Ditransitive verbs

Consider sentence (2a), which is an example of a sentence containing a ditransitive verb.

(2) a. 他递给哥哥一壶酒。   (Huang, Li, & Li, 2009, p. 82)
tā dìgěi   gēge   yī   hú   jiǔ
he pass.give brother one bottle_{CL} wine
'He handed a bottle of wine to his brother.'

b.

```
                vP
          ┌──────┴──────┐
         NP             v'
          │        ┌─────┴─────┐
          │        v          VP
          │        │     ┌─────┴─────┐
          │        │    NP          V'
          │        │     │      ┌────┴────┐
          │        │     │      V        NP
          │        │     │      │         │
         he        v  brother pass.give one bottle wine
```

c.

```
                vP
          ┌──────┴──────┐
         NP             v'
          │        ┌─────┴─────┐
          │        v          VP
          │        │     ┌─────┴─────┐
          │        │    NP          V'
          │        │     │      ┌────┴────┐
          │        │     │      V        NP
          │        │     │      │         │
         he    pass.give brother  t   one bottle wine
```
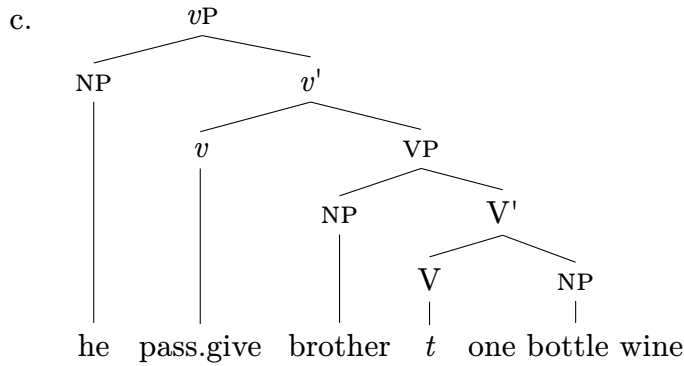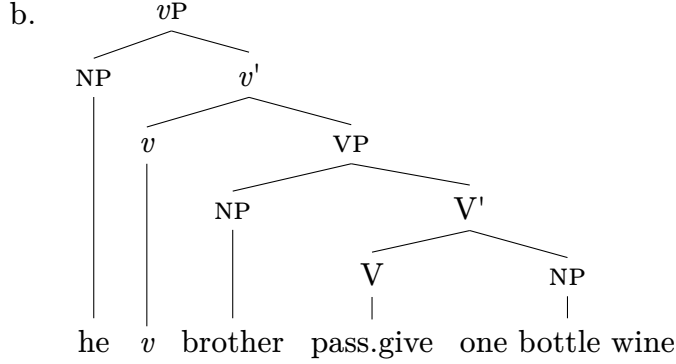
Upon first glance, it appears that the verb *dìgěi* 'to hand' takes two objects: *gēge* 'brother' and *hú* 'bottle'. This potentially violates the generalization that verbs would only have one constituent to their right. However, Huang, Li, and Li (2009) claim that this violation is only apparent.

Huang, Li, and Li (2009) argue, based on Larson (1988), that the verb *dìgěi* 'to pass' moves from a V position to a higher position in the structure, leaving behind a trace. The higher position is the light verb position *v*. The tree in (2b) describes the structure of the sentence in (2a) before the verb *dìgěi* 'to pass' moves, and the tree in (2c) describes the structure of the sentence after the verb *dìgěi* 'to pass' moves. The reader is referred to Huang, Li, and Li (2009, Subsection 3.2.1) for a detailed discussion of the structure

of double-object constructions.

1.2.2 Frequency and duration expressions

A similar behavior is observed with other verbs which are not ditransitive, but the sentence contains a frequency or duration phrase. Consider sentence (3a), which is an example of a sentence containing a verb that is not ditransitive.

(3) a. 他骂了那个人三次。   (Huang, Li, & Li, 2009, p. 95)
       tā mà   le   nà   gè rén   sān   cì
       he scold LE that CL person three time$_{\text{CL}}$
       'He scolded that person three times.'

    b.   vP   inferred from (Huang, Li, & Li, 2009, p. 92)
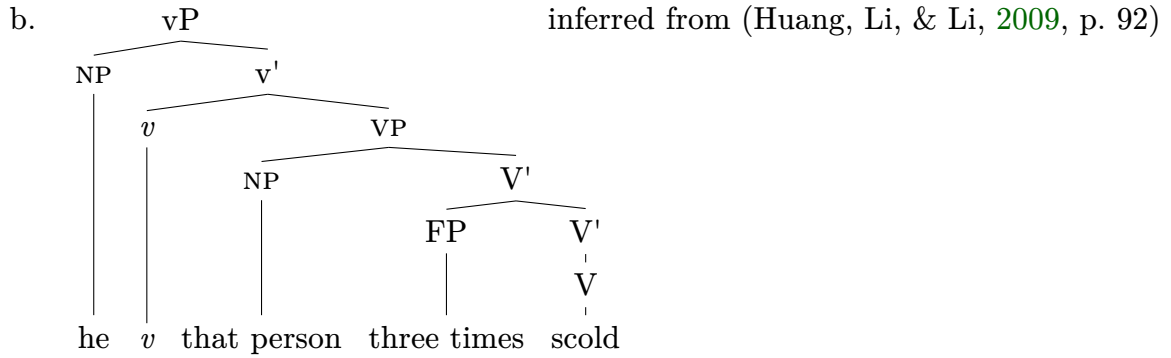
In sentence (3a), there appears to be two constituents to the right of the verb *mà* 'to scold', namely *nà gè rén* 'that person' and *sān cì* 'three times'. However, Huang, Li, and Li (2009) argue that the structure of sentence (3a) is the one shown in (3b)[†], before the verb *mà* 'to scold' moves to the light verb position *v*.

The same structure is observed when duration phrases, such as *liǎng gè xiǎoshí* 'two hours', are used instead of frequency phrases.

[†]FP stands for Frequency Phrase

1.3 The 把 *bǎ* construction

Transitioning from the analysis of v-to-*v* movements, we now turn to the *bǎ* construction in Chinese grammar, as detailed by Huang, Li, and Li (2009, Chapter 5) and others. The reader is reffered to Li (2015) for a basic overview of the *bǎ* construction, and to Huang, Li, and Li (2009) for a detailed analysis of the *bǎ* construction. The *bǎ* construction cannot be comprehensively discussed in this thesis, but we follow Huang (1997), Huang, Li, and Li (2009), and Lin (2001) and employ a simplified analysis that takes *bǎ* as a light verb *v* that takes a VP complement.

Consider the sentences (4b) and (4d), which are examples of the *bǎ* construction, and their non-*bǎ* counterparts (4a) and (4c).

(4) a. 李斯杀了那个坏蛋。 (Huang, Li, & Li, 2009, p. 153)
         Lǐsī shā le nà gè huàidàn
         Lisi kill LE that CL scoundrel
         'Lisi killed that scoundrel.'

     b. 李斯把那个坏蛋杀了。 (Huang, Li, & Li, 2009, p. 153)
         Lǐsī bǎ nà gè huàidàn shā le
         Lisi BA that CL scoundrel kill LE
         'Lisi killed that scoundrel.'

     c. 临沂骑累了马。 (Huang, Li, & Li, 2009, p. 153)
         Línyí qí lèi le mǎ
         Linyi ride tired LE horse
         'Linyi rode a horse and made it tired.' or
         'Linyi became tired from riding a horse.'

     d. 临沂把马骑累了。 (Huang, Li, & Li, 2009, p. 153)
         Línyí bǎ mǎ qí lèi le
         Linyi BA horse ride tired LE
         'Linyi rode a horse and made it tired.'

e.

```
            vP
          /    \
        NP      v'
              /    \
            v       VP
            |      /   \
            BA   NP     V'
                      /    \
                    V      XP
```
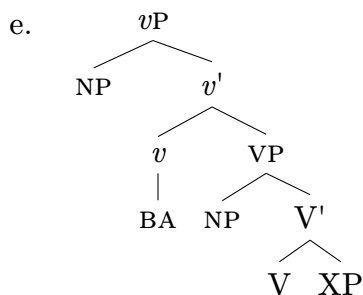
We take the structure of the *bǎ* construction to be the one shown in (4e), similar to the structure in (2b). Note that a distinction between the structures in (4e) and (2b) is that there is no v-to-*v* movement in (4e), since the *v* position is occupied by the overt light verb *bǎ*.

1.4 Verb copying

Now we turn into a different phenomenon in Mandarin Chinese, verb copying. We do not discuss verb copying in detail, but we provide a brief overview of the phenomenon. The reader is referred to Cheng (2015) for a basic overview of verb copying, and to Cheng (2007) for a detailed analysis of verb copying.

In practical terms, verb copying allows a bypassing of the Phrase Structure Constraint, which states that a verb can only take one constituent to its right. The sentences in (5) are examples of verb copying.

(5) a. 他写字写在黑板上。   (Cheng, 2015)
        tā xiě zì   xiě zài hēibǎn   shàng
        he write character write LOC blackboard on
        'He wrote characters on the blackboard.'

    b. 我们走路走到学校。   (Cheng, 2015)
        wǒmen zǒu lù   zǒu dào xuéxiào
        we   walk road walk to   school
        'We walked to school.'

c. 他看书看得很累。 (Cheng, 2015)
tā kàn shū kàn de hěn lèi
he read book read DE very tired
'He is tired from reading.'

d. 我拍手拍了两次。 (Li & Thompson, 1981, p. 443)
wǒ pāi shǒu pāi le liǎng cì
I clap hand clap LE two time$_{CL}$
'I clapped my hands twice.'

e. 他吃饭吃了两个小时。 (Cheng, 2007, p. 153)
tā chī fàn chī le liǎng gè xiǎoshí
he eat rice eat LE two CL hour
'He ate for two hours.'

For example, in sentence (5a), the verb *xiě* 'to write' takes two constituents to its right: *zì* 'character' and *zài hēibǎn shàng* 'on the blackboard'. If both constituents were to be placed to the right of the verb, the sentence would be ungrammatical, violating the PSC. The verb copying construction allows the first verb *xiě* 'to write' to take the verb phrase *zì* 'character' as its complement, and the second verb *xiě* 'to write' to take the locative expression *zài hēibǎn shàng* 'on the blackboard' as its complement.

While we do not discuss verb copying in further detail, we make an observation that will be relevant later. Adverbial phrases or aspectual markers appear with the second verb in the verb copying construction. For example, the aspectual marker *le* in (5d) appears with the second verb *pāi* 'to clap'.

2 The 每–都 *měi–dōu* co-occurrence and the Central Hypothesis

In this section, we present one of the ways in which universal quantification is expressed in Mandarin Chinese, namely the *měi–dōu* co-occurrence. The spotlight of this thesis is a hypothesis proposed by Huang (1996), which we refer to as the Central Hypothesis (see page 21). We introduce and provide the rationale for this hypothesis in this section, akin to Huang (1996). This thesis expands on Huang's work by testing the Central Hypothesis in a wider range of contexts, presented in Sections 3 and 4.

2.1 The *měi*–NP construction

One of the ways to construct universal quantification in Mandarin Chinese is to use the *měi–dōu* co-occurrence. The word *měi* is a quantifier, which is often glossed in the literature as 'every'; we follow this convention in this document. The word *dōu* is an adverb, which is sometimes glossed in the literature as 'all', and other times glossed neutrally as DOU; we follow the latter convention in this document.

There is a lot of discussion in the literature about the *měi–dōu* coocurrence as well as quantification in general in Mandarin Chinese, e.g., Lee (1986) Liu (1990), Cheng (1995), Huang (1996), Lin (1998), Huang (2005), Cheng (2008), Tsai (2015).

Consider sentence (6a), an example of the *měi–dōu* co-occurrence, and sentence (6b), a minimal pair of (6a).

(6) a. 每**一个**学生都毕业了。   (Huang, 1996, p. 2)
          měi   ***yī***   ***gè*** ***xuéshēng*** *dōu* *bìyè*   *le*
          every **one** **CL** **student**   DOU graduate LE
          'Every student graduated.'

      b. *每**学生**都毕业了。
          měi   ***xuéshēng*** *dōu* *bìyè*   *le*
          every **student**   DOU graduate LE
          'Every student graduated.' (intended)

Sentence (6a) displays an example of the *měi–dōu* co-occurrence. In (6a), *měi* is part of the nominal quantifier phrase *měi yī gè xuéshēng* 'every student'. We remark that, empirically, *měi* quantifies over the set of students.

Sentence (6b) shows that *yī gè* 'one CL' is necessary for the sentence to be grammatical. In sentence (6a), the numeral *yī* 'one' is optional, but it is generally accepted that this is due to phonological reasons and it should be present in a syntactic–semantic representation of the sentence. Such constructions in which *měi* is part of a nominal quantifier phrase are called *měi*–NP constructions.

2.2 The *měi*–VP construction

Constructions in which *měi* is part of a verbal quantifier phrase, instead of a nominal quantifier phrase, are called *měi*–VP constructions. Huang (1996) highlights that *měi*--VP constructions are often forgotten in studies about the *měi–dōu* co-occurrence, and offers the first systematic account of the *měi*–VP construction.

Consider sentence (7a), an example of the *měi*–VP construction, and sentence (7b), a minimal pair of (7a).

(7) a. 李四每打王五一**次**，张三都要骂他一顿。
          *Lǐsī měi dǎ Wángwǔ **yī** **cì**,   Zhāngsān dōu yào mà   tā yī   dùn*
          Lisi every hit Wangwu **one time**_{CL}, Zhangsan DOU will scold he one session_{CL}
          'Every time Lisi hits Wangwu, Zhangsan will scold him.'

b. *李四每打王五，张三都要骂他一顿。

Lǐsī měi   dǎ Wángwǔ, Zhāngsān dōu yào mà   tā yī   dùn
Lisi every hit Wangwu, Zhangsan DOU will scold he one session$_{\text{CL}}$
'Every time Lisi hits Wangwu, Zhangsan will scold him.' (intended)

Sentence (7a) displays an example of the *měi*–VP construction. In (7a), *měi* is part of the verbal quantifier phrase *Lǐsī měi dǎ Wángwǔ yī cì* 'every time Lisi hits Wangwu'. Huang (1996) claims that *měi* quantifies over the set of events in which Lisi hits Wangwu.

The ungrammatical sentence (7b) is obtained from (7a) by removing the expression *yī cì* 'one time'. The minimal pair of sentences (7a) and (7b) provides evidence that the expression *yī cì* 'one time' has to play an important role in this construction.

Given that *měi* 'every' is a universal quantifier, it certainly requires a set for which quantification must occur over.

Assumption.   The universal quantifier *měi* requires a set for which quantification occurs over.

Drawing from Chierchia (1998) and Huang (1996), we draw a parallel between the pair of sentences in (6) and the pair of sentences in (7). In both scenarios, nominal in (6) and verbal in (7), the classifier is necessary for making the set available for quantification. In (6), such classifier is *yī gè*; and in (7), such classifier is *yī cì* 'one time'. We collect this observation in the Naïve Hypothesis.

Naïve Hypothesis.   The universal quantifier *měi* requires for the expression it is quantifying over, whether verbal or nominal, to be accompanied by a classifier.

The idea behind the Naïve Hypothesis is that the classifier makes the denotation of the expression to be a set, as required by the Assumption. In the nominal case, the expression would denote a set of individuals, and in the verbal case, the expression would denote a

set of events. In either case, the classifier would be responsible for making the expression into a set, which in turn would be the set for which quantification occurs over.

Consider the sentences in (8). The ungrammatical sentence (8a) is obtained from the grammatical sentence (7a) by changing the referential object *Wángwǔ* to the indefinite object *yī gè rén* `one CL person'. The grammatical sentence (8b) is obtained from the ungrammatical sentence (7b) by the same change.

(8)   a. *李四每打**一个人一次**，张三都要骂他一顿。
        *Lǐsī měi dǎ **yī gè rén   yī cì,**   Zhāngsān dōu yào mà tā yī dùn*
        Lisi every hit **one CL person one time**$_{\text{CL}}$, Zhangsan DOU will scold he one session$_{\text{CL}}$
        'Every time Lisi hits someone, Zhangsan will scold him.' (intended)

       b. 李四每打**一个人**，张三都要骂他一顿。
          *Lǐsī měi dǎ **yī gè rén,**   Zhāngsān dōu yào mà tā yī dùn*
          Lisi every hit **one CL person**, Zhangsan DOU will scold he one session$_{\text{CL}}$
          'Every time Lisi hits someone, Zhangsan will scold him.'

The sentence (8a) has a verbal quantifier phrase accompanied by a classifer, namely *yī cì* 'one time$_{\text{CL}}$', satisfying the conditions of the Naive Hypothesis, but (8a) is ungrammatical. One might think that the fact that sentence (8a) is ungrammatical while satisfying the conditions of the Naive Hypothesis is evidence against the Naive Hypothesis. However, we can attribute the ungrammaticality of sentence (8a) to the fact that its non-*měi* counterpart, sentence (9a), is also ungrammatical, unrelated to the Naive Hypothesis.

(9)   a. *李四打了**一个人一次**。
        Lǐsī dǎ le yī gè rén   yī cì
        Lisi hit LE **one CL person one time**$_{\text{CL}}$
        'Lisi hit someone one time.' (intended)

       b. 李四打了**一个人**。
          Lǐsī dǎ le yī   gè rén
          Lisi hit LE **one CL person**
          'Lisi hit someone.'

An attentive reader might question whether sentence (9a) is the correct counterpart of sentence (8a), given the presence of perfective aspect marker *le*, which is not part of sentence (8a). To address this concern, we present the grammatical sentence (9b). Since the only difference between sentences (9a) and (9b) is the presence of the indefinite expression *yī cì* 'one time', we can conclude that the ungrammaticality of the non-*měi* sentence (9a) is due to the presence of the indefinite expression *yī cì* 'one time', and hence unrelated to the Naive Hypothesis (or to any other hypothesis about the *měi* presented in this section).

Explaining the ungrammaticality of sentence (9a) is beyond the scope of this thesis, and I believe that this is an open question in the literature. Subsection 5.2 provides further discussion on sentence (9a) and similar sentences, exposing the challenge in explaining their grammaticality judgments.

However, we claim that the Naive Hypothesis does not account for the data in (8b). Before we present our argument, we first argue that *měi* is quantifying over the events denoted by the verbal phrase, and not over the individuals denoted by the nominal phrase *yī gè rén* 'one person'. Huang (1996) provides syntactic arguments to dismiss the possibility that *měi* is quantifying over *yī gè rén* 'one person'. We do not reproduce these arguments here, but instead we provide a semantic argument to dismiss this possibility.

One piece of evidence that *měi* is not quantifying over *yī gè rén* 'one person' is that sentence (10a) is not an appropriate translation of (8b). In particular, sentence (8b) entails (10b), while sentence (10a) does not entail (10b).

(10) a. For every person that Lisi hits, Zhangsan will scold him.
      b. If Lisi hits Wangwu four times, Zhangsan will scold him four times.

Therefore, we conclude that *měi* is quantifying over the events denoted by the verbal phrase. With this in mind, we can now present our argument against the Naive

Hypothesis.

The sentence (8b) does not have a verbal quantifier phrase accompanied by a classifier, not satisfying the conditions of the Naive Hypothesis, but (8b) is grammatical. Although sentence (8b) has a classifier, namely *yī gè*, this classifier is a classifier for *rén* 'person', and not the verbal phrase. Consequently, the Naive Hypothesis is problematic because it does not account for the data in (8b).

2.3 Central Hypothesis

With the Naive Hypothesis being problematic with respect to the pair of sentences in (8), we present the Central Hypothesis, proposed by Huang (1996, p. 178), following her observation that all examples of *měi*–VP had an indefinite expression in the verbal quantifier phrase.

Huang (1996, p. 78) claims that, in the context of *měi*–VP constructions, the universal quantifier *měi* requires an indefinite expression or other variable-introducing element in the verb phrase. It is important to note that indefinite expressions are variable-introducing elements, as claimed by Huang (1996), who follows Heim (1982) and Kamp (1981) on this matter.

We begin a discussion about the precise constituent in which the Central Hypothesis requires a variable-introducing element by considering the sentences in (11).

(11) a. 李四每打**一个人**，张三都要骂他一顿。 (same as 8b)
      *Lǐsī měi dǎ **yī gè rén,** Zhāngsān dōu yào mà tā yī dùn*
      Lisi every hit **one CL person**, Zhangsan DOU will scold he one session_{CL}
      'Every time Lisi hits someone, Zhangsan will scold him.'

    b. *__一个人__每打李四，张三都要骂他一顿。
      ***yī gè rén měi dǎ Lǐsī** Zhāngsān dōu yào mà tā yī dùn*
      one CL person every hit Lisi Zhangsan DOU will scold he one session_{CL}
      'Every time someone hits Lisi, Zhangsan will scold him.' (intended)

c. 每**一个**学生都毕业了。 (same as 6a)
měi **yī** **gè** **xuéshēng** *dōu* *bìyè* *le*
every **one** **CL** **student** DOU graduate LE
'Every student graduated.'

The grammaticality of sentence (11a) indicates that the complement of the verb under quantification should be part of the constituent in which the Central Hypothesis requires a variable-introducing element. The ungrammaticality of sentence (11b) indicates that the subject of the sentence, that is, the specifier[†] of the verb under quantification should not be part of the constituent in which the Central Hypothesis requires a variable-introducing element. Finally, the grammaticality of sentence (11c) indicates that the head of a nominal phrase under quantification should be part of the constituent in which the Central Hypothesis requires a variable-introducing element.

We can achieve this by requiring a variable-introducing element in the maximal projection of the verb or noun under quantification excluding its specifier or, equivalently, the highest intermediate projection of the verb or noun under quantification.

We collect this observation in the Central Hypothesis, which improves on Huang (1996, p. 178) by providing a more precise description of the constituent in which the requirement is satisfied.

Central Hypothesis. The universal quantifier *měi* requires the existence of a variable-introducing element in the highest intermediate projection of the verb or noun under quantification.

We observe that the Central Hypothesis accounts for all sets of data in (6)–(8).

In sentence (6a), the universal quantifier *měi* quantifies over the nominal phrase *yī gè xuéshēng* 'one CL student', which is an indefinite expression; hence the Central Hypothesis

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[†]This thesis (and the cited literature) draws trees assuming the internal subject hypothesis, which is the hypothesis that the subject of a sentence is the specifier of the main verb (or the specifier of the light verb v).

correctly predicts that sentence (6a) is grammatical. In sentence (6b), the universal quantifier *měi* quantifies over the nominal phrase *xuéshēng* 'student', which does not contain a variable-introducing element; hence the Central Hypothesis correctly predicts that sentence (6b) is ungrammatical.

In sentence (7a), the universal quantifier *měi* quantifies over the verbal phrase *dǎ Wángwǔ yī cì* 'hit Wangwu one time', which contains the indefinite expression *yī cì* 'one time'; hence the Central Hypothesis correctly predicts that sentence (7a) is grammatical. In sentence (7b), the universal quantifier *měi* quantifies over the verbal phrase *dǎ Wángwǔ* 'hit Wangwu', which does not contain a variable-introducing element; hence the Central Hypothesis correctly predicts that sentence (7b) is ungrammatical.

In sentence (8b), the universal quantifier *měi* quantifies over the verbal phrase *dǎ yī gè rén* 'hit one CL person', which contains the indefinite expression *yī gè rén* 'one CL person'; hence the Central Hypothesis correctly predicts that sentence (8b) is grammatical.

Interestingly, Huang (1996) phrases the Central Hypothesis in terms of *variable-introducing elements* although all of her examples have indefinite expressions, which are variable-introducing elements. We have seen that indefinite expressions are variable-introducing elements, but there are also other expressions with this property, and notably, the reflexive pronoun *zìjǐ* 'self' is a variable-introducing element, as claimed by Huang (1996).[†]

Consider sentence (12), an example of the *měi*–VP construction with the reflexive pronoun *zìjǐ* 'self'.

(12)　张三每看到**自己的倒影**，都会哭。
　　　*Zhāngsān měi　kàndào **zìjǐ de　　dàoyǐng,**　dōu huì kū*
　　　Zhangsan every see　　**self POSS reflection**, DOU will cry
　　　'Every time Zhangsan sees his own reflection, he cries.'

[†]Huang (1996) claims that the reflexive pronoun *zìjǐ* 'self' is a variable-introducing element in a different context than the context of *měi*–VP constructions.

Since the reflexive pronoun *zìjǐ* 'self' is a variable-introducing element, Central Hypothesis correctly predicts that sentence (12) is grammatical. Therefore, sentence (12) provides further evidence for the Central Hypothesis, and in particular for the generalization that the Central Hypothesis is not restricted to indefinite expressions but to variable-introducing elements in general.

In the next two sections, we will test the Central Hypothesis in the context of the *měi*–VP construction with indefinite expressions and the *měi*–VP construction with the reflexive pronoun *zìjǐ* 'self', respectively.

3 Testing the Central Hypothesis in sentences with indefinite expressions

In Section 2, we presented the Central Hypothesis that says that the presence of a variable-introducing element in a sentence is a necessary condition for quantification by *měi*. In this section, we will systematically test this hypothesis by examining the grammaticality of sentences where the verbal phrase in the *měi*–VP construction is more complex than the sentences investigated in Section 2. Moreover, in this section, we will exclusively examine sentences where the variable-introducing element is an indefinite expression.

In particular, we will examine *měi*–VP constructions with: single objects, double objects, verb copying, and the *bǎ* construction. The non-*měi* counterparts of these kinds of sentences are introduced in Section 1.

3.1 Typical verb phrase

A typical verb phrase in Chinese has a single verb, optionally followed by one post-verbal constituent as its complement. The grammaticality of *měi*–VP constructions with either no post-verbal constituents or just one was studied in Huang (1996), and they are the motivation for the Central Hypothesis.

The Central Hypothesis predicts that *měi*–VP constructions with zero post-verbal constituents are always ungrammatical — since it doesn't contain any variable-introducing

element — and that *měi*–VP constructions with one post-verbal constituent are only grammatical when such constituent contains a variable-introducing element.

For completeness, we reproduce and explain below two examples from Huang (1996), and we refer the reader to Huang (1996) for more examples of grammatical and ungrammatical *měi*–VP constructions with zero and one post-verbal constituents.

Consider the sentences in (13).

(13) a. 他每写完**一篇文章**，我都请他大吃一顿。 (Huang, 1996, p. 178)
         *tā měi xiě wán **yī piān wénzhāng,** wǒ dōu qǐng tā dà chī yī dùn*
         he every write finish **one CL article,** I DOU treat him big eat one meal_CL
         'Every time he finishes writing an article, I treat him to a hearty meal.'

     b. *他每写完**文章**，我都请他大吃一顿。
         *tā měi xiě wán **wénzhāng,** wǒ dōu qǐng tā dà chī yī dùn*
         he every write finish **article,** I DOU treat him big eat one meal_CL

     c. *他每写完**那篇文章**，我都请他大吃一顿。
         *tā měi xiě wán **nà piān wénzhāng,** wǒ dōu qǐng tā dà chī yī*
         he every write finish **that CL article,** I DOU treat him big eat one
         dùn
         meal_CL

In (13a), the verb *xiě wán* 'write finish' in the *měi*–VP construction is followed by a single post-verbal constituent, the indefinite expression *yī piān wénzhāng* 'an article'. Therefore, since the verb phrase contains a variable-introducing element, the Central Hypothesis correctly predicts that the sentence is grammatical. In (13b) and (13c), the verb *xiě wán* 'write finish' is followed by a definite expression, *wénzhāng* 'article'[†] in (13b) and *nà piān wénzhāng* 'that article' in (13c). Therefore, since the verb phrase contains no variable-introducing elements, the Central Hypothesis correctly predicts that both sentences are ungrammatical. The analyses of (13a) and (13b–c) are analogous, respectively, to the analyses of (8b) and (7b) in Section 2.

[†]Unlike English, bare NPs in Chinese are referential (Chierchia, 1998).

Now, consider the sentences in (14).

(14)   a.   他每病**一场**，他妈妈都要病一场。   (Huang, 1996, p. 179)
            *tā měi   bìng **yī   chǎng,**   tā   māma   dōu   yào bìng yī   chǎng*
            he every sick **one session**_{CL,} his mother DOU will sick one session_{CL}
            'Every time he gets sick, his mother gets sick.'

       b. *他每病，他妈妈都要病一场。   (Huang, 1996, p. 179)
            tā měi   bìng, tā   māma   dōu   yào bìng yī   chǎng
            he every sick, his mother DOU will sick one session_{CL}

       c. *他每病，他妈妈都要病。
            tā měi   bìng, tā   māma   dōu   yào bìng
            he every sick, his mother DOU will sick

In (14a), the verb *bìng* 'sick' in the *měi*–VP construction is followed by a single post-verbal constituent, the indefinite expression *yī chǎng* 'one session'. Therefore, since the sentence contains a variable-introducing element, the Central Hypothesis correctly predicts that the sentence is grammatical. However, in (14b) and (14c), the verb *bìng* 'sick' is not followed by any post-verbal constituents, and therefore, the verbal phrase contains zero variable-introducing elements. The Central Hypothesis correctly predicts that the sentences are ungrammatical.

3.2 Two apparent post-verbal constituents

An important question is whether the Central Hypothesis can be extended to sentences with two post-verbal constituents. Although Chinese verbs do not allow double post-verbal constituents, one of the ways of obtaining "apparent" double post-verbal constituents is by employing a light verb *v*.

We refer to Subsection 1.2 for the use of light verbs in the non-*měi* counterparts of the sentences described in this section.

3.2.1 Frequency and duration expressions

The example for this subsection is the first one to be tested against the Central Hypothesis in Section 2, namely (7a). For completeness, we reproduce it here in (15).

(15)　李四每打王五**一次**，张三都要骂他一顿。　　　　　　　　　　(same as 7a)
　　　　*Lǐsī měi dǎ Wángwǔ **yī cì,**　 Zhāngsān dōu yào mà tā yī dùn*
　　　　Lisi every hit Wangwu **one time**$_{\text{CL}}$, Zhangsan DOU will scold he one session$_{\text{CL}}$
　　　　'Every time Lisi hits Wangwu, Zhangsan will scold him.'

Sentence (7a), reproduced above as sentence (15), is analyzed in Section 2 as containing one variable-introducing element; and therefore the Central Hypothesis correctly predicts that the sentence is grammatical.

The analogous sentence (8a), reproduced below as (16), is analysed in Section 2 and its ungrammaticality is attributed to a reason unrelated to the Central Hypothesis. We refer the reader to page 18 for the discussion.

(16) *李四每打**一个人一次**，张三都要骂他一顿。　　　　　　　　(same as 8a)
　　　　*Lǐsī měi dǎ **yī gè rén**　 **yī cì,**　 Zhāngsān dōu yào mà tā yī dùn*
　　　　Lisi every hit **one CL person one time**$_{\text{CL,}}$ Zhangsan DOU will scold he one session$_{\text{CL}}$
　　　　'Every time Lisi hits someone, Zhangsan will scold him.' (intended)

3.2.2 Ditransitive verbs

A ditransitive verb such as *gěi* 'give' or *dìgěi* 'hand over' can be used to introduce two objects. In this subsection, we will examine the grammaticality of *měi*–VP constructions with such verbs.

The sentences in (17) display non-*měi* sentences using the verb *dìgěi* 'hand over' to demonstrate that such constructions are grammatical.

(17) a. ?他递给哥哥笛子。
      tā dìgěi   gēge   dízi
      he pass.give brother flute
      'He handed the flute to his brother.'

    b. 他递给哥哥那支笛子。
      tā dìgěi   gēge   nà   zhī dízi
      he pass.give brother that CL flute
      'He handed that flute to his brother.'

    c. 他递给哥哥一支笛子。
      tā dìgěi   gēge   yī   zhī dízi
      he pass.give brother one CL flute
      'He handed a flute to his brother.'

    d. ?他递给一个人笛子。
      tā dìgěi   yī gè rén   dízi
      he pass.give one CL person flute
      'He handed the flute to a person.'

    e. 他递给一个人那支笛子。
      tā dìgěi   yī gè rén   nà   zhī dízi
      he pass.give one CL person that CL flute
      'He handed that flute to a person.'

    f. 他递给一个人一支笛子。
      tā dìgěi   yī gè rén   yī   zhī dízi
      he pass.give one CL person one CL flute
      'He handed a flute to a person.'

The reader should note that the presence or absence of indefinite expressions does not change the grammaticality of the sentences — they are all grammatical.[†]

Now, consider the sentences in (18), which display *měi*–VP constructions using the verb *dìgěi* 'hand'.

(18) a. *他每递给**哥哥笛子**，他都想要收回来。
      *tā měi dìgěi   **gēge**   **dízi,** tā dōu xiǎngyào shōuhuílai*
      he every pass.give **brother flute,** he DOU want   get.back

---

[†]Although (17a) and (17d) are not as acceptable as the others, this is not because of the presence of indefinite expressions, as evidenced by the grammaticality of (17b) and (17e).

b. *他每递给**哥哥那支笛子**，他都想要收回来。
  *tā měi dìgěi **gēge nà zhī dízi,** tā dōu xiǎngyào shōuhuílai*
  he every pass.give **brother that** CL **flute,** he DOU want　get.back

c. 他每递给**哥哥一支笛子**，他都想要收回来。
  *tā měi dìgěi **gēge yī zhī dízi,** tā dōu xiǎngyào shōuhuílai*
  he every pass.give **brother one** CL **flute,** he DOU want　get.back
  'Every time he handed a flute to his brother, he wanted to get it back.'

d. ?? 他每递给**一个人笛子**，他都想要收回来。
  *tā měi dìgěi **yī gè rén dízi,** tā dōu xiǎngyào shōuhuílai*
  he every pass.give **one** CL **person flute,** he DOU want　get.back
  'Every time he handed the flute to a person, he wanted to get it back.'

e. ?? 他每递给**一个人那支笛子**，他都想要收回来。
  *tā měi dìgěi **yī gè rén nà zhī dízi,** tā dōu xiǎngyào shōuhuílai*
  he every pass.give **one** CL **person that** CL **flute,** he DOU want　get.back
  'Every time he handed that flute to a person, he wanted to get it back.'

f. 他每递给**一个人一支笛子**，他都想要收回来。
  *tā měi dìgěi **yī gè rén yī zhī dízi,** tā dōu xiǎngyào shōuhuílai*
  he every pass.give **one** CL **person one** CL **flute,** he DOU want　get.back
  'Every time he handed a flute to a person, he wanted to get it back.'

The Central Hypothesis correctly predicts that the sentences (18a) and (18b) are ungrammatical, since they do not contain a variable-introducing element; and it also correctly predicts that the sentence (18c) is grammatical, since it contains a variable-introducing element.

Interestingly, one might believe that the Central Hypothesis incorrectly predicts the grammaticality of sentences (18d) and (18e). The sentences contain one variable-introducing element, namely the indefinite expression *yī gè rén* 'one person', hence the Central Hypothesis predicts that they are grammatical. Nevertheless, the sentences (18d) and (18e) are ungrammatical.

However, the argument above is an incorrect application of the Central Hypothesis. Let's recall the precise statement of the Central Hypothesis.

Central Hypothesis. The universal quantifier *měi* requires the existence of a variable-introducing element in the highest intermediate projection of the verb or noun under quantification. (repeated from page 21)

For conciseness, we provide the argument for the ungrammaticality of (18e) only, since the argument for (18d) is analogous.

As described in Subsection 1.2, the sentence (18e) is derived via V-to-*v* movement. The tree in (19) shows the general structure of sentences with V-to-*v* movement, with the remark that some nodes might be empty or omitted in their actual structure. The tree in (20) shows the structure of the non-*měi* counterpart of (18e), the sentence (17e). Note that *yī gè rén* 'one person' occupies the NP2 position and *nà zhī dízi* 'that flute' occupies the NP3 position.

(19)

$$
\begin{array}{c}
v\text{P} \\
\quad NP1 \quad v' \\
\qquad v \quad VP \\
\qquad\quad NP2 \quad V' \\
\qquad\qquad XP \quad V' \\
\qquad\qquad\quad V \quad NP3
\end{array}
$$

(20)

$$
\begin{array}{c}
v\text{P} \\
\quad NP1 \quad v' \\
\qquad v \quad VP \\
\qquad\quad NP2 \quad V' \\
\qquad\qquad V \quad NP3
\end{array}
$$

he   one person   give   that flute
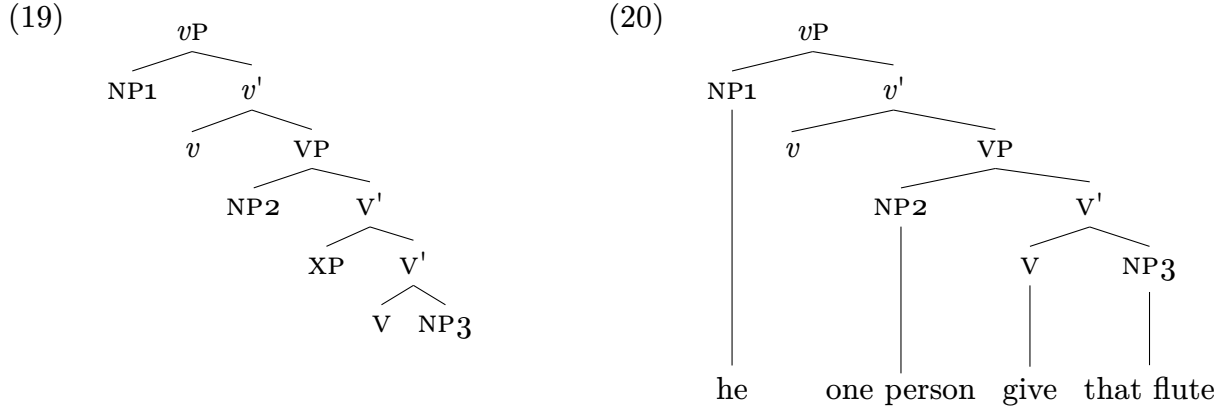
In order for the Central Hypothesis to correctly predict the ungrammaticality of (18e), the highest intermediate projection of the verb under quantification must not contain any variable-introducing element. In (20), the highest intermediate projection *v'* contains the NP2 position, which is occupied by the variable-introducing element *yī gè rén* 'one person'. However, the highest intermediate projection V' does not contain any variable-introducing element — in particular, it does not contain *yī gè rén* 'one person' in the

NP2 position. Therefore, in order for the Central Hypothesis to correctly predict the ungrammaticality of (18e), the verb under quantification must be the verb V, and not the light verb v.

There are many ways to implement the preference for quantifying over the verb V instead of the light verb v in ditransitive sentences, but we choose to implement the following hypothesis in order to correctly predict the ungrammaticality of (18e).

Overt Quantified Head Hypothesis. The head of the expression under quantification must be overt.

Since the light verb v is not overt, the Overt Quantified Head Hypothesis indicates that the verb under quantification is the verb V. Consequently, the Central Hypothesis correctly predicts the ungrammaticality of (18e) since there are no variable-introducing elements in the highest intermediate projection V'.

The analysis above only holds if the Central Hypothesis is checked in the deep structure of the sentence, and we collect this additional hypothesis in the following statement.

Pre-Movement Verification Hypothesis. The requirement of the Central Hypothesis is checked before movements (in particular, V-to-v movements).

For the last sentence in the dataset (18), namely (18f), the Central Hypothesis correctly predicts that it is grammatical, since the highest intermediate projection V' contains the variable-introducing element *yī zhī dízi* 'one flute' in the NP3 position.

Before we move on, it is important to check these additional hypothesis against the sentences with frequency expressions from Subsection 3.2.1, since they also feature V-to-v movement. Consider the *měi*–VP sentence (7a), reproduced below as (21a), and its non-*měi* counterpart (21b).

(21) a. 李四**每**打**王五一次**, 张三都要骂他一顿。 (same as 7a)
      *Lǐsī **měi** dǎ **Wángwǔ yī cì**, Zhāngsān dōu yào mà tā yī dùn*
      Lisi **every** hit **Wangwu one time**$_{\text{CL}}$, Zhangsan DOU will scold he one session$_{\text{CL}}$
      'Every time Lisi hits Wangwu, Zhangsan will scold him.'

    b. 李四打了**王五一次**。
      *Lǐsī dǎ le **Wángwǔ yī cì***
      Lisi hit LE **Wangwu one time**$_{\text{CL}}$
      'Lisi hit Wangwu once.'

As described in Subsection 1.2, sentence (21a) is derived via V-to-v movement, whose general structure is shown in (19). The tree in (22) shows the structure of the non-*měi* counterpart of (21a), the sentence (21b). Note that *Wángwǔ* 'Wangwu' occupies the NP**2** position and *yī cì* 'one time' occupies the XP position.
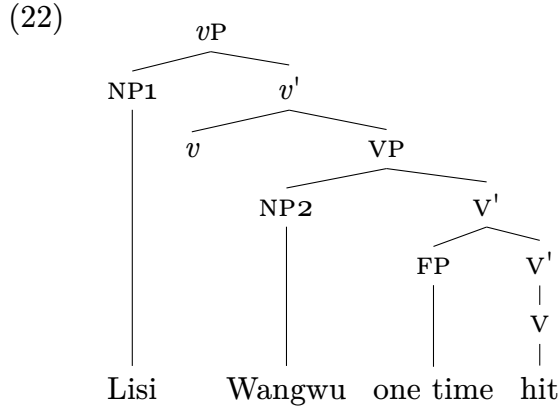
(22)

Since the light verb v is not overt, the Overt Quantified Head Hypothesis indicates that the verb under quantification is the verb V. The Pre-Movement Verification Hypothesis indicates that the requirement of the Central Hypothesis must be checked in the pre-movement structure. Finally, the Central Hypothesis correctly predicts the grammaticality of (21a), since the highest intermediate projection V′ contains the variable-introducing element *yī cì* 'one time' in the XP position.

In general, since the XP position is under both highest intermediate projections v′ and V′, the predictions of the Central Hypothesis are the same for sentences with frequency

expressions, regardless of whether the verb under quantification is the light verb v or the verb V.

Therefore, adding the Overt Quantified Head Hypothesis and the Pre-Movement Verification Hypothesis as additional hypotheses on top of the Central Hypothesis allows us to correctly predict the grammaticality of *měi*–VP constructions with ditransitive verbs. Moreover, it does not affect the correct predictions of the Central Hypothesis for sentences with frequency expressions, as desired.

3.3 Verb copying

The next type of sentences that we will examine are those containing verb copying. The mechanism of verb copying is another way of obtaining two constituents in the verb phrase. We refer to Subsection 1.4 for the use of verb copying in the non-*měi* counterparts of the sentences described in this section.

We will divide the sentences with verb copying into three groups based on the type of postverbal adverbial constituent they contain: frequency or duration expressions, directional or locative expressions, and resultative expressions.

3.3.1 Frequency and duration expressions

Consider the sentences in (23), using the verb *pāi* 'clap' and the frequency expression *liǎng cì* 'two times'.

(23) a. 我拍手拍了**两次**。   (Li & Thompson, 1981, p. 443)
          *wǒ pāi shǒu pāi le **liǎng cì***
          I   clap hand clap LE **two   time**_CL
          'I clapped my hands twice.'

     b. *我**每**拍手拍**两次**，灯都会亮起来。
          *wǒ **měi**   pāi shǒu pāi **liǎng cì,**   dēng dōu huì liàng qǐlai*
          I   **every** clap hand clap **two   time**_CL, lamp DOU will light up

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c. 我拍手**每拍两次**，灯都会亮起来。
*wǒ pāi shǒu **měi** pāi **liǎng cì**, dēng dōu huì liàng qǐlai*
I clap hand **every** clap **two** **time**<small>CL</small>, lamp DOU will light up
'Every time I clap my hands twice, the lamp lights up.'

Sentence (23a) displays a non-*měi* sentence using the verb *pāi* 'clap' to demonstrate a grammatical use of verb copying with frequency expressions, as we have seen in Subsection 1.4. The frequency expression *liǎng cì* 'two times' is part of the complement of the second copy of the verb *pāi* 'clap'.

In (23b), the quantifier *měi* is placed before the first copy of the verb *pāi* 'clap', and yields an ungrammatical sentence. This sentence is ungrammatical because the preverbal adverb *měi* is not in the position where preverbal adverbs are placed under verb copying, unrelated to the Central Hypothesis. Refer to the discussion in Subsection 1.4.

In (23c), the quantifier *měi* is placed before the second copy of the verb *pāi* 'clap' — the position where preverbal adverbs are placed under verb copying. Moreover, the Central Hypothesis correctly predicts that the sentence is grammatical, considering that the indefinite adverbial expression *liǎng cì* 'two times' is the only variable-introducing element in the clause.

For duration expressions, the same pattern is observed. Consider the sentences in (24), using the verb *chī* 'eat' and the duration expression *liǎng gè xiǎoshí* 'two hours'.

(24) a. 他吃饭吃了**两个小时**。   (Cheng, 2007, p. 153)
*tā chī fàn chī le **liǎng gè xiǎoshí***
he eat rice eat LE **two** **CL** hour
'He ate for two hours.'

b. *他**每**吃饭吃**两个小时**，都要喝三杯水。
*tā **měi** chī fàn chī **liǎng gè xiǎoshí**, dōu yào hē sān bēi shuǐ*
he **every** eat rice eat **two** **CL** hour, DOU will drink three cup water

c. 他吃饭**每**吃**两个小时**，都要喝三杯水。
*tā chī fàn **měi** chī **liǎng gè xiǎoshí**, dōu yào hē sān bēi shuǐ*
he eat rice **every** eat **two** **CL** hour, DOU will drink three cup water

'Every time he eats for two hours, he drinks three cups of water.'

Sentence (24a) displays a non-*měi* sentence using the verb *chī* 'eat' to demonstrate a grammatical use of verb copying with duration expressions. The duration expression *yī gè xiǎoshí* 'one hour' is the complement of the second copy of the verb *chī* 'eat'.

In (24b) is ungrammatical because of the position of the preverbal adverb *měi* in relation to the verb copying construction.

In (24c), the quantifier *měi* is placed before the second copy of the verb — the position where preverbal adverbs are placed under verb copying. Moreover, the Central Hypothesis correctly predicts that the sentence is grammatical, considering that the indefinite adverbial expression *yī gè xiǎoshí* 'one hour' is the only variable-introducing element in the clause.

3.3.2 Directional and locative expressions

Consider the sentences in (25), using the verb *zǒu* 'walk' and the directional expression *dào xuéxiào* 'to school'.

(25) a. 我们走路走到**学校**。 (Cheng, 2015)
         *wǒmen zǒu   lù   zǒu   dào **xuéxiào***
         we   walk road walk to   **school**
         'We walked to school.'

     b. *我们**每**走路走到**学校**，都会看到一只狗。
         *wǒmen **měi**   zǒu   lù   zǒu   dào **xuéxiào,** dōu huì kànjiàn yī   zhī gǒu*
         we   **every** walk road walk to   **school,** DOU will saw   one CL   dog

     c. *我们走路**每**走到**学校**，都看到一只狗。
         *wǒmen zǒu   lù   **měi**   zǒu   dào **xuéxiào,** dōu huì kànjiàn yī   zhī gǒu*
         we   walk road **every** walk to   **school,** DOU will saw   one CL   dog

     d. *我们**每**走路走到**一个公园**，都看到一只狗。
         *wǒmen **měi**   zǒu   lù   zǒu   dào **yī   gè gōngyuán,** dōu huì kànjiàn yī   zhī gǒu*
         we   **every** walk road walk to   **one CL park,**   DOU will saw   one CL   dog

e. 我们走路**每**走到**一个公园**，都看到一只狗。
*wǒmen zǒu lù **měi** zǒu dào **yī gè gōngyuán,** dōu huì kànjiàn yī zhī gǒu*
we walk road **every** walk to **one CL park,** DOU will saw one CL dog
'Every time we walked to a park, we saw a dog.'

Sentence (25a) displays a non-*měi* sentence using the verb *zǒu* 'walk' to demonstrate a grammatical use of verb copying with directional expressions. The directional expression *dào xuéxiào* 'to school' is the complement of the second copy of the verb *zǒu* 'walk'.

Sentences (25b) and (25d) are ungrammatical because of the position of the preverbal adverb *měi* in relation to the verb copying construction.

In (25c) and (25e), the quantifier *měi* is placed before the second copy of the verb — the position where preverbal adverbs are placed under verb copying. The Central Hypothesis correctly predicts that sentence (25c) is ungrammatical, considering that there are no variable-introducing elements in the clause; note that the directional expression *dào xuéxiào* 'to school' is definite. Moreover, the Central Hypothesis correctly predicts that sentence (25e) is grammatical, considering that the indefinite adverbial expression *dào yī gè gōngyuán* 'to a park' is the only variable-introducing element in the clause.

The same pattern is observed with locative expressions. Consider the sentences in (26), using the verb *xiě* 'write' and the locative expression *zài hēibǎn shàng* 'on LOC blackboard'.

(26) a. 他写字写在**黑板**上。 (Cheng, 2015)
*tā xiě zì xiě zài **hēibǎn** shàng*
he write character write LOC **blackboard** on
'He wrote characters on the blackboard.'

b. *他**每**写字写在**黑板**上，都写错了。
*tā **měi** xiě zì xiě zài **hēibǎn** shàng, dōu xiě cuò le*
he **every** write character write LOC **blackboard** on, DOU write wrong LE

c. *他写字**每**写在**黑板**上，都写错了。
*tā xiě zì **měi** xiě zài **hēibǎn** shàng, dōu xiě cuò le*
he write character **every** write LOC **blackboard** on, DOU write wrong LE

d. *他**每**写字写在**一个黑板**上，都写错了。

tā	***měi***	*xiě*	*zì*		*xiě*	*zài*	***yī***	***gè***	***hēibǎn***	*shàng,*	*dōu*	*xiě*	*cuò*	*le*
he	**every**	write	character		write	LOC	**one**	**CL**	**blackboard**	on,	DOU	write	wrong	LE

e. 他写字**每**写在**一个黑板**上，都写错了。

tā	*xiě*	*zì*		***měi***	*xiě*	*zài*	***yī***	***gè***	***hēibǎn***	*shàng,*	*dōu*	*xiě*	*cuò*	*le*
he	write	character		**every**	write	LOC	**one**	**CL**	**blackboard**	on,	DOU	write	wrong	LE

'Every time he wrote characters on a blackboard, he made a mistake.'

Sentence (26a) displays a non-*měi* sentence using the verb *xiě* 'write' to demonstrate a grammatical use of verb copying with locative expressions. The locative expression *zài hēibǎn shàng* 'on LOC blackboard' is the complement of the second copy of the verb *xiě* 'write'.

Sentences (26b) and (26d) are ungrammatical because of the position of the preverbal adverb *měi* in relation to the verb copying construction.

In (26c) and (26e), the quantifier *měi* is placed before the second copy of the verb — the position where preverbal adverbs are placed under verb copying. The Central Hypothesis correctly predicts that sentence (26c) is ungrammatical, considering that there are no variable-introducing elements in the clause; note that the locative expression *zài hēibǎn shàng* 'on LOC blackboard' is definite. Moreover, the Central Hypothesis correctly predicts that sentence (26e) is grammatical, considering that the indefinite adverbial expression *zài yī gè hēibǎn shàng* 'on a blackboard' is the only variable-introducing element in the clause.

3.3.3 Resultative expressions

Consider the sentences in (27), using the verb *kàn* 'read' and the resultative expression *de hěn lèi* 'DE very tired'.

(27)   a. 他看书看得很累。   (Cheng, 2015)

              tā kàn shū kàn de hěn lèi

              he read book read DE very tired

              'He is tired from reading.' or 'He read the book until he was very tired.'

        b. *他**每**看书看得很累，都喝水。

              *tā **měi** kàn shū kàn de hěn lèi dōu hē shuǐ*

              he **every** read book read DE very tired DOU drink water

        c. *他看书**每**看得很累，都喝水。

              *tā kàn shū **měi** kàn de hěn lèi dōu hē shuǐ*

              he read book **every** read DE very tired DOU drink water

        d. *他**每**看一本书看得很累，都喝水。

              *tā **měi** kàn yī běn shū kàn de hěn lèi dōu hē shuǐ*

              he **every** read one CL book read DE very tired DOU drink water

        e. *他看一本书**每**看得很累，都喝一杯水。

              *tā kàn yī běn shū **měi** kàn de hěn lèi dōu hē shuǐ*

              he read one CL book **every** read DE very tired DOU drink water

Sentence (27a) displays a non-*měi* sentence using the verb *kàn* 'read' to demonstrate a grammatical use of verb copying with resultative expressions. The resultative expression *de hěn lèi* 'DE very tired' is the complement of the second copy of the verb *kàn* 'read'.

Sentences (27b) and (27d) are ungrammatical because of the position of the preverbal adverb *měi* in relation to the verb copying construction.

In (27c) and (27e), the quantifier *měi* is placed before the second copy of the verb — the position where preverbal adverbs are placed under verb copying. The Central Hypothesis correctly predicts that sentence (27c) is ungrammatical, considering that there are no variable-introducing elements in the clause. Moreover, the Central Hypothesis correctly predicts that sentence (27e) is ungrammatical for the same reason.

Note that, although (27e) contains a variable-introducing element, namely *yī běn shū* 'one book', it appers outside of the constituent of the requirement of the Central Hypothesis.

Although none of the *měi*–VP sentences in (27b-e) with a resultative expression are grammatical, this stems from the fact that the resultative expression *de hěn lèi* 'DE very tired' does not contain a variable-introducing element. I tried to find a resultative expression that contains a variable-introducing element, but I was unable to find one. If a resultative expression with a variable-introducing element is found, the Central Hypothesis predicts that the *měi*–VP sentences this resultative expression would be grammatical.

3.4 The 把 *bǎ* construction

The last type of sentences that we will examine are those containing the *bǎ* construction. The *bǎ* construction is yet another way of making the verb phrase more complex. We refer to Subsection 1.3 for the use of the *bǎ* construction in the non-*měi* counterparts of the sentences described in this section.

Recall that the Central Hypothesis requires a variable-introducing element to be in the highest intermediate projection of the verb under quantification. Since our treatment of *bǎ* is that it is a light verb, we are open to two possibilities for the verb under quantification: either the light verb *v bǎ* itself,[†] or the main verb V of the sentence. It is hard to semantically distinguish between these two possibilities, but this distinction has syntactic consequences, namely which highest intermediate projection of the verb under quantification the variable-introducing element must be in.

Consider the sentences in (28), using the verb *piàn* 'cheat' in the *bǎ* construction.

[†]Although our analysis of *měi*–VP sentences with ditransitive verbs in Subsection 3.2.2 excludes the possibility that the light verb *v* is the verb under quantification, our argument for this exclusion is the Overt Quantified Head Hypothesis, which requires the verb under quantification to be overt. The light verb *v* in ditransitive constructions is not overt, but the light verb *v bǎ* here is overt. Hence, the light verb *v bǎ* is a possible candidate for the verb under quantification.

(28) a. 我把**他**騙了。   (Li, 2015)
      *wǒ bǎ **tā** piàn   le*
      I   BA **him** cheat/deceive LE
      'I cheated/deceived him.'

   b. *我**每**把**他**騙了，都会感到內疚。
      *wǒ **měi** bǎ **tā** piàn le, dōu huì gǎndào nèijiù*
      I   **every** BA **him** cheat LE, DOU will feel   guilty

   c. *我把**他每**騙了，都会感到內疚。
      *wǒ bǎ **tā** **měi** piàn le, dōu huì gǎndào nèijiù*
      I   BA **him every** cheat LE, DOU will feel   guilty

   d. 我**每**把**一个人**騙了，都会感到內疚。
      *wǒ **měi** bǎ **yī** **gè rén**   piàn le, dōu huì gǎndào nèijiù*
      I   **every** BA **one CL person** cheat LE, DOU will feel   guilty
      'Every time I cheated/deceived someone, I felt guilty.'

   e. *我把**一个人每**騙了，都会感到內疚。
      *wǒ bǎ **yī** **gè rén**   **měi** piàn le, dōu huì gǎndào nèijiù*
      I   BA **one CL person** **every** cheat LE, DOU will feel   guilty

Sentence (28a) displays a non-*měi* sentence using the verb *piàn* 'cheat' to demonstrate a grammatical use of the *bǎ* construction.

In (28b) and (28d), the quantifier *měi* is placed before *bǎ*. We will take this as evidence that the light verb *v bǎ* is the verb under quantification, and not the verb v *piàn* 'cheat'.[†] The Central Hypothesis correctly predicts that sentence (28b) is ungrammatical, considering that there are no variable-introducing elements in the clause headed by *bǎ*. Moreover, the Central Hypothesis correctly predicts that sentence (28d) is grammatical, considering that the indefinite adverbial expression *yī gè rén* 'one person' is the only variable-introducing element in the clause headed by *bǎ*.

In (28c) and (28e), the quantifier *měi* is placed before verb *piàn* 'cheat'. We will take this as evidence that the verb v *piàn* 'cheat' is the verb under quantification, and not

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[†]Taking the light verb *bǎ* as the verb under quantification allows the Central Hypothesis to correctly predict the grammaticality of the sentence. Therefore, this claim and the Central Hypothesis support each other.

the light verb *v bǎ*. The Central Hypothesis correctly predicts that sentences (28c) and (28e) are ungrammatical, considering that there are no variable-introducing elements in the clause headed by *piàn* 'cheat'.

Consider the sentences (29a) and (29b), which are obtained from (28c) and (28e) by replacing *le* with the indefinite expression *yī cì* 'one time' after the verb *piàn* 'cheat'.

(29)　a.　我把**他每**騙**一次**，都会感到內疚。
　　　　*wǒ bǎ **tā** **měi** piàn **yī cì,** dōu huì gǎndào nèijiù*
　　　　I　BA **him every** cheat **one time**$_{CL}$, DOU will feel　guilty
　　　　'Every time I cheated/deceived him, I felt guilty.'

　　　b.　我把**一个人每**騙**一次**，都会感到內疚。
　　　　*wǒ bǎ **yī gè rén** **měi** piàn **yī cì,** dōu huì gǎndào nèijiù*
　　　　I　BA **one CL person every** cheat **one time**$_{CL}$, DOU will feel　guilty
　　　　'Every time I cheated/deceived a *(certain) person, I felt guilty.'

Sentences (29a) and (29b) show that it is possible for *měi* to appear before the verb *piàn* 'cheat', as long as the Central Hypothesis is satisfied. In other words, it is possible for the verb *piàn* 'cheat' to be the verb under quantification, and consequently the requirement of the Central Hypothesis is the existence of a variable-introducing element in the highest intermediate projection of the verb *piàn* 'cheat'.

Explicitly, in sentences (29a) and (29b), the indefinite expression *yī cì* 'one time' is a variable-introducing element in the clause headed by *piàn* 'cheat'; and consequently, the Central Hypothesis correctly predicts that (29a) and (29b) are grammatical.

Now, consider the sentences in (30), using the verb *chǎo* 'stir-fry' in the *bǎ* construction.

(30)　a.　他把**菜**炒烂了。　　　　　　　　　　　　　　　　　　　　　(Li, 2015)
　　　　*tā bǎ **cài** chǎo làn le*
　　　　he BA **vegetable** stir.fry mushy LE
　　　　'He stir-fried the vegetable mushy.'

　　　b.^{??}他**每**把**菜**炒烂，都怪自己手太重。
　　　　*tā **měi** bǎ **cài** chǎo làn, dōu guài zìjǐ shǒu tài zhòng*
　　　　he **every** BA **vegetable** stir.fry mushy, DOU blame self hand too heavy

'Every time he stir-fried the vegetable mushy, he blamed himself for being too heavy-handed.'

c. *他把**菜每**炒烂，都怪自己手太重。

*tā bǎ **cài***   ***měi***   *chǎo*   *làn,*   *dōu guài zìjǐ shǒu tài zhòng*

he   BA   **vegetable every** stir.fry mushy, DOU blame self hand too heavy

d. 他**每**把一**盘菜**炒烂，都怪自己手太重。

*tā **měi** bǎ **yī** pán **cài**   chǎo   làn,*   *dōu guài zìjǐ shǒu tài zhòng*

he **every** BA **one** CL   **vegetable** stir.fry mushy, DOU blame self hand too heavy

'Every time he stir-fried the vegetable mushy, he blamed himself for being too heavy-handed.'

e. *他把一**盘菜每**炒烂，都怪自己手太重。

*tā bǎ **yī** pán **cài***   ***měi*** *chǎo*   *làn,*   *dōu guài zìjǐ shǒu tài zhòng*

he BA **one** CL   **vegetable every** stir.fry mushy, DOU blame self hand too heavy

Sentence (30a) displays a non-*měi* sentence using the verb *chǎo* 'stir-fry' to demonstrate a grammatical use of the *bǎ* construction.

In (30b) and (30d), the quantifier *měi* is placed before *bǎ*. The Central Hypothesis correctly predicts that sentence (30b) is ungrammatical, considering that there are no variable-introducing elements in the clause headed by *bǎ*. Moreover, the Central Hypothesis correctly predicts that sentence (30d) is grammatical, considering that the indefinite adverbial expression *yī pán cài* 'one vegetable' is the only variable-introducing element in the clause headed by *bǎ*.

In (30c) and (30e), the quantifier *měi* is placed before verb *chǎo* 'stir-fry'. The Central Hypothesis correctly predicts that sentences (30c) and (30e) are ungrammatical, considering that there are no variable-introducing elements in the clause headed by *chǎo* 'stir-fry'.

3.5 Conclusion

In this section, we have seen that the Central Hypothesis correctly predicts the grammaticality of a wide range of *měi*–VP sentences, with or without an indefinite expression.

In particular, the Central Hypothesis even accounts for data in which v-to-v raising is involved in which the relevant constituent is influenced by this movement, as described by the Overt Quantified Head Hypothesis and the Pre-Movement Verification Hypothesis. The fact that the Central Hypothesis accounts for the ample dataset of *měi*–VP sentences in this section is a strong argument in its favor.

4 Testing the Central Hypothesis in sentences with the reflexive 自己 *zìjǐ* 'self'

In this section, we will repeat the discussion from the previous section, but instead of taking the variable-introducing element to be an indefinite expression, we will take it to be the reflexive expression *zìjǐ* 'self'.

The discussion in this section is slighly more concise, as the reflexive *zìjǐ* 'self' is not as versatile as indefnite expressions. The reflexive *zìjǐ* 'self' cannot be used as part of a frequency, duration, direction, locative, or resultative expression. Hence, this section does not contain a subsection on verb copying nor a subsection on frequency and duration expressions as part of a sentence with two apparent variable-introducing elements.

4.1 Typical verb phrase

Consider the sentences in (31).

(31) a. 我更了解自己了。
          wǒ gèng liǎojiě   zìjǐ le
          I   more understand self LE
          'I understand myself more.'

      b. 我每更了解自己，都会感到更加自信。
          wǒ měi   gèng liǎojiě   zìjǐ, dōu huì gǎndào gèngjiā zìxìn
          I   every more understand self, DOU will feel   more   confident
          'Every time I understand myself more, I feel more confident.'

   c. *我每更了解王五，都会感到更加自信。
      wǒ měi   gèng liǎojiě   Wángwǔ, dōu huì gǎndào gèngjiā zìxìn
      I   every more understand Wangwu, DOU will feel   more   confident
      'Every time I understand Wangwu more, I feel more confident.' (intended)

The non-*měi* sentence (31a) displays a grammatical use of the reflexive *zìjǐ* 'self' in a non-*měi* sentence. In the *měi*–VP sentence (31b), the verb *liǎojiě* 'understand' is followed by a single post-verbal constituent, the reflexive pronoun *zìjǐ* 'self'. Therefore, since the clause contains one variable-introducing element, the Central Hypothesis correctly predicts that the sentence is grammatical.

Moreover, the sentence (31c) forms a contrasting minimal pair with (31b). The Central Hypothesis correctly predicts the ungrammaticality of the *měi*–VP sentence (31c), where the verb *liǎojiě* 'understand' is followed by the nominal phrase *Wángwǔ* 'Wangwu', which does not contain a variable-introducing element.

Consider the sentences in (32), using the reflexive *zìjǐ* 'self'.

(32) a. 张三在镜子里看到了自己。
         Zhāngsān zài jìngzi lǐ   kàndào le zìjǐ
         Zhangsan in mirror inside see   LE self
         'Zhangsan sees himself in the mirror.'

     b. ?张三每在镜子里看到自己，都会哭。
         Zhāngsān měi   zài jìngzi lǐ   kàndào zìjǐ dōu huì kū
         Zhangsan every in mirror inside see   self DOU will cry
         'Every time Zhangsan sees himself in the mirror, he will cry.'

Sentence (32a) displays a non-*měi* sentence using the reflexive *zìjǐ* 'self' to demonstrate a grammatical use of *zìjǐ* 'self' in a sentence. In the *měi*–VP sentence (32b), the verb *kàndào* 'see' is followed by a single post-verbal constituent, the reflexive pronoun *zìjǐ* 'self'. Therefore, since the clause contains one variable-introducing element, the Central Hypothesis correctly predicts that the sentence is grammatical. Consider the sentences in (33), using the reflexive *zìjǐ* 'self' with the possessive particle *de.*

(33)   a.   张三每看到自己的倒影，都会哭。   (same as 12)
       Zhāngsān měi   kàndào zìjǐ de   dàoyǐng,   dōu huì kū
       Zhangsan every see   self POSS reflection, DOU will cry
       'Every time Zhangsan sees his own reflection, he cries.'

       b.   小丽每对比自己的过去和现在，都会感到自豪。
       Xiǎolì měi   duìbǐ   zìjǐ de   guòqù hé xiànzài, dōu huì găndào zìháo
       Xiaoli every compare self POSS past and now,   DOU will feel   proud
       'Every time Xiaoli compares her past and present self, she feels proud.'

       c.   李芳每违反自己设定的规则，都会引起混乱。
       Lǐfāng měi   wéifăn zìjǐ shèdìng de   guīzé, dōu huì yǐnqǐ hùnluàn
       Lifang every break self set   POSS rule, DOU will cause chaos
       'Every time Lifang breaks her own set rules, she causes chaos.'

In the *měi*–VP sentence (33a), the verb *kàndào* 'see' is followed by the nominal phrase *zìjǐ de dàoyǐng* 'self's reflection', featuring the reflexive *zìjǐ* 'self', a variable-introducing element. Therefore, as the clause has one variable-introducing element, the Central Hypothesis correctly predicts the sentence's grammaticality.

For the *měi*–VP sentence (33b), the verb *duìbǐ* 'compare' is followed by the nominal phrase *zìjǐ de guòqù hé xiànzài* 'self's past and future', also containing the reflexive *zìjǐ* 'self'. Therefore, since this clause also contains one variable-introducing element, the Central Hypothesis correctly predicts its grammaticality.

Lastly, in the *měi*–VP sentence (33c), the verb *wéifăn* 'break' is followed by the nominal phrase *zìjǐ shèdìng de guīzé* 'self's set rules', including the reflexive *zìjǐ* 'self'. Therefore, as this clause contains one variable-introducing element, the Central Hypothesis accurately predicts its grammaticality.

4.2 Ditransitive verbs

Consider the sentence in (34a), a *měi*–VP using the reflexive *zìjǐ* 'self' in a ditransitive construction, with the verb *dìgěi* 'hand over'. Sentence (34b) is the non-*měi* counterpart

of (34a).

(34) a. 张伟每递给李华自己的报告，都会得到有用的反馈。

    Zhāngwěi měi dìgěi Lǐhuá zìjǐ de bàogào, dōu huì dédào yǒuyòng fǎnkuì

    Zhangwei every give Lihua self POSS report, DOU will receive useful feedback

    'Every time Zhangwei hands over his own report to Lihua, he will receive useful feedback.'

b. 张伟递给李华自己的报告。

    Zhāngwěi dìgěi Lǐhuá zìjǐ de bàogào

    Zhangwei give Lihua self POSS report

    'Zhangwei hands over his own report to Lihua.'

Since this sentence involves v-to-*v* raising, the Pre-Movement Verification Hypothesis is applicable. Refer to Subsection 3.2.2, where we motivate the Pre-Movement Verification Hypothesis from the behavior of ditransitive constructions with indefinite expressions.

The structure of (34b) is shown in (35), before v-to-*v* raising.
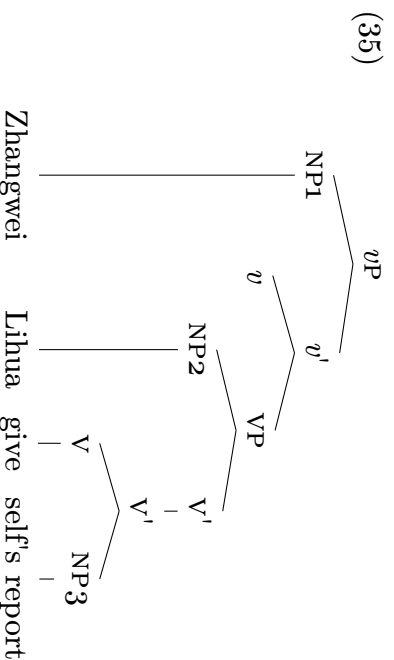
(35)

    Zhangwei   Lihua   give   self's report

The Central Hypothesis requires a variable-introducing element in the highest intermediate projection v' of the verb *dìgěi* 'to hand'. Since such projection v' contains the nominal phrase *zìjǐ de bàogào* 'self's report', which contains the reflexive *zìjǐ* 'self', the Central Hypothesis correctly predicts the grammaticality of (34a).

Note that the Central Hypothesis would predict the ungrammaticality of sentences in a ditransitive construction where the reflexive pronoun *zìjǐ* 'self' is part of the noun phrase

NP2. However, all sentences I came across in which *zìjǐ* 'self' occurs in the NP2 position are not pragmatically felicitous, and hence their grammaticality cannot be reliably tested.

4.3 The 把 *bǎ* construction

Consider the sentences in (36), using the reflexive *zìjǐ* 'self' in a *bǎ* construction.

(36) a. 张三把自己推荐给了一家公司。
    Zhāngsān bǎ zìjǐ tuījiàn   gěi le yī jiā gōngsī
    Zhangsan BA self recommend to LE one CL company
    'Zhangsan recommended himself to a company.'

  b. 张三把自己推荐给了这家公司。
    Zhāngsān bǎ zìjǐ tuījiàn   gěi le zhè jiā gōngsī
    Zhangsan BA self recommend to LE this CL company
    'Zhangsan recommended himself to this company.'

  c. 张三每把自己推荐给一家公司，都会自我吹嘘一番。
    Zhāngsān měi bǎ zìjǐ tuījiàn   gěi le yī jiā gōngsī,   dōu huì
    Zhangsan every BA self recommend to LE one CL company, DOU will
       zìwǒ chuīxū yīfān
       self boast a.little
    'Every time Zhangsan recommends himself to a company, he will boast himself a little.'

  d. ?张三把自己每推荐给这家公司，都会自我吹嘘一番。†
    Zhāngsān bǎ zìjǐ měi   tuījiàn   gěi le zhè jiā gōngsī,   dōu huì
    Zhangsan BA self every recommend to LE this CL company, DOU will
       zìwǒ chuīxū yīfān
       self boast a.little
    'Every time Zhangsan recommends himself to this company, he will boast himself a little.'

Sentences (36a) and (36b) display how the reflexive *zìjǐ* 'self' can be used in a *bǎ* construction grammatically.

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†In order to make this sentence natural, consider the context where Zhangsan is able to apply for a job at this company multiple times.

In the *měi*–VP sentences (36c) and (36d), the quantifier *měi* precedes *bǎ*. Therefore, the Central Hypothesis requires a variable-introducing element in the highest intermediate projection *v'* of the light verb *bǎ*. Sentence (36c) contains not only one, but two variable-introducing elements, namely the reflexive pronoun *zìjǐ* 'self' and the indefinite expression *yī* 'one'. Sentence (36d) contains only one variable-introducing element, namely the reflexive pronoun *zìjǐ* 'self'. Still, the Central Hypothesis correctly predicts the grammaticality of both sentences.

Consider the sentences in (37), using the reflexive *zìjǐ* 'self' in a *bǎ* construction.

(37)　a.　他把自己沉浸在音乐之中。
　　　　tā bǎ zìjǐ chénjìn zài yīnyuè zhī zhōng
　　　　he BA self immerse in music POSS middle
　　　　'He immerses himself in music.'

　　　b.　他每把自己沉浸在音乐之中，都会有新的感受。
　　　　tā měi bǎ zìjǐ chénjìn zài yīnyuè zhī zhōng, dōu huì yǒu xīn de gǎnshòu
　　　　he every BA self immerse in music POSS middle, DOU will have new DE feeling
　　　　'Every time he immerses himself in music, he will have new feelings.'

　　　c.　阳光永远把自己送到每一个角落
　　　　yángguāng yǒngyuǎn bǎ zìjǐ sòngdào měi yī gè jiǎoluò
　　　　sunshine always BA self send every one CL corner
　　　　'Sunshine always sends itself to every corner.'

　　　d.　阳光每把自己送到这个阴暗的角落，都会把这个角落变得十分美丽。
　　　　yángguāng měi bǎ zìjǐ sòngdào zhè gè yīn'àn de jiǎoluò, dōu huì bǎ
　　　　sunshine every BA self send this CL dark DE corner, DOU will BA
　　　　　zhè gè jiǎoluò biànde shífēn měilì
　　　　　this CL corner become very beautiful
　　　　'Every time sunshine sends itself to this dark corner, it will make this corner very beautiful.'

Sentences (37a) and (37c) display how the reflexive *zìjǐ* 'self' can be used in a *bǎ* construction grammatically.

In the *měi*–VP sentences (37b) and (37d), the quantifier *měi* precedes *bǎ*. Therefore, the Central Hypothesis requires a variable-introducing element in the highest intermediate

projection v' of the light verb *bǎ*. Both sentences (37b) and (37d) contain a variable-introducing element in the highest intermediate projection v' of the light verb *bǎ*, namely the reflexive pronoun *zìjǐ* 'self'. Therefore, the Central Hypothesis correctly predicts the grammaticality of the sentences.

4.4 Conclusion

In this section, we have seen that the Central Hypothesis correctly predicts the grammaticality of sentences with the reflexive *zìjǐ* 'self'. This is a strong argument in favour of the Central Hypothesis, and particularly strengthens the argument that the Central Hypothesis should refer to variable-introducing elements, rather than only to indefinite expressions.

5 Final discussions

This section discusses a theoretical concern on the Central Hypothesis, a broader question on Chinese nominal expressions, the specificity of the 把 bǎ construction, and prospective avenues for future research.

5.1 Remarks about the Central Hypothesis

Although the Central Hypothesis predicts the dataset in this thesis, taking it as a defining property of *měi* is theoretically troublesome. Why would one expect the Central Hypothesis to make sense? It may look like that the Central Hypothesis has an underlying cause, which would rely on some semantic property of quantification. From this idea, we formulate the Extended Hypothesis, proposed by Huang (1996).

Extended Hypothesis. A variable-introducing element inside a verb phrase "helps" the event variable of the verb phrase to be available for quantification.

<div align="right">(adapted from Huang, 1996)</div>

We note that the Extended Hypothesis is a plausible explanation of the Central Hypothesis. Under the Extended Hypothesis, a verb phrase without a variable-introducing element is not available for quantification by *měi*, and the sentence is ungrammatical. Similarly, a verb phrase with a variable-introducing element is available for quantification by *měi*, and the sentence is grammatical. However, Huang (1996)'s analysis is

incomplete. In particular, there is no proposed theory explaining what "help" means in the Extended Hypothesis or how exactly this "help" takes place.

5.2 Trichotomy between bare, indefinite, and definite noun phrases in sentences with post-verbal frequency phrases

The issue that was unravelled in Subsection 2.2 about sentence (9a) is distilled by the trichotomy between the noun phrases *rén* 'person', *yī gè rén* 'one person', and *nà gè rén* 'that person' in the sentences in (38).

(38) a. 他骂了三次人。   (Huang, Li, & Li, 2009, p. 95)
         tā mà   le sān   cì   rén
         he scold LE three time_CL person
         'He scolded people three times.'

      b. *他骂了人三次。   (Huang, Li, & Li, 2009, p. 95)
         tā mà   le rén   sān   cì
         he scold LE person three time_CL

      c. *他骂了三次一个人。
         tā mà   le sān   cì   yī   gè rén
         he scold LE three time_CL one CL person

      d. 他骂了一个人三次。
         tā mà   le yī gè rén   sān   cì
         he scold LE one CL person three time_CL
         'He scolded a *(certain) person three times.'

      e. 他骂了三次那个人。
         tā mà   le sān   cì   nà   gè rén
         he scold LE three time_CL that CL person
         'He scolded that person three times.'

      f. 他骂了那个人三次。   (Huang, Li, & Li, 2009, p. 95)
         tā mà   le nà   gè rén   sān   cì
         he scold LE that CL person three time_CL
         'He scolded that person three times.'

The attempt by Huang, Li, and Li (2009) to explain sentences (38a), (38b), and (38f) relies solely on the referentiality (or non-referentiality) of the noun phrases. However, as shown by (38a-f), the three noun phrases *rén* 'person', *yī gè rén* 'one person', and *nà gè rén* 'that person' display three distinct behaviors in the same context. The non-referential noun phrase *rén* 'person' is acceptable only after *sān cì* 'three times' but not before it; the non-referential noun phrase *yī gè rén* 'one person' is acceptable only before *sān cì* 'three times' but not after it, and only with a specific reading; and the referential noun phrase *nà gè rén* 'that person' is acceptable both before and after *sān cì* 'three times'. Therefore, one binary parameter is not enough to account for the data. We conjecture that specificity plays a role in the explanation of the data, as highlighted by (38d).

Consider the sentences in (39), obtained from (38) by changing *sān* 'three' to *yī* 'one'.

(39) a. 他骂了一次人。
      tā mà le yī cì rén
      he scold LE one time_CL person
      'He scolded people once.'

    b. *他骂了人一次。
      tā mà le rén yī cì
      he scold LE person one time_CL

    c. *他骂了一次一个人。
      tā mà le yī cì yī gè rén
      he scold LE one time_CL one CL person

    d.^{??}他骂了一个人一次。
      tā mà le yī gè rén yī cì
      he scold LE one CL person one time_CL
      'He scolded a *(^{??}certain) person once.'

    e. 他骂了一次那个人。
      tā mà le yī cì nà gè rén
      he scold LE one time_CL that CL person
      'He scolded that person once.'

    f. 他骂了那个人一次。
      tā mà le nà gè rén yī cì
      he scold LE that CL person one time_CL

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'He scolded that person once.'

The only difference in grammaticality between the set of sentences in (39) and the set of sentences in (38) is in sentences (38d) and (39d). While sentence (38d) is grammatical, sentence (39d) is marginally ungrammatical.

The unresolved issue of explaining the data in (38) and (39) is beyond the scope of this thesis, but its explanation has direct implications for the analysis of the most simple of *měi*–VP construction.

For example, consider the sentences in (40).

(40) a. 李四每打王五一次，张三都要骂他一顿。 (same as 7a)
Lǐsī měi dǎ Wángwǔ yī cì, Zhāngsān dōu yào mà tā yī dùn
Lisi every hit Wangwu one time_CL, Zhangsan DOU will scold he one session_CL
'Every time Lisi hits Wangwu, Zhangsan will scold him.'

   b. 李斯打了王五一次。
Lǐsī dǎ le Wángwǔ yī cì
Lisi hit LE Wangwu one time_CL
'Lisi hit Wangwu once.'

Sentence (40a) is derived from sentence (40b), which is part of the trichotomy observed. Hence, an analysis of the trichotomy will have implications for the analysis of (40b) and similar sentences, and it will consequently have implications for the analysis of (40a) and other *měi*–VP sentences.

5.3 Overruling of specificity only in 把 *bǎ* construction

The data in Subsection 3.4 shows that *měi* is able to overrule the requirement of specificity imposed by the 把 *bǎ* construction in the non-*měi* counterpart.

For example, consider the sentences in (41).

(41) a. 我把一个人骗了。
　　　 wǒ bǎ yī gè rén piàn le
　　　 I BA one CL person cheat/deceive LE
　　　 'I cheated a *(certain) person.'

b. 我**每**把**一个人**骗了，都会感到内疚。　　　　　　　(same as 28d)
　 *wǒ **měi** bǎ **yī gè rén** piàn le, dōu huì gǎndào nèijiù*
　 I **every** BA **one CL person** cheat LE, DOU will feel guilty
　 'Every time I cheated/deceived someone, I felt guilty.'

In sentence (41a), the noun phrase *yī gè rén* 'one person' has to be specific; while in sentence (41b), the noun phrase *yī gè rén* 'one person' has to be non-specific.

While this is not a direct issue, it implies the universal quantifier *měi* is able to overrule the requirement of specificity imposed by the 把 *bǎ* construction.

However, consider the sentences in (42).

(42) a. 李四打了一个人三次。
　　　 Lǐsī dǎ le yī gè rén sān cì
　　　 Lisi hit LE one CL person three time$_{CL}$
　　　 'Lisi hit a *(certain) person three times.'

b. *李四打了一个人一次。　　　　　　　　　　　　　(same as 9a)
　 Lǐsī dǎ le yī gè rén yī cì
　 Lisi hit LE one CL person one time$_{CL}$
　 'Lisi hit a person one time.' (intended)

c. *李四每打一个人一次，张三都要骂他一顿。　　　　　(same as 8a)
　 Lǐsī měi dǎ yī gè rén yī cì, Zhāngsān dōu yào mà tā yī dùn
　 Lisi every hit one CL person one time$_{CL}$, Zhangsan DOU will scold he one session$_{CL}$
　 'Every time Lisi hits someone, Zhangsan will scold him.' (intended)

The argument we gave for the ungrammaticality of sentence (42c) in Subsection 2.2 is that it follows from the ungrammaticality of sentence (42b). However, the grammaticality of sentence (41a) only when the noun phrase *yī gè rén* 'one person' is specific might suggest that the ungrammaticality of sentence (42b) is related to the interaction of the frequency phrase *yī cì* 'one time' in a non-*měi* sentence. For example, one might argue

that (42b) is not acceptable because the frequency phrase *yī cì* 'one time' is irrelevant to the sentence; removing the frequency phrase *yī cì* 'one time' from (42b) does not change the sentence's intented meaning.

Back to the relevant matter, in (41b), we see the universal quantifier *měi* is able to overruling the requirement of specificity that exists in the non-*měi* counterpart (41a). However, in (42c), the universal quantifier *měi* is not able to overrule the requirement of specificity that exists in the non-*měi* counterpart (42a).

The inconsistency in how the universal quantifier *měi* overrides the specificity requirement in some sentences but not in others is an open issue. Understanding the mechanics of this overwrite is crucial for unraveling the underlying grammatical rules and factors influencing these constructions.

5.4 Other variable-introducing elements

Consider the *měi*–VP sentence in (43), which is a variant of the sentences in (13).

(43) ?他每写完新剧本，我都请他大吃一顿。
     tā měi xiě wán xīn jùběn wǒ dōu qǐng tā dà chī yī dùn
     he every write finish new script I all invite him chief eat one meal
     'Every time he finishes writing a new script, I invite him to a big meal.'

Since the sentence (43) is grammatical, the Central Hypothesis predicts the existence of a variable-introducing element in the verbal phrase. However, the verbal phrase *xiě xīn jùběn* 'write a new script' does not contain an indefinite expression or the reflexive *zìjǐ* 'self'. The conclusion is that the nominal expression *xīn jùběn* 'new script' is a variable-introducing element.

Although it might not be surprising that the nominal expression *xīn jùběn* 'new script' is a variable-introducing element, given is resemblance to indefinite expressions like *yī*

piān wénzhāng 'one article', we highlight it here because it is another kind of variable-introducing element.

This initial observation sets the stage for subsequent studies to further test the Central Hypothesis against a variety of other potential variable-introducing elements and structures. These studies will provide valuable insights into the applicability of the Central Hypothesis in explaining the *měi*–VP construction across different contexts.

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