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On the syntax-semantics interface of focus particles: the additive particle 還 *hai* "HAI" in Mandarin Chinese

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Abstract

This paper investigates the syntax-semantics interface of the focus particle 還 *hai* 'HAI' in Mandarin Chinese. In particular, this paper argues that the various interpretations of *hai* observed in the previous studies can be explained by the syntactic positions where it occurs. Based on the word order of *hai* and adverbials that occupy fixed positions, I map out the typography of *hai*: *Hai* occurring in the CP periphery is associated with the additive meaning. *Hai* that adjoins to AspP has the additive or temporal meaning. *Hai* adjoining to DegP is associated with the comparative or marginal meaning. I propose that *hai* only has one core sense, which is the additive reading (König 1991). By adopting the theory of alternative semantics (Rooth 1992), I propose that the various interpretations of *hai* result from the interaction between the additive sense, and the focus associate and the focus domain, which are restricted by the syntactic positions of *hai*.

Keywords: *Hai*; Additive particles; Alternative semantics; Syntax-semantics interface; Mandarin Chinese

1 Introduction

In many languages, aspectual adverbs can be associated with several readings, such as *still* in English and *noch* 'still' in German (König 1991; Michaelis 1993). A similar phenomenon has also been observed in Mandarin Chinese (henceforth MC) (Yeh 1998; Liu 2000). As shown by the following examples, the particle *hai* can have many interpretations[a,b,c].

(1) a. (李四煮了飯,) 他還洗了碗。　[additive]
    (lisi__zhu-le__fan,)__ta__hai__xi-le__wan
    Lisi__cook-PERV__rice__he__HAI__wash-PERV__bowl
    Lisi cooked, and he also did the dishes.
  b. (李四剛剛在洗碗,) 他現在還在洗。　[temporal]
    (lisi__ganggang__zai__xi__wan,)__ta__xianzai__hai__zai__xi
    Lisi__just.now__PROG__wash__bowl__he__now__HAI__PROG__wash
    Lisi was doing dishes just now, and he is still doing now.

　　　c. 張三的房間還(算){乾淨/好/可以}。　[marginal]
　　　　zhangsan-de__fangjian__hai__(suan)__{ganjing/hao/keyi}
　　　　Zhangsan-DE__room__HAI__count__clean/good/okay
　　　　Zhangsan's room is still {clean/good/okay}.
　　　d. 張三比李四還高。　[comparative]
　　　　zhangsan__bi__lisi__hai__gao
　　　　Zhangsan__than__Lisi__HAI__tall
　　　　Zhangsan is even taller than Lisi.

First, *hai* in 1a asserts that the housework denoted by the predicate (i.e., 洗了碗 wash-PERV bowl 'washed the dishes') is not the only thing that the subject (i.e., 李四 *lisi* 'Lisi') did, but another related work (e.g., 煮了飯 *zhu-le fan* 'cooked') must have been done before (henceforth, the additive *hai*). Second, in 1b, *hai* requires an extension of the state 在洗碗 *zai xi wan* 'washing dishes' through the topic time 現在 *xianzai* 'now' (henceforth, the temporal *hai*). Third, 1c suggests that a sentence containing *hai* can indicate that the subject (i.e., 張三 *zhangsan* 'Zhangsan') only meets the standard of the property denoted by the predicate (e.g., 乾淨 *ganjing* 'clean') in a marginal way (henceforth, the marginal *hai*). Finally, 1d shows that *hai*, when used in comparatives, can imply that the standard of comparison (i.e., 李四 *lisi* 'Lisi') and the subject (i.e., *Zhangsan*) have a positive sense of the property denoted by the predicate 高 *gao* 'tall' (henceforth, comparative *hai*). That is, both are considered tall.

The observation that *hai* can be associated with various meanings raises two interesting questions: (1) What is the semantics of *hai*? (2) How likely are these meanings derived from one core sense? Instead of treating *hai* simply as a polysemous word, previous studies on the semantics of *hai* (Liu 2000; also see Kay 1990; Michaelis 1993) propose that *hai* only has one core sense, namely, the scalar sense, which requires the proposition in question to be more informative than propositions in the context (Fillmore et al. 1988). In other words, the various meanings of *hai* are derived from the composition of the core sense and different semantic dimensions that are provided by the context.

Along this line, this paper sets out to explore the restriction on what meanings *hai* may have in a sentence. The previous analyses suggest that the context plays the major role in the meaning of *hai*. However, this paper argues that the context is not the only factor. The syntax of *hai*, particularly the syntactic position, also restricts the meaning in an interesting way. Following alternative semantics (Rooth 1985, 1992), I propose that there are three subparts that comprise the meaning of *hai*: (i) the core sense, in particular, an additive sense (König 1991); (ii) the denotation of the focus domain; and (iii) the focus associate (i.e., the element which is in focus in a sentence) and the alternatives induced by them. Importantly, the latter two are, in fact, conditioned by the syntactic position of *hai*: the focus domain refers to the projection immediately c-commanded by *hai*, and the focus associates must be located within the focus domain (i.e., within the scope of *hai*). By using *hai* as a case study, this paper argues that one needs to take the syntactic position into consideration when accounting for the multiple meanings of a lexical item, and that the various meanings usually result from the cooperation between syntactic positions and semantic interpretations. In fact, this idea is not new; it has also

been strongly advocated by the cartographic approach (Rizzi 1997; Cinque 1999; among others).

This paper is organized as follows. Section 1.1 investigates the distribution of *hai* associated with the meanings mentioned in 1 and maps out the topography of *hai*. In Section 2.1, I briefly introduce the theory of alternative semantics (Rooth 1992), and then argue that *hai* is an additive particle (König 1991). Then, to derive the various meanings of *hai*, I combine the core sense, namely, the additive meaning, with the denotation of the focus domain and the alternatives. Section 3.1 reviews an alternative analysis proposed by Liu (2000). Section 4 is the conclusion.

2 The distribution of *hai*

This section examines the distribution of *hai* in terms of its relative position with respect to aspect markers and certain adverbials. Based on this, I propose that the additive *hai* adjoins to AspP, IP, or CP; the temporal *hai* adjoins to AspP; the marginal *hai* and the comparative *hai* are DegP adjuncts.

2.1 On the additive *hai*

As Example 2 shows, the additive *hai* conveys that, in addition to the housework that the subject already did (i.e., cooking), he did other housework (e.g., doing the dishes).

(2) (張三煮了飯,) 他還洗了碗。 [additive]
   (zhangsan__zhu-le__fan,)__ta__hai__xi-le__wan
   Zhangsan__cook-PERV__rice__he__HAI__wash-PERV__bowl
   Zhangsan cooked, and he also did the dishes.

Syntactically, the additive *hai* occurs above AspP because it must precede AspP adjuncts, such as 已經 *yijing* 'already' in 3. Besides, the reading shows that *hai* scopes over the perfect aspect marker 了 –*le* 'PERF', which denotes a sense of becoming (Lin 2003; Shen 2004; among others).

(3) 李四在工作了, 他(*已經)還(已經)有房子了。
   (lisi__zai__gongzuo-le,)__ta__(*yijing)__hai__(yijing)__you__fangzi-le
   Lisi__in__work-PERF__he__already__HAI__already__have__house-PERF
   Lisi has a job, and he also has already owned a house.
   #*Lisi has a job, and it has become the case that he also owns a house.*

Moreover, CP-level adverbials can be used to examine the syntactic position of the additive *hai*. According to Cinque (1999, 2004) (also see Rizzi 1997; Tsai 蔡維天 2010), there are four functional projections in the CP layer, as shown in 4 (Cinque 2004: 133). What is crucial here is that the additive *hai* can only occur after evidential adverbials, such as 好像 *haoxiang* 'seemingly', as in 5, suggesting that the additive *hai* occurs below MoodP$_{evidential}$[d]. Thus, the additive *hai* adjoins to projections below MoodP$_{evidential}$ but not lower than AspP.

(4) MoodP$_{\text{speech act}}$ > MoodP$_{\text{evaluative}}$ > MoodP$_{\text{evidential}}$ > ModP$_{\text{epistemic}}$ > TP...

(5) 李四在工作了, 他(好像)還(??好像)有房子。
lisi__zai__gongzuo-le,__ta__(haoxiang)__hai__(??haoxiang)__you__fangzi
Lisi__in__job-PERF__he__seemingly__HAI__seemingly__have__house
Lisi has a job, and it seems that he also owns a house.

Therefore, there are three possible adjunction positions for the additive *hai*: AspP, IP, and ModP$_{\text{epistemic}}$ (henceforth, MP$^{\text{EPi}}$), as illustrated in Examples 2, 6a, and 6b[e]. In 6a, the additive *hai* adjoins to IP because it occurs to the right of the epistemic modal 或許 *huoxu* 'perhaps'. By contrast, the additive *hai* in 6b occurs to the left of the modal, so it adjoins to MP$^{\text{EPi}}$.

(6) a. 這次颱風, 北部地區已經淹水了, 晚點南部地區或許還會停電。
zhe-ci__taifeng__beibu__diqu__yijing__yanshui-le.__wandian__nanbu__diqu __ huoxu__ **hai**__hui__tingdian
this-CL__typhoon__north__area__already__flood-PERF__later__south__area __maybe__**HAI**__will__blackout
Due to this typhoon, northern Taiwan has already been flooded. Perhaps people in southern Taiwan will also experience a blackout later.

b. 這次颱風來勢洶洶, 北部地區一定會淹水, 南部地區還或許會停電。
zhe-ci__taifeng__laishixiongxion__beibu__diqu__yiding__hui__yanshui,__ nanbu__diqu__**hai**__huoxu__hui__tingdian
this-CL__typhoon__violent__north__area__must__will__flood-PERF__ later__south__area__**HAI**__maybe__will__blackout
The super typhoon is approaching. It must be the case that northern Taiwan will be flooded, and it is also possible that people in southern Taiwan will experience a blackout.

Interestingly, the meaning which the additive *hai* contributes to a sentence seems to differ with respect to the syntactic positions to which it adjoins. First, when adjoining to AspP as in 2, the additive *hai* indicates that the subject *Zhangsan* not only did the work denoted by the predicate (i.e., doing the dishes) but also did other related work, like cooking. Second, if attached to IP, the additive *hai* has the meaning that the proposition denoted by the IP (i.e., "*people in southern Taiwan will experience a blackout later*") is true, and the other propositions related to the topic 這次颱風 *zhe-ci taifeng* 'this typhoon' are also true, such as the proposition that northern Taiwan has already been flooded. However, there is a mismatch between the surface position of *hai* and its meaning. That is, the meaning of 6a suggests that the additive *hai* scopes over the whole IP, but the surface structure of this sentence shows that the subject 南部地區 *nanbu diqu* 'southern area' is out of the scope of *hai*. To explain this mismatch, I assume that the subject is topicalized to the position before the additive *hai* in the surface structure. Since MC is a topic-prominent language (Tsao 1979; Huang 1984; Tsai 2015b), it is plausible to make this assumption[f]. Finally, when the additive *hai* adjoins to MP$^{\text{EPi}}$, as in 6b, it indicates that the possibility denoted by MP$^{\text{EPi}}$ exists (i.e., it is possible that people

in southern Taiwan will experience a blackout), in addition to other relevant possibilities provided by the context. For example, it must be the case that northern Taiwan will be flooded.

In sum, the additive *hai* can adjoin to AspP, IP, or MP^{Epi}. The exact adjunction position of the additive *hai* can be determined by its relative position with epistemic modals and the meanings it indicates (i.e., the addition of actions, propositions or possibilities).

2.2 On the temporal *hai*

As exemplified by 7, the temporal *hai* expresses that the denoted state (e.g., washing the dishes) extends from a salient temporal point in the context, 剛剛 *ganggang* 'just now', to the topic time 現在 *xianzai* 'now', resulting in a sense of persistence.

(7) (李四剛剛在洗碗,) 他現在還在洗。
(lisi__ganggang__zai__xi__wan,)__ta__xianzai__hai__zai__xi
Lisi__just.now__PROG__wash__bowl__he__now__HAI__PROG__wash
Lisi was washing the dishes just now, and he is still doing now.

The word order of the temporal *hai* and some delimitators helps identify the syntactic position where it occurs. First, the temporal *hai* must precede the aspect marker 在 *zai* 'PROG', which is treated as the head of AspP (Tsai 2008). See the contrast between 7 and 8. Thus, the temporal *hai* is located above AspP.

(8) *(李四剛剛在洗碗,) 他現在在還洗。
*(lisi__ganggang__zai__xi__wan,)__ta__xianzai__zai__hai__xi
Lisi__just.now__PROG__wash__bowl__he__now__PROG__HAI__wash

Second, the temporal *hai* cannot occur to the left of the subject and epistemic modals, as in 9a,b^g. This means that the temporal *hai* is located below IP.

(9) a. *剛剛還{李四/很少學生}在讀書。
*ganggang__hai__**{lisi/henshao__xuesheng}**__zai__dushu
just.now__HAI__**Lisi/few__student**__PROG__study
{Lisi/Few students} are still studying just now.
b. ??(李四剛剛在洗碗,) 他現在還或許在洗。
??(lisi__ ganggang__zai__xi__wan,)__ta__xianzai__hai__**huoxu**__zai__xi
Lisi__just.now__PROG__wash__bowl__he__now__HAI__**maybe**
__PROG__wash
Lisi was doing dishes just now, and maybe he is still doing now.

The examples discussed above suggest that the temporal *hai* is adjoined to AspP because it occurs above AspP but below IP.

2.3 On the comparative *hai*

The comparative *hai* occurs between a gradable predicate and the *bi* phrase in *bi*-comparatives (Kennedy 2007; Liu 2010b, 2011; among others), as in Example 10.

Comparatives denote a superiority relation (e.g., *Zhangsan is taller than Lisi*). On top of that, *hai* implies that both Zhangsan and Lisi are tall.

(10) 張三比李四還高。 [comparative]
zhangsan__bi__lisi__hai__gao
Zhangsan__than__Lisi__HAI__tall
Zhangsan is even taller than Lisi.

Since the comparative *hai* appears in *bi*-comparatives, it is important to examine the word order of *hai* and the other components in this construction. According to Liu (2011), *bi*-comparatives are composed of a gradable predicate, the covert comparative morpheme *geng* inducing the sense of superiority, a *bi* phrase introducing the standard of comparison, and the subject referring to the compared individual. These components are structured as in 11. *Geng* and the overt counterpart 更 *geng* 'GENG' are treated as the head of DegP preceding AP, and the *bi* phrase is adjoined to the DegP[h].

(11) [S [NP 張三] [DegP [PP 比 [NP 李四]] [DegP {*geng* /更} [AP高]]]
zhangsan__bi__lisi__*geng*/geng__gao
Zhangsan__than__Lisi__*geng*/GENG__tall
Zhangsan is taller than Lisi.

Building from the analysis in 11, I propose that the comparative *hai* occurs above DegP that contains the comparative morpheme and AP. One piece of evidence that supports this analysis comes from the fact that *hai* must precede *geng*, as in 12.

(12) 張三比李四(*更)還(更)高。
zhangsan__bi__lisi__(***geng**)__hai__(**geng**)__gao
Zhangsan__than__Lisi__**GENG**__HAI__**GENG**__tall
Zhangsan is even taller than Lisi.

In addition, Example 12 shows that *hai* occurs to the right of the *bi* phrase, which is an adjunct of DegP. So this means that the comparative *hai* cannot occur higher than DegP. Accordingly, I suggest that *hai* is adjoined to DegP.

2.4 On the marginal *hai*

When immediately preceding gradable predicates, *hai* can have a sense of marginality, namely, indicating that the subject only meets the standard of the property denoted by the predicate in a marginal way. For example, 13a (also see Liu 2000: 42) denotes that Zhangsan's room is considered marginally clean[i]. Example 13b also illustrates the similar idea: Zhangsan can slightly walk[j].

(13) a. 張三的房間還乾淨。 [marginal]
zhangsan-de__fangjian__hai__ganjing
Zhangsan-DE__room__HAI__clean
Zhangsan's room is still clean.

    b. 張三還{能/可以}走路。 [marginal]
       zhangsan__hai__{neng/keyi}__zoulu
       Zhangsan__HAI__can/can__walk
       Zhangsan is still able to walk.

Based on this reading, the marginal *hai* seems to regulate the degrees of the property denoted by the gradable predicate (e.g., *ganjing* in 13a), so *hai* must directly operate on degrees. Accordingly, I suggest that the marginal *hai* is adjoined to DegP.

Unfortunately, it is not an easy task to prove the syntactic position of the marginal *hai* proposed above because the sense of marginality is incompatible with many adverbials and aspect markers. The only type of adverbial that can interact with the marginal *hai* is the locative adverbial, which occurs in the scope of AspP headed by the perfect aspect marker –*le*. Consider 14.

(14) 連續殺人犯在台北殺了人了。
    lianxu__sharenfan__**zai__taibei**__sha-le__ren-**le**
    serial__killer__**in__Taipei**__kill-PERV__person-**PERF**
    It has become the case that the serial killer killed someone in Taipei.

In 14, the speaker presupposes that the serial killer killed people in some places and asserts that it becomes the case that he killed people in Taipei. To obtain this reading, the locative adverbial 在台北 *zai taibei* 'in Taipei' should be in the scope of –*le*. Therefore, if an element occurs after locative adverbials, it is also located below AspP.
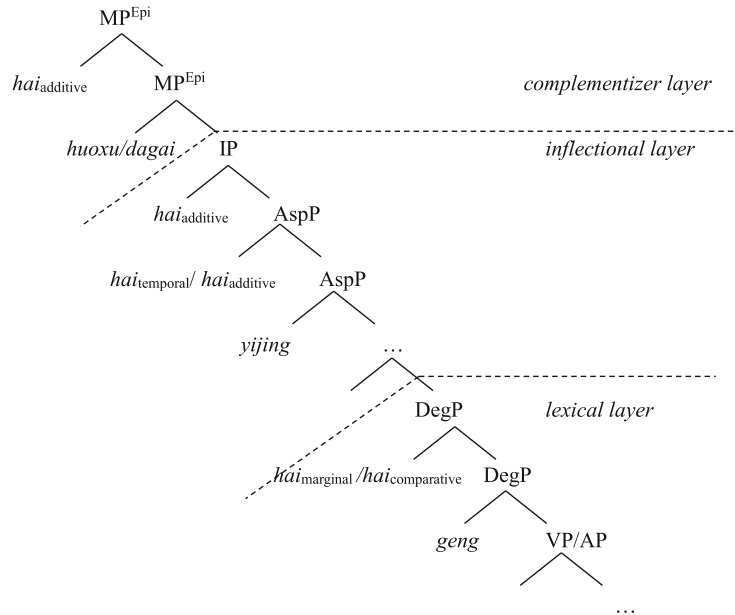
As an adjunct of DegP below AspP, the marginal *hai* should occur after locative adverbials. As shown in 15, the prediction is borne out. The marginal *hai* can only follow the locative adverbial 在小公司 *zai xiao gonsi* 'in small companies'. Otherwise, the sentence would become ungrammatical.

(15) 這樣的做法(在小公司)還(*在小公司)可以, 但在大公司就不行了。
    zhe-yang-de__zuofa__(zai__xiao__gongsi)__hai__(*zai__xiao__gongsi)
    __keyi,__dan__zai__da__gongsi__jiu__buxing-le
    this-CL-DE__behavior__in__small__company__HAI__in__small__company
    __okay__but__in__big__company__then__not.permit-PERF
    It is still fine to deal with things like this in small companies, but you cannot behave like this in big companies.
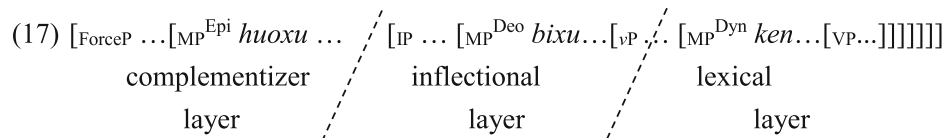
2.5 Syntacticizing the diverse senses of *hai*

The syntactic positions of *hai* associated with different meanings are summarized as follows: The additive *hai* adjoins to AspP, IP or MP^{Epi}; the temporal *hai* is an AspP adjunct; the comparative *hai* and the marginal *hai* are DegP adjuncts, as sketched in 16.

(16) The topography of *hai*

$$\text{MP}^{\text{Epi}}$$

*hai*additive MP^{Epi} *complementizer layer*

huoxu/dagai   IP   *inflectional layer*

*hai*additive   AspP

*hai*temporal/ *hai*additive   AspP

yijing   …

DegP   *lexical layer*

*hai*marginal /*hai*comparative   DegP

geng   VP/AP

…

The syntactic positions of *hai* with different meanings, as in Example 16, present a transparent mapping between syntax and semantics. More interestingly, this typography can be further supported by the word order of modals and *hai*. According to Tsai (2015a), who adopts the cartographic approach (Cinque 1999; Rizzi 1997), modals appear in specific positions: epistemic, deontic, and dynamic modals (e.g., 或許 *huoxu* 'maybe', 必須 *bixu* 'must', 肯 *ken* 'willing') are, respectively, located in the complementizer layer, the inflectional layer, and the lexical layer, as in 17[k].

(17) $[_{\text{ForceP}} \ldots [_{\text{MP}}^{\text{Epi}} \textit{huoxu} \ldots [_{\text{IP}} \ldots [_{\text{MP}}^{\text{Deo}} \textit{bixu}\ldots[_{v\text{P}} \ldots [_{\text{MP}}^{\text{Dyn}} \textit{ken}\ldots[_{v\text{P}}\ldots]]]]]]]$

complementizer   inflectional   lexical

layer   layer   layer

Thus, I take 16 and 17 as the basis and propose that *hai* and modals can be linearized as follows. First, the additive *hai*, which can be an adjunct of MP^{Epi}, IP, or AspP, may occur either before or after epistemic modals, but should precede deontic and dynamic modals, as in 18. Second, the temporal *hai*, which adjoins to AspP, occurs between epistemic modals and deontic modals, as in 19. Third, the comparative *hai* and the marginal *hai*, which are DegP adjuncts, occur between deontic modals and dynamic modals, as in 20–21, respectively.

(18) additive *hai* > MP^{Epi} > additive *hai* > MP^{Deo} > MP^{Dyn}

    a. (除了煮飯,) 李四(或許)還(或許)洗了碗。
       (chule__zhufan,)__lisi__(huoxu)__**hai**__(huoxu)__xi-le__wan
       in.addition__cook__Lisi__maybe__**HAI**__maybe__wash-PERV__bowl
       (In addition to cooking a meal,) it is also possible that Lisi did the dishes.
       (In addition to cooking a meal,) Lisi may also do the dishes.

b. (除了打針,) 李四(*必須)還(必須)吃藥。

(chule__dazhen,)__lisi__(*bixu)__**hai**__(bixu)__chi__yao

in.addition__injection__lisi__must__**HAI**__must__eat__medicine

(In addition to having an injection,) Lisi also must take medicine.

c. (除了會跳舞,) 李四(*會^Dyn)還(會^Dyn)彈鋼琴。

(chule__hui__tiaowu,)__lisi__ (*hui^Dyn)__**hai**__(hui^Dyn)__tan__gangqin

in.addition__can__dance__Lisi__can__**HAI**__can__play__piano

(In addition to dancing,) Lisi also can play piano.

(19) MP^Epi > temporal *hai* > MP^Deo > MP^Dyn

a. (李四之前喜歡瑪麗,) 他(或許)還(*或許)喜歡她。

(lisi__zhiqian__xihuan__mali,)__ta__(huoxu)__**hai**__(*huoxu)__xihuan__ta

Lisi__before__like__Mary__he__maybe__**HAI**__maybe__like__she

(Lisi has liked Mary.) Perhaps, Lisi still likes her.

b. (李四還在生病,) 他(*必須)還(必須)吃藥。

(lisi__hai__zai__shengbing,)__ta__(*bixu)__**hai**__(bixu)__chi__yao

Lisi__HAI__PROG__sick__he__must__**HAI**__must__eat__medicine

Lisi is still sick. He still needs to take medicine.

c. (李四小時候會^Dyn游泳,) 他現在(*會^Dyn)還(會^Dyn)游。

(lisi__xiaoshihou__hui^Dyn__youyong,)__ta__xianzai__(*hui^Dyn)__**hai**__(hui^Dyn)__you

Lisi__childhood__can__swim__he__now__can__**HAI**__can__swim

Lisi can swim when he was a child, and now he still can swim.

(20) MP^Epi > MP^Deo > comparative *hai* > MP^Dyn

a. 張三(*還)或許比李四(還)高。

zhangsan__(***hai**)__huoxu__bi__lisi__(**hai**)__gao

Zhangsan__**HAI**__maybe__than__Lisi__**HAI**__tall

Zhangsan may be even taller than Lisi.

b. (要進校隊,) 張三(*還)必須比李四(還)高。

(yao__jin__xiaodui,)__zhangsan__(***hai**)__bixu__bi__lisi__(**hai**)__gao

want__enter__varsity__Zhangsan__**HAI**__must__than__Lisi__**HAI**__tall

(In order to be on the varsity team, Zhangsan must be even taller than Lisi.

c. 張三比李四(還)會^Dyn (*還)游泳。

zhangsan__bi__lisi__(**hai**)__hui^Dyn__(***hai**)__youyong

Zhangsan__than__Lisi__**HAI**__can__**HAI**__swim

Zhangsan even swims better that Lisi.

(21) MP^Epi > MP^Deo > marginal *hai* > MP^Dyn

a. 這個地方昨天(或許)還(*或許)安全。

zhe-ge__difang__zuotian__(huoxu)__**hai**__(*huoxu)__anquan

this-CL__place__yesterday__maybe__**HAI**__maybe__safe

This place may be still safe yesterday.

b. 我們對住宿的要求嘛, 交通必須還方便, 價格(必須)還(*必須)便宜。

wome__dui__zhusu-de__yaochiu-ma,__jiaotong__bixu__**hai**__fangbian,__jiage__ (bixu)__hai__(*bixu)__pianyi

we__to__accommodation-DE__request-TOP__traffic__must__**HAI**__
convenient__price__must__HAI__bixu__cheap
As for our request of accommodations, the transportation must be still convenient, and the price must be still low.

c. 張三(*能^{Dyn}/*可以^{Dyn})還(能^{Dyn}/可以^{Dyn})走路。
zhangsan__(*neng^{Dyn}/*keyi^{Dyn})__**hai**__(neng^{Dyn}/keyi^{Dyn})__zoulu
Zhangsan__can/can__**HAI**__can/can__walk
Zhangsan is still able to walk.

Moreover, since *hai* is an adjunct, there can be multiple *hai*s in a sentence. Following the Linear Correspondence Axiom (Kayne 1994), which states that the asymmetrical c-command relation is mapped to the precedence relation at PF, the hierarchy of *hai* in 16 predicts that *hai* with distinct meanings can be ordered as in 22.

(22) $hai_{additive} > hai_{temporal}/hai_{additive} > hai_{comparative}/hai_{marginal}$

The additive *hai* asymmetrically c-commands the temporal *hai*, which in turn asymmetrically c-commands the others. Accordingly, the additive *hai* precedes the temporal *hai*, and the temporal *hai* occurs to the left of the marginal *hai* and the comparative *hai*. As shown by the following examples, the prediction is borne out. Perhaps due to the difficulties in processing, sentences with multiple *hai*s are less preferred, but still some can be found on the Internet and the corpus.

(23) [additive > temporal/marginal]
請不要再送收容所了，在野外還或許還可以活下來。
qing__bu-yao__zai__song__shourongsuo-le,__zai__yewai__**hai**__huoxu__**hai**__
keyi__huo-xiaqu
please__not-want__again__send__shelter-PERF__in__wild__**HAI**__maybe__
HAI__can__survive
Don't send stray dogs to shelters anymore, please. It is also possible that they are still able to survive in the wild, (in addition to other possibilities)[l].

(24) [additive > comparative]
如果收費就算了，竟然還比果汁還貴。
ruguo__shoufei__jiu__suan-le,__jingran__**hai**__bi__guozhi__**hai**__gui
if__charge__just__fine-PERF__surprisingly__**HAI**__than__juice__**HAI**__expensive
It's barely acceptable to pay for hot water. Surprisingly, it is also the case that hot water is even more expensive than juice[m].

(25) [additive > additive]
不但能舒解壓力，還或許還能更專心在工作上。
budan__neng__shujie__yali,__**hai**__huoxu__**hai**__neng__geng__zhuanxin__
zai__gongzuo-shang
not.only__can__relieve__stress__**HAI**__maybe__**HAI**__can__even__
concentrate__in__work-up
This way helps you relieve stress, and it is also possible that it can help you concentrate on your work[n].

Examples 23–24 show that the additive *hai* occurs to the left of *hai*s associated with the temporal, marginal, and comparative meanings. More interestingly, there can be two additive *hai*s in a sentence, as in 25. This co-occurrence of two additive *hai*s also follows from my proposal because they occur in different positions: the first *hai* adjoins to MP^{Epi} in the CP layer and the second *hai* occurs in the IP layer. The word order of *hai*s in 23–25 cannot be reversed; otherwise, the sentences above would become ungrammatical.

In this section, I propose the topography of *hai* and provide two pieces of evidence to support this analysis. I will use the proposed syntactic analysis of *hai* to account for its various meanings in the next section.

3 The semantics of *hai*

This section argues that *hai* only has one core sense, namely, the additive meaning (König 1991). Following the theory of alternative semantics (Rooth 1985, 1992), I propose that the various interpretations of *hai* result from the interactions between the additive meaning and different focus domains and the alternatives evoked by the focus associate. In Section 2.1.1, I briefly introduce the theory of alternative semantics. Then, I argue that the core meaning of *hai* is the additive meaning in Section 2.1.2. Finally, I show how these various readings of *hai* are derived in Section 2.1.3. I will present the idea in a relatively informal way, leaving the formalization of *hai*'s meaning for further research.

3.1 Alternative semantics

What a focus particle contributes to a sentence is influenced by the focus associate (i.e., the focused phrase) in the scope of the particle, which is known as *association with focus* (Jackendoff 1972; Rooth 1985, 1992; Krifka 1992, 2006; among others). Consider 26.

(26) a. John only [$_{VP}$ introduced [BILL]$_F$ to Sue].
    b. John only [$_{VP}$ introduced Bill to [SUE]$_F$].

These sentences only differ in the focus associate. It is *Bill* in 26a and Sue in 26b. Interestingly, this distinction causes 26a and 26b to have different meanings. 26a indicates that, except for Bill, John introduced no one else to Sue; 26b means that John introduced Bill to nobody else but Sue.

Rooth (1985, 1992) propose the theory of alternative semantics to explain this phenomenon. In addition to ordinary semantic values (i.e., the denotation of phrases or sentences), there is another type of semantic value, namely, focus semantic values. To state it more clearly, the focus semantic value refers to the set of elements "obtainable from the ordinary semantic value by making a substitution in the position corresponding to the focused phrase" (Rooth 1992: 76). The elements that can be the replacement are determined by the context. For example, in 26a, the focus associate is *Bill*, and the ordinary semantic value of the syntactic sister of *only* (i.e., [$_{VP}$ introduced [BILL]$_F$ to Sue]) is the property of introducing Bill to Sue. To obtain the focus semantic value, the focus associate *Bill* is replaced by other individuals salient in the context, like Matt, Tom, or Bill himself, resulting in the set of properties {introduce Bill to Sue, introduce

Matt to Sue, introduce Tom to Sue}. This set is the focus semantic value of the sister of *only*. Then, the focus particles *only* asserts that all properties in the set are excluded (i.e., introducing Matt to Sue, introducing Tom to Sue) except the property that has the same meaning as the ordinary semantic value (i.e., introducing Bill to Sue). Thus, 26a has the meaning that John introduced Bill to Sue and he did not introduce other people to Sue.

For ease of exposition, I call the sister of focus particles "the focus domain" (e.g., $[_{VP(=FD)}$ introduced $[BILL]_F$ to Sue] in 26a)°. The ordinary semantic value and focus semantic value of the focus domain are called "the focused denotation" and "the alternatives," respectively. Besides, I assume that the alternatives include only members with different meanings from the focused denotation (e.g., {introduce Matt to Sue, introduce Tom to Sue} for the alternatives of 26a). Based on this, the focus particle *only* asserts that the focused denotation (i.e., introducing Bill to Sue), but not alternatives (i.e., introducing Matt to Sue, introducing Tom to Sue), participates in the following semantic computation. This results in the meaning that the subject *John* possesses the focused denotation, namely *introducing Bill to Sue*, but not the alternatives.

Now, let us turn to 26b. Adjoining to the same position, *only* in 26b has the same focus domain and focused denotation as it does in 26a. However, the focus associate in the focus domain is different (i.e., $[_{VP(=FD)}$ introduced Bill to $[SUE]_F$]), so different alternatives are induced (i.e., {introduce Bill to Jane, introduce Bill to Mary}), given that the salient individuals in the context are Jane and Mary. Then, *only* asserts that the focused denotation (i.e., introducing Bill to Sue) can be composed with the subject (i.e., John), but not the alternative properties (i.e., introducing Bill to Jane, introducing Bill to Mary). Accordingly, 26b indicates that John introduced Bill to Sue, but not the others.

The contrast between 26a and 26b shows that what focus particles contribute to sentences varies with the focus associate. This is because the focus associate serves to identify the alternatives of the focused denotation by specifying the element which can be substituted by other salient elements in the context. Therefore, distinct focus associates lead to different alternatives. Since excluding different alternatives from further semantic computation, the focus particle *only* contributes different meanings to the sentence.

This paper adopts the theory of alternative semantics to derive the various meaning of *hai*. In the next section, I will show that *hai* only has one core sense, the additive sense. The various meanings *hai* contributes actually result from different focus domains, different focus associates, and the alternatives the focus associates induced.

3.2 *Hai* as an additive particle

Focus particles are divided into exclusive (i.e., restrictive) and additive (i.e., inclusive) particles depending on whether the alternatives are excluded from (exclusive particles; cf. 26) or included (additive particles) in further computation (König 1991: 55; also see Sudhoff 2010: 53). Besides, according to whether the alternatives must be arranged on scales, additive particles are further divided into simple inclusion additive particles (henceforth, additive particles) and scalar additive particles (henceforth, scalar particles). Additive particles (e.g., *also*) "do not induce an ordering, but operate over an

unordered set of contextually relevant values" (König 1991: 63; also see Krifka 1999: 1; Sudhoff 2010). For example, *also* in 27 asserts that the focused property *met Mary* applies to the subject *Jenny* (i.e., Jenney has the property of meeting Mary) and presupposes that at least one alternative property, such as *met Bill*, is possessed by *Jenny*. Therefore, 27 indicates that Jenny met Mary and someone else. Crucially, *also* does not induce any scale to rank the properties. That is, Jenny is just as likely to meet Mary as to meet other people salient in the context.

(27) Jenny also [$_{VP=FD}$ met [MARY]$_F$]. [additive particle]
   Jenny met Mary (and she met someone else).

By contrast, scalar particles (e.g., *even*) arrange the focused denotation and its alternatives on a scale and assign the latter an extreme position (Sudhoff 2010: 53; also see König 1991: 38 and 68). In many contexts, this scale is based on the likelihood of an event (Karttunen and Peters 1979; Krifka 1999: 1). As shown in 28, *even* asserts that the focused property *met Mary* is less likely to be applied to the subject than the alternatives, as *met Bill*. Therefore, scalar particles induce a scale of likelihood and require the focused denotation to have a lower value (i.e., less likely) than the alternatives.

(28) Jenny even [$_{VP=FD}$ met [MARY]$_F$]. [scalar particle]
   Jenny met Mary (and Mary is an unlikely person for Jenny to meet with).

Interestingly, with appropriate contexts, additive particles can be associated with scalar interpretations, as shown by the contrast of the German examples in 29 (König 1991: 64).

(29) a. Mein Sohn ist **auch** [EIN GUTER SCHWIMMER]$_F$. [additive sense]
       My son is also a good swimmer.
   b. **Auch** [IN HANNOVER]$_F$ wird eine U-Bahn gebaut. [scalar sense]
       In Hanover, too, a subway is being built.

Example 29b can have the scalar sense that a subway can be built even in Hanover. König (1991) suggests that the focus particle *auch* only contributes the additive meaning to the sentence. That is, in addition to other places, a subway is built in Hanover. Instead, the meaning that Hanover is an unlikely place to have a subway is provided by the context, such as the landform of Hanover. In other words, it is the context that induces a scale of likelihood and the ordering of the focused denotation and alternatives, which are instead encoded in the semantics of scalar particles. Therefore, in 29b, the scalar sense is derived from combining the additive meaning of *auch* with the scale and ordering induced by the context[p].

Accordingly, additive particles intrinsically convey an additive sense, and they do not induce scales or rank the focused denotation and alternatives on the scale. By contrast, scalar particles are only associated with the scalar sense. That is, they induce a scale of likelihood and rank the focused denotation in a lower position of the scale. Therefore, one way to distinguish these two types of particles is to see if they can impose a restriction

of the ordering of the focused denotation and the alternatives. If they do not, the particle is an additive particle.

With this in mind, let us turn to *hai*. I suggest that *hai* is an additive particle because, unlike scalar particles, it does not induce scales or orderings for the focused denotation and the alternatives. As shown in 30, these two semantic components may be unordered. *Hai* only asserts that Xiaoying has the focused property of eating chocolate, in addition to other alternative properties (i.e., ate cookies, drank black tea)[q]. Crucially, *hai* does not assert that it is less likely for Xiaoying to eat chocolate than to have other sweets. That is, *hai* can have a sense of simple inclusion.

(30) Context: Xiaoying loves sweets. As usual, she had some after dinner today.
(除了吃了餅乾,喝了茶,) 小英還[VP=FD吃了巧克力]F。 [additive sense]
(chule__chi-le__binggan,__he-le__cha)__xiaoying__hai__chi-le__qiaokeli
in.addition__eat-PERV__cookie__drink-PERV__tea__Xiaoying__HAI__
eat-PERV__chocolate
Xiaoying ate cookies and drank tea. She also ate chocolate.

Interestingly, if the sentence in 30 is uttered in a different context, like the context where Xiaoying is on the diet, the focused action (i.e., eating chocolate) is less likely to be done by Xiaoying than the alternative actions. Therefore, *hai* can occur in a sentence in which the focused denotation is less likely than the alternatives.

Moreover, 31 shows that *hai* can even allow the focused denotation (i.e., 偷了一台 BMW *tou-le yi-tai BMW* 'stole a BMW') to be ranked in the higher position than the alternative in the context (i.e., 殺了人 *sha-le ren* 'killed people').

(31) (李四殺了人,) 他還[VP=FD偷了一台BMW]F。 [additive sense]
(lisi__sha-le__ren,)__ta__hai__tou-le__yi-tai__BMW
Lisi__kill-PERV__people__he__HAI__steal-PERV__one-CL__BMW
Lisi killed someone and he also stole a BMW.

Stealing and murder are crimes committed by the subject *Lisi* in 31. With regard to crimes, the latter is more serious than the former. This means that the alternative crime (i.e., murder) is less likely to be committed than the focused crime (i.e., stealing).

The discussion above suggests that *hai* does not impose any scale and ordering on the focused denotation and the alternatives because they can be unranked or ranked in either order. This flexible ordering strongly argues that *hai* is an additive particle.

3.3 The multiple senses of *hai*

So far, *hai* is proposed to be an additive particle. The various meanings of *hai* are derived by the interaction of the additive sense and different focused denotations and distinct focus associates, which are restricted by the syntactic positions of *hai*. In particular, the focus domain is immediately c-commanded by *hai*, and the focus associate must be in the scope of the focus particle (Bayer 1996; Büring and Hartmann 2001; Jacob 1983; Sudhoff 2010). Therefore, to derive the meanings of *hai*, one needs to consider its relative syntactic positions. On the basis of the typography proposed in Section 1.1 (cf. 16), in this section, I identify the focused denotation and the

alternatives induced by the focus associate, combining them with the core sense of *hai*, namely, the additive sense, and thereby derive the semantic contribution of *hai* in different environments.

3.3.1 The additive sense

Let us start with the additive *hai*. Syntactically, the additive *hai* is an adjunct of MP^{Epi}, IP, or AspP, as in 32. Constituents below the position of *hai* can be the focus associate, namely, DP, VP, AspP, IP, and MP^{Epi}, as presented by 33a–e, respectively.

(32) $[_{CP} \dots [_{MP}^{Epi} (hai_{additive}) \dots [_{IP} (hai_{additive}) \dots [_{AspP} \dots (hai_{additive}) [_{AspP} \dots [_{VP} \dots]]]]]]$

(33) a. (除了餅乾,) 她$_i$ 還 $[_{MP}^{Epi}{}_{(=FD)}$ 或許 $[_{TP}$ t$_i$ $[_{VP}$ 吃了 $[_{DP}$ 巧克力$]_F]]]$。
   (chule__binggan,)__ta$_i$__**hai**__huoxu__t$_i$__chi-le__**qiaokeli**
   in.addition__cookie__she__**HAI**__maybe__t$_i$__eat-PERV__**chocolate**
   In addition to some cookies, it is also possible that she ate chocolate.
   b. (除了喝了茶,) 她$_i$ 還$[_{MP}^{Epi}{}_{(=FD)}$ 或許$[_{TP}$ t$_i$ $[_{VP}$吃了巧克力$]_F]]$
   (chule__he-le__cha,)__ta$_i$__**hai**__huoxu__t$_i$__**chi-le__qiaokeli**
   in.addition__drink-PERV__tea__she__**HAI**__maybe__t$_i$__**eat**-PERV__
   chocolate
   She drank some tea, and it is also possible that she ate chocolate.
   c. (除了一直在抱怨,) 她$_i$ 還$[_{MP}^{Epi}{}_{(=FD)}$ 或許$[_{TP}$ t$_i$ $[_{AspP}$ 哭了$]_F]]$。
   (chule__yizhi__zai__baoyuan,)__ta$_i$__**hai**__huoxu__t$_i$__**ku-le**
   in.addition__continuously__PROG__complain__she__**HAI**__
   maybe__t$_i$__**cry-PERF**
   She was complaining continuously, and it is also possible that she cried.
   d. 這次颱風, 北部地區已經淹水了, 晚點南部地區$_i$還 $[_{MP}^{Epi}{}_{(=FD)}$ 或許
   $[_{TP}$ t$_i$ 會停電$]_F]$。
   zhe-ci__taifeng__beibu__diqu__yijing__yanshui-le.__wandian__nanbu__
   diqu__**hai**__huoxu__t$_i$__**hui__tingdian**
   this-CL__typhoon__north__area__already__flood-PERF__later__**south
   __area__HAI**__maybe__t$_i$__**will__blackout**
   Northern Taiwan has already been flooded due to this typhoon, and it is also possible that southern Taiwan will experience a blackout later.
   e. 這次颱風來勢洶洶, 北部地區一定會淹水, 南部地區$_i$還$[_{MP}^{Epi}{}_{(=FD)}$
   或許$[_{TP}$ t$_i$ 會停電$]]_F$
   zhe-ci__taifeng__laishixiongxiong,__beibu__diqu__yiding__hui__yanshui,__
   nanbu__diqu$_i$__**hai__huoxu__t$_i$__hui__tingdian**
   this-CL__typhoon__violent__north__area__must__will__flood-PERF__
   south__area__**HAI__maybe__t$_i$__will__blackout**
   The super typhoon is approaching. It must be the case that northern Taiwan will be flooded, and it is also possible that southern Taiwan will experience a blackout.

In the examples in 33, *hai*s adjoin to MP^{Epi}, so they have the same focus domains, namely, MP^{Epi}. However, the focus associates in the sentences are different, and hence the alternatives cannot be the same. In particular, the alternatives of the focused denotation

(i.e., the denotation of the focus domain) (henceforth, fd) in 33a–e are obtained by substituting the correspondent focus associate with other salient elements in the context, as in 34a–e, respectively.

(34) a. the alternatives of fd in 33a: { it is possible that she ate **cookies**, …}
    b. the alternatives of fd in 33b: {it is possible that she **drank green tea**, …}
    c. the alternatives of fd in 33c: {it is possible that she **was crying**, …}
    d. the alternatives of fd in 33d: {it is possible that **northern Taiwan has already been flooded**, … }
    e. the alternatives of fd in 33e: {**it is possible that northern Taiwan will be flooded**, …}

What *hai* contributes here is a simple inclusion additive sense. It asserts that the focused denotation will continue to participate in the computation of a sentence, in addition to the alternatives. No scale or ordering is induced. Take 33a as an example, *hai* asserts that it is possible that she ate chocolate (i.e., the focused denotation) and it is possible that she ate cookies (i.e., the alternatives). *Hai* does not indicate that the focused denotation is less likely than the alternatives, or vice versa.

Recall that in Section 2.1.2, I have mentioned that *hai* can be associated with the scalar meaning if the context induces scales and orderings of the focused denotation and the alternatives. Consider 35.

(35) Context: Xiaomei has been going on a diet recently, so she has to keep sweets away. However, she terribly desired sweets today, and unfortunately had some.
(除了吃了餅乾, 喝了茶,) 小美還[$_{AspP=FD}$吃了巧克力]$_{F}$ [scalar sense]
(chule__chi-le__binggan,__he-le__cha,)__xiaomei__**hai__chi-le__qiaokeli**
in.addition__eat-PERV__cookie__drink-PERV__tea__Xiaomei__**HAI__**
eat-PERV__chocolate
Xiaomei ate cookies and drank tea. She even ate chocolate.

The above example means that Xiaomei is less likely to eat chocolate (i.e., the focused denotation) than to eat cookies and drink tea (i.e., the alternatives). That is, there is a scale of likelihood and the focused denotation is located in the lower part of the scale than the alternatives. I proposed that *hai* only contributes the additive sense to the sentence. That is, *hai* asserts that Xiaomei did the focused action (i.e., eating chocolate) and the alternatives actions (i.e, eating cookies, drinking tea), as in 36.

(36) The function of *hai* in 35
    a. the focused denotation: {**eating chocolate**}
    b. the alternatives: {**eating cookies**, **drinking tea**}

Based on 36, the context induces the scale and ordering. Xiaomei is on a diet, as the context mentions, so the information about the calorie content of food is very important. Thus, the scale of the amount of calories is induced in this context, as presented in 37.

(37) The order in the scale of *the amount of calories* (contextually induced)

drinking black tea　eating cookies　eating a chunk of chocolate

As the scale shows, eating chocolate causes Xiaomei to absorb more calories than its alternatives (i.e., drinking black tea, eating cookies), so it is the least likely thing that Xiaomei, who is on a diet, would do; this results in the scalar meaning. To sum up, *hai* only denotes an addition meaning. The apparent scalar meaning results from the high degree of the focused property in the contextually induced scale and it is unlikely for the subject to have this property.

3.3.2 The temporal sense

As discussed in Section 1.1.2, *hai* in the temporal use attaches to AspP headed by the imperfective aspect, such as 在 *zai* 'PROG'. See Example 38.

(38) (李四剛剛在洗碗,) 他現在還在洗。
 (lisi　ganggang　zai　xi　wan,)　ta　xianzai　hai　zai　xi
 Lisi　just.now　PROG　wash　bowl　he　now　HAI　PROG　wash
 Lisi was doing dishes just now, and he is still doing now.

The imperfective aspect regulates the relation between the situation time (e.g., the time when Lisi is washing dishes) and the topic time (e.g., 現在 *xianzai* 'now'): the latter must be included in the former (Klein 1994). In other words, the state is required to hold through the topic time. Notice that the topic time is encoded as a variable (henceforth, t_{Top}) in the aspect marker and its reference is left unspecified until TP, where the topic time is merged. For example, in 38, AspP denotes that the state of doing the dishes holds through t_{Top}, and its value is assigned as *now* when *xianzai* is merged in the TP later, yielding the meaning that this state holds through now. That is, Lisi is doing the dishes now.

Adjoining to AspP headed by *zai*, the temporal *hai* has AspP as the focus domain and t_{Top} as the focus associate, as sketched in 39. As in 40a, the focused denotation is that the activity denoted by the predicate (i.e., doing the dishes) holds through the focus associate t_{Top}. By replacing t_{Top} with other salient topic times t_{Top}' in the context, the alternatives of the focused denotation are states which hold through t_{Top}', as in 40b. Notice that t_{Top} and t_{Top}' are variables. T_{Top} is bound by the temporal adverbial *xianzai* when it is merged in TP, and t_{Top}' is bound by the salient topic time in the context, like 剛剛 *ganggang* 'just now'.

(39) $[_{CP} \ldots [_{IP} \ldots [_{AspP} \textit{hai} _{\text{temporal}} \ldots [_{\textbf{AspP (=FD)}} \ldots [^{\textbf{0}}_{\textbf{Asp}} \textbf{t}_{\textbf{Top}}]_{\textbf{F}} \ldots]]]]]$

(40) The function of *hai* in 38
 a. the focused denotation: {doing dishes at $\textbf{t}_{\textbf{Top}}$ }
 b. the alternatives: {doing dishes at $\textbf{t}_{\textbf{Top}}'$, ...}

Hai asserts that the state of doing the dishes holds through the topic time in focus (i.e., now) and presupposes that this state also holds though the alternative topic time

(i.e., just now). This meaning suggests that *hai* still contributes the additive sense to a sentence. That is, *hai* asserts that the state in question holds through t_{Top} and t_{Top}'.

However, the previous analyses, like Liu (2000), suggest that the temporal *hai* denotes a sense of persistence. That is, the state in question should persist from t_{Top}' to t_{Top}. By contrast, in my analysis, this persistence sense is not part of the semantics of *hai*. Instead, it is just a conversational implicature. If t_{Top} and t_{Top}' at which the state holds are not temporally distant from each other, it is easy to imply that the state persist from t_{Top}' to t_{Top}. See 41 for an illustration.

(41) The temporal scale induced by t_{Top} and t_{Top}'

shi fenzhong-qian 'thirty minutes ago'   *xianzai* 'now'

doing the dishes   doing the dishes
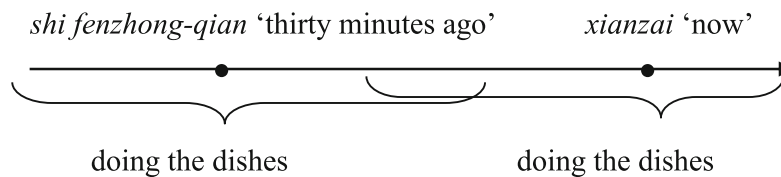
Being a conversational implicature, the persistence sense can be cancelled, as predicted. See the dialogue in 42.

(42) Context: Zhangsan went to sleep at 3:00 yesterday afternoon, and he was still sleeping at 9:00 last night. At 10:00 this morning, Lisi, Zhangsan's brother, found that it seemed that Zhangsan had not woken up. He asked his mom:

李四: 張三還在睡嗎?

Lisi: zhangsan__hai__zai__shui__ma

Zhangsan__HAI__PROG__sleep__Q

Is Zhangsan still sleeping?

媽媽: 是啊, 他還在睡, 不過中間有醒來過。

Mom: shi-a,__ta__hai__zai__shui,__buguo__zhongjian__you__xinglai-quo

yes-SFP__he__HAI__PROG__sleep__but__between__have__wake.up-EXP

Yes, he is still sleeping. But he woke up a few hours ago.

In the context of 42, Lisi knew that Zhangsan was sleeping from 3:00 p.m. to 9:00 p.m. yesterday, and he wondered whether Zhangsan is still sleeping now (i.e., 10:00 a.m. today). Mom replied his question by the answer, which contains *hai*. It means that Zhangsan is sleeping at 10:00 a.m., in addition to other salient topic times (e.g., 3:00 p.m. and 9:00 p.m. yesterday). Besides, this sentence also implies that he was sleeping from 3:00 p.m. yesterday to 10:00 a.m. today. However, this implicature is not true. Thus, Mom cancelled the implicature by the second conjunct that indicates that Zhangsan woke up between 9:00 p.m. yesterday and 10:00 a.m. today. The cancellability suggests that the persistence sense is a conversational implicature triggered by the temporal scale, which is induced by the focus associate t_{Top} and other salient topic time t_{Top}' in the context. What *hai* contributes to a sentence is the additive meaning.

3.3.3 The marginal sense

When *hai* immediately precedes gradable predicates, a sentence containing it may convey a sense of marginality. For example, 43 indicates that Zhangsan's room is considered marginally clean.
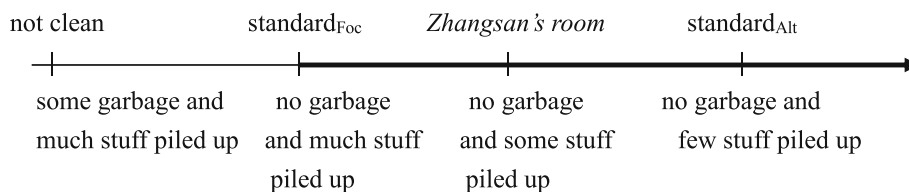
(43) 張三的房間[$_{DegP}$ 還 [$_{DegP\ (=FD)}$ [$_{Deg}$^{0} ***pos***]$_F$ [$_{AP}$ 乾淨]]]。

      zhangsan-de__fangjian__hai__ganjing

      Zhangsan-DE__room__HAI__clean

      Zhangsan's room is still clean.

Before discussing the marginal sense, I digress to explain how to judge whether an object has a gradable property in the semantics. For example, to judge whether a cup of coffee is expensive, one should see if the degrees of the property (i.e., being expensive) of the cup of coffee are higher than those of the standard of comparison in the context. If so, the cup of coffee is judged to have the property of being expensive. This intuition is formalized by the semantics of the positive morpheme (*pos*) (Kennedy 2007; also see Liu 2010a).

With this in mind, let us return to 43. Syntactically, *hai* adjoins to DegP, so the focus domain is DegP. I propose that the focus associate of *hai* is the standard encoded in *pos* (henceforth, the standard$_{Foc}$), which is in the focus domain. Imagine that there is no garbage but some stuff is piled up in Zhangsan's room. To let the speaker judge that Zhangsan's room is clean, the degrees of the cleanness of the standard$_{Foc}$ should be lower than the cleanness of Zhangsan's room. For example, the standard$_{Foc}$ may refer to rooms with no garbage but with much stuff piled up. Hence, the focused denotation of DegP indicates that the rooms that are cleaner than rooms with no garbage but with much stuff piled up are considered clean, as in 44a. By replacing the standard$_{Foc}$ with other standard salient in the context (e.g., rooms without garbage and with few stuff piled up) (henceforth, standard$_{Alt}$), the alternatives are obtained, namely, the alternative judgments of the property cleanness, as in 44b. The gradable property of being clean induces a scale of cleanness, in which Zhangsan's room, the standard$_{Foc}$ and the standard$_{Alt}$ are ordered according to the degrees of the cleanness of them. Please see 45.

(44) The function of *hai* in 43

    a. the focused denotation: {rooms cleaner than **rooms with no garbage but with stuff piled up** are clean}

    b. the alternatives: {rooms cleaner than **rooms without garbage and with few stuff piled up** are clean, …}

(45) The scale induced by the property of being clean

not clean	standard$_{Foc}$	*Zhangsan's room*	standard$_{Alt}$
some garbage and much stuff piled up	no garbage and much stuff piled up	no garbage and some stuff piled up	no garbage and few stuff piled up

The standard$_{Foc}$ are less clean than the standard$_{Alt}$. Therefore, Zhangsan's room is considered marginally clean because this room is only higher than the standard$_{Foc}$, which has lower degrees of cleanness.

Attentive readers may wonder why the standard$_{Foc}$ has lower degrees of properties than the standard$_{Alt}$, but not vice versa. I suggest that this restriction has to do with the nature of the additive meaning. Being an additive particle, *hai* requires

the focused denotation to provide different information from its alternatives. As in 46, if the standard$_{Foc}$ is less clean than the standard$_{Alt}$, the domain of being clean is widened from rooms that are at least as clean as rooms without garbage and with only few stuff piled up (i.e., the standard$_{Alt}$) to the set of rooms that are at least as clean as rooms without garbage but with much stuff piled up (i.e., the standard$_{Foc}$). This extension makes more rooms to be counted as being clean, which satisfies the requirement of the additive meaning. By contrast, if the standard$_{Foc}$ is cleaner than the standard$_{Alt}$, the focused denotation would not extend the domain of being clean, and hence, it would provide no more information from the alternatives. See 46b. That is the reason why the standard$_{Foc}$ can never have higher degrees than the standard$_{Alt}$.

(46) The scale of cleanness

    a. standard$_{Foc}$ < standard$_{Alt}$
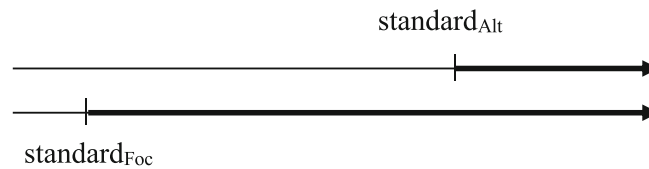
    b. #standard$_{Alt}$ < standard$_{Foc}$
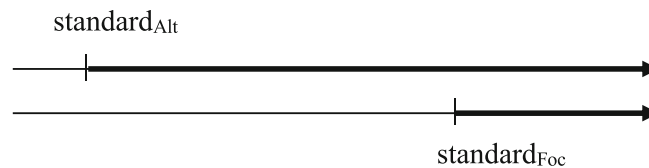
Hai asserts that there is a standard (i.e., standard$_{Foc}$) of the property denoted by the gradable predicate, in addition to other standards (i.e., the standard$_{Alt}$). The standard$_{Foc}$ must have lower values than the standard$_{Alt}$ because the nature of the additive meaning requires that the focused denotation should provide more information. Accordingly, since being judged by the standard of comparison with lower degrees, the subject is considered to have the property in a marginal way.

3.3.4 The comparative sense

It is observed that the comparative *hai* triggers the positive presupposition, which requires that the subject and the standard both have a positive sense of the property denoted by the predicate (Michaelis 1993; Liu 2000). For example, with the occurrence of *hai*, 47 presupposes that Zhangsan and Lisi are tall. This is supported by the infelicity of 47, where the comparative *hai* is followed by a clause that negates the positive presupposition. By contrast, if *hai* does not appear (Liu 2011: 34), no positive presupposition is induced and it is felicitous to have the same follow-up sentence.

(47) 雖然張三比李四[DegP (#還) [**DegP(=FD)** [**Deg0** *geng*]**F** 高]]，但他們兩個都不高。
    suiran__zhangsan__bi__lisi__(#hai)__***geng*** __gao,__dan__ta-men__liang-ge__
    dou__bu__gao

although__Zhangsan__than__Lisi__HAI__*geng*__tall__but__they__
two-CL__all__not__tall
Although Zhangsan is still taller than Lisi, but both of them are not tall.

Thus, the contrast above seems to suggest that *hai* is a presupposition inducer. But a careful examination indicates that it is just an illusion. In 48, when the comparatives contain a differential phrase like 三公分 *san-gongfen* 'three centimeter', this effect disappears[r]. Speakers who observe the contrast in 47 find that it is felicitous to conjoin the comparative with a follow-up sentence that negates the so-called positive presupposition.

(48) 雖然張三比李四[$_{DegP}$還[$_{DegP(=FD)}$ *geng* 高 [三公分]$_F$], 但他們兩個都不高。
suiran__zhangsan__bi__lisi__hai__gao__**san-gongfen,**__dan__ta-men__
liang-ge__dou__bu__gao
although__Zhangsan__than__lisi__HAI__tall__**three-centimeter**__but__they__
two-CL__both__not__tall
Although Zhangsan is still three centimeters taller than Lisi, but both of them are not tall.

The cancellability of the positive effect in 48 suggests that the infelicity in 47 is more like an implicature than a presupposition. Besides, whether *hai* induces this positive implicature depends on what is the focus associate in the focus domain, DegP.

On the one hand, the focus associate in 47 is the comparative morpheme *geng*, which denotes a superiority relation. Thus, as 49a shows, the focused denotation is the property taller. The alternatives are obtained by making a substitution of this relation by other salient in the context, like equality or inferiority. Consider 49.

(49) The function of *hai* in 47
　　a. the focused denotation: {tall**er**}
　　b. the alternatives: {**as** tall **as, less** tall}

Based on 49, *hai* asserts that the superiority relation of tallness holds for the subject (i.e., Zhangsan) and standard of the comparison (i.e., Lisi). If Lisi is not tall, it is normal that Zhangsan is taller than him. Therefore, emphasizing the superiority relation, which is not prominent enough, violates the maxim of manner (Grice 1989), and results in the infelicity effect in 47.

On the other hand, the focus associate in 48 is the differential *san gongfen*. Replacing this in the focus domain with other differentials that are salient in the context yields the alternative set, as in 50.

(50) The function of *hai* in 48
　　a. the focused denotation: {taller by **three centimeters**}
　　b. the alternatives: {taller by **two centimeters**, taller by **four centimeters**, …}

Different from 47, 48 conveys enough information because the focus associate in the sentence is differentials rather than the relation of superiority. Therefore, the

standard does not need to have a positive sense. Hence, the positive implicature is not derived in 48.

Before ending this section, it is worthwhile to discuss sentences in which *hai* precedes the *bi* phrase. One reviewer suggests that these sentences also have the positive effect, as in 51.

(51) 張三很高, 李四還比張三高。
zhangsan__hen__gao,__lisi__**hai**__bi__zhangsan__gao.
Zhangsan__very__tall__Lisi__**HAI**__than__Zhangsan__tall
Zhangsan is very tall, and Lisi is even taller than him.

The standard of comparison has a positive sense of *tallness*, but this is because the degree is already set to be at least as tall as the general standard in the context. It has nothing to do with *hai*.

Besides, there are some examples where the standard following *hai* does not have a positive sense. Take 52 for example. In the context, Lisi is only 155 cm tall and would be considered to be short. However, in the third clause in 52, Lisi can be used as the standard of comparison.

(52) Context: Zhangsan is 150 cm tall, Lisi is 155 cm tall, and Wangwu is 160 cm tall.
張三150公分高, 李四比他高, 王五[$_{DegP}$ 還 [$_{DegP(=FD)}$ 比李四高]$_F$]。
zhangsan__yibaiwushi__gongfen__gao,__lisi__bi__ta__gao,__wangwu__**hai__
bi__lisi__gao**
Zhangsan__150__centimeter__tall__Lisi__than__he__tall__Wangwu__**HAI__
than__Lisi__tall**
Zhangsan is 150 cm tall. Lisi is taller than him. Wangwu is even taller than Lisi.

Preceding the *bi* phrase, the focus domain is DegP containing the standard of comparison, as in 52. I propose that the focus associate is the degrees more than the degrees of the tallness of Lisi (i.e., the degrees of tallness of Wangwu). To obtain the alternatives, the focused degrees are replaced by other degrees salient in the context, such as the degrees to which Lisi is tall (i.e., 155 cm tall), as in 53. The gradable predicate induces a scale of tallness and ranks the focused degrees and the alternatives, as in 54.

(53) The function of *hai* in 52
   a. the focused denotation: {**taller than 155 cm**}
   b. alternatives: {**155cm tall**, **150cm tall**, …}

(54) The scale induced by *tallness*

The focused degrees (taller than 155cm)

alternative (155cm tall)
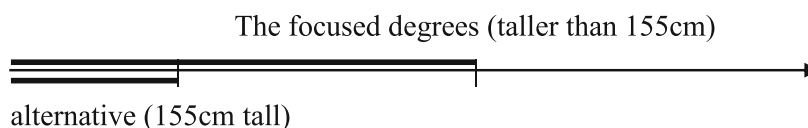
Then, *hai* asserts that focused degrees of tallness are true of the subject, in addition to the alternative degrees. Because the focused denotation must provide more

information than the alternatives, the focused degrees should be higher than alternative degrees. By doing so, the degrees which are true of the subject can be expanded from those that are not higher than 155 cm to those higher than 155 cm, as in 54. Therefore, similar to the other uses of *hai*, *hai* in 52 only contributes the additive meaning to a sentence, and the scales and ordering are instead provided by other components, such as gradable predicates.

As for the lack of the positive implicature, since the focus associate in 53 is degrees instead of superiority relation (cf. 49), the participants in the conversation do not need to assume that the standard has the positive sense to make sentences informative[s].

3.3.5 The focus domain

So far, I have discussed how the various meaning of *hai* is derived by the interaction of the core meaning and the different focus associates. In this section, I point out that the focused denotation (i.e., the denotation of the focus domain) also helps to restrict the meaning of *hai*.

Hai in each meaning has a semantic selection of the semantic types of the focused denotation and the alternatives: the marginal *hai* requires the focused denotation and alternative to refer to judgments with different standards; the comparative *hai* requires them to refer to different comparative relations; the temporal *hai* requires them to refer to states holding through different topic times; the additive *hai* requests them to refer to different events, propositions, or possibilities.

For example, when *hai* adjoins to MP^{Epi} and has MP^{Epi} as the focus domain, the correspondent focused denotation and alternatives refer to different possibilities, as in 55. As mentioned above, the additive *hai* selects this semantic type, so *hai* adjoining to MP^{Epi}, has the additive reading.

(55) a. 張三在浴室洗臉, 他還或許在洗澡。 [additive]
   zhangsan__zai__yushi__xilian,__ta__**hai__huoxu**__zai__xizao
   Zhangsan_PROG__bathroom__wash.fash__now__he__**HAI__maybe**__
   PROG__take.bath
   Intended: Zhangsan is washing his face in the bathroom, and it is also possible
   he is taking a bath.
  b. 除了可以自己吃飯, 張三還或許可以走路。 [additive]
   chule__keyi__ziji__chifan,__zhangsan__**hai__huoxu**__keyi__zoulu
   in.addition__able__self__eat__Zhangsan__**HAI__maybe**__able.to__walk
   In addition to being able to eat on his own, it is also possible that Zhangsan is
   barely able to walk.

Interestingly, in 55 *hai* in this position cannot have other interpretations, such as the temporal and marginal meaning, as shown in 56.

(56) a. ??張三剛剛在洗澡, 現在他還或許在洗。 [temporal]
   ??zhangsan__ganggang__zai__xizao,__xianzai__ta__hai__huoxu__zai__xi
   Zhangsan__just.now__PROG__take.bath__now__he__HAI__maybe__
   PROG__take.bath
   Intended: Zhangsan was taking bath just now. Perhaps, he is still taking a bath
   now.

b. #張三還或許可以走路。 [marginal]
#zhangsan__hai__huoxu__keyi__zoulu
Zhangsan__HAI__maybe__able.to__walk
Intended: Perhaps, Zhangsan is barely able to walk.

In the above sentences, *hai* adjoins to MP^{Epi} and have MP^{Epi} as the focus domain. Since any element in the focus domain can be the focus associate, *hai* can have the same focus associate as the focus associates of the temporal *hai* and the marginal *hai*. Consider 57a and 58a. However, *hai*s in 56 cannot have these two meanings[t].

(57) Temporal sense
   a. ...xianzai$_i$ ta$_j$ **hai** [$_{MP}$^{Epi} $_{(=FP)}$ huoxu [$_{TP}$ t$_i$ t$_j$...[$_{AspP}$...[$_{Asp}$^{0} **zai-t$_{Top}$**]$_F$ xi]]]
   b. the focused denotation: {probably he is taking a shower right now}
   c. alternatives: {probably he was taking a shower just now,... }

(58) Marginal sense
   a. Zhangsan$_i$ **hai** [$_{MP}$^{Epi} $_{(=FP)}$ huoxu [$_{TP}$ t$_i$...[$_{DegP}$ [$_{Deg}$^{0} ***pos***]$_F$ [$_{MP}$^{Dyn} keyi zoulu]]]]
   b. the focused denotation: {probably Zhangsan is counted as able to walk based on the judgment that people can walk if able to move by their own leg}
   c. alternatives: {probably Zhangsan is counted as able to walk based on the judgment that people can walk if able to walk smoothly, ...}

The awkwardness of the temporal and marginal meaning of *hai* in 56 is caused by the incompatible semantic types of the focused denotation and alternatives. As in 57b,c and 58b,c, the focused denotation and alternatives refer to possibilities in 56. However, the temporal *hai* selects those denoting states, and the marginal *hai* chooses those denoting judgments of a gradable property. This is the reason why 56 cannot have these two interpretations.

This section shows that the semantic type of the denotation of the focus domain plays an important role in deriving the reading of *hai*. More interestingly, these semantic types are mapped into distinctive projections in syntax, so the syntactic positions of *hai* determine the semantic types of the denotation of the focus domain, which results in a transparent mapping between syntactic positions and semantic interpretations: when adjoining to DegP, *hai* has DegP as the focus domain, which may denote judgments with different standards or different comparatives relations. By combining them with the additive meaning of *hai*, the marginal meaning and the comparative meaning are derived, respectively. Besides, the temporal meaning is derived if *hai* adjoins to AspP: the focus domain is AspP, which can denote states holding at different topic times. Moreover, the additive reading is derived when *hai* is attached to AspP, IP, and MP^{Epi}. Thus, the focus domain can be AspP, IP, and MP^{Epi}, which have the denotation of events, propositions, and possibilities, respectively. These semantic types are compatible with the additive meaning.

4 An alternative analysis: *hai* as a scalar particle

To the best of my knowledge, not much research has been done to examine and explain the various interpretations of *hai* in the theoretical linguistics literature. In this

section, I review one of the previous analyses. Liu (2000) adopts the scalar model proposed by Fillmore et al. (1988) to account for the semantics of *hai* (also see Kay 1990). Different from Krifka (1999), who takes the focused denotation and alternatives to be ordered along the scale of likeliness, the scale model ranks them in terms of informativeness. Along this line, Liu proposes that *hai* is a scalar particle with the meaning of persistence (also see Michaelis 1993), ranking two propositions. One refers to the proposition uttered with *hai*, which is called the text proposition (tp). The other one, known as the context proposition (cp), is the proposition already presented in the context. As a scalar particle, *hai* specifically requires tp to be ranked higher than cp in the scale model. The more informative proposition entails, the less informative one, so tp should entail cp.

With this core meaning, Liu further composes it with different dimensions of the scale model to derive various meanings. For example, the semantic dimension of the temporal *hai* is persistence through time. As shown in 59, the tp is 現在在看電視 *xianzai zai kan dianshi* 'watching TV now', and the covert cp is *watching TV just now*. Due to the persistence property, the former implies the latter and hence is more informative. Thus, *hai* can be used in this sentence.

(59) 老王現在還在看電視。 [temporal]
　　 laowang__xianzai__hai__zai__kan__dianshi
　　 Laowang__now__HAI__PROG__watch__TV
　　 Laowang is still watching TV now.

As for the additive *hai*, the semantic dimension is the number of events related to the topic. For instance, the topic of 60 (Liu 2000: 30) refers to the things Laowang has done. The tp is the entire sentence, and the cp consists of all conjuncts in 60 except for the last one. Then, the tp entails that four things were done and the cp entails that three things were done. Thus, the former entails the latter, hence satisfying the requirement of *hai*.

(60) 老王買了車, 洗了衣服, 寫了一封信, 還做了一個蛋糕。 [additive]
　　 laowang__mai-le__cai,__xi-le__yifu,__xie-le__yi-feng__xin,__hai__zuo-le__
　　 yi-ge__dangao
　　 Laowang__buy-PERV__groceries__wash- PERV__clothes__write- PERV__
　　 one-CL__letter__HAI__make- PERV__one-CL__cake
　　 Laowang bought groceries, did the laundry, wrote a letter and also made a cake.

Besides, Liu mentions that the comparative *hai* can be explained along the same line. In 61, the sentence itself provides the tp and the standard 我的 *wode* 'mine' offers information for the cp, as in 62a,b respectively. Then, it is assumed that the tp entails the cp, which obeys the requirement of *hai*.

(61) 老王的房間比我的還乾淨。 [comparative]
　　 laowang-de__fangjian__bi__wode__hai__ganjing
　　 Laowang-DE__room__than__mine__HAI__clean
　　 Laowang's room is even cleaner than mine.

(62) a. Laowang's room is y degree clean, where y > x. (text proposition)

b. My room is x degree clean. (context proposition)

In sum, Liu tries to decompose these readings into a core meaning and distinct dimensions. This approach is very inspiring but analyzing *hai* as a scalar particle in the scalar model still needs more elaborations. One of the concerns is that it is hard to tell what *hai* contributes to a sentence. Although Liu proposes that *hai* requires the tp to be more informative than the cp, it is still unclear what is the meaning that *hai* contributes to a sentence. Take 60 as an example: the cp involves three conjuncts about what Laowang has done, and the tp involves four conjuncts; hence, tp entails cp, as *hai* requires. In fact, this increase of informativeness may just follow from the rationale of pragmatics instead of *hai*: The more propositions the speaker uttered for a topic, the more information he provided. Thus, an utterance that contains four conjuncts about what Laowang has done is more informative than an utterance that contains three conjuncts.

Besides, the entailment of tp and cp is hard to test when degrees are involved. For example, to me, it is weird to claim that the tp of comparative *hai* entails the cp.

Moreover, since the informativeness of a proposition is evaluated in the pragmatics, this proposal does not respect the structure of a sentence. That is, the syntactic position of *hai* is considered irrelevant to its interpretation according to his proposal. As a result, Liu's analysis predicts that *hai* can have as many readings as the context allows. For example, the comparative *hai* in 61 should also have the temporal reading and additive reading in appropriate contexts. Unfortunately, the prediction is not borne out, as evidenced by the examples in 63 and 64.

(63) Context: Laowang's room was cleaner than mine yesterday.
#老王的房間現在比我的還乾淨。 [temporal]
#laowang-de__fangjian__xianzai__bi__wode__**hai**__ganjing
Laowang-DE__room__now__than__mine__**HAI**__clean
Laowang's room is still cleaner than mine now.

(64) Context: Laowang's room is cleaner than mine.
#老王的房間比我的還乾淨。 [additive]
#laowang-de__fangjian__bi__wode__**hai**__ganjing
Laowang-DE__room__than__mine__**HAI**__clean
Laowang's room is also cleaner than mine.

The context in 63 suggests that the dimension is persistence through time, so the tp is *Laowang's room is cleaner than mine now* and the cp is *Laowang's room is cleaner than mine yesterday* (cf. 59). The former implies the latter, and therefore obeys the requirement of *hai*. Under this circumstance, it is predicted that *hai* can have the temporal sense, which is, however, contrary to the fact. Besides, based on the context in 64, the dimension is the number of the properties of Laowang's room, such as the space and the cleanness (cf. 60). The tp is *Laowang's room is bigger than mine and is also cleaner than mine*, entailing two properties, and the cp is *Laowang's room is bigger than mine*, only entailing one; hence, tp entails cp. Therefore, *hai* in 64 could have the additive reading, but the prediction is not borne out.

By contrast, the analysis that I argue for in this paper avoids these problems. First, *hai* is treated as an additive particle (König 1991), so the semantic contribution of *hai* is clear: *Hai* asserts that the focused denotation can participate in the following semantic computation of the sentence, in addition to alternatives (cf. Section 2.1.2). Second, this analysis restricts the interpretations of *hai* by the syntactic position of *hai* (cf. Section 2.1.3): the meaning of *hai* is determined by the semantic types of the denotation of the focus domain, which is the sister of *hai*, and the focus associate, which must be in the scope of *hai* (Büring and Hartmann 2001; Sudhoff 2010). For example, in 63 and 64, *hai* can only have the comparative meaning because *hai* adjoins to DegP, in which *hai* only scopes over the comparative morpheme. To have the temporal meaning and the additive meaning, *hai* should occur in a position high enough to scope over AspP. Accordingly, my analysis can exclude these unwanted readings.

Before ending this section, let us look at some more examples, in which *hai* seems to occur in the same place, and yet several interpretations are possible. Consider 65–66.

(65) Context: Laowang's room was cleaner than mine yesterday.
老王的房間現在還(是)比我的乾淨。 [temporal]
laowang-de__fangjian__xianzai__**hai**__(shi)__bi__wode__ganjing
Laowang-DE__room__now__**HAI**__be__than__mine__clean
Laowang's room is still cleaner than mine now.

(66) (老王的房間比我的大,) 老王的房間還比我的乾淨。 [additive]
(laowang-de__fangjian__bi__wode__da,)__laowang-de__
fangjian__**hai**__bi__wo-de__ganjing
Laowang-DE__room__**HAI**__than__mine__big__Laowang-DE__room__than__
mine__clean
Laowang's room is bigger than mine and is also cleaner than mine.

From the surface word order, *hai* in 65 and 66 seems to appear in the same position. However, they, in fact, occur in different positions and have different focus domains and focus associates. Thus, different meanings can be derived. First, *hai* in 65 adjoins to AspP, so AspP is the focus domain and the focus associate is the topic time encoded in Asp^0. Thus, the focused denotation is the state of *cleaner than mine* holding in the focus associate t_{Top}. Replacing t_{Top} with other salient topic times t_{Top}' in the context results in states holding through the alternative t_{Top}'. Then, *hai* asserts that the state holds through t_{Top} and t_{Top}', which will be valued as *xianzai* and 昨天 *zuotian* 'yesterday' later, hence the temporal sense. Second, the additive *hai* in 66 is also attached to AspP, having AspP as the focus domain and DegP as the focus associate. By making a substitution of the focus associate (i.e., *cleaner than mine*), the alternatives are obtained (i.e., *bigger than mine*). Based on this, *hai* asserts that the subject 老王的房間 *laowang-de fangjian* 'Laowang's room' has the focused property (*cleaner than mine*), in addition to the alternative properties (i.e., *bigger than mine*), yielding the additive sense.

The discussion of 63–66 suggests that it is necessary to consider the syntactic position in order to derive the meanings of *hai*. This is because the syntactic position of

hai determines what the focus domain is and what elements can be the focus associate. In other words, these components cooperate to derive the meaning of *hai*. By doing so, this proposal not only accounts for the correct readings of *hai* (c.f., 65–66) but also avoids the problem of overgeneration (c.f. 63–64).

5 Conclusion

In this paper, I examine the distribution of the particle *hai* with the additive meaning, temporal meaning, comparative meaning, and marginal meaning in Mandarin Chinese. Through the word order between *hai* on the one hand and adverbials, aspects and modals, on the other hand, it is observed that there is a transparent mapping of the syntactic positions and the semantic interpretations of *hai*: the additive *hai* adjoins to AspP, IP, or MP^{Epi}; the temporal *hai* is attached to AspP; the marginal *hai* and the comparative *hai* are DegP adjuncts. I suggest that *hai* only has one core sense, the additive meaning (König 1991), and the various meanings are derived from the composition of the core sense and the denotation of the focus domain, as well as its alternatives induced by the focus associate, along the line of alternative semantics (Rooth 1985, 1992). The focus domain is the sister of *hai* and the focus associate should in the scope of *hai*. Therefore, the syntactic position of *hai* plays an important role in determining the meaning of *hai*. Different from the previous studies, this paper argues that to derive the meaning of *hai*, one should also take the syntactic position of *hai* into consideration. This idea also echoes the cartographic framework, which assumes a transparent mapping between syntax and semantics (Rizzi 1997; Cinque 1999; Cinque and Rizzi 2010).

Endnotes

[a]Abbreviations used in this paper included: HAI: the morpheme *hai*, PROG: progressive aspect, EXP: experiential aspect, PERV: perfective aspect, PERF: perfect aspect, FOC: focus marker, SHI: the marker *shi*, CL: classifier, DE: the marker for modifying phrases in MC, PL: plural marker, GENG: comparative morpheme, Q: question particle, and SFP: sentence final particle.

[b]This paper will not discuss *hai* in the subjective use, which expresses a subjective evaluation or attitude toward the proposition. This is because *hai* in this use always occurs in special structures, such as rhetorical questions. See Example i below (Liu 2000: 72). Therefore, this meaning is not intrinsically contributed by *hai*. Instead, the clause type plays a more important role. Thus, I leave this issue for further research.

(i) 這還用說? 天天吵著我帶他去。

    zhe_hai_yong_shuo?_tiantian_chao-zhe_wo_dai_ta_qu

    This_HAI_need.to_say_Every.day_cry-ASP_I_take_him_go

    Of course. (Lit. Does this still need to be said?) Everyday he asks me to take him there.

[c]*Hai* may have a concessive meaning when immediately following the focus marker 是 *shi*, as in i.

(i) (雖然張三很累,) 他還*(是)洗了碗。 [concessive]

    (suiran_zhangsan_hen_lei,)_ta_hai_*(shi)_xi-le_wan

    although_Zhangsan_very_tired_he_HAI_SHI_wash-PERV_bowl

    Although Zhangsan was tired, he still did the dishes.

In this use, the marker *shi* 'SHI' is obligatory and should be adjacent to *hai*. The adjacency property suggests that they are used as a unit. I suggest that *shi* is a verum focus marker, which focuses the truth values of a proposition (Höhle 1992; Schaffar and Chen 2001). *Hai* adjoins to 是 *shi* 'FOC', the head of FocP, forming a complex Foc^0. Semantically, the concessive meaning is composed of the scalar implicature (Hirschberg 1991 and Fox 2007), induced by *shi*, and the additive meaning denoted by *hai*. This is a possible analysis of the syntax and semantics of *hai-shi*. Since the focus of this paper is the lexical item *hai*, I will leave this issue for further research.

[d]One reviewer thinks that the additive *hai* can appear before *haoxiang*. After checking BLCU, there are much more examples with the additive *hai* following *haoxiang* than those with the reverse order. Besides, for the native speakers that I consulted, the former word order is preferred over the latter one, and more importantly, in either order, *haoxiang* is interpreted as taking a wide scope. This means that *hoaxing* always scopes over the additive *hai* regardless of their surface order. Accordingly, I suggest that *hai* is located below *haoxiang*, and the reverse order may result from other reasons, like the performance factors.

[e]One anonymous reviewer cannot accept 6b, where the additive *hai* precedes *huoxu*, unless *huoxu* is replaced with another epistemic modal 可能 *keneng* 'maybe'. Perhaps, this distinction may be due to the frequency effect. I will leave this issue for further research. What is important here is that *hai* can precede epistemic modals.

[f]This assumption is supported by the observation that the subject unable to be topicalized cannot precede the additive *hai*, such as 很少人 *henshaoren* 'few people' (Ko 2005: 886). As in i, the additive *hai* can only precede the subject *henshaoren*. This proves that the additive *hai* can be an IP adjunct and the subject which precedes it (e.g., *nanbudiqu* in 6a) is in the spec of TopicP.

(i) 這個班, 很多人上課打瞌睡, (還)很少人(*還)交作業。

zhe-ge__ban,__henduoren__shangke__da-keshui,__(hai)__henshaoren__(*hai)__jiao__huijiazuoye

this-CL__class__many.people__in.class__HAI__few.people__HAI__hand.in__homework

In this class, many students doze off in class. It is also the case that few students hand in homework.

[g]After checking the BLCU, I found no example in which the temporal *hai* occurs to the left of *huoxu* and *zai*, which strengthens the judgment made for 9b.

[h]MC *bi*-comparative is a famous topic that has been studied in the syntax and semantics literature. This paper adopts Liu (2011)'s analysis. For readers interested in the topic, see the following studies for alternative proposals: Paul (1993), Kennedy (2007a), Lin (2009), and Grano and Kennedy (2012).

[i]In fact, *hai* with the marginal meaning is not very productive. For example, not every gradable predicate can be used in this construal, without the appearance of 算 *suan* 'count'. Consider i.

(i) 這件衣服還*(算){好看/便宜}。

zhe-jian__yifu__hai__*(suan)__{haokan/pianyi}

this-CL__cloth__HAI__count__pretty/cheap

These clothes are slightly considered {pretty/cheap}.

Suan is obligatory in i but optional in 13. For some reason, the marginal *hai* in 13 can be used to judge whether the degree of cleanness of Zhangsan's room meets the standard of cleanness which is provided by the context, but in i, the marginal *hai* cannot be used to do so. This contrast may result from many factors, such as the frequency effect or semantic differences of gradable predicates. I leave this issue open in this paper.

For those examples where *suan* has to appear like i, *suan* indicates that the degree of the property (e.g., cheapness in i) possessed by the subject is counted to meet the standard of comparison. Interestingly, the sense of counting induces an implicature that the degrees in question only marginally meet the standard. The marginal *hai*, as one anonymous reviewer points out, just adds a marginal sense to the counting sense. That is to say, if the marginal *hai* does not occur in sentence i, it would just have the counting sense, as shown in ii.

(ii) 那件衣服算{好看/便宜}了。

na-jian__yifu__suan__{haokan/pianyi}-le
that-CL__cloth__count__pretty/cheap-PERF
Those clothes can be counted as {pretty/cheap}.

As predicted, without the marginal sense, the degrees of the cheapness of the subject in ii are higher than those in i. Suppose that clothes with the price of NT$ 200 are cheap and those with the price of NT$ 300 are not. There are some clothes that cost NT$ 240 each and others that cost NT$280 each. In this context, ii will be used to describe the former ones, while i the latter ones. This contrast has to do with the presence or absence of the marginal *hai*. With the appearance of the marginal *hai*, i can only describe degrees located in the lower and more marginal part of the scale of *cheapness*. If the marginal *hai* does not occur, sentences like ii should depict those in the less marginal part. Therefore, the marginal *hai* in i, where the occurrence of *suan* is mandatory, contributes the same meaning as those in 13 to the sentence, where *suan* does not need to appear. What is different is that the marginal *hai* in the former case modifies *suan* while those in the latter case directly modify degree predicates. For the ease of exposition, in the following sections, I will just discuss *hai* in the latter case.

[j]I thank an anonymous reviewer for providing this example.

[k]Tsai (2015a) argues for the hierarchical structure in 17 by using the following empirical phenomena: co-occurrence restrictions of modals, effects on the entailment relation, and co-occurrence restrictions of modals and negative words. Readers who are interested in this issue are referred to his paper.

[l]The source of the example is https://www.facebook.com/pages/中華紙漿股份有限公司台東廠/404453176289297. Accessed 11 March 2016. The second *hai* in this sentence may have the temporal or marginal meaning.

[m]The source of the example is https://www.tripadvisor.com.tw/ShowUserReviews-g274887-d782615-r335419067-Kiskakukk_Etterem-Budapest_Central_Hungary.html. Accessed 11 March 2016.

[n]The source of the example is http://eisen.pixnet.net/blog/post/25202265-愈是不幸-愈要無聊傻笑的小品《行板.莫札瑞拉起司》. Accessed 11 March 2016.

[o]For ease of exposition, the element in focus is followed by a subscript $_F$, such as Bill in 26a, and the focus domain (i.e., the sister of focus particles) is marked by a subscript $_{FD}$.

ᵖOne anonymous reviewer doubts that the additive particle *auch* can support König's proposal. According to Krifka (1999: 3) and Altmann (1976), *auch* has a scalar sense that is prominent if it occurs to the left of the focus, but this sense disappears when *auch* carries stress and occurs after the focus. Therefore, the reviewer suggests it is the distribution and absence/presence of the stress, rather than the context, that play a role in the interpretation of *auch*. Consider ia and ib (Krifka 1999: 3).

   (i) a. **auch** der schnèllste Computer kann diese Aufgabe nicht lösen

       even the fastest computer cannot solve this task.

     b. der schnellste Computer kann diese Aufgabe **àuch** nicht lösen

       the fastest computer cannot solve this task, either.

Actually, the contrast above results from an interaction of two factors. First, *auch* only asserts that the fastest computer cannot solve this task, in addition to other computers. Therefore, though less prominent, ia may have the additive meaning. It is the context that makes *auch* to seem to have a scalar reading. With world knowledge, the fastest computer is less likely to fail to solve a task than the alternatives. By combining this scale with the additive meaning of *auch*, the scalar sense is derived. Second, all focus particles in German can follow the focus associate, but when stressed, only additive particles can do so. Consider ii.

   (ii) a. Peter hat die Ausstellung {àuch/glèichfalls/èbenfalls} besucht. (Krifka 1999: 3)

       Peter visited the exhibition, too.

     b. *Peter hat die Ausstellung {sogàr/sèlbst} besucht.

       Even Peter visited the exhibition.

The reason why scalar particles cannot carry stress is that they express an attitude of the speaker as epistemic sentence adverbs (Sudhoff 2010: 118–119). This non-propositional property makes them unable to be focused/accented, negated, or corrected. Therefore, in ib, the stressed particle *auch* cannot have the scalar reading because this sense cannot be focused. By contrast, being unstressed, *auch* in ia can have a scalar reading in an appropriate context. Therefore, the contrast of ia and ib does not cast doubt on the proposal that additive particles only denotes the additive meaning and it is the context that makes a scalar sense possible by inducing scales and orderings.

�q The focus domain in 30 coincides with the focus associate. It is possible because the former is the sister of the focus particle and the latter is only required in scope of *hai*.

ʳTwo anonymous reviewers consider 48 unacceptable. The standard should hold to a positive degree regardless of the occurrence of the differential. However, to me and my informants, this sentence is good or at least better than 47. Besides, there are examples on the Internet which supports the claim that no positive presupposition is induced with the appearance of a differential phrase. Consider i. The speaker does not presuppose that the standard (i.e., the prices for take-away) is expensive.

   (i) 內用通常都比外帶價格還貴一點。

     neiyong__tongchang__dou__bi__waidai__jiage__hai__gui__yidian

     for.here__usually__DOU__than__take-away__price__HAI__expensive__a.little

     Usually, restaurants charge lower prices for take-away than for the same item eaten inside.

The source of the example is https://tw.news.yahoo.com/明明都點滷肉飯-外帶竟比內用貴-045712126.html. Accessed 17 March 2016.

[s]In fact, *hai* in this position may have *geng* as the focus, triggering the positive effect, because this morpheme is also within the scope of *hai*.

[t]I thank an anonymous reviewer who brought this issue to my attention.

References
Altmann, Hans. 1976. Die Gradpartikel im Deutschen. Tübingen: Niemeyer.
Bayer, Josef. 1996. Directionality and logical form: On the scope of focusing particles and wh-in-situ. Dordrecht: Kluwer.
Büring, Daniel, and Katharina Hartmann. 2001. The syntax and semantics of focus-sensitive particles in German. Natural Language and Linguistic Theory 19(2): 229–281.
Cinque, Guglielmo. 1999. Adverbs and functional heads. A cross-linguistic perspective. New York: Oxford University Press.
Cinque, Guglielmo. 2004. Issues in adverbial syntax. Lingua 114(6): 683–710.
Cinque, Guglielmo, and Luigi Rizzi. 2010. The cartography of syntactic structures. In The Oxford handbook of linguistic analysis, ed. Bernd Heine and Heiko Narrog, 51–65. Oxford: Oxford University Press.
Fillmore, CJ, Paul Kay, and Mary C O'Connor. 1988. Regularity and idiomaticity in grammatical constructions: The case of *let alone*. Language 64(3): 501–538.
Fox, Danny. 2007. Free choice and the theory of scalar implicatures. In Presupposition and implicature in compositional semantics, ed. Sauerland Uli and Stateva Penka, p. 71–120. Basingstoke: Palgrave Macmillan.
Grano, Thomas, and Chris Kennedy. 2012. Mandarin transitive comparatives and the grammar of measurement. Journal of East Asian Linguistics 21(3): 219–266.
Grice, Paul. 1989. Studies in the way of words. Cambridge: Harvard University Press.
Huang, CT James. 1984. On the distribution and reference of empty pronouns. Linguistic Inquiry 15(4): 531–574.
Hirschberg, Julia B. 1991. A theory of scalar implicature. New York: Garland.
Höhle, Tilman. 1992. Über verum-fokus im Deutschen. In Informationsstruktur und Grammatik, ed. Joachim Jacobs, 112–141. Opladen: Westdeutscher Verlag.
Jackendoff, Ray. 1972. Semantic interpretation in generative grammar. Cambridge: MIT Press.
Jacob, Joachim. 1983. Fokus und Skalen. Tübingen: Niemeyer.
Karttunen, Lauri, and Stanley Peters. 1979. Conventional implicature. Syntax and Semantics 11: Presupposition, ed. Choon-Kyu Oh and David A Dinneen, 1-56. New York: Academic Press
Kay, Paul. 1990. Even. Linguistics and Philosophy 13(1): 59–111.
Kayne, Richard. 1994. The antisymmetry of syntax. Cambridge: The MIT Press.
Kennedy, Christopher. 2007. Modes of comparison. In Papers from the 43rd Annual Meeting of the Chicago Linguistic Society Volume 1: The Main Session, ed. Malcolm Elliott, James Kirby, Osamu Sawada, Eleni Staraki, and Suwon Yoon, 139–163. Chicago: Chicago Linguistic Society.
Klein, Wolfgang. 1994. Time in language. London and New York: Routledge.
Ko, Heejeong. 2005. Syntax of why-in-situ: Merge Into [SPEC, CP] in the overt syntax. Natural Language and Linguistic Theory 23 (4): 867–916.
König, Ekkehard. 1991. The meaning of focus particles: A comparative perspective. London and New York: Routledge.
Krifka, Manfred. 1992. A compositional semantics for multiple focus constructions. In Informationsstruktur und Grammatik, ed. Joachim Jacobs, 17–53. Opladen: Westdeutscher Verlag.
Krifka, Manfred. 1999. Additive particles under stress. In Proceedings of SALT 8, ed. Devon Strolovitch and Aaron Lawson, 111–128. Ithaca: CLC Publications.
Krifka, Manfred. 2006. Association with focus phrases. In The architecture of focus, ed. Valéria Molnár and Susanne Winkler, 105–136. Berlin and New York: Mouton de Gruyter.
Lin, Jo-wang. 2003. Temporal reference in Mandarin Chinese. Journal of East Asian Linguistics 12(3): 259–311.
Lin, Jo-wang. 2009. Chinese comparatives and their implicational parameters. Natural Language Semantics 17(1): 1–27.
Liu, Chen-Sheng L. 2010a. The positive morpheme in Chinese and the adjectival structure. Lingua 120(4): 1010–1056.
Liu, Chen-Sheng L. 2010b. The Chinese geng clausal comparative. Lingua 120(6): 1579–1606.
Liu, Chen-Sheng L. 2011. The Chinese bi comparative. Lingua 121(12): 1767–1795.
Liu, Feng-hsi. 2000. The scalar particle hai in Chinese. Cahiers de Linguistique-Asie Orientale 29(1): 41–84.
Michaelis, Laura. 1993. 'Continuity' within three scalar models: The polysemy of adverbial *still*. Journal of Semantics 10(3): 193–237.
Paul, Waltraud. 1993. A non-deletion account of the comparative construction in Mandarin Chinese. Cahiers de Linguistique-Asie Orientale 22(1): 9–29.

Rizzi, Luigi. 1997. The fine structure of the left periphery. In Elements of grammar: Handbook of generative syntax, ed. Liliane Haegeman, 281–337. Dordrecht: Kluwer.

Rooth, Mats. 1985. Association with focus. Ph.D. dissertation. Amherst: University of Massachusetts.

Rooth, Mats. 1992. A theory of focus interpretation. Natural Language Semantics 1(1): 75–116.

Schaffar, Wolfram, and Lansun Chen. 2001. Yes-no questions in Mandarin and the theory of focus. Linguistics 39(5): 837–870.

Shen, Li. 2004. Aspect agreement and light verb in Chinese: A comparison with Japanese. Journal of East Asian Linguistics 13(2): 141–179.

Sudhoff, Stefan. 2010. Focus particles in German: Syntax, prosody, and information structure. Amsterdam and Philadelphia: John Benjamins.

Tsai, Wei-Tien D. 2008. Tense anchoring in Chinese. Lingua 118(5): 675–686.

Tsai, Wei-Tien D 蔡維天. 2010. On the syntax-semantics correspondences of Chinese modals 談漢語模態詞的分布與詮釋之對應關係. Studies of the Chinese Language 中國語文 336: 208-221.

Tsai, Wei-Tien D. 2015a. On the topography of Chinese modals. In Beyond functional sequence. The cargography of syntactic structures, vol 10, ed. Ur Shlonsky, 275–294. New York: Oxford University Press.

Tsai, Wei-Tien D. 2015b. A case of V2 in Chinese. Studies of Chinese Linguistics 36(2): 81–108.

Tsao, Feng-Fu. 1979. A functional study of topic in Chinese: The first step towards discourse analysis. Taipei: Student Book Co.

Yeh, Meng. 1998. On *hai* in Mandarin. Journal of Chinese Linguistics 26(2): 236–280.