

How can *zenme(yang)* be so?

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Abstract. This paper observes that *zenme(yang)* ‘how’ in Mandarin Chinese can be used not only to express manners but also to convey degrees. A unified compositional analysis of *zenme(yang)* ‘how’ has been provided to account for the fact that *zenme(yang)* can be used across two domains: manners and degrees. By borrowing Anderson & Morzycki (2015)’s proposal on the anaphoric words *tak* and *jak*, *zenme(yang)*’s two uses can be modeled by the general notion of kinds: manner *zenme(yang)* modeled as kinds of events and the degree use modeled as state kinds. For the manner use, *zenme(yang)* with *wh* feature is base-generated on the head position of DegP under AP and its trace undergoes the Kind-Shift after *wh*-movement, which leads to a manner question. Regarding the degree use, *zenme(yang)*, which takes a kind as its complement, needs the negation marker *bu* ‘not’ to license it. Hence, by borrowing the general notion of kind, it becomes feasible to achieve a compositional unification for the two uses of *zenme(yang)*.

Keywords. *zenme(yang)*; negation; degree; manner; *wh*-words; Mandarin Chinese

1. Introduction. In Mandarin Chinese, *zenme(yang)* ‘how’, similarly to its English counterpart, can be used in interrogatives. In interrogative sentences, it can serve as a manner question word. For example, in (1a), *zenme(yang)* has a manner *wh* interpretation. *Zenme* can also function as a reason question word, meaning *why* or *how come*, as shown in (1b).

- (1) interrogative
- a. Zhangsan *zenme(yang)* *hui-jia*?
Zhangsan how go-home
‘How does Zhangsan go home?’ (MANNER)
 - b. Zhangsan *zenme* *xihuan* Lisi?
Zhangsan how like Lisi
‘How come Zhangsan likes Lisi?’ (REASON)

When used with gradable predicates, besides manners, *zenmeyang* can also serve as a marked way to express degrees, as shown in (2a). An unmarked way to express degree questions in Mandarin is by using *duo* ‘how much’, as demonstrated in (2b).

- (2) a. Zhangsan *zenmeyang* *gao*?
Zhangsan how tall
Interpretation 1: ‘In what way is Zhangsan tall?’ (MANNER)
Interpretation 2: ‘How tall is Zhangsan?’ (DEGREE)
- b. Zhangsan *duo* *gao*?
Zhangsan how.much tall
‘How tall is Zhangsan?’ (DEGREE)

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Under negation, *zenme(yang)* can attenuate meanings. For example, in comparison to sentence (3a), sentence (3b) with *zenme(yang)* expresses a weaker literal meaning.

- (3) psych verb (state verb)
- a. Zhangsan bu xihuan Lisi.
Zhangsan not like Lisi
'Zhangsan does not like Lisi.'
 - b. Zhangsan bu zenme(yang) xihuan Lisi.
Zhangsan not how like Lisi
lit: 'Zhangsan does not like Lisi very much.'
implicature: 'Zhangsan does not like Lisi.'

Buzenme(yang) can also modify adjectives:

- (4) positive adjective vs. negative adjective
- a. Zhangsan bu zenme(yang) gao.
Zhangsan not how tall
lit: 'Zhangsan is not very tall.'
implicature: 'Zhangsan is not tall.'
 - b. Zhangsan bu zenme(yang) ai.
Zhangsan not how short
lit: 'Zhangsan is not very short.'
*implicature: 'Zhangsan is not short.'

When occurring with activity verbs, *buzenme(yang)* 'not how' can express the meaning of lower frequency, indicating 'not often', or simply 'not', as shown in (5). Sentence (5a) expresses 'Zhangsan does not often jog' or 'Zhangsan does not jog'. In contrast, sentence (5b) without *zenme(yang)* 'how' just expresses the meaning of 'Zhangsan does not jog'.

- (5) activity verb
- a. Zhangsan bu zenme paobu.
Zhangsan not how jog
Interpretation 1: 'Zhangsan does not often jog.'
Interpretation 2: 'Zhangsan does not jog.'
 - b. Zhangsan bu paobu.
Zhangsan not jog
'Zhangsan does not jog.'

Based on the above, with negation combined with the *wh*-word *zenme(yang)*, the construction of *buzenme(yang)* expresses the meaning of *not very*, indicating a degree interpretation.

The general pattern can be summarized in Table 1. Without negation, *zenme(yang)* can express manner or reason questions.¹ Sometimes, *zenmeyang* can also be used as a marked way to express degree questions. Under negation, *zenme(yang)* can only express degrees in non-questions.

This paper is to give a compositional analysis of *buzenme(yang)*'s two uses. Although there are no direct studies on why *zenme(yang)* can not only express manners but also give rise to de-

¹ The morpheme *yang* is not permitted to cooccur with *zenme* in reason questions, which means that only *zenme* can have reason use. However, under negation, both *zenmeyang* and *zenme* have degree interpretations. As for *zenme* in degree uses, a silent counterpart of *yang* may accompany *buzenme*, which is omitted for simplicity.

	<i>zenme(yang)</i> without Negation		<i>zenme(yang)</i> with Negation	
	Question	non-Question	Question	non-Question
<i>degree</i>	✓ *	×	×	✓
<i>manner</i>	✓	✓	×	×
<i>reason</i>	✓	×	×	×

*Note: In some dialects, the counterpart of *zenme(yang)* can express both degrees and manners.

Table 1. Descriptive generalizations

gree readings under negation, some related work on negated *wh*-words has been done in Mandarin Chinese and Cantonese. The studies in Mandarin Chinese mainly concentrate on the negation of *shenme* ‘what’ by analyzing it as a *wh*-indefinite (Chierchia & Liao 2015; Giannakidou & Lin 2016; Lin et al. 2014). Chierchia & Liao (2015) treat *shenme* as an exhaustive Negative Polarity Item (NPI) like *any* while Giannakidou & Lin (2016) propose that it behaves like a non-exhaustive NPI.² In Cantonese, some studies concentrate on *matzai* ‘(not) much at all, hardly ... at all’ (Lee 2013; Tang 2006; Lee 2023). Tang (2006) and Lee (2023) analyze *matzai* as an NPI. In contrast, Lee (2013) disagrees with Tang’s analysis and treats *matzai* with negation as the reverse of the scale of ‘almost’.

2. A compositional analysis for manner and degree. As mentioned previously, without negation, *zenme(yang)* can express a manner question in (6a); under negation, *zenme(yang)* can express degree as in (6b).

- (6) a. Zhangsan *zenmeyang* *paobu*?
 Zhangsan how jog
 ‘How does Zhangsan jog?’
 b. Zhangsan *bu zenme* *paobu*.
 Zhangsan not how jog
 ‘Zhangsan does not often jog.’

The goal of this section is to offer a compositional analysis for manner *how* in (6a) and degree *how* in (6b). To attain this objective, it is necessary to figure out the link between manner and degree. This will be pursued through a combination of empirical and theoretical approaches. Anderson & Morzycki (2015) examine the relationship from the perspective of the general concept of kind, providing inspiration for our approach to *zenme(yang)*.

2.1. ANDERSON & MORZYCKI’S PROPOSAL.

2.1.1. EMPIRICAL CONNECTIONS. Empirical data on anaphors and other linguistic structures present a connection between manner and degree. Adverbial or adnominal *so* and *such* can express manner and degree. For example, *so* as an adverbial modifier in (7a) expresses degree. In (7b), adverbial *so* expresses manner. Examples (8a) and (8b) show that English *such* as an adnominal modifier can also express degree and manner as *so* does.

- (7) a. John is *so* tall. (DEGREE)

² NPIs often include words such as *any*, *ever*. An exhaustive NPI requires an exhaustive interpretation, which means that it should be interpreted in a way that includes all possible alternatives, leaving no room for exceptions.

- b. John did it so. (MANNER)
- (8) a. It's such a cold day. (DEGREE)
- b. John did it in such a way. (MANNER)

In addition to manner and degree, the adnominal anaphor *such* can be used to refer to individual kinds. Consider example (9). The adnominal anaphor *such* as a modifier can be interpreted as an anaphor to an individual kind, a subkind of *dogs*.

- (9) I want a dog that never barks, never gets sick, and enjoys cuddling. But, such a dog is difficult to find.

Parallels between adnominal and adverbial anaphors have been observed by some researchers. Carlson (1977) hypothesizes that adnominal anaphoric words like *so* and *such* can be used to refer to individual kinds. Landman & Morzycki (2003) extend the hypothesis about adnominals to adverbials. They maintain that, analogous to how adnominal *taki* 'so' in Polish, as well as *so* in English, denotes properties of individuals, adverbial *tak* 'so' could be used to denote a property of events. In a nutshell, they propose that paralleling adnominal uses, the adverbial uses can denote properties and realize event-kinds.

The connection between individual kinds, manners, and degrees can be embodied by the cross-categorical parallels in Polish (Anderson & Morzycki 2015). In Polish, *tak* as an anaphor can be used across the three domains to express individual kinds, manners, and degrees, as shown in (10).

- (10) a. tak-i pies
such-MASC dog
'such a dog', 'a dog of that kind' (KIND of INDIVIDUALS)
- b. tak si zachowywa
such REFL behave
'behave that way' (MANNER)
- c. tak wysoki
such tall
'that tall' (DEGREE)
- (Anderson & Morzycki 2015: 3)

Moreover, the *wh*-word *jak* can also be used across the three domains:

- (11) a. jak-i pies
WH-MASC dog
'what kind of dog' (KIND of INDIVIDUALS)
- b. Jak si zachowywa
WH REFL behaved.3MASC
'How did he behave?' (MANNER)
- c. Jak wysoki jest Clyde
WH tall is Clyde
'How tall is Clyde?' (DEGREE)
- (Anderson & Morzycki 2015: 2-3)

2.1.2. ANALYTICAL HYPOTHESES. Beyond the previously mentioned empirical evidence, some theories also model the connection between manner and degree. Anderson & Morzycki (2015)

present a promising theoretical analysis of this relationship.

Without modeling the connection between manner and degree through the concept of general kind, Umbach (2007) presents a theoretical explanation for the observed empirical pattern of parallels between anaphors and manners/degrees separately. Umbach proposes that German *so* in equative constructions functions as an anaphor referring to degrees and manners. The degree-referring interpretation of *so* is shown in (12). G is a gradable adjective and d^* is a variable required to be identified with the antecedent's degree. In Umbach's proposal, the manner-referring interpretation is shown in (13). Q is an event predicate and P^* represents an anaphoric property of events.

$$(12) \quad so_{degree} \rightsquigarrow \lambda G \lambda x. \exists d. G(d)(x) \& d = d^*$$

$$(13) \quad so_{manner} \rightsquigarrow \lambda Q \lambda e. Q(e) \wedge P^*(e)$$

Umbach's hypothesis provides a way to model degrees and manners separately. However, the challenge remains in establishing a connection between manners and degrees. Some researchers propose that manners can be modeled as kinds of events (Landman & Morzycki 2003; Anderson & Morzycki 2015). According to Landman & Morzycki (2003), manners in the adverbial domain can be analogous to adnominals. They propose that in some languages, anaphoric words can be used to refer to kinds of individuals and manners as kinds of events. Adverbial modifiers like *so* can be used to denote properties of event-kind realizations. They hypothesize that event-kinds can be used as a way to represent manner. Regarding how to model manners as event-kinds, Chierchia (1998)'s proposal on how general kind is realized offers a way. He proposes that $\cup$ is used to represent a realization relation. Taking the adverbial *so* as an example, a lexical entry can be given in the following:

$$(14) \quad so_i \rightsquigarrow \lambda e. \cup k_i(e)$$

With (14), they propose that the adverbial *so* can be construed as properties of events and the realization of an event-kind is contextually dependent.

Degrees can be modeled as kinds of states, analogous to manners modeled as kinds of events (Anderson & Morzycki 2015). Cresswell (1977) proposes that degrees are equivalence classes of individuals. For example, the degree 'six feet tall' encompasses individuals who precisely measure six feet in height. All states of being six feet tall form an equivalence class. Being six feet tall as a plurality varies across worlds, representing a degree. A tallness state like *six feet* has a measure, which must realize the SIX-FEET-TALL state-kind. The denotation for *six feet* is shown in (15):

$$(15) \quad six\ feet \rightsquigarrow \lambda s. \cup SIX-FEET(s)$$

Distinguished properties can be used to capture the connection between manners, and degrees (Anderson & Morzycki 2015). For events, **distinguished** properties are manner realizations; for states, **distinguished** properties are degrees. **Distinguished** properties act as a filter, capable of categorizing kinds (manners or degrees) depending on the input (events or states). They propose that the relation **dist** can be represented in the following way:

$$(16) \quad \mathbf{dist}(o, P) \text{ is true iff } P \text{ is among the } \mathbf{distinguished} \text{ properties of } o$$

In (16), o is an object and P represents a property of the object. When o is a state, $\mathbf{dist}(o, P)$ is true iff P is a degree-related property. When o is an event, $\mathbf{dist}(o, P)$ is true iff P is a manner-

related property. This can be represented as a presupposition, as shown in (17). $^{\cup}k$ is a property counterpart for a kind k .³

$$(17) \quad tak \rightsquigarrow \lambda k \lambda o : \mathbf{dist}(o, ^{\cup}k).^{\cup}k(o)$$

2.2. A COMPOSITIONAL ANALYSIS. Building on the key insights of Anderson & Morzycki (2015), I propose that *zenme(yang)* can be treated as a kind modifier like *jak* in Polish. As mentioned previously, they observe that Polish exhibits a systematic connection between individual kinds, manners, and degrees. According to them, *tak* ‘such’ is a proform for individual kinds, manners, and degrees. The *wh*-word *jak* is used across these three domains in question. In Mandarin, the *wh*-word *zenme(yang)* shows a similar pattern as *jak*. *Zenme(yang)* can be used across the domains of degrees, manners, and individual kinds.

- (18) a. Zhangsan zenmeyang nuli, dou kaobushang daxue.
 Zhangsan how hard DOU not.be.admitted.to university
 ‘No matter how hard Zhangsan tried,
 he cannot be admitted to the University.’ (DEGREE)
- b. Zhangsan zenmeyang huijia?
 Zhangsan how go.home
 ‘How does Zhangsan go home?’ (MANNER)
- c. Zhangsan kan zenmeyang de biaoyan?
 Zhangsan watch how MOD show
 ‘What kind of show does Zhangsan watch?’ (KIND of INDIVIDUALS)

Given the observed empirical similarity between *zenme(yang)* and *jak*, we are approaching the goal of providing a compositional analysis for *zenme(yang)*. To conduct the compositional analysis, it is essential to understand the involved lexical entries and compositional rules.

2.2.1. LEXICAL ENTRIES AND COMPOSITIONAL RULES. Here, I list the lexical entries and rules that will be involved in my theory. The involved lexical entries’s denotations are summarized in the following:

- (19) Lexical entries for *zenme(yang)*
- a. $zenme(yang)_{[-wh]} \rightsquigarrow \lambda k \lambda o. ^{\cup}k(o)$
 b. $zenme(yang)_{[+wh]}$ has no denotation
- (20) Other lexical entries
- a. $Zhangsan \rightsquigarrow zs$
 b. $bu \rightsquigarrow \lambda P_{\langle s, t \rangle}. \lambda s. \neg P(s)$
 c. $paobu \rightsquigarrow \lambda e. jog(e)$
 d. $gao \rightsquigarrow \lambda s. tall(s)$
 e. $v \rightsquigarrow \lambda x. \lambda s. holder(s, x)$

The lexical entries of *zenme(yang)* are divided, as shown in (19). *Zenme(yang)* under negation is assigned the same denotation as *jak* and characterized by the absence of a *wh* feature, marked as

³ k is an index for *tak* and analyzed as a sister branch of *tak*.

$[-wh]$. $Zenme(yang)_{[-wh]}$ operates over a kind variable and needs to apply to objects (individuals or eventualities). $Zenme(yang)$ in questions has a wh feature but does not have a denotation, marked as $[+wh]$. Following Huang (1982) and Pesetsky (2000), I assume that underlyingly, $zenme(yang)$ in questions is base-generated on the head position of DegP under AP/VP, which undergoes covert movement to the specifier of CP at LF. The wh -movement leaves a kind denoting trace and $zenme(yang)_{[+wh]}$ is semantically vacuous. Regarding other lexical entries, they are listed in (20). A name like *Zhangsan* will be translated as the type e expression zs , which denotes the individual *Zhangsan*. I adopt Anderson & Morzycki's way of treating states and events as the same kind of variables s . *Paobu* 'jog' and *gao* 'tall' denote a function of type $\langle s, t \rangle$. The negation marker *bu* 'not' denotes a function that takes a predicate P with the type $\langle s, t \rangle$ as input and returns a new predicate, which returns True given an input s only if P does not hold of s , and otherwise returns False. Following Kratzer (1996), the voice head will be given the semantics as shown above, denoting a function that takes an individual and returns a set of propositions.

In the proposal, compositional rules, transformational rules, and type-shifting rules are involved. The involved compositional rules can be categorized into standard and non-standard. For standard compositional rules, four rules are involved: Function Application (FA), Predicate Modification (PM), Predicate Abstraction (PA), and Pronouns and Traces Rule.

(21) **Function Application (FA)**⁴

Let γ be a syntax tree whose only two subtrees are α and β (in any order) where:

- (i) $\alpha \rightsquigarrow \alpha'$ where α' has type $\langle \sigma, \tau \rangle$
- (ii) $\beta \rightsquigarrow \beta'$ where β' has type σ .

Then

$$\gamma \rightsquigarrow \alpha'(\beta')$$

(22) **Predicate Modification (PM)**

If:

- (i) γ is a tree whose only two subtrees are α and β
- (ii) $\alpha \rightsquigarrow \alpha'$
- (iii) $\beta \rightsquigarrow \beta'$
- (iv) α' and β' are of type $\langle s, t \rangle$

Then:

$$\gamma \rightsquigarrow \lambda u[\alpha'(u) \wedge \beta'(u)]$$

where u is a variable of type s that does not occur free in α' or β' .

(23) **Predicate Abstraction (PA)**

- (i) γ is a syntax tree whose only two subtrees are α_i and β
- (ii) α_i is a terminal node carrying the index i
- (iii) $\beta \rightsquigarrow \beta'$
- (iv) β' is an expression of any type

⁴ For FA, PM, PA, and Pronouns and Traces Rule, I follow Coppock & Champollion (in prep)'s formulations of Heim & Kratzer (1998).

Then $\gamma \rightsquigarrow \lambda x_i \beta'$

(24) **Pronouns and Traces Rule**

If α is an indexed trace or pronoun, $\alpha_i \rightsquigarrow x_i$

Regarding non-standard compositional rules, Event Identification is involved.

(25) **Event Identification** (Kratzer 1996)

If:

- (i) γ is a tree whose only two subtrees are α and β
- (ii) $\alpha \rightsquigarrow \alpha'$
- (iii) $\beta \rightsquigarrow \beta'$
- (iv) α' is of type $\langle e, \langle s, t \rangle \rangle$ and β' is of type $\langle s, t \rangle$

Then:

$$\gamma \rightsquigarrow \lambda x_e \lambda e_s [\alpha'(x)(e) \wedge \beta'(e)]$$

where x and e is variables of type e and s respectively that do not occur free in α' and β' .

The following involved rules are transformational rules and type-shifting rules. As for transformational rules, *wh*-movement is involved in the proposal. I adopt Heim & Kratzer (1998)'s theory on *wh*-movement. Heim & Kratzer propose that the *wh*-movement triggers lambda abstraction:

(26) **Wh-movement:**

In a syntactic tree,

- (i) α is a constituent containing a *wh*-word with [+wh]
- (ii) $\beta_{[+wh]_i}$ is the *wh*-word with [+wh] contained in α
- (iii) $\beta_{[+wh]_i}$ is moved out of α to the position of [Spec, CP] and leaves a trace with an index, t_i which is coindexed with $\beta_{[+wh]_i}$

As for type-shifting rules, three rules are involved:

(27) **Kind Shift (KS):** shift k to $\lambda o. \cup k(o)$.

(28) **Existential-shift** (from $\langle \tau, t \rangle$ to $\langle \tau t, t \rangle$) (Anderson & Morzycki 2015): shift P to $\lambda Q_{\langle \tau, t \rangle} . \exists x_\tau [P(x) \wedge Q(x)]$

(29) **Existential Closure (EC)** (revised from (Coppock & Champollion in prep))

If $\alpha \rightsquigarrow \alpha'$, where α' is of category $\langle s, t \rangle$, then:

$$\alpha \rightsquigarrow \exists s. \alpha'(s)$$

as well (as long as s does not occur in α' , use a different variable of the same type).

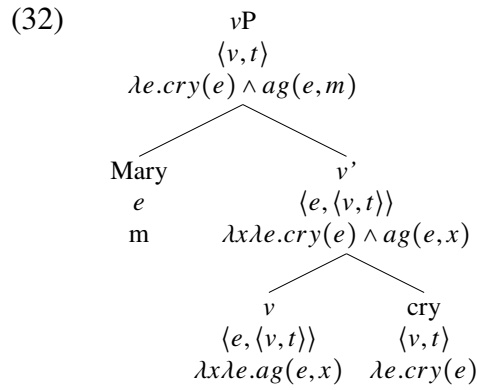
2.2.2. APPLICATION. Now let us consider how to analyze *zenmeyang* in manner questions, as shown (30):

- (30) Zhangsan zenmeyang gao?
 Zhangsan how gao
 'In what way is Zhangsan tall?'

Following Huang (1982) and Pesetsky (2000), I assume that underlyingly, *zenme(yang)* is base-generated on the head position of DegP under AP, which undergoes covert movement to the specifier of CP at LF. The *wh*-movement leaves a kind denoting trace. To be understood intersectively with the predicate *gao* ‘tall’, it will be shifted from *k* to $\langle o, t \rangle$ via Kind Shift. The denotation of the resulting structure is:

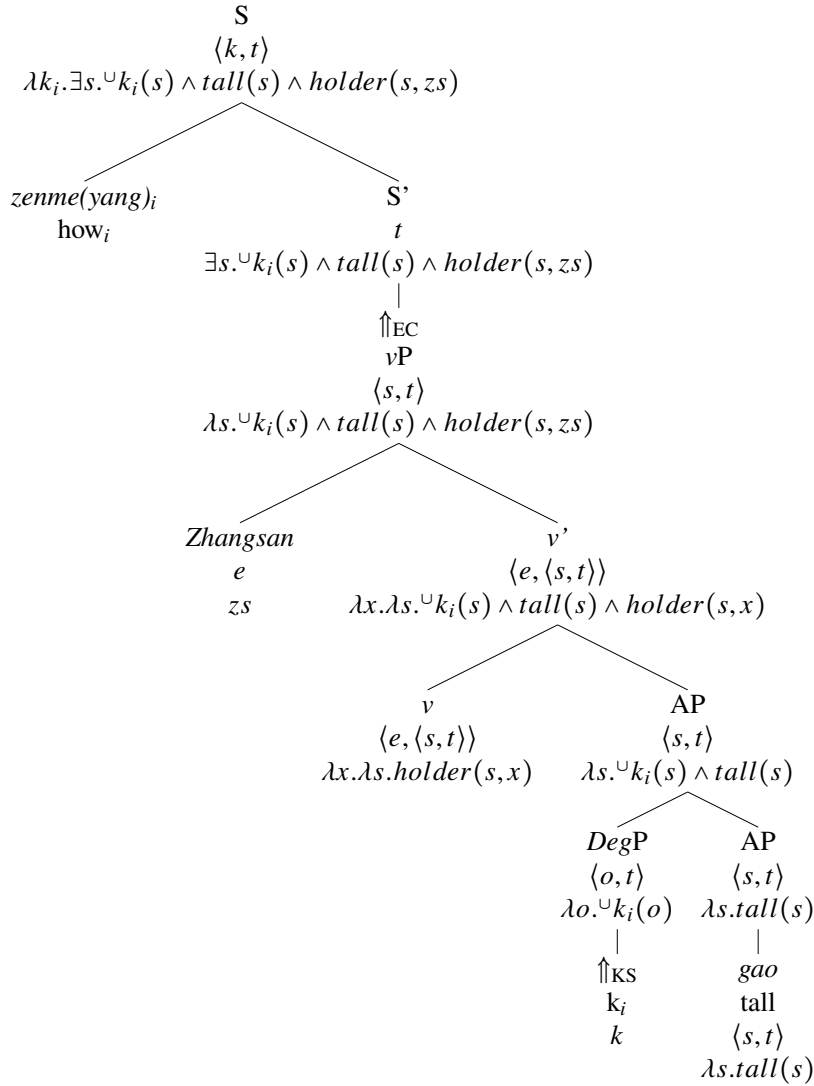
$$(31) \quad \lambda s. {}^{\cup}k_i(s) \wedge tall(s)$$

The resulting structure (the higher AP) will combine with the voice head before the composition with the subject *Zhangsan*. According to Kratzer (1996)’s version of semantics, external arguments are base-generated in the specifier of VoiceP and VP is the complement of the head Voice. In order to show how the application of the voice head works, let’s take *cry* as an example. In (32), the agent *Mary* is introduced by *v* (the voice head) via Event Identification.



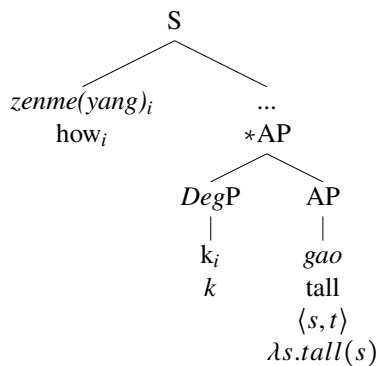
After combining with the subject, the semantic type of the resulting structure will be shifted from $\langle s, t \rangle$ to *t* via Existential closure. Then, the *wh*-word without assigned denotation in the position of Spec of CP will do λ -abstraction over the structure by applying Heim & Kratzer’s theory on *wh*-movement. With these rules, we will end up with the following analysis for the sentence *Zhangsan zenmeyang gao*:

(33)



In the above, the Kind Shifting rule is applied to the trace in the composition. If there is no kind-shift, we will confront a type mismatch when combining the DegP and the lower AP, as shown in (34). No existing rules can support us to compose two denotations with the semantic types of $\langle s, t \rangle$ and k respectively. This failure prevents us from performing the subsequent semantic composition.

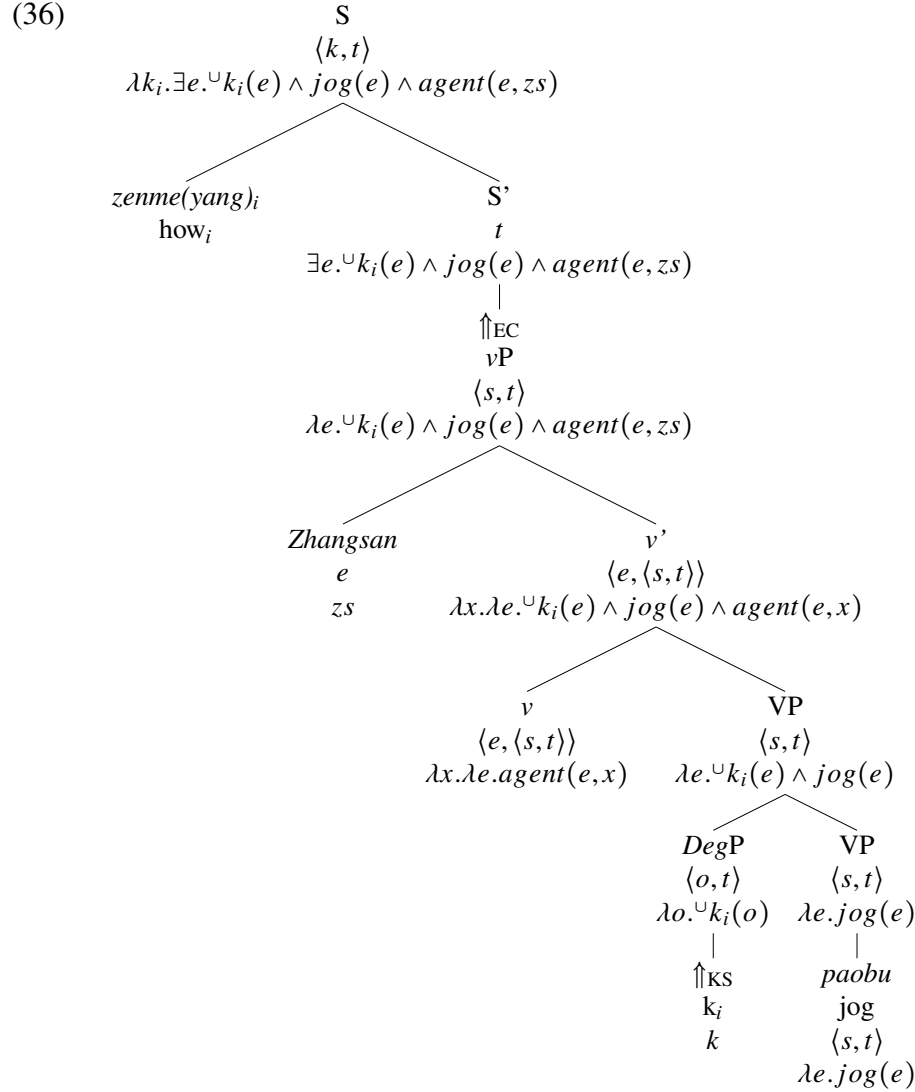
(34)



Let us consider how *zenme(yang)* as a manner adverb is composed with activity verbs like

paobu ‘jog’ in manner questions. Generally, the composition of *paobu* ‘jog’ follows the pattern seen in the composition of *gao* ‘tall’ in (33) and applies the same compositional rules. The difference is that the *tall* sentence expresses properties of a state while the *jog* sentence expresses properties of an event, as shown in (35).⁵ The derivation tree is shown in (36).

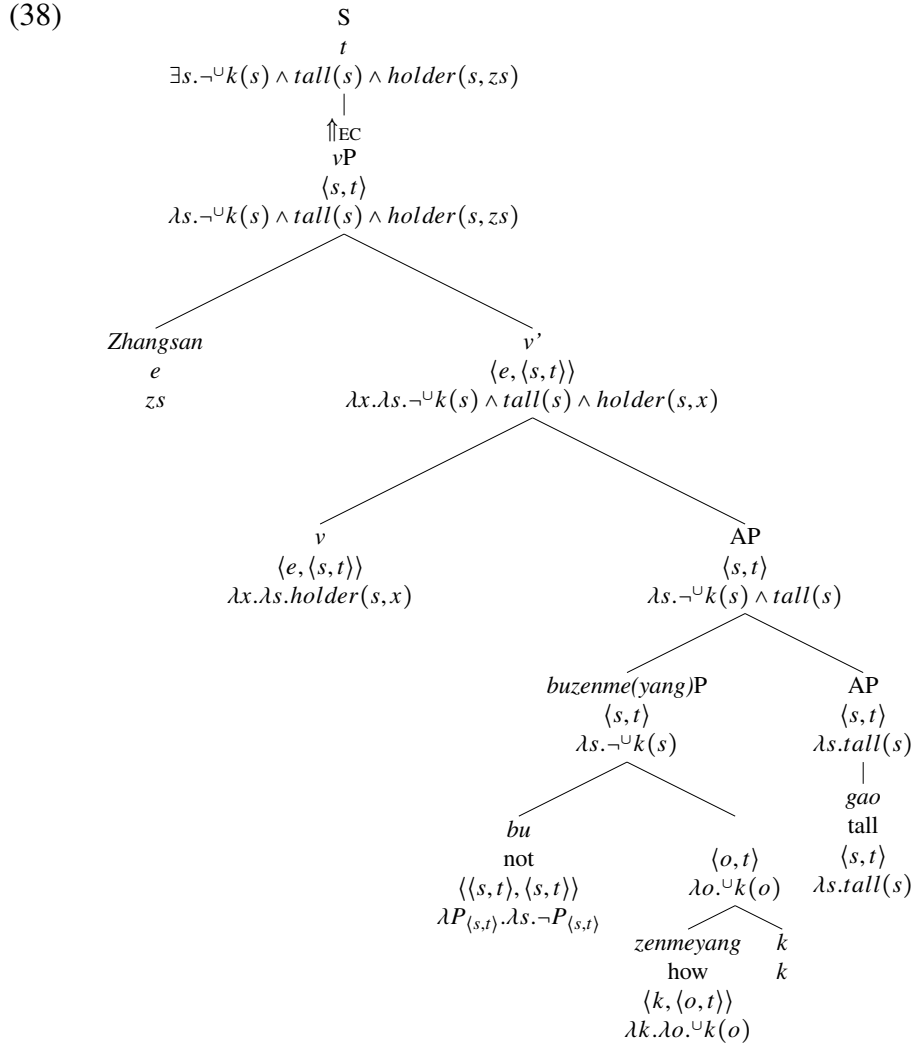
- (35) Zhangsan zenmeyang paobu?
 Zhangsan how paobu
 ‘How does Zhangsan jog?’



Now let us consider the case of *zenmeyang* under negation. The first example is on how *zenmeyang* under negation is composed with adjectives such as *gao* ‘tall’, as shown in (37). The derivation tree is shown in (38).

⁵ For the sentence *Zhangsan zenmeyang gao*, it can be interpreted as a manner question and sometimes it can also be interpreted as a degree question. **Distinguished** properties make wrong predictions. Unlike the *jog* sentence, the *tall* sentence can only be predicted to be a degree question based on **distinguished** properties, which contradicts the example in (30). Acknowledging the theoretical limitations, I leave it open for future work.

- (37) Zhangsan bu zenmeyang gao.
 Zhangsan not how tall
 ‘Zhangsan is not very tall.’



In the case of *zenme(yang)* under negation, *zenme(yang)* does not have a *wh*-feature, marked as $[-wh]$. The $[-wh]$ feature is required for a negator to license it. Following Anderson & Morzycki, I propose that *zenme(yang)* as a manner adverb denotes properties of events and it can take a kind k as its complement, as shown in (38). The dependency can be reflected by assigning an index to a separate branch as *zenme(yang)*'s sister.

A further concern is the scope of *bu* in *buzenme(yang)*. The scope of the negator *bu* plays a crucial role in the composition, particularly when *bu* is a sentential negation. In such cases, *bu* does not directly combine with *zenme(yang)* but extends its scope to the entire sentence. However, I propose that the negation *bu* in *buzenme(yang)* cannot be a sentential negation. The copula *shi* cannot be inserted between *bu* and *zenme* to express a degree meaning, as shown in (39a). Similarly, modals like *neng* or *keyi* ‘can’ cannot be inserted between *bu* and *zenme* to express a degree meaning.

- (39) a. *Zhangsan bu shi zenme paobu.
 Zhangsan not COP how paobu
 Intended: ‘Zhangsan does not jog much.’
 b. *Zhangsan bu neng/keyi zenme paobu.
 Zhangsan not can how paobu
 Intended: ‘Zhangsan can not jog much.’

The negation marker *bu* ‘not’ will take *zenme(yang)* as its complement. The denotation of *bu* ‘not’ is shown in (40). They will be combined via Function Application and the resulting denotation is shown in (41):

$$(40) \quad bu \rightsquigarrow \lambda P_{\langle s, t \rangle} . \lambda s . \neg P(s)$$

$$(41) \quad \lambda s . \neg^{\cup} k(s)$$

Buzenme(yang) acts as a degree modifier for the predicate *gao* ‘tall’ and it will be combined with *gao* via Predicate Modification. The result is in (42):

$$(42) \quad \lambda s . \neg^{\cup} k(s) \wedge tall(s)$$

This is a property of state, *s*. The expression requires that *s* not be a realization of a degree state-kind of some tallness. Before the higher AP *buzenme(yang) gao* is combined with the subject *Zhangsan*, it will be combined with the head of *vP* (voice phrase) via Event Identification, which will introduce a holder *e* to be saturated. Then, the resulting denotation *v*’ will combine with the subject *Zhangsan* by Function Application. After combining with the subject, the resulting structure will go through an existential type shift from $\langle s, t \rangle$ to *t*. The denotation is shown in (43):

$$(43) \quad \exists s . \neg^{\cup} k(s) \wedge tall(s) \wedge holder(s, zs)$$

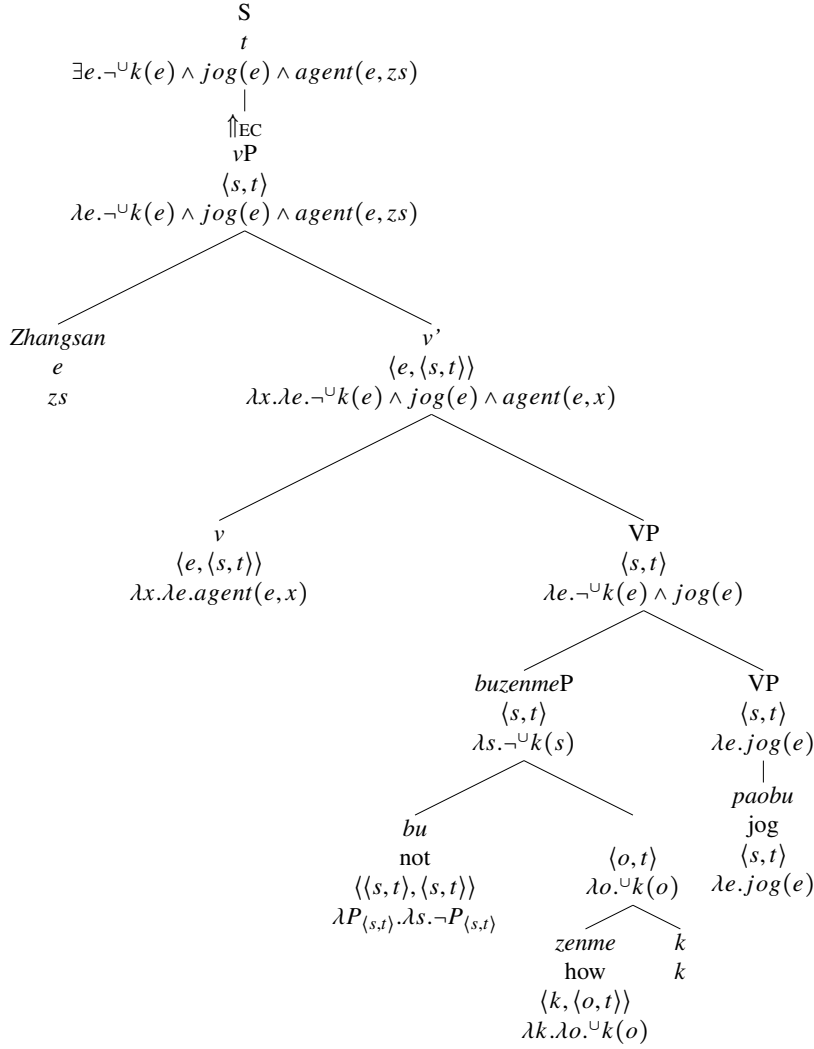
The whole thing in (43) will be true iff there exists a state of kind such that Zhangsan’s tallness does not instantiate.

In the above, I have shown how *buzenme(yang)* interacts with the adjective *gao* ‘tall’. As for activity verbs like *paobu* ‘jog’, it generally shares the pattern with the case of *gao* ‘tall’ via the same rules, as shown in (45).

While Anderson & Morzycki’s theory provides valuable theoretical support and has inspired us to offer a unified analysis on manner *zenme(yang)* and degree *zenme(yang)*, it still exhibits limitations when applied to instances of *buzenme* with event predicates like “jog”. Based on **distinguished** properties, when *buzenme* occurs with the event *jog*, *zenme* is wrongly predicted to be manner rather than degree. This diverges from the case shown in (45) that *zenme* under negation *bu* expresses a degree meaning and serves as a modifier for the event “jog”. In light of this contradiction, I acknowledge the need for further exploration and leave this issue open for future research.

- (44) Zhangsan bu zenme paobu.
 Zhangsan not how jog
 ‘Zhangsan does not jog much.’

(45)



3. Conclusion. In this paper, I observed that *zenme(yang)* under negation can express degrees and presented a compositional analysis on the manner use and the degree use of *zenme(yang)*, drawing inspiration from Anderson & Morzycki.

In the future, I will investigate ways to improve the proposal considering the limitations of Anderson & Morzycki's theory on **distinguished** properties. In addition, the future study will carefully examine the interaction between *mei* and *zenme(yang)* and provide a unified analysis for both *meizenme(yang)*, and *buzenme(yang)*.

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