The Semantic Constraints on the VERB+*zhe*[3] Nouns in Mandarin Chinese

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The suffix –*zhe* can attach to a verb stem to form a VERB+*zhe* 'one who is/does X' noun. *Zhe* is compatible with different aktionsarts, but there is a distinct difference in productivity. The VERB+*zhe* nouns adhere to three constraints. First, the semantic completion is obligatory when the verb stems are transitive. Second, the referents of VERB+*zhe* nouns must be human. Third, the VERB+*zhe* nouns are episodically linked to their verb stems.

1. Introduction

The issue addressed here concerns the semantic constraints on the words formed by the combination of a verb stem and the suffix –*zhe* in Mandarin Chinese. The VERB+*zhe* nouns are used to refer to 'one who is/does X'. The –*zhe* nouns are used mostly in formal contexts. Colloquially, *de ren* 'person who…' can be used to replace *zhe*.

Zhe is regarded as a word formation suffix, not a bound root[1]. A bound root, -*yuan* 'person whose job is …' for example, is entailed by –*zhe*, which means –*zhe* has the more general meaning. The meanings of words formed with a bound root are more lexicalized, while the words formed with the suffix –*zhe* have a derivational meaning related to the stems. In brief, the suffix -*zhe* is more productive than a bound root. Packard (2000) claims that –*zhe* causes a shift in grammatical role to something like 'agent'. More specifically, -*zhe* can affix to nouns, adjectives, and verbs to indicate the characteristics of agency or property (Packard 2000)[2]. The examples are shown in (1). (1a) denotes someone who is a writer, (1b) refers to someone who has the property of being fat, and (1c) describes a runner.

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[1] Whether –*zhe* is a suffix or a bound root remains controversial. Here I adopt the argument in Packard (2000) that –*zhe* is a word formation affix because there is a clear contrast between –*zhe* and the bound root, -*yuan*, which means 'person whose job is X'. Words formed with –*yuan* tend to have meanings which are more lexicalized and fixed, while words formed with –*zhe* carry more of a sense of being derivationally related to the stems to which –*zhe* is affixed.

[2] Packard (2000) defines –*zhe* as 'one who does/is X', but this interpretation cannot capture all the –*zhe* nouns. For instance, *san-zhe* three-zhe can mean either three people or three objects. This issue will be addressed in Section 4.

(1)
a.   NOUN + *zhe*   b.   ADJECTIVE + *zhe*
     bi   zhe   *feipang   zhe*
     pen   *zhe*   'writer'   obese   *zhe*   'one who is fat'
c.   VERB + *zhe*
     pao   zhe
     run   *zhe*   'runner'

In this paper, my focus will be on the combination of verbs and *–zhe*, as in (1c). Noun/adjective-*zhe* will not be included in my discussion.   In terms of verbs, the suffix *–zhe* can attach to (i) a verb on the lexical level, (ii) a verb with an aspect marker, and (iii) a verb plus a resultative verb complement (RVC), as in (2).   (2a) is the most productive template for the VERB+*zhe* nouns.

(2) a. a verb on the lexical level + zhe
        taopao-zhe
        escape-zhe   'one who escaped'
    b. a verb with an aspect marker +zhe
        xue-guo-yuyanxue-zhe
        learn-ASP[3]-linguistics-zhe   'one who has learned linguistics'
    c. a verb with a resultative verb complement
        xie-wan-kaojuan-zhe
        write-RES. PHASE-test sheet-zhe   'one who has finished a test sheet'

The data here are collected from *Academia Sinica Balanced Corpus of Modern Chinese* and *Google* searches.   The corpus contains 5,000 tokens of *–zhe* nouns. Unless otherwise specified, in the following sections the *–zhe* examples are those found in the corpus.   The data from *Google* searches will be indicated.

There are three main semantic constraints on the VERB+*zhe* nouns.   First, the specification of the direct objects for the transitive verbal stems is obligatory.   Second, the VERB+*zhe* nouns must satisfy the requirement that the referents be human beings. Third, the VERB+*zhe* nouns are episodically linked to the denotation of their verbal stems.

In terms of aktionsarts, basically all five verb classes can appear in the VERB+*zhe* nouns.   The verbal stem which is Activity is the most productive in the VERB+*zhe* nouns, and the one which is Accomplishment is the least productive.

The organization of this paper is as follows.   I will begin by giving a brief introduction to the Mandarin verb classification in Section 2.   Section 3 describes the restrictions of the combination of a transitive verb stem and *–zhe*.   In Section 4, an

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[3] Abbreviation ASP: aspect, RES. PHASE: resultative phase, RVC: resultative verb complement, CL: classifier, Vt: transitive verb, Vi: intransitive verb, PASS: passive

attempt is made to determine the compatibility of –*zhe* with the five verb classes in terms of aktionsarts.   In Section 5, I claim that the VERB+*zhe* nouns must satisfy the requirement of referring to human beings.   A discussion of the episodic link between the VERB+*zhe* nouns and their verb stems is presented in Section 6.   Section 7 is the conclusion.

2. Situation Aspects in Mandarin Chinese

   Since my focus is on the VERB+*zhe* nouns, I intend to figure out whether the aktionsart of verb stems could play a role.   In this section, I will briefly introduce Mandarin verb classes discussed in Smith (1997).

   Mandarin verbs are classified in neutral contexts, where everything that might change the aspectual value of a verb is excluded.   That is, only the inherent features of verbs alone are taken into account.   Xiao & McEnery (2004), based on Smith (1997), define five verb classes for Mandarin, as summarized in Table 1.

Verb class	Feature
Activities	[Atelic] [Durative]
Statives	[State]
Accomplishments	[Telic] [Durative]
Achievements	[Telic] [Instantaneous]
Semelfactives	[Atelic] [Instantaneous]

   Table 1: Mandarin verb classes

A lexical level verb can be combined with aspectual markers and then be classified into different categories (Li & Thompson 1981).

   Resultative Verb Complements (RVCs), including Resultative Phases and Resultative Completives, specify the resultative state of telic events.   The RVC examples quoted from Smith (1997) include *jian* 'see', *dao* 'attainment', *hao* 'satisfaction', and *wan* 'finish'.   The combinations of verbs and RVCs can change the verb classes of a lexical level verb.   It is not uncommon that phase RVCs form Achievements from Activity verbs in Mandarin.   The examples in (3) are quoted from Smith (1997: 283).

(3)

Activity	Achievement
kan　'see'	*kan-dao* 'see'
ting　'hear'	*ting-dao* 'hear'
zhao　'look for'	*zhao-dao* 'find'

Different combinations of verbs and RVCs fall into different classes.   In Section 4, I will discuss what kind of lexical level verbs and verb constellations can be attached by –*zhe* to form a new word.

3. The restrictions of word formation of TRANSITIVE VERB+ *zhe* nouns

This section describes the restrictions of the word formation whereby the suffix *–zhe* is attached to a transitive verbal stem.   One is the requirement of the specification of the object for transitive verbal stems.   The other is about the number of syllables of the transitive verbal stems.

If the verbal stem is transitive, its direct object has to be specified.   As in (4), where the verbs are all transitive, the direct objects of the verb stems have to be overtly realized or specified in the contexts.   The VERB+*zhe* nouns are not acceptable when out of context.

(4)

	Verb [transitive]	Verb + *zhe*	[Vt, object]+ *zhe*
a.	*shiyong* 'use'	?*shiyong-zhe*	*shiyong-wanglu-zhe* use-Internet-zhe or *wanglu-shiyong-zhe* Internet-use-zhe 'one who uses Internet'
b.	*jingying* 'operate'	?*jingying-zhe*	*jingying-gongsi-zhe* operate-company-zhe or *gongsi-jingying-zhe* company-operate-zhe 'one who runs a company'
c.	*zeng* 'donate'	**zeng-zhe*	*zeng-shu-zhe* donate-book-zhe 'one who donates books' **shu-zeng-zhe* book-donate-zhe

In (4a) and (4b), the order of the verb and the object can be reversed, but not in (4c). This has to do with the number of syllables of the transitive verb.   If a transitive verb stem has two syllables, the object can be fronted.   Although both sequences are grammatical, the OBJECT-V-*zhe* form is the preferred one.   If a transitive verb has only one syllable, there can only be one order, V-OBJECT-*zhe*.   The syllable constraint decides the template of the VERB+*zhe* nouns.

For those verbal stems with two syllables, their direct objects do not have to be overtly incorporated into *–zhe* nouns if the objects can be specified in the context.   For instance, *shiyong-zhe* 'user' is acceptable when its direct object is already known in the context.   This generalization does not include the fossilized *–zhe* words, such as *zuozhe* compose-zhe 'writer', *zhizhe* know-zhe 'knower', and *xuezhe* learn-zhe 'learner'[4].

The specification of direct objects plays an important role in the *–zhe* word formation.

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[4] *Xue-zhe* has a lexicalized meaning: a scholar.   This meaning is not considered an example of VERB+*zhe* nouns because it cannot be rephrased as 'one who learns'.   *Xuexi* is a synonym of *xue* 'learn'.   *Xuexi-zhe* means 'one who learns'.

Besides transitivity, other factors, aktionsarts for example, may influence the word formation of *zhe*. In the next section, I will discuss whether all classes of verbs can form VERB+*zhe* nouns.

4. The compatibility of *-zhe* with five verb classes

In this section, I will discuss whether the five verb classes are compatible with *-zhe*. I adopt Smith's (1997) definitions for the five verb classes. In the corpus, there are 5,000 tokens of *–zhe* nouns. The percentages for each of the five verb classes are shown in Chart 1. The category *Others* includes Adj.+*zhe* nouns and Noun+*zhe* nouns.
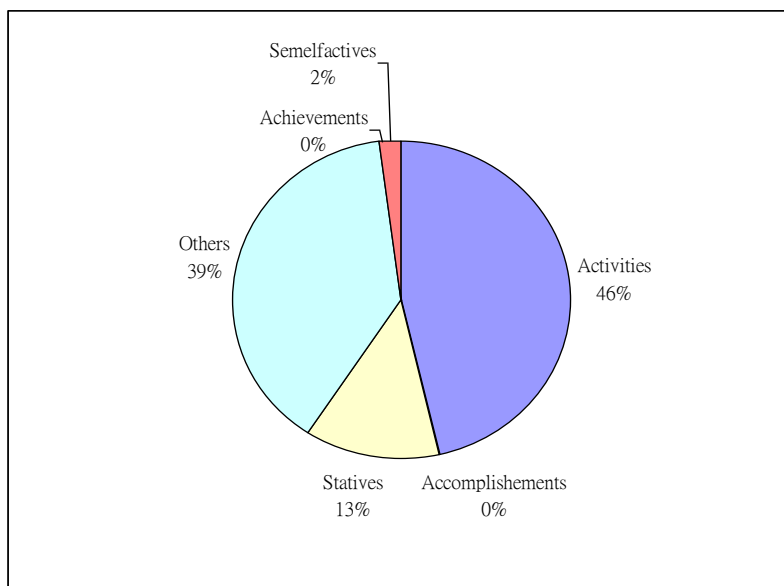

Chart 1: The percentages for the VERB+*zhe* nouns of the five verb classes

In the following sections, the instances for each case will be discussed in more detail.

4.1 Activities

In Mandarin, verbs with features [Atelic] and [Durative] form Activities, such as *xue* 'learn', *gai* 'build', *xie* 'write', *pao* 'run', *kan* 'see', *jian* 'see', *ting* 'listen', *zhao* 'look for' and *youyong* 'swim'[5]. If Activity verbs are combined with *–zhe* on the lexical level, the results are shown in (5).

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[5] These examples, *zhao* 'look for', *xue* 'learn', *kan* 'see', *jian* 'see', *ting* 'listen' , are collected from Smith (1997: 283 & 285).

(5)

	Verb	Vt or Vi	Verb + zhe
a.	*xie* 'write'	Vt	*?xie-zhe* intended meaning: 'one who writes'
b.	*gai* 'build'	Vt	*?gai-zhe* intended meaning: 'one who builds'
c.	*xue* 'learn'	Vt	*?xue-zhe* intended meaning: 'one who learns'
d.	*kan* 'see'	Vt	*?kan-zhe* intended meaning: 'one who sees'
e.	*xiuli* 'fix'	Vt	*? xiuli-zhe* intended meaning: 'one who fixes…'
f.	*pao* 'run'	Vi	*pao-zhe* 'runner'
g.	*youyong* 'swim'	Vi	*youyong-zhe* 'swimmer'

If we take a closer look at (5a)-(5g), there is a clear cut in terms of transitivity. *Zhe* can attach to intransitive verbs to form words, as in (5f) and (5g). Nevertheless, the combination of transitive verb stems and *zhe* is awkward when used out of context. The ungrammaticality of (5a)-(5e) can be repaired if the objects of the transitive verbs are incorporated into (5a)-(5e), as shown in (6). If the objects are not overtly incorporated, they have to be identified in the context. It is worth our attention that the object must be uncountable and unspecified. If not, the verb phrases become Accomplishments.

(6)

	Verb	[Vt, object] + zhe
a.	*xie* 'write'	*xie-xin-zhe* write-letter-zhe 'one who writes letters'
b.	*gai* 'build'	*gai-wu-zhe* build-house-zhe 'one who builds houses'
c.	*xue* 'learn'	*xue-yingwen-zhe* learn-English-zhe 'one who learns English'
d.	*kan* 'see'	*kan-tu-zhe* see-picture-zhe 'one who looks at the pictures'
e.	*xiuli* 'fix'	*zixingche-xiuli-zhe* or *xiuli-zixingche-zhe* bike-fix-zhe 'one who fixes bikes'

In some cases, the transitive Activities can be combined with *zhe* to form new words without the overt objects, as in (7). The main difference between the instances in (6) and (7) lies in that the –*zhe* nouns in (7) are already lexicalized, whereas those in (6) are not. (7a)-(7c) are common in classical Chinese literature, so they can be viewed as fixed expressions.

(7)

	Verb	Vt or Vi	Verb + zhe
a.	*jian* 'see'	Vt	*jian-<u>zhe</u>* 'one who sees'
b.	*ting* 'listen'	Vt	*ting-<u>zhe</u>* 'one who listens'
c.	*shuo* 'speak'	Vt	*shuo-<u>zhe</u>* 'one who speaks'

In brief, Activities are compatible with *–zhe*. If the verbal stem is transitive, the direct object must be either overtly incorporated or specified in the contexts.

The *–zhe* nouns formed with Activity stems can be seen as the most productive type since they account for the largest portion of the *–zhe* nouns in the corpus.

4.2 Statives

As defined by Smith (1997), Mandarin verbs which intrinsically have the feature [State] are Statives. Moreover, states are homogenous situations with no dynamics, for example, *cunzai* 'exist', *qian* 'owe', *shuyu* 'belong', *xiang* 'resemble', etc. Mandarin emotional verbs, such as *ai* 'love', *xihuan* 'like', *taoyan* 'hate', and *hen* 'resent' are also Statives since they are [State] (Xiao & McEnery 2004). The realization of direct objects still plays a crucial role here. As shown in (8), if the Statives are transitive verbs, the *–zhe* formation is impeded due to lack of direct objects.

(8)

	Verb	Verb (Vt) +*zhe*		Verb	Verb (Vt) +*zhe*
a.	*yongyou* 'own'	**yongyou-zhe*	b.	*ai* 'love'	**ai-zhe*
c.	*qian* 'owe'	**qian-zhe*	d.	*xihuan* 'like'	**xihuan-zhe*
e.	*shuyu* 'belong'	**shuyu-zhe*	f.	*taoyan* 'dislike'	**taoyan-zhe*
g.	*xiang* 'resemble'	**xiang-zhe*	h.	*hen* 'hate'	**hen-zhe*
	Verb	Verb (Vi) +*zhe*			
i.	*cunzai* 'exist'	*cunzai-zhe*[6]			

If the objects are incorporated into the VERB+*zhe* nouns or specified in the context, these ungrammatical *–zhe* nouns can be repaired, as in (9).

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[6] In Mandarin, *cunzai* 'exist' is an intransitive verb. There is only one token of *cunzai-zhe* 'one who exists' in the corpus.

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(9)

	Verb	[Verb, Object]+*zhe*
a.	*yongyou* 'own'	*fangzi-yongyou-zhe* house-own-zhe 'one who owns a house'
b.	*qian* 'owe'	*qian-qian-zhe* own-money-zhe 'one who owes money'
c.	*ai* 'love'	*ai-mao-zhe* love-cat-zhe 'one who loves cats'
d.	*xiang* 'resemble'	*xiang-muqin-zhe*[7] resemble-mother-zhe 'one who resembles his/her mother'

These examples show that there is no problem for Mandarin Statives to combine with the suffix –*zhe* as long as the direct objects of the transitive verbs are specified.

4.3 Accomplishments

In Mandarin, verbs which have the features [Telic] and [Durative] form Accomplishments.   Accomplishments are telic durative situations consisting of a process and an associated outcome (Smith 1997).   No lexical-level verb in Mandarin can form Accomplishments.   There are two common ways to form Accomplishments.   One is by adding phase RVCs to Activity verbs to denote change of state.   The other is by adding countable NPs or NPs with specific meanings.

No cases of the combination of Accomplishments and –*zhe* are attested in the corpus. However, such instances can be found in *Google* search.   The examples in (10) are gathered from *Google*, and there is only one token for each.   In (10a) and (10b), *chi* 'eat' and *xie* 'write' are Activities.   With the RVCs, the verb constellations become Accomplishments.   The verb constellation in (10c) is also an Accomplishment because the NP is countable and specific.   Since the verb stems in (10b) and (10c) have only one syllable, the order of the verb and the object cannot be reversed.

(10)

	VERB+*zhe*
a.	*chi-bao-zhe* eat-RVC-zhe 'one who is full'
b.	*xie-wan-xin-zhe* write-RVC-letter-zhe 'one who has finished writing a letter'
c.	*gai-nei-zuo-qiao-zhe* build-that-CL-bridge-zhe 'one who built that bridge'

The examples in (10) sound awkward for native speakers.   It is likely that –*zhe* is prone

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[7] This example is from *Google*.

to be combined with lexical level verbs, but Mandarin Accomplishments are verb constellations.

4.4 Achievements

The Achievement verbs emphasize the successful achievement of the encoded result with or without profiling the process leading up to the result. Verbs with the intrinsic features [Telic] and [Instantaneous] form Achievements, such as *ying/sheng* 'win', *shu/bai* 'lose', *si* 'die' and '*daoda* 'arrive'. Besides, it is also possible to make verbs with the intrinsic feature [Atelic] into Achievements by adding directional complements (Smith 1997). For instance, *pa* 'climb' and *zhao* 'look for' are atelic, but in (11) the verb constellations are telic because there is a directional complement, *dao*.

(11) a.   *pa-dao(-shanding)*

climb-RVC(-mountaintop)   'reach the summit'

b.   *zhao-dao*

look for-dao   'find'

Mandarin Achievements are compatible with *–zhe* in forming new words, as shown in (12).

(12)

	Verb	*-zhe* nouns
a.	*si* 'die'	*si-zhe* 'one who died'
b.	*ying/sheng* 'win'	*ying-zhe sheng-zhe* 'one who won'
c.	*shu/bai* 'lose'	*shu-zhe bai-zhe* 'one who lost'
d.	*muji* 'witness'	*muji-zhe*[8] 'one who witnessed'
e.	*faxian* 'discover'	*faxian-zhe* 'one who discovered'
f.	*juewu* 'to become aware'	*juewu-zhe* 'one who became aware'
g.	*zhao-dao* look for-dao 'find'	*?zhao-dao-da'an-zhe* look for-dao-answer-zhe 'one who found the answer' **da'an-zhao-dao- zhe* answer-look for-dao-zhe
h.	*pa-dao* climb-RVC 'climb to'	*?pa-dao-shanding-zhe* climb-RVC-mountaintop-zhe 'one who reaches the summit' **shanding-pa-dao- zhe* mountaintop-climb-RVC-zhe

It is noteworthy that lexical level verbs are preferable in the word formation of *–zhe*, as reflected in (12a)-(12h). The Achievements which are formed by adding directional

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[8] In the corpus, there are 19 tokens for this. All of the witnessing events are described in the context, so the direct objects of 'witnessing' are not incorporated.

complements to Activities are not attested in the corpus. (12g) and (12h) are unacceptable due to the conflict between the classical and literary sounding *-zhe* and the colloquial sounding verb stems.

4.5 Semelfactives

Semelfactives are formed by the verbs with intrinsic features [Atelic] and [Instantaneous]. *Ti* kick', *qiao* 'knock', *kesou* 'cough', and *dage* 'hiccup/burp' are instances of Semelfactives. In the corpus, no instance of SEMELFACTIVE+*zhe* is attested. The examples collected from *Google* are shown in (13).

(13)

	Verb	Vt or Vi	*-zhe* noun
a.	*ti* 'kick'	Vt	*ti-men-zhe* kick-door-zhe 'one who kicked the door'
b.	*qiao* 'knock'	Vt	*qiao-men-zhe* knock-door-zhe 'one who knocked the door'
c.	*kesou* 'cough'	Vi	*kesou-zhe* 'one who coughs'
d.	*dage* 'hiccup'	Vi	*dage-zhe* 'one who hiccups/burps'

The requirement of specifying the direct objects of the transitive verbs is observable in the *–zhe* nouns, as in (13a) and (13b). The *-zhe* nouns in (13a) and (13b) retain the instantaneous meaning, but the *–zhe* nouns in (13c) and (13d) have an additional frequentative reading.

4.6 The productivity of the five verb classes in the VERB+*zhe* nouns

The distribution of the *-zhe* nouns in the corpus shows that Activities, Statives, and Achievements can fit squarely into the *–zhe* nouns. They are productive in the word formation of *–zhe*. Although the *–zhe* nouns with Accomplishment and Semelfactive verbal stems are not attested in the corpus, some examples can still be found from *Google* searches.

Native speakers tend not to accept the ACCOMPLISHMENT+ *zhe* nouns. The reason may reside in that a lexical verb without complements or phase markers is the preferred verb stem for the VERB+ zhe nouns. In Mandarin, there are no verbs which are Accomplishments by themselves, so the ACCOMPLISHMENT + *zhe* nouns can barely be found. The data of ACHIEVEMENT+*zhe* nouns also support this observation.

5. The VERB+ *zhe* nouns refer to human beings

According to Packard (2000), the meaning of the suffix *–zhe* is 'one who does/is X'. However, this generalization cannot capture all the *–zhe* nouns. For the ADJECTIVE +*zhe* nouns, some of them can refer to inanimate objects, as in (14). For example, in the

corpus, *san-zhe* in (14a) refers to the three things, teaching, service, and research, not three people.

(14) ADJ.-*zhe*
  a. *san-zhe*
        three-zhe   'three entities(people/objects/concepts)'
      b. *qing-zhe*
        light-zhe   'light person/object'
      c. *geng-zhongyao-zhe*
        more-important-zhe   'what is more important ' or 'the more important person'

Let's come back to the VERB+*zhe* nouns. For all the VERB+*zhe* nouns, their referents must be human beings. It is impossible for a VERB+*zhe* noun to denote an inanimate entity. As shown in (15), all the VERB+*zhe* nouns refer to human beings. It is not entailed that the referent of the direct object of *zhuang*[9] 'collide with' and *ti* 'kick' must be sentient since inanimate entities can be collided with or kicked. However, there is no way to get a non-sentient referent in (15a) and (15b). Example (15c) can only refer to the person who was written about, not inanimate objects such as words, essays and paper. The only possible reading for (15d) is the person who was drawn/painted a picture of.

The examples without passive markers are shown in (15e) and (15f). Both animate and inanimate entities can be the subject of the intransitive verbs, *zhuiluo* 'fall' and *xuanzhuan* 'revolve', but (15e) and (15f) can only refer to human beings.

(15)

a. *bei-zhuang-zhe*	b. *bei-ti-zhe*
PASS-collide with-zhe	PASS-kick-zhe
'one who got rammed into'	'one who got kicked'
c. *bei-xie-zhe*	d. *bei-hua-zhe*
PASS-write-zhe	PASS-draw/paint-zhe
'one who was written about'	'one who was drawn/painted a picture of'
zhuiluo-zhe	*xuanzhuan-zhe*
fall-zhe	revolve-zhe
'one who fell down'	'one who revolved'

These examples show that when *-zhe* is combined with a verb to form a noun, it can only denote a human being. The VERB+*zhe* nouns do not merely pick up a specific argument associated with the verbal stem. Instead, they have their own characteristic semantic contribution.

The VERB+*zhe* nouns are related to their verb stems in terms of event structure.

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[9]*Zhuang* is a transitive verb in Mandarin.

They can take the thematic roles such as Agent, Patient, Experiencer, and Recipient, but Theme and Location are ruled out.

The contrast between the ADJECTIVE +*zhe* nouns and the VERB+*zhe* nouns supports the fact that the VERB+*zhe* nouns have the unique semantic constraint of denoting human beings.

6. Episodic linking of the *verb+zhe* nouns

The focus of this section is on the episodic nature of VERB+*zhe* nouns. The referent of a –*zhe* noun must be involved in an event corresponding to a stem verb. For instance, to be qualified as the noun *diaocha-zhe* 'investigator', the referent of the noun must be involved in a certain role in an investigating event. The definition of episodic linking is adopted from Barker (1998), as cited in (16).

(16) A derived noun N is episodically linked to its stem S iff for every stage <x, e> in the stage set of N, *e* is a member of the set of events that characterize S. [x is an individual]

Mandarin VERB+*zhe* nouns share the same definition given in (16). That is, there is an episodic link between each –*zhe* noun and its stem. Let's examine the noun *diaocha-zhe* 'investigator'. There must be a qualifying event in which a person participates to get a person qualified as a *diaocha-zhe* ''investigator'. Therefore, every investigating event qualifies a certain individual as a *diaocha-zhe*, and for every *diaocha-zhe*, there is an investigating event. The derived nouns are associated with their verbal stems semantically. The episodic link with the verbal stem is a characteristic of the VERB+*zhe* nouns.

The semantic connections between the –*zhe* nouns and their verb stems can also be supported in the punctuality of the VERB+*zhe* nouns. The definition of punctuality is adapted from Barker (1998), as in (17).

(17) An individual *x* will be in the extension of a –*zhe* noun N when it is evaluated at time *t* just in case there is a stage <x, e> in the stage set of N and either (i) *e* is punctual and t $\geq \tau(e)$ or (ii) *e* is nonpunctual and t $\subseteq \tau(e)$.

As defined in (17), *x* is in the extension of the VERB+*zhe* noun from the moment when the qualifying event occurs onwards if the qualifying event is punctual. That is, if a verb stem characterizes an event that is naturally punctual, its associated VERB+*zhe* noun is also punctual. As shown in (18)[10], the actions described by the verbs are essentially punctual. The people described are in the extension of the VERB+*zhe* nouns from the time point at which the actions happen onwards. For instance, since the event of retiring denotes a permanent change of state, a person is qualified as *tuixiu-zhe* 'one who retired' from the moment he or she is retired until the description is no longer relevant.

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[10] The verbal stems of examples (16c) and (16d) are transitive. Their direct objects are specified in the context.

(18)

a. *lihun-zhe* divorce-zhe 'one who got divorced'	b. *tuixiu-zhe* retire-zhe 'one who retired'
c. *mousha-zhe* murder-zhe 'one who murdered…'	*chuangzao-zhe* create-zhe 'one who created…'

For the verbs characterizing events which are nonpunctual, their associated VERB+*zhe* nouns are antipunctual.   As defined in (17), *x* is in the extension of the VERB+*zhe* nouns only for the duration of the qualifying event.   The examples are shown in (19).   If the events described by the verbs are nonpunctual, an individual is in the extension of the VERB+*zhe* noun only for the duration of the qualifying event.   For instance, a person is not described as *qian-qian-zhe* 'one who owed money' after the debt is paid off. Similarly, a person is in the extension of *yu-hui-zhe* 'one who attended the conference' only during the conference.

(19)

a. *qian-qian-zhe* owe-money-zhe 'one who owed money'	b. *qian-yue-zhe* sign-contract-zhe 'one who signed a contract'
c. *shou-pin-zhe* receive-employment-zhe 'one who got employed'	*daikuan-zhe* loan-zhe 'one who got a loan'
yu-hui-zhe attend-conference-zhe 'one who attended the conference'	

So far the examples in this section show that the VERB+*zhe* nouns are episodically linked with their verbal stems.   The denotation of some VERB+*zhe* nouns is qualified from a specific moment onwards, and some VERB+*zhe* nouns have individuals in their extension only for specific periods of time.   The punctuality of the denotation of the VERB+*zhe* nouns is mainly determined by their verbal stems.

7. Conclusion

The combination of the suffix –*zhe* and a verb stem is a productive way of coining new words in Mandarin morphology.   The VERB+*zhe* nouns systematically obey three semantic constraints.

First, the semantic completion is obligatory for the VERB+*zhe* nouns which have transitive verb stems.   If a verb stem is transitive, its direct object must be either overtly incorporated with the VERB+*zhe* nouns or specified in the context.

The second one is that the referent of a VERB+*zhe* noun must be a human being.

This requirement cannot be predicted from their verb stems. It shows the VERB+*zhe* nouns have their own semantic features. If *zhe* is combined with an adjective or a noun, the referent is not restricted to human beings.

Third, a VERB+*zhe* noun is episodically linked to its verb stem. There must be a qualifying event to license the use of a VERB+*zhe* noun. The punctuality of the VERB+*zhe* nouns depends on their stems. It is entailed in the assumption of the episodic link.

As for the compatibility with different aktionsarts, *-zhe* basically can affix to all the five classes. However, there is a distinct difference in productivity. The stems which are Activities are the most productive. Statives and Achievements also fit nicely into the formation of the VERB+*zhe* nouns. The combination of Semelfactives and *-zhe* works well although no such case is attested in the corpus. It is hard to find an instance of ACCOMPLISHMENT+*zhe* noun. The reason lies in that the combination of a lexical verb and *–zhe* is the preferred template. It is better not to insert an aspectual marker between a lexical verb and *–zhe*, but Mandarin Accomplishments are formed by verb constellations.

Based on the examples we have gone through so far, it is notable that the VERB+*zhe* nouns adhere to the three semantic constraints. They can capture the possible meanings shared by the newly formed VERB+*zhe* nouns.

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