

## Thematic Hierarchy and Derivational Economy\*

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What thematic hierarchy is has been controversial, and whether it should exist as a theoretical construct has been questioned. This work shows that if thematic hierarchy is represented structurally as layers of projections, it helps to account for some newly observed constraints on object deletion in Chinese. Chinese exhibits much flexibility in the number and type of arguments that can occur with verbs, and subjects and objects seem to be interchangeable in many cases. However, it is shown that constraints can be found amid the great flexibility in argument structure—object deletion is not possible in the cases not following thematic hierarchy, although subject deletion is still possible. Moreover, object deletion is unacceptable in the cases where arguments are added syntactically. Again, subjects can be deleted in such constructions. These generalizations will be captured by the aforementioned layers of projections reflecting thematic hierarchy and a notion of derivational economy—simpler structures are favored when choices are available.

Key words: argument structure, flexible word order, lexical specification, object deletion, thematic hierarchy, unaccusative

### 1. Introduction

The questions of what ‘thematic hierarchy’ is and what its status is in grammatical theories about human languages have generated heated debates for a long time. Beginning from Fillmore’s (1968) subject selection rule, there have been many works establishing some asymmetric relation between thematic roles—some thematic roles are more prominent or higher than others hierarchically. Many different and often conflicting formulations of thematic hierarchy have been proposed (see, e.g. the review in Newmeyer 2002; Rappaport Hovav & Levin 2007), which has prompted questions as to whether thematic hierarchy should even exist as a theoretical construct. As Newmeyer (2002:65) puts it, ‘there is reason for strong doubt that there exists a Thematic Hierarchy provided by UG [Universal Grammar]. That seems to be the best explanation for the fact that after over three decades of investigation, nobody has proposed a hierarchy of theta-roles that comes close to working’. Levin & Rappaport Hovav (2005), Rappaport Hovav & Levin (2007), and others investigate the issues regarding argument structure in depth and argue that the notion of thematic hierarchy is not a primitive theoretical construct. Various instantiations of thematic hierarchy reflect different factors

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underlying the generalizations captured by particular hierarchies, which could be understood in terms of event structures or via lexical entailments. The notion of prominence may also be relevant (Bresnan & Kanerva 1989:23–24)—an encoding of relations of semantic structural prominence among a verb’s arguments or salience hierarchy, which may reflect relative topicality of arguments.

This work brings forth more linguistic generalizations that exhibit some ranking of thematic roles. The empirical focus will be on argument ellipsis in seemingly freely-ordered constructions in Chinese, a language that allows us to see more clearly the effect of thematic hierarchy because of its possibility of having non-selected subjects and objects (Lin 2001; Zhang 2005, among many others). It will be shown that, even though Chinese appears to allow prominent argument ellipsis and free word order in constructions involving subjects and/or objects not typically selected (e.g. Huang et al. 2009:Chapter 2; Yen-Hui A. Li forthcoming), object deletion is subject to a constraint that can be phrased in terms of thematic hierarchy. This work broadens the empirical coverage of thematic hierarchy and further demonstrates that thematic hierarchy can be represented by hierarchical structures. Empirically, there exists a contrast in object deletion between constructions following some thematic hierarchy and those not following the hierarchy, as well as an asymmetry in deleting subjects and objects. These generalizations are to be captured by the interaction between thematic hierarchy/hierarchical structure and a notion of derivational economy.

This paper is structured as follows: Section 2 describes the possibilities of subjects and objects not typically selected; §3 focuses on arguments demonstrating that non-typically-selected arguments—‘non-canonical’ arguments—indeed occupy subject and object positions. Moreover, the order of thematic roles possible in the subject and object positions seems to be quite free. Nonetheless, the seemingly freely-ordered constructions exhibit sensitivity to a thematic hierarchy when object deletion applies (§4). Section 5 evaluates possible analyses and §6 proposes a solution to the observed asymmetries according to a derivational economy defined in terms of structural complexity and lexical specification. The nature of such a derivational economy will be briefly discussed in the concluding §7.

## 2. Argument structure

The argument structure of a verb in Chinese is not easy to define because (i) Chinese frequently drops subject and object arguments and (ii) types of verbs are difficult to distinguish according to their abilities to take objects. The first point is illustrated by (1a–d).

- |     |    |                         |                |    |                       |     |
|-----|----|-------------------------|----------------|----|-----------------------|-----|
| (1) | a. | kan-guo-le              | ma?            | b. | xihuan                | ma? |
|     |    | see-ASP-LE              | Q <sup>1</sup> |    | like                  | Q   |
|     |    | ‘(Have you) seen (it)?’ |                |    | ‘(Do you) like (it)?’ |     |

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<sup>1</sup> The abbreviations in glosses used in this work are: Q for question marker, SFP for sentence-final particle, ASP for aspect marker, CL for classifier, EXT for extent marker and PL for plural. Some morphemes are glossed directly, such as the aspect/inchoative LE, the disposal construction marker BA, the modification or possession marker DE within noun phrases.

- |    |                                   |        |     |    |                          |     |      |
|----|-----------------------------------|--------|-----|----|--------------------------|-----|------|
| c. | da-shang-le                       | ren    | le. | d. | ta                       | bu  | yao. |
|    | hit-hurt-LE                       | person | LE  |    | he                       | not | want |
|    | ‘(Someone) hit and hurt someone.’ |        |     |    | ‘He does not want (it).’ |     |      |

The second point is demonstrated by the apparent lack of clear specifications on the arguments required to co-occur with particular verbs. For instance, Chinese is notoriously difficult in distinguishing between transitive and intransitive verbs. It is not clear when an object is required, when not, and what objects are required (e.g. J. Cheng 2009; J. Guo 1999; Hu 2007, 2008, 2010; Lu 2002; Shen 2006; Sun & Li 2010; Xiong 2009; Xu & Shen 1998; Yuan 1998, 2003; Zhan 2004; Zhang 2005; Zhou 1997, among many others). Although English has alternations like (2a and b), Chinese is much more conspicuous for such alternations, as in (3b–d) below, in addition to (3a).

- (2) a. He likes to fly.  
b. He likes to fly big planes.
- (3) a. ta xihuan fei (da feiji).  
he like fly big plane  
‘He likes to fly (big planes).’  
b. ta changchang zuo (zhe-ge yizi).  
he often sit this-CL chair  
‘He often sits ((on) this chair).’  
c. ta bu shui (da chuang).  
he not sleep big bed  
‘He does not sleep ((on) big beds).’  
d. ta bu dasuan pao (na-ge gongyuan).  
he not plan run that-CL park  
‘He does not plan to run ((in) that park).’

As illustrated by (3b–d), typical one-argument verbs such as ‘sit’, ‘sleep’, ‘run’ can not only have an argument in the subject position, but also allow an additional noun phrase (NP) in the typical postverbal object position, which roughly corresponds to a prepositional phrase (PP) in English.<sup>2</sup> Such an NP behaves like a typical object grammatically (see §2.2 for objecthood tests). The rough correspondence between a Chinese NP and an English PP is also quite common in the cases involving typical transitive verbs. Transitive verbs, especially those denoting activities, allow expressions like instruments, temporals, locatives etc. of activities to take the place of the arguments that are normally subcategorized for by verbs. For instance, the following sentence can have these readings: he writes the words ‘this brush pen’ (theme of the verb), or he writes with this brush pen (instrument of the activity), or he writes on this brush pen (location of the activity).

- (4) ta xie zhe-zhi maobi.  
he write this-CL brush.pen

<sup>2</sup> Distinguishing NPs and DPs is not important in this work; therefore, the traditional label NP is adopted.

Similarly, subject arguments typically selected by verbs or verb phrases can be replaced by many other options. Lin (2001) extensively discusses the types of arguments that can appear in the subject and object positions (also see Zhang 2005, for instance):<sup>3</sup>

## Objects:

- (5) a. chi niu-rou mian (Theme/patient)  
eat beef noodle  
'eat beef noodle'
- b. chi da-wan (Instrument)  
eat big-bowl  
'use a big bowl to eat'
- c. chi guanzi (Location)  
eat restaurant  
'dine at a restaurant'
- d. chi xiawu (Time)  
eat afternoon  
'dine in the afternoon'
- e. chi tou-teng (Reason)<sup>4</sup>  
eat head-ache  
'eat for [curing] headache'  
(zhe yao shi chi tou-teng de 'this medicine is for headaches')

## Subjects:

- (6) a. Laozhang kai-le yi-liang tanke-che. (Agentive)  
Laozhang drive-LE one-CL tank  
'Laozhang drove a tank.'
- b. gaosu-gonglu-shang kai-zhe yi-pai tanke-che. (Existential)  
expressway-on drive-ASP one-line tank  
'There is a line of tanks on the expressway.'
- c. zhe-liang po-che kai-de wo xia-si le. (Causative)  
this-CL broken-car drive-EXT I scare-dead LE  
'Driving this broken car made me scared to death.'
- d. zhe-chang changtu sai-che yijing kai-le (Progress)  
this-CL long-distance car-racing already drive-LE  
san-fen-zhi-yi de lucheng le.  
one-third DE journey LE  
'This long-distance car racing has proceeded for one third of the journey.'

<sup>3</sup> There have been no clear and agreed-upon inventory and definition of theta roles and the related light verbs after decades of work, as Newmeyer (2002) notes. This work focuses on a smaller set of more familiar and widely-accepted theta roles—causer (the entity that causes an event to take place), agent (doer), experiencer (the one experiencing an event), temporal (time of an activity/event), locative (location where an activity/event takes place), instrument (for an activity) and theme.

<sup>4</sup> Reason expressions will not be discussed further because of their different properties (see Barrie & Li forthcoming, note 7).

- e. zhe-tang renwu zonggong kai-le ba-tang che,  
 this-CL mission altogether drive-LE eight-time car  
 yunsong qishi dun wuzi. (Inclusion)  
 transport seventy ton material  
 ‘For this mission, vehicles were driven eight times altogether (eight times of transportation via vehicles), 70 tons of materials transported.’
- f. mashang jiu kai che le, zuo hao! (Occurrence)  
 right-now then drive car LE sit well  
 ‘The car is starting immediately, sit well!’
- g. zhe-liang tanke-che cong erci da-zhan kai dao xianzai,  
 this-CL tank from Second World-War drive to now  
 kuai pao-mao le. (Theme)  
 soon break-down LE  
 ‘This tank has been driven from the Second World War to now; it is breaking down soon.’

As demonstrated by these examples, object and subject positions allow not only the arguments typically selected by the relevant verbs/verb phrases, but also many other possibilities. Let us refer to those arguments typically selected as subjects and objects by the associated verbs or verb phrases as ‘canonical subjects/objects’ and the non-typically selected as ‘non-canonical subjects/objects’. In addition, the terms ‘canonical arguments’ and ‘non-canonical arguments’ will be used to refer to the arguments that are canonical and non-canonical subjects/objects respectively.<sup>5</sup> In the following subsections, it will be shown that non-canonical subjects and objects indeed occupy subject and object positions structurally.

Before we proceed, however two clarifications about non-canonical arguments should be made. One is that non-canonical objects are not completely productive. They have institutionalized idiosyncratic meanings, just like the cases of noun incorporation in languages that have a productive process of incorporating nouns to verbs, or the cases of compounding with nouns in languages such as English (see Barrie & Li 2012; Lin 2001; Zhang 2005, among others). For instance, the following two sentences contrast in acceptability.

<sup>5</sup> It should also be pointed out that the division between canonical and non-canonical arguments is not entirely clear. Consider, for instance, the NP ‘park’ in the object position in *qu gongyuan* ‘go park’, which roughly corresponds to *dao gongyuan qu* ‘to park go’. The NP following *qu* generally has to be a destination place. That is, if *qu* is subcategorized for an argument, it should be one indicating a destination. Is such a destination NP a canonical or non-canonical object? If it is a canonical object, then, how about the place NP following *zuo* ‘sit’ as in *ni zuo zher/yizi* ‘you sit here/the chair.’? This work shows that there are actually no significant syntactic differences between canonical and non-canonical arguments. Distinctions that can be made might be the relative degree to which the relation between an argument and its associated verb is institutionalized or conventionalized. The more institutionalized/ conventionalized a relation is, the more ‘canonical’ an argument is. A canonical object might simply be the most institutionalized/conventionalized argument of a verb.

- (7) a. ni chi zhe-shuang kuaizi ba!  
 you eat this-CL chopsticks SFP  
 ‘You eat with this pair of chopsticks!’  
 b. \*ni chi zhe-ba chazi ba!  
 you eat this-CL fork SFP  
 (‘You eat with this fork!’)

Eating with chopsticks is an institutionalized activity in Chinese culture. Thus, the non-canonical object in (7a) is acceptable. However, eating with forks is a borrowed concept, and much more recent, so (7b) is generally not acceptable to native speakers. The institutionalized idiosyncratic interpretation can be further illustrated by a sentence like the one below, which does not have to mean that the eating place is a canteen. It can mean takeout food from a canteen consumed elsewhere (Zhang 2005).

- (8) ta pingchang dou chi shitang.  
 he normally all eat canteen  
 ‘He normally eats canteen (food).’

Another example is a sentence like (9) following which does not have to mean that the person goes to the place *jiaotang* ‘religion-hall, church’. It can simply mean attending services, wherever the services are held.

- (9) ni shi qu jiaotang de ren ma?  
 you be go church DE person Q  
 ‘Are you the type of person that goes to church?’

The other point is that non-canonical arguments are not possible with just any verbs. They overwhelmingly occur with activity verbs (which can be changed to different situation types with aspect markers).<sup>6</sup> For instance, transitive stative verbs such as *xihuan* ‘like’ or *zhidao* ‘know’ behave just like their counterparts in English and only occur with canonical subjects and objects.<sup>7</sup> Non-canonical arguments are impossible with them. An achievement verb like *si* ‘die’ requires the

<sup>6</sup> Lin (2001:Chapter 3) notes that only non-stative verbs fail to take non-canonical arguments. However, he includes aspect markers in defining verb types (such as the perfective aspect marker *-le* making a verb an accomplishment). However, we should focus on verbs themselves, excluding aspect markers. This is because accomplishment verbs formed by the compounding of an activity verb and a result verb behave differently from accomplishment verb phrases consisting of activity verbs and aspect markers in their abilities to accept a non-canonical object—the former type generally cannot.

<sup>7</sup> In demonstrating the lack of non-arguments with stative verbs, Lin (2001:Chapter 3) suggests that the lack of temporal subjects with stative verbs could be due to the atemporality of stative verbs. He suggests that a non-canonical temporal subject is licensed by the light verb EXIST, which is not compatible with atemporal stative verbs. However, stative verbs can express temporary states, not always permanent states (stage-level versus individual-level). Further, note that individual-level stative verbs do occur with temporal expressions, as long as they appear as modifying phrases, rather than non-canonical arguments:

presence of its canonical argument—the one that dies. Thus, a non-canonical locative object is not possible in the object position, such as (10). Instead, the locative marker *zai* is obligatory:

- (10) ta si \*(zai) yiyuan-li.  
 he die at hospital-inside  
 ‘He died at the hospital.’

Because *si* is an unaccusative verb, however, whose argument is base-generated and can stay in the object position, the subject position can be occupied by a temporal or locative expression (Yen-Hui A. Li 1990)—non-canonical subjects.

- (11) a. na-jia yiyuan si-le henduo bingren.  
 that-CL hospital die-LE many patient  
 ‘That hospital died many patients (Many patients died in that hospital).’  
 b. zuotian si-le henduo bingren.  
 yesterday die-LE many patient  
 ‘Yesterday died many patients (Many patients died yesterday).’

As for accomplishment verbs, they are generally compounds of [activity verb + result verb]<sup>8</sup> (Tai 1984; also see Yafei Li 1990, 1993, 1995 for causative verb compounding). They can be used transitively as in (12a) or like an unaccusative as in (12b).

- (12) a. ta chui-po qiqiu le.  
 he blow-broken balloon LE  
 ‘He blew the balloon and it broke.’  
 b. qiqiu chui-po le.  
 balloon blow-broken LE  
 ‘The balloon broke (from blowing).’

- 
- (i) ta yiqian / zai na shihou hen xihuan wo.  
 he before / at that time very like me  
 ‘He liked me before/at that time.’

The same is true of locative expressions:

- (ii) wo zai jia-li dou zhidao zhexie shi.  
 I at home-in all know these matter  
 ‘I know all these matters at home.’

Clearly, the cases of (i–ii) cannot feed into non-canonical argument structures, pointing to the importance of distinguishing the overt temporal or locative *zai*-phrases from non-canonical temporal or locative arguments (Barrie & Li forthcoming).

<sup>8</sup> The result verb generally expresses a state; but it can also be an intransitive activity verb like ‘cry’ in (13). See Sybesma (1999), for instance, for resultative expressions.

Interestingly, a reviewer suggests the type of alternation between the two-argument (12a) and the one-argument (12b) structures is not always possible. For instance, even though (13a) below is possible, the counterpart in (13b) is not acceptable.

- (13) a. ta nong-ku le meimei.  
           he make-cry LE sister  
           ‘He made (his) sister cry.’  
       b. \*meimei nong-ku le.  
           sister make-cry LE  
           ‘(His) sister was made to cry.’

Nonetheless, the judgment that (13b) is unacceptable is not shared by all the speakers I consulted with. Moreover, if the second part of the two-verb (V-V) compound in (13) is changed to an unaccusative verb, in contrast to *ku* ‘cry’, which is unergative, the alternation is quite acceptable:

- (14) a. ta nong-po le huaping.  
           he make-break LE vase  
           ‘He made-broke the vase.’  
       b. huaping nong-po le.  
           vase make-break LE  
           ‘The vase was broken.’

This might suggest that the properties of the relevant verbs are important. The (un)acceptable alternation in (12)–(14) probably has to do with the possibility of analyzing the relevant V-V compounds as unaccusatives. However, the issue of whether a V-V compound can be analyzed as an unaccusative is too complex to be included in this work. The rest of this work will focus on activity verbs and clearer unaccusative verbs, leaving the other issues for further research (see Lin 2001: Chapters 3 to 4).

## 2.1 Non-canonical arguments in subject positions

This subsection shows that non-canonical subjects do indeed occupy subject positions. Her (2009) uses tests such as subject-to-subject raising and the impossibility of co-occurring intentional adverbs to show that a non-canonical subject in the construction with the meaning of ‘accommodation’ or capacity is indeed in the subject position, such as (15) (see note 18 for the accommodation construction; see also Yen-Hui A. Li 1998 for quantity expressions, and Tsai 2001 for indefinite subjects and flip flop constructions).<sup>9</sup>

<sup>9</sup> A reviewer questioned why a *pro* subject was not possible in such structures. If a *pro* is in the subject position, the initial NP can only be a topic and a sentence-initial topic is generally separated from the subject of a sentence by a pause. However, such sentences can be read without any pause after the initial NP and can occur in contexts that do not allow sentence-initial topics (such as relative clauses). The fact that the relevant sentences are not possible with agent-oriented expressions shows that an agent is not present even implicitly. This is expected because there is no position available to the logical subject.

- (15) yi-wan fan (keyi) (\*guyi) chi san-ge ren.  
 one-bowl rice can intentionally eat three-CL person  
 ‘One bowl of rice eats (feeds) three people.’

Similar tests apply to all other cases with non-canonical subjects, as in (16a–c).<sup>10</sup>

- (16) a. zhe-ge kaoxiang keyi kao rou.  
 this-CL oven can roast meat  
 ‘This oven can roast meat (can be used for roasting meat).’  
 b. zhe-ba daozi bu yinggai qie rou.  
 this-CL knife not should cut meat  
 ‘This knife should not cut meat (should not be used for cutting meat).’  
 c. zuo shou keyi/shi bang hong-sheng.  
 left hand can/be tie red-string  
 ‘The left hand can be/IS tied with red strings.’  
 d. zhe-ge qiu keyi/shi ti you jiao.  
 this-CL ball can/be kick right foot  
 ‘This ball can be/IS kicked with the right foot.’  
 e. zhe-ge kaoxiang keyi kaishi kao rou.  
 this-CL oven can begin roast meat  
 ‘This oven can begin to roast meat (can begin to be used for roasting meat).’

Raising modals or auxiliaries (‘can’ and ‘should’ in (16a–e) and the focus *shi* ‘be’ in (16c–d)) and raising verbs (*kaishi* ‘begin’ (16e)) are possible with non-canonical subjects. Agent-oriented intentional adverbs and purpose expressions (purpose of the agent taking the action), which require an agent in the sentence explicitly or implicitly, are not acceptable. The unacceptability shows that the agentive subject (canonical subject) of the activity verb is not present (Huang et al. 2009: Chapter 2, uses examples with agent-oriented adverbs such as ‘carefully’ to show that the agent NP is not present in such instances).

- (17) a. \*zhe-ge qiu guyi ti you jiao.  
 this-CL ball intentionally kick right foot  
 ‘This ball was intentionally kicked with the right foot.’  
 b. \*zhe-ge qiu ti you jiao qu zhuang tade tou.  
 this-CL ball kick right foot go hit his head  
 ‘This ball was kicked with the right foot to hit his head.’  
 cf. c. wo guyi ti zhe-ge qiu qu zhuang tade tou.  
 I intentionally kick this-CL ball go hit his head  
 ‘I intentionally kicked the ball to hit his head.’

<sup>10</sup> The sentences in (16)–(18) should be read without a clear pause after the initial NP to avoid the option of the initial NP being analyzed as a topic.

- (18) a. \*zhe-ge kaoxiang guyi kao rou lai anwei ta.  
 this-CL oven intentionally roast meat come comfort him  
 ‘\*This oven intentionally roasted meat to comfort him.’
- cf. b. wo guyi kao rou lai anwei ta.  
 I intentionally roast meat come comfort him  
 ‘I intentionally roasted meat to comfort him.’

To summarize, the unacceptability of agent-oriented intentional adverbs and purpose expressions shows that the relevant sentences do not contain an agent subject. This suggests that the sentences cannot be analyzed as having the canonical subject as an empty subject (such as a *pro*)—the preverbal argument should take the subject position, which is further supported by the fact that raising modals/verbs can appear between the non-canonical subject and the verb, as a result of subject-to-subject raising.

## 2.2 Non-canonical arguments in object positions

Non-canonical objects occur in the same positions as those occupied by canonical objects because they have the same grammatical properties. Yen-Hui A. Li (2010, 2011) and Barrie & Li (2012) have a good number of tests showing that non-canonical objects do indeed behave like canonical objects syntactically.<sup>11</sup> Some of the properties are summarized and illustrated below (for more tests and details, see the works mentioned above).

- (19) a. A non-canonical object, like a canonical object, can be any type of nominal expressions—definite, indefinite or quantificational. The elements that may occur between a verb and an object, such as the aspect markers *le*, *guo*, are also possible in non-canonical object constructions. These properties show that a non-canonical object is

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<sup>11</sup> Non-canonical arguments are generally used in colloquial, casual speech. The acceptability judgments of all the logically possible cases in the constructions illustrating the properties listed in (19) are not always unanimous among native speakers, and the choice of verbs and noun phrases for non-canonical objects also affects judgments. The generalization seems to be that the more conventionalized/institutionalized the relation between verbs and objects is for a speaker, the greater the acceptability is for that speaker. A high degree of conventionalization or institutionalization also makes it easier to use in formal speech. However, confirmation of such an intuition would require large scale correlation studies.

Interestingly, such constraints do not apply to subjects. For instance, in contrast to (7b), the following sentence is fine with the instrument as subject, especially in contrastive contexts:

- (i) zhe-ba chazi chi-mian; na-ba chazi chi-shala.  
 this-CL fork eat-noodle that-CL fork eat-salad  
 ‘This fork is to eat noodle (with); that fork is to eat salad (with).’

This shows that the relation between an object and the related verb is closer than that between a subject and a verb phrase. See the general observation that subcategorization of verbs is only relevant to objects (see, e.g. Halle & Marantz 1993; Kratzer 1996).

not incorporated into the verb.<sup>12</sup> It is just like a canonical object with respect to the range of noun phrases permitted and the possibility of intervening aspect markers.

- b. A non-canonical object is in complementary distribution with a canonical object; they therefore occupy the same position.
- c. A non-canonical object can occur with a postverbal duration/frequency phrase, taking the same position as a canonical object relative to these other postverbal phrases. V-reduplication is possible in these cases, just like canonical objects. This is also true when the V is directly followed by a *de* phrase of description or result.
- d. Like a canonical object, a non-canonical object can also combine with V to take an affected outer object.
- e. Like a canonical object, a non-canonical object can occur in the relativization construction [<sub>NP/DP</sub> . . . de Ø (null)], a pattern separating an argument from an adjunct (see, among many others, Zhu 1961). That is, if an argument undergoes relativization, the relativized argument can be deleted. In contrast, a relativized adjunct cannot be deleted (see, e.g. Aoun & Li 2003:Chapter 5 for detailed discussion of this argument/ adjunct asymmetry).

The properties in (19a) are illustrated by the following examples containing aspect markers and allowing various types of postverbal noun phrases:

- (20) a. ta hua-le ji-zhang zhi? -- quantificational and aspect marker *le*  
 he draw-LE how.many-CL paper  
 ‘How many pieces of paper did he draw on?’
- b. ta hua-guo na-mian qiang. -- definite and aspect marker *guo*  
 he draw-ASP that-CL wall  
 ‘He has drawn on that wall.’
- c. jiao bang-tiao hong shengzi. -- indefinite with classifier attached to V  
 foot tie-CL red string  
 ‘The foot was tied with a red string.’

A non-canonical object and a canonical object are in complementary distribution (19b). For instance, the verb ‘eat’ in the following example can be followed by the canonical object ‘dinner’ or non-canonical object ‘restaurant’, but not both simultaneously:

- (21) a. wo chi wancan.  
 I eat dinner  
 ‘I eat dinner.’

<sup>12</sup> It is possible to consider such cases as pseudo-incorporation, if pseudo-incorporation permits the whole range of noun phrases and intervening aspect markers. Regardless of the labels, they are not distinct from canonical objects grammatically.

- b. wo chi zhe-jia fandian.  
I eat this-CL restaurant  
'I eat at this restaurant.'
- c. \*wo chi wancan zhe-jia fandian / zhe-jia fandian wancan  
I eat dinner this-CL restaurant / this-CL restaurant dinner  
-- *complementary distribution*

Just as a canonical object is able to occur with a postverbal frequency/duration phrase, so is a non-canonical object (a definite one tends to precede the duration/frequency phrase and a bare nominal object follows the duration/frequency), as stated in (19c):

- (22) a. wo shang xingqi chi-le san-ci/tian mian/fandian.  
I last week eat-LE three-times/day noodle/restaurant  
'I ate noodles/at restaurants three times/days last week.'  
-- *fre/dur + bare object*
- b. wo shang xingqi chi-le na-zhong mian / na-jia fandian san-ci/tian.  
I last week eat-LE that-CL noodle / that-CL restaurant three-times/day  
'I ate that kind of noodle/at that restaurant three times/days last week.'  
-- *def obj + fre/dur*

V-reduplication is possible with non-canonical objects and other postverbal phrases such as duration/frequency and *de* expressions, just as it is with the cases involving canonical objects:

- (23) wo **chi** mian / haohua fandian **chi-le** henduo ci/tian.  
I eat noodle / fancy restaurant eat-LE many time/day  
'I ate noodle/at fancy restaurants many times/days.'  
-- *V-reduplication with fre/dur*
- (24) wo **chi** mian / haohua fandian **chi-de** hen gaoxing/lei.  
I eat noodle / fancy restaurant eat-DE very happy/tired  
'I am happy/tired from eating noodle/at fancy restaurants.'  
-- *V-reduplication with de-phrases*<sup>13</sup>

In addition, as noted in (19d), a non-canonical object can behave like a canonical object and combine with a verb to take an 'affected' object (inner and outer object; see among many others, Huang 2007; Lu 2002; Thompson 1973). For instance, the canonical inner object in (25a–b) can be replaced with a non-canonical object (the examples in (25) are adapted from Lu 2002):

- (25) a. wo chi-le ta san-ge pingguo.  
I eat-LE him three-CL apple  
'I ate him three apples = he was affected by my eating (his) three apples.'

<sup>13</sup> In Chinese, what occurs postverbally is limited. Generally, in addition to objects, a verb can be followed by the grammatical marker *de* and an adjectival phrase or a clause expressing the manner, extent or result of an action/event.

- b. wo jian-le ta shi-gongchi bu.  
I cut-LE him ten-meter cloth  
'I cut ten meters of cloth from him.'
- (26) a. wo (cai) chi-le ta san-tian fanguan (ta jiu yijing shou-bu-liao le).  
I only eat-LE him three-day restaurant he then already put-not-up LE  
'I (only) ate at restaurants for three days on him (and he already could not take it).'
- b. wo (cai) jian-le ta san-ba jiandao (ta jiu yijing bu gaoxing le).  
I only cut-LE him three-CL scissors he then already not happy LE  
'I (only) cut with three pairs of scissors on him (and he already was not happy).'

The following are some more examples demonstrating the ability of a non-canonical object combining with a V to license an affected object:<sup>14</sup>

- (27) a. wo xie-le ta yigong san-zhi maobi.<sup>15</sup>  
I write-LE him altogether three-CL brush.pen  
'I wrote with three brush pens (of his) altogether (and he was affected).'
- b. wo jiu hua-le ta san-zhang zhi.  
I only paint-LE him three-CL paper  
'I only painted on three pieces of paper (on him) (he was affected).'
- c. wo shui-le ta yigong san-ge fangjian.  
I sleep-LE him altogether three-CL room  
'I slept altogether in three rooms on him (he was affected).'

The examples above show canonical objects behave like non-canonical objects syntactically.

The point in (19e) is to use the relativization construction to demonstrate that non-canonical objects are like arguments. The test involves relative clauses with and without an overt modified noun phrase. Briefly, if an argument undergoes relativization and occupies the position following *de* (the marker following a pre-nominal modifier)  $[[_{rel. cl.} \dots t_i \dots] de [NP_i]]$ , the relativized NP can be deleted. However, relativization of an adjunct does not allow the NP following *de* (the one modified by the relative clause) to be empty (see Aoun & Li 2003:Chapters 5–6 for details).<sup>16</sup>

- (28) a. [ta chi de] (dongxi) dou shi hao dongxi. -- argument relativization  
he eat DE thing all be good thing  
'All (things) he eats are good things.'

<sup>14</sup> It is difficult to find examples with time expressions as non-canonical objects in such constructions because generally the inner and outer object bear some relation, such as a possession or affectedness relation (see Huang 2007 for examples not bearing a possession relation, even though an 'affected' relation still holds).

<sup>15</sup> The use of adverbials such as *yigong* 'altogether' between the two objects is to show that the construction indeed has two separate objects, rather than one object containing a possessor pronoun (see Lu 2002).

<sup>16</sup> The *de* in this construction is a modification marker within a noun phrase, different from the *de* mentioned in note 13.

- b. [ta (weishenme) chi fan de] \*(liyong) (dou) shi hao liyong. -- adjunct relativization  
 he why eat meal DE reason all be good reason  
 ‘The reasons why he eats meals are (all) good reasons.’

Importantly, a non-canonical object can undergo relativization and be deleted, just like an argument:

- (29) a. ta chi de (cating) dou shi haohua cating.  
 he eat DE (restaurant) all be fancy restaurant  
 ‘(The restaurants where) he ate were fancy restaurants.’  
 b. zhe-shuang kuaizi jiu shi ta chi de (kuaizi).  
 this-CL chopsticks exactly be he eat DE chopsticks  
 ‘This pair of chopsticks was (the chopsticks) he ate with.’  
 c. zhe-ba dao jiu shi ta qie de (dao).  
 this-CL knife exactly be he cut DE knife  
 ‘This knife was exactly (the knife) he cut with.’  
 d. ta xie de (zhi) jiu shi zhe-zhong zhi.  
 he write DE paper exactly be this-kind paper  
 ‘(The paper) he wrote on was exactly this kind of paper.’  
 e. ta kan de (shijian) shi wanshang, bu shi zaoshang.<sup>17</sup>  
 he see DE time be evening not be morning  
 ‘(The time when) he saw (something) was in the evening, not in the morning.’

All these constructions show that a non-canonical object behaves like a canonical object.

The behavior of non-canonical arguments raises the question of how they are derived and whether there are constraints on what arguments occur with what verbs. That is, is there any argument structure specified for any lexical item? Adding to the complexity is the flexibility in word order—an object seems to be quite free to turn into a subject and a subject to become an object, as shown next.

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<sup>17</sup> One might suggest that the time expression here is actually the reduction of a noun phrase with the time expression as a modifier [time + *de* + NP], with *de* and NP are deleted, leaving only the time expression. That is, ‘morning’ stands for ‘the movie in the morning’. However, this is not correct because such a ‘reduction’ is not possible in argument positions other than subjects and objects of verbs, such as the object of prepositions or *bei/ba*:

- (i) ta ba zaoshang \*(de dianying) dou kan le.  
 he BA morning DE movie all see LE  
 ‘He watched all the movies in the morning.’  
 (ii) ta bei zaoshang \*(de dianying) xiadao le.  
 he BEI morning DE movie scare LE  
 ‘He was scared by the movies in the morning.’  
 (iii) wo dui zaoshang \*(de dianying) you xingqu.  
 I to morning DE movie have interest  
 ‘I am interested in the movies in the morning.’

### 3. Free ordering

Huang et al. (2009:Chapter 2) use the following examples to demonstrate that arguments in the postverbal object and preverbal subject position seem to be freely exchangeable (see Lu 2004; Tsai 2001, among many others):

- (30) a. xiao bei he lücha. (subj = Instrument, obj = Theme)  
 small cup drink green.tea  
 ‘Use the small cup to drink the green tea.’  
 b. lücha he xiao bei. (subj = Theme, obj = Instrument)  
 green.tea drink small cup  
 ‘Green tea is drunk with small cups.’
- (31) a. nide keren shui na-zhang chuang ba. (subj = Agent,<sup>18</sup> obj = Location)  
 your guest sleep that-CL bed SFP  
 ‘Let your guest sleep on that bed.’  
 b. na-zhang chuang shui nide keren ba. (subj = Location, obj = Experiencer)  
 that-CL bed sleep your guest SFP  
 ‘Let that bed sleep your guests (used for sleeping by your guests).’
- (32) a. jieri liwu dou gei-le pengyou-men le. (subj = Theme, obj = Goal)<sup>19</sup>  
 holiday gift all give-LE friend-PL SFP  
 ‘Holiday gifts were all given to the friends.’  
 b. pengyou-men dou gei-le jieri liwu le. (subj = Goal, obj = Theme)  
 friend-PL all give-LE holiday gift SFP  
 ‘Friends were all given gifts.’

The freedom for arguments to take either subject or object positions in these examples does not seem exceptional. If we go through the range of possible thematic roles in subject and object positions, we find that such freedom is widely available, as shown below.<sup>20</sup>

<sup>18</sup> As shown in this and other similar examples later in the text, an agentive argument normally appears in the subject position. It also seems as if it can be in the object position, although the agentivity reading is no longer available for a ‘postverbal agent’. That is, the agent is no longer an agent. Moreover, the interpretation generally is about capacity or so-called accommodation. The label ‘Agent/Experiencer’ is therefore used for the thematic role borne by the ‘agent’ argument occurring in the postverbal position and having lost the agent interpretation. Further note that the subject of an unaccusative verb (such as *shui* ‘sleep’) originates from the object position and need not be an agent even when it is in the preverbal subject position. Only the label ‘Experiencer’ is used for the relevant argument in the object position. See further discussions in the text.

<sup>19</sup> This alternation is restricted to double object verbs only.

<sup>20</sup> To avoid complications from dealing with many issues at the same time, let us focus on bare verbs, ignoring the effect of the roles played by modals and aspectual markers.

Logically speaking, if we have theta-roles of agent, temporal, locative, instrument and theme, we have the following possible combinations (disregarding other theta-roles such as recipient-goal, benefactive, or comitative; see Barrie & Li 2012).<sup>21</sup>

agent > theme and theme > agent/experiencer (accommodation or capacity reading)

- (33) a. san-ge ren chi yi-wan fan.  
three-CL person eat one-CL rice  
'Three people eat a bowl of rice.'  
b. yi-wan fan chi san-ge ren.  
one-bowl rice eat three-CL person  
'One bowl of rice eats (feeds) three people.'

agent > location; location > agent/experiencer (as in (31a–b))

agent > instrument; instrument > agent/experiencer (accommodation or capacity)

- (34) a. liang-ge ren qie yi-ba dao.  
two-CL person cut one-CL knife  
'Two people cut with a knife.'  
b. yi-ba dao qie yi-ge ren.  
one-CL knife cut one-CL person  
'A knife is used for cutting by one person.'

time > location; location > time

- (35) a. wanshang mai lubiantan.  
evening sell street.stall  
'Sell at street stalls in evenings.'  
b. lubiantan mai wanshang.  
street.stall sell evening  
'Sell at street stalls in evenings.'

time > instrument; instrument > time

- (36) a. zaoshang qie zhe-ba dao.  
morning cut this-CL knife  
'Cut with this knife in the morning.'  
b. zhe-ba dao qie zaoshang.  
this-CL knife cut morning  
'This knife is to cut with in the morning.'

time > theme; theme > time

- (37) a. xiatian chi liang-bu, dongtian chi re-bu.  
summer eat cool-tonic winter eat hot-tonic  
'Summer is for eating cool tonics; winter is for eating hot tonics.'

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<sup>21</sup> The (b) items in the following sets of examples are even more colloquial and casual than the (a) sentences. See note 11.

- b. liang-bu chi xiatian, re-bu chi dongtian.  
 cool-tonic eat summer hot-tonic eat winter  
 ‘Cool tonics are to eat in the summer; hot tonics are to eat in the winter.’

location > instrument; instrument > location

- (38) a. jia-li xie maobi; xuexiao xie qianbi.  
 home-inside write brush.pen school write pencil  
 ‘At home write with brush pens; in school write with pencils.’  
 b. maobi xie jia-li; qianbi xie xuexiao.  
 brush.pen write home-inside pencil write school  
 ‘At home write with brush pens; in school write with pencils.’

location > theme; theme > location

- (39) a. da dianyingyuan kan dongzuo pian; xiao dianyingyuan kan katong pian.  
 big theater watch action film small theater watch cartoon film  
 ‘Big theaters are for watching action films; small theaters are for watching cartoon films.’  
 b. dongzuo pian kan da dianyingyuan; katong pian kan xiao dianyingyuan.  
 action film watch big theater cartoon film watch small theater  
 ‘Action films are to watch in big theaters; cartoon films are to watch in small theaters.’

instrument > theme; theme > instrument

- (40) a. da guozi zhu niurou; xiao guozi zhu jirou.  
 big pot cook beef small pot cook chicken  
 ‘Big pots cook beef; small pots cook chicken.’  
 b. niurou zhu da guozi; jirou zhu xiao guozi.  
 beef cook big pot chicken cook small pot  
 ‘Beef cooks in big pots; chicken cooks in small pots.’

The facts presented so far demonstrate great flexibility of thematic roles in subject and object positions. To be noted is that Agent differs from the others in the flexibility of ordering. When it is not a subject, it can no longer be a true agent. Because the ‘agent’ argument of activity verbs like ‘eat’, ‘cut’ can no longer be interpreted as agent in the postverbal position, the label ‘agent/experiencer’ is used to indicate the change (see note 18). An ‘agent’ as a postverbal argument must take the form of a quantity expression (with number and classifier) and express the meaning of quantity (capacity or accommodation; Her 2009). Thus, (33b) means that a bowl of rice is for three people in quantity. (34b) means a knife is for a person in quantity. A non-quantity ‘agent’ is not possible in the postverbal position. Note that this quantity requirement does not apply to the argument in the subject position of the capacity/accommodation construction. (33b) and (34b) are to be contrasted with the unacceptable (41a–b) below, whose objects are not quantity expressions.

- (41) a. \*yi-wan fan chi ren  
 one-bowl rice eat person

- b. \*yi-ba      dao      qie      ren  
           one-CL    knife    cut     person

As long as the object is a quantity expression, the subject can be any types of NPs normally available in subject positions, such as a definite NP in (42a) and a quantificational phrase in (42b).

- (42) a. zhe-wan    fan    chi    liang-ge    ren.  
           this-bowl    rice    eat    two-CL    person  
           ‘This bowl of rice is for two people.’  
       b. mei-wan    fan    chi    liang-ge    ren.  
           every-bowl    rice    eat    two-CL    person  
           ‘Every bowl of rice is for two people.’

The requirement for the postverbal argument to be a quantity expression is relevant only to the cases where the argument is interpreted as an agent in the preverbal subject position, and solely as an agent. The others do not have such restrictions, such as the examples with unaccusative verbs like (31). An unaccusative verb is typically subcategorized for an internal argument, which can be raised to the subject position. Like all unaccusative verbs, the typical argument of an unaccusative verb such as *shui* ‘sleep’ as in (31), *zuo* ‘sit’, *zou* ‘leave’, *lai* ‘come’ can occur in the subject or object position:

- (43) a. keren    lai-le.  
           guest    come-LE  
           ‘Guests came.’  
       b. lai-le      keren    le.  
           come-LE    guest    LE  
           ‘There came guests.’

What distinguishes Chinese unaccusative structures from their counterparts in some other languages such as English is that the argument of an unaccusative verb can stay in the object position and the subject can be filled by another argument, rather than an expletive as in English:

- (44) a. women    jia      lai-le      keren    le.  
           we        home    come-LE    guest    LE  
           ‘Our home came guests (We have guests coming to our home).’  
       b. zuotian    lai-le      keren    le.  
           yesterday    come-LE    guest    LE  
           ‘Yesterday came guests (Guests came yesterday).’

These postverbal arguments need not be quantity expressions because they do not have to be interpreted as agents when in the preverbal subject position.

To summarize, the examples in this section and the previous one demonstrate that subject and object positions can be occupied by a variety of non-canonical arguments, and there is flexibility

in choosing which one to be the subject and which one the object. Such data appear to suggest that there are no rules dictating the positioning of arguments (except the agent/experiencer alternation mentioned above). However, this is not entirely true. When we broaden the range of the data investigated, we see that the pairs of seemingly free-ordering examples noted in this section do not behave alike, as will now be demonstrated.

#### 4. Asymmetry in argument deletion—thematic hierarchy

The seemingly free-ordering pairs actually differ in their possibilities of object deletion. When we apply object deletion to the pairs of sentences in the previous section, we find that the (a) sentences generally allow object deletion but not the (b) sentences:

agent > theme; theme > ‘agent/experiencer’

- (45) a. san-ge ren chi yi-wan fan hen hao; yi-ge ren chi \_\_ bu hao.  
 three-CL person eat one-CL rice very good one-CL person eat \_\_ not good  
 ‘That three people eat a bowl of rice is good; that one person eats (a bowl of rice) is not good.’
- b. yi-wan fan chi san-ge ren hen hao; \*liang-wan fan chi \_\_ bu hao.  
 one-bowl rice eat three-CL person very good two-bowl rice eat \_\_ not good

agent > locative; locative > experiencer<sup>22</sup>

- (46) a. nide keren shui na-zhang chuang hen hao; wode keren shui \_\_ bu hao.  
 your guest sleep that-CL bed very good my guest sleep \_\_ not good  
 ‘It is good that your guests sleep on that bed; it is not good that my guests sleep (on that bed).’
- b. zhe-zhang chuang shui nide keren hen hao; \*na-zhang chuang shui \_\_ bu hao.  
 this-CL bed sleep your guest very good that-CL bed sleep \_\_ not good

agent > instrument; instrument > ‘agent/experiencer’

- (47) a. liang-ge ren qie yi-ba dao hen hao; san-ge ren qie \_\_ bu hao.  
 two-CL person cut one-CL knife very good three-CL person cut \_\_ not good  
 ‘It is good that two people cut with one knife; it is not good that three people cut (with one knife).’
- b. yi-ba dao qie yi-ge ren hen hao; \*liang-ba dao qie \_\_ bu hao.  
 one-CL knife cut one-CL person very good two-CL knife cut \_\_ not good

time > location; location > time

- (48) a. wanshang mai lubiantan hen hao; zaoshang mai \_\_ bu hao.  
 evening sell street.stall very good morning sell \_\_ not good

<sup>22</sup> Recall that ‘sleep’ is an unaccusative verb. Its argument ‘the one that sleeps’ can occur in the subject or object position. When it appears in the object position, it need not be a quantity expression, as required of the agent argument of unergative verbs such as ‘eat’.

‘It is good to sell at street stalls in the evening, not good to sell (at street stalls) in the morning.’

- b. lubiantan mai wanshang hen hao; \*baihuo-gongsi mai \_\_\_ bu hao.  
 street.stall sell morning very good department-store sell \_\_\_ not good

time > instrument; instrument > time

- (49) a. zaoshang qie zhe-ba dao hen hao, wanshang qie \_\_\_ bu hao.  
 morning cut this-CL knife very good evening cut \_\_\_ not good  
 ‘It is good to cut with this knife in the morning; not good to cut (with this knife) in the evening.’

- b. zhe-ba dao qie zaoshang hen hao, \*na-ba dao qie \_\_\_ bu hao.  
 this-CL knife cut morning very good that-CL knife cut \_\_\_ not good

time > theme; theme > time

- (50) a. xiatian chi liang-bu hen hao, dongtian chi \_\_\_ bu hao.  
 summer eat cool-tonic very good winter eat \_\_\_ not good  
 ‘It is good to eat cool tonics in the summer; not good to eat (cool tonics) in the winter.’

- b. liang-bu chi xiatian hen hao, \*re-bu chi \_\_\_ bu hao.  
 cool-tonic eat summer very good hot-tonic eat \_\_\_ not good

location > instrument; instrument > location

- (51) a. shi-wai kan wangyuanjing hen hao; shi-nei kan \_\_\_ bu hao.  
 room-outside see binoculars very good room-inside see \_\_\_ not good  
 ‘It is good to watch with binoculars outside the room, not good to watch (with binoculars) inside the room.’

- b. wangyuanjing kan shi-wai hen hao; \*xianweijing kan \_\_\_ bu hao.  
 binoculars see room-outside very good microscope see \_\_\_ not good

location > theme; theme > location

- (52) a. da dianyingyuan kan dongzuo pian hen hao;  
 big theater watch action film very good  
 xiao dianyingyuan kan \_\_\_ bu hao.  
 small theater watch \_\_\_ not good  
 ‘For big theaters to watch action films in is good, not good to watch (action films) in small theaters.’

- b. dongzuo pian kan da dianyingyuan hen hao; \*katong pian kan \_\_\_ bu hao.  
 action film watch big theater very good cartoon film watch \_\_\_ not good

instrument > theme; theme > instrument

- (53) a. da guozi zhu nirou hen hao; xiao guozi zhu \_\_\_ bu hao.  
 big pot cook beef very good small pot cook \_\_\_ not good  
 ‘It is good that big pots (are used to) cook beef, not good to cook (beef) with small pots.’

- b. niurou zhu da guozi hen hao; \*jirou zhu \_\_ bu hao.  
 beef cook big pot very good chicken cook \_\_ not good

The constructions in (45)–(53) show an interesting asymmetry in object deletion: the (a) examples are acceptable, but not the (b) ones. Further note that subject deletion applying to the (b) constructions is clearly better than object deletion: the acceptable subject deletion cases illustrated in (c) of (45)–(53) below contrast with the unacceptable (b) sentences of (45)–(53).<sup>23</sup>

theme > ‘agent/experiencer’

- (45) c. yi-wan fan chi san-ge ren hen hao; \_\_ chi wu-ge ren bu hao.  
 one-bowl rice eat three-CL person very good \_\_ eat five-CL person not good  
 ‘It is good that a bowl of rice is for 3 people (to eat), not good for five people.’

location > experiencer

- (46) c. na-zhang chuang shui nide keren hen hao; \_\_ shui tade keren bu hao.  
 that-CL bed sleep your guest very good \_\_ sleep his guest not good  
 ‘It is good that this bed is for your guests, not good for his guests.’

instrument > ‘agent/experiencer’

- (47) c. yi-ba dao qie yi-ge ren hen hao; \_\_ qie liang-ge ren bu hao.  
 one-CL knife cut one-CL person very good \_\_ cut two-CL people not good  
 ‘It is good for one knife to be cut with by one person, not good to cut with by two people.’

location > time

- (48) c. lubiantan mai wanshang hen hao; \_\_ mai zaoshang bu hao.  
 street.stall sell morning very good \_\_ sell morning not good  
 ‘It is good to sell at street stalls in the evening, not good to sell in the morning.’

instrument > time

- (49) c. zhe-ba dao qie zaoshang hen hao, \_\_ qie wanshang bu hao.  
 this-CL knife cut morning very good \_\_ cut evening not good  
 ‘It is good that this knife is cut with in the morning; not good to cut with in the evening.’

theme > time

- (50) c. liang-bu chi xiatian hen hao, \_\_ chi dongtian bu hao.  
 cool-tonic eat summer very good \_\_ eat winter not good  
 ‘It is good that cool tonics are eaten in the summer, not good to be eaten in the winter.’

<sup>23</sup> To complete the paradigm, the (a) cases with subject deletion are also acceptable. They are the ‘normal instances’ and will not be illustrated here.

instrument > location

- (51) c. wangyuanjing kan shi-wai hen hao; \_\_\_ kan shi-nei bu hao.  
 binoculars see room-outside very good \_\_\_ see room-inside not good  
 ‘It is good to watch outside the room with binoculars, not good to watch inside the room.’

theme > location

- (52) c. dongzuo pian kan da dianyingyuan hen hao;  
 action film watch big theater very good  
 \_\_\_ kan xiao dianyingyuan bu hao.  
 \_\_\_ watch small theater not good  
 ‘It is good that action films are watched in big theaters, not good in small theaters.’

theme > instrument

- (53) c. niurou zhu da guozi hen hao; \_\_\_ zhu xiao guozi bu hao.  
 beef cook big pot very good \_\_\_ cook small pot not good  
 ‘It is good that beef is cooked with big pots, not good with small pots.’

So far we have seen that the ordering of thematic roles matters. The facts shown in (34)–(40) give us this hierarchy: agent/experiencer > temporal > locative > instrument > theme. If we consider a regular clausal structure in Chinese, such an ordering seems to reflect an unmarked sequence:

- (54) ta ganggang zai chufang yong daozi qie niurou.  
 he just.now at kitchen use knife cut beef  
 ‘He cut beef with a knife in the kitchen just now.’

An agent is higher than all other thematic roles in almost all versions of thematic hierarchy discussed in the literature (see Bowers 2010 for a different view).<sup>24</sup> There has been less agreement on how the other theta-roles should be ranked. It is not clear either where an experiencer stands in different constructions. Because the universality and validity of any thematic hierarchy are controversial (and definitions of thematic roles themselves also uncertain), let us take a narrow approach and limit ourselves only to the data examined in this work. The facts discussed so far then suggest a thematic hierarchy like the one below:

<sup>24</sup> Bowers (2010) argues that an agent must begin at the lowest position in a clausal structure. Clausal structures are mapped from the hierarchy of thematic roles and agent is the lowest in the hierarchy. Main arguments are built on the fact that the agent NP in passive sentences can be c-commanded by all the other NPs in the sentence. However, the arguments cannot apply to Chinese (see Yen-Hui A. Li 1990 for the fact that the logical subject of the passive construction in Chinese c-commands the arguments and antecedes the dependents within the predicate).

(55) agent (experiencer) > temporal > locative > instrument > theme

The empirical generalizations observed can be stated as:

- (56) a. Any combination of the two thematic roles listed in (55) can be subjects and objects of clauses (with restrictions on the form and interpretation of Agent as object). That is, one higher in the hierarchy can be a subject or an object and the same is true of one that is lower.
- b. However, object deletion is possible only when arguments appearing in the subject and object positions follow the thematic hierarchy in (55)—the one higher in the thematic hierarchy should be the subject and the one lower, the object. This means that there is a thematic constraint on argument deletion, which can be stated as: an object can be missing only if it is lower in thematic hierarchy than the subject of the clause.
- c. The thematic constraint on argument deletion does not apply to subject deletion—subjects can be missing even when they are lower in thematic hierarchy than objects.

These generalizations raise interesting questions: How is the notion of thematic hierarchy relevant to object deletion? How should the thematic constraint on object deletion be captured? Why doesn't such a constraint apply to subject deletion?

## 5. Possible analyses

In order to answer the questions just raised, let us begin with the issue of why non-canonical arguments are possible and how sentences with arguments are generated. Two main proposals have been made in the recent literature. One is the event structure approach by Lin (2001). The other is the lexical approach in Huang et al. (2009:Chapter 2). These are discussed in the following subsections.

### 5.1 Lexical approach

Huang et al. (2009:Chapter 2) emphasize the effect of lexical items on argument structures. The proposal is this: a lexical verb root  $\sqrt{\quad}$  conceptualizes a set of events  $e$  and contains the information on all the participants of  $e$ ; a lexical verb  $V$  is composed of the root  $\sqrt{\quad}$  and a small number of light verbs (Lv) which indicate the event type(s) of  $e$ ; only the information on those participants of  $e$  which bear directly on the nature of the event type sifts through Lv and remains accessible to syntax. Thus, only appropriate arguments relevant to the types of events sifting through Lvs appear in the right positions. For instance, the theta-roles Theme and Agent/Originator are the results of Lv1 and Lv2 combined with the root  $V, \sqrt{\quad}$ . The one sifted through Lv2 is the external argument and the one through Lv1, the internal argument. Because Lvs regulate the positioning of arguments, absence of Lvs means absence of constraints on the occurrence of arguments. English verbs generally are specified with Lvs and arguments are selected. Chinese differs from English in allowing

the option of not having any Lvs in  $V$ ,<sup>25</sup> exposing all participant information encoded in  $\checkmark$  to syntax and thereby creating the effect of thematic flexibility. That is, non-canonical arguments are possible when verbs have the option of not lexically specifying their subcategorization properties and when Lvs are not generated. This can be expressed below.

- (57)  $V \in \{(\checkmark), [Lv1 \checkmark], [Lv2 \checkmark], [Lv2 [Lv1 \checkmark]]\}$ , where the option of  $V = \checkmark$  is available only in Chinese.

As Chinese allows the root-only option for a  $V$ , it makes non-canonical arguments possible and arguments un-ordered, summarized below.

- (58) Chinese, not English, can generate Vs as root  $\checkmark$  only, without Lvs, allowing flexibility of arguments not only in numbers but also in ordering. A verb can occur with or without arguments and no restriction is imposed on which can be subjects or objects.

This proposal makes use of lexical specifications and the projections of Lvs to license the generation of arguments. Exceptions are made for Chinese, which allows verbs to be  $\checkmark$  only, that is, without Lvs, making argument structure flexible.

Can this proposal be extended to account for the contrast in acceptability noted between object and subject deletion? One option is to take the projection of Lvs as requiring the presence of arguments syntactically, to merge in the Specifier position of  $Lv$ . The absence of Lvs would mean that the related arguments are not needed. The proposal that Chinese verbs can simply be  $\checkmark$  could be interpreted as allowing Chinese verbs not to require arguments syntactically. In other words, the presence of an  $Lv$  indicates the presence of an argument, and the lack of an  $Lv$  provides no clues to the presence of arguments. Taking this option, we may capture one facet of the thematic constraint on object deletion—those objects in the sentences whose arguments do not follow the thematic hierarchy, as in (56a), cannot be deleted. This could be because the cases where subject–object arguments do not follow the thematic hierarchy, as in (55), are necessarily derived without the projection of Lvs, as they do not follow the event structure specified by Lvs. The presence of  $Lv1$  can force the presence of an internal argument, but not the lack of one. Accordingly, one might claim that in the sentences whose arguments do not follow the thematic hierarchy in (55), there is no clue to the presence of an object syntactically (no Lvs). The impossibility of object deletion in this case is due to the fact that no object is syntactically present. By contrast, subject deletion is possible, which means that the syntactic presence of a subject is required. This requirement could be due to the obligatory occurrence of a subject with a predicate—the essence of the Extended Projection Principle (EPP, Chomsky 1981:27, 1982:10). In other words, the subject–object asymmetry in deletion might be accommodated by the non-projection of Lvs and the EPP.

This option may account for the contrast in object deletion between the (a) and (b) cases of (45)–(53). In the (b) cases, not (a),  $Lv1$  is not projected and a null object is not licensed. Such a lexical approach can also accommodate the fact that non-canonical objects tend to be idiosyncratic

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<sup>25</sup> Recall that this concerns activity verbs in general.

and sensitive to conventionalized or institutionalized usage (therefore subject to variation individually and across different speech communities). Unfortunately, this option does not capture all the facts summarized in (56a–c). Note that what appear in the subject and object positions can be non-canonical arguments, regardless of whether the thematic hierarchy is obeyed. According to the proposal outlined in (52)–(53), the presence of Lvs requires the arguments to be canonical ones. This amounts to saying that there should not be a contrast between the (a) and (b) examples in (47)–(44) and (46) in regard to object deletion because the relevant objects are non-canonical arguments. Thus, the possibility of object deletion in the constructions obeying the thematic hierarchy but containing non-canonical objects is not expected.

## 5.2 Event structure approach (predicate decomposition)

Thematic hierarchy can often be derived by event structures (see, e.g. relevant reviews in Rapoport Hovav & Levin 2007). Lin's (2001) extensive discussion of non-canonical arguments in Chinese is built on decomposed predicate/event structures (see Hale & Keyser 1993, 1997, 2002; Huang 1997; Ramchand 2008, among others). This section discusses how an event structure approach might capture the facts in (56a–c).

To account for the possibility of non-canonical subjects and objects in Chinese (unselected subjects and objects in Lin's terms), Lin suggests that lexical items in Chinese are not subcategorized for arguments at all. Instead, sentences consist of a number of light verbs, each of which licenses an argument. Light verbs having been proposed are AT, FOR, USE for objects and DO, EXIST, CAUSE, PROCEED, INCLUDE and OCCUR for subjects. Event structures consist of series of light verbs.

Nonetheless, the postulation of all these different light verbs raises some issues. One may wonder whether there is an upper limit to the number of light verbs, whether there is a way to predict what light verbs are available, what sequential or co-occurrence requirements there might be among the light verbs, whether such light verbs are universally available and whether there are independent tests supporting the existence of such light verbs. More importantly, the contrast between the cases obeying and those not obeying the thematic hierarchy observed above would not be expected because there is no difference between them except the label of light verbs. For canonical subjects of activity verbs, the highest light verb would be DO. For non-canonical subjects, the highest light verb would be a different one such as OCCUR, EXIST, etc. A locative expression could be an argument licensed by the light verb EXIST when it is in the subject position, but would be an argument licensed by the light verb AT when it is in the object position. More generally, the same argument could be licensed by different light verbs, depending on whether it occurs in the subject or object position. This variability makes it difficult to see how the thematic hierarchy as stated in (55) should be expressed.

Accordingly, a strict version of the event structure approach as framed by Lin (2001) cannot be adopted. Nevertheless, it might be useful to consider the hierarchical relation of the many light verbs, each of which licenses an argument. In this sense, thematic roles might be represented hierarchically in the tree structure. This is exactly the kind of structure proposed in works such as Bowers (2010): thematic roles are hierarchically represented in syntactic structures.

Further, note that many of what appear as non-canonical subjects in Lin's analysis, such as those licensed by the proposed PROCEED, INCLUDE as in (6d–e), can be a topic phrase to a comment that does not have any gap. They may also appear in gapless relativization:

- (59) a. zhe-chang changtu sai-che women yijing kai-le  
 this-CL long-distance car-racing we already drive-LE  
 san-fen-zhi-yi de lucheng le.  
 one-third DE journey LE  
 'This long-distance car racing, we have driven one third of the journey.'
- b. women yijing kai-le san-fen-zhi-yi de lucheng  
 we already drive-LE one-third DE journey  
 de zhe-chang changtu sai-che.  
 DE this-CL long-distance car-racing  
 'This long-distance car racing for which we have driven one third of the journey.'
- (60) a. zhe-tang renwu women zonggong kai-le ba-tang che.  
 this-CL mission we altogether drive-LE eight-time car  
 'For this mission, we drove cars eight times altogether (eight times of transportation via cars).'
- b. women zonggong kai-le ba-tang che de zhe-tang renwu.  
 we altogether drive-LE eight-time car DE this-CL mission  
 'The mission for which we have driven cars 8 times altogether.'

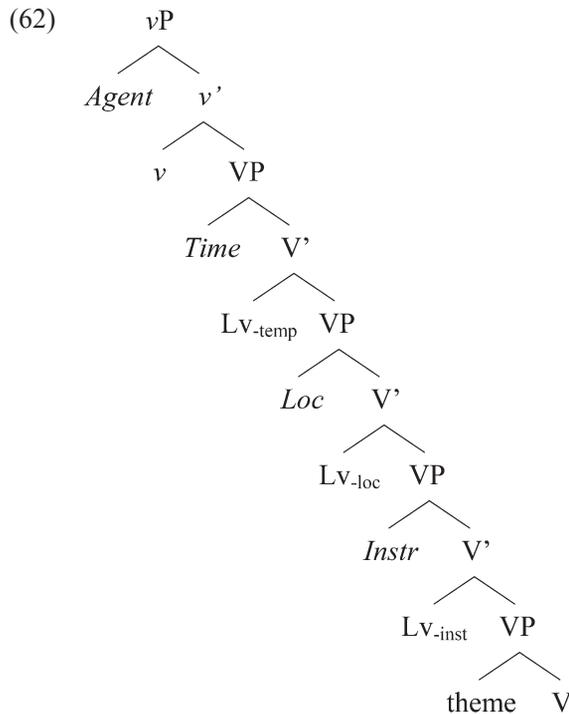
What is common to relative, topic constructions in (59)–(60) and the non-canonical subject construction in (6) mentioned earlier in §2 is that the noun phrase (the phrase modified by the relative clause, the topic phrase, the non-canonical subject) bears a predication relation with the rest (the relative clause, the comment clause and the standard predicate phrase). Note that the topics in (59)–(60) cannot be objects. Moreover, the canonical subject of a predicate has a privileged status, despite the seeming flexibility of subject and object selection described in §4. Recall that a true agent cannot take the postverbal object position. When in the object position, it no longer has the agent interpretation. That is, gapless topic and canonical subjects do not become objects. Let us return to this point shortly.

In the spirit of Lin's (2001) light verb structures and Bowers (1993, 2010) structural representation of predication relation and thematic roles, I suggest the following clausal structure and the verb phrase (VP) can contain layers of light verbs or projections licensing thematic roles.<sup>26</sup> The projection containing the canonical subject can be represented by *vP* (see Chomsky 1995, or other labels such as *voiceP* as in Kratzer 1996). I will use 'agent' to represent the type of arguments that

<sup>26</sup> The choice of labels such as *VP* here is not as significant as the distinction between two layers of projections—one for the argument that must be a subject and the other for all the other arguments.

cannot become non-subjects, even though such a subject might not be an agent, such as the cases in (59) and (60).

(61) [Agent *v* [<sub>VP</sub> Time LV<sub>-tem</sub> [location LV<sub>-loc</sub> [instrument LV<sub>-inst</sub> [theme V]]]]]]



It should be noted that the Lvs in this structure are decompositions of verbs. They are not identical to overt counterparts such as *yong* ‘use’ for instruments, *zai* ‘at’ for temporals or locatives. These ‘light verbs’ always need to be combined with the V to create the form [Subject + V + Object (canonical or non-canonical)], not those with PPs or serial VPs [Subject + *yong/zai* + NP + V (+ Object)], because the two have distinct syntactic behavior, such as the co-occurrence possibilities of other adverbials and the interpretation of the verbal object versus the object of *yong/zai* (see Barrie & Li 2012; Li 2010; Zhang 2005).<sup>27</sup>

The structure in (62) indicates that, in the unmarked case, if there is an Agent (and equivalents), it must be the highest. Next, a temporal is higher than a locative or an instrument or a theme, etc. What is important in Chinese is that a canonical subject need not occur, as noted in the lexical

<sup>27</sup> Adopting the insight from the lexical approach described in the previous section, we may assume that the idiosyncrasy and lack of full productivity of non-canonical objects are determined by whether all the light verbs can be combined into and spelled out as one lexical item—conventionalized/institutionalized lexical items accepted by the speech community, in contrast to cases with overt Ps or Vs for instruments/temporals/locatives etc., which are free morphemes and are not so restricted.

approach briefly described in §5.1 (specified for individual verbs) and the event structure approach mentioned above (in general).<sup>28</sup> When this happens, an argument within the VP can be raised to occupy the subject position, creating non-canonical subject structures.<sup>29</sup> If the higher argument within the VP is raised, the result is those instances following the thematic hierarchy stated in (55). If the lower argument is raised, then those not following the thematic hierarchy are derived.<sup>30</sup>

With the structure in (62) and possible derivations, we are now ready to consider options to account for the thematic constraint on argument deletion observed so far. Note that, according to the structure in (62), further movement of the arguments to the surface subject position is required. That is, an argument should move to the Specifier of I and surfaces as subject. Generally, it should be the argument in the Specifier of *v* that is raised to the Specifier of IP position. When the canonical subject is absent, as is allowed in Chinese (see note 28), an argument in the VP can be raised to be the subject of the sentence. This is why, despite the apparent free ordering, the canonical subject seems to enjoy a privileged status as subject (generally agents, causers or experiencers. Also see Borer 2005 for the notion of originator). Recall that an Agent cannot occur in the postverbal position. More generally, when the canonical subject and object occur in a sentence, it is impossible to invert the word order. As noted earlier and further demonstrated by the following examples, the preverbal argument is unambiguously interpreted as the canonical subject of the predicate. It cannot be interpreted as an object raised from the object position to a projection higher than where the canonical subject is base-generated, making the canonical subject in the postverbal argument position.

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<sup>28</sup> Even though there are mechanisms capturing the possibility of not having canonical arguments as in the lexical approach in §5.1. and the event structure approach as in Lin (2001) and briefly described in this section, the question is why the possibility exists. Lin (2001), building on the works of Huang (most recently and comprehensibly represented by Huang forthcoming), proposes that some languages are more analytic and others more synthetic. Analytic languages like Chinese allow verbs to be without thematic requirements in the lexicon. Arguments are projected syntactically licensed by light verbs. However, it has been noted that non-canonical arguments are not entirely productive even in Chinese. They are restricted to certain types of verbs and subject to conventions in the speech community. English also allows some non-canonical arguments. The contrast between different languages in the acceptance of non-canonical arguments seems to be more of a matter of degrees, rather than absoluteness.

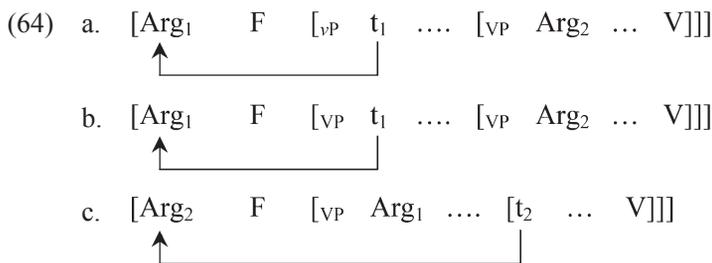
<sup>29</sup> Alternatively, a noun phrase that can bear a predication relation with the verb phrase can occur in the vacated subject position. This would be the kind of noun phrases that are claimed to be licensed by such light verbs as PROCEED, INCLUDE in Lin's work. Also see the discussion in the text regarding (59)–(60). Such arguments would behave like canonical subjects and enjoy the privileged status of being the subject of a sentence whenever they occur. They will be included as subcases of canonical subjects in the following discussions.

<sup>30</sup> One might ask why the lower argument can be raised, considering the minimal distance requirement, an assumption that is generally accepted from the early Minimal Distance Principle of Rosenbaum (1967) to the notion of minimality in the most recent theoretical developments (Minimalist Program, Chomsky 1995, 2000, among others). This issue might not be a real one if one adopts the notion of phase—the highest VP is a phase and any argument dominated by the highest VP is of equal distance (Chomsky 2001, 2008).

- (63) a. pengyou chi/zhaogu pengyou.  
 friend eat/care friend  
 ‘Friends eat/take care of friends.’  
 b. wo xihuan pengyou.  
 I like friend  
 ‘I like friends.’  
 c. wo renshi ta.  
 I know him  
 ‘I know him.’  
 d. wo zhidao zhe-jian shi.  
 I know this-CL matter  
 ‘I know this matter.’

This privileged status of canonical subjects can be captured by the different positions where the relevant arguments are generated: in contrast to all the other arguments, canonical subjects are not generated within the VP-layer (decomposed verbs with the layers of Lvs) but in the higher vP. When the Specifier of IP is occupied by an argument, this argument will be the subject. It is when the canonical subject is not present (the Specifier of vP is not filled) that other arguments, including locatives, temporals, instruments, themes etc. can be raised to the subject position. The privileged status of a canonical subject or Specifier of vP can be due to some notion of minimal distance defined in terms of the boundary of vP (or VoiceP) versus VP.

An argument within the VP is raised to the Specifier of IP and becomes the surface subject when the canonical object is not generated. Therefore, the pairs of sentences in (a) and (b) of (45)–(53) may be schematically represented as follows, where F is the functional projection hosting the surface subject (such as an Inflection). If a canonical subject is present, it must be the surface subject as in (64a). Without a canonical subject, either a higher argument within VP can be raised to become the surface subject as in (64b), or a lower argument, as in (64c).



The result of (64a–b), not (64c), obeys the observed thematic hierarchy. How can the two sets be distinguished in regard to the possibilities of object deletion, that is, the fact that (64a–b) allow object deletion, but (64c) doesn't? Before a suggestion is made, it is relevant to point out the following interesting fact first: topicalization and relativization seem also to follow the same hierarchical constraint on object deletion—topicalizing or relativizing a higher argument crossing a lower one is impossible. Below are some examples created from those illustrating the range of patterns in (45)–(53), although not all are listed due to space considerations:

topicalization/relativization of a theme object crossing a time subject like (50a)—acceptable

- (65) a. liang-bu, xiatian chi \_\_\_ (hen hao).  
 cool-tonic summer eat \_\_\_ very good  
 ‘Cool tonics, (it is good to) eat in the summer.’  
 b. xiatian chi \_\_\_ de bupin  
 summer eat \_\_\_ DE tonics  
 ‘tonics that are eaten in the summer’

topicalization/relativization of a time object crossing a theme subject like (50b)—unacceptable

- (66) a. \*xiatian, liang-bu chi \_\_\_ (hen hao)  
 summer cool-tonic eat \_\_\_ very good  
 b. \*liangbu chi \_\_\_ de shijian  
 cool-tonic eat \_\_\_ DE time

topicalization/relativization of an instrument object crossing a locative subject like (51a)—acceptable

- (67) a. wangyuanjing, shi-wai kan \_\_\_ jiu hao le.  
 binoculars room-outside see \_\_\_ then good LE  
 ‘Binoculars, watch with outside the room; that would be good.’  
 b. shi-wai kan \_\_\_ de wangyuanjing  
 room-outside see \_\_\_ DE binoculars  
 ‘binoculars to watch with outside the room’

topicalization/relativization of a locative object crossing an instrument subject like (51b)—unacceptable

- (68) a. \*shi-wai, wangyuanjing kan \_\_\_ jiu hao le  
 room-outside binoculars see \_\_\_ then good LE  
 b. \*wangyuanjing kan \_\_\_ de difang  
 binoculars see \_\_\_ DE place

topicalization/relativization of a theme object crossing an instrument subject like (53a)—acceptable

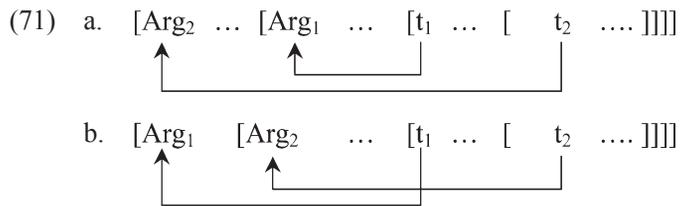
- (69) a. niurou, da guozi zhu \_\_\_ hen hao.  
 beef big pot cook \_\_\_ very good  
 ‘Beef, it is good to use big pots cook \_\_\_.’  
 b. da guozi zhu \_\_\_ de rou  
 big pot cook \_\_\_ DE meat  
 ‘meat cooked with big pots’

topicalization/relativization of an instrument object crossing a theme subject like (53b)—unacceptable

- (70) a. \*da guozi, niurou zhu \_\_\_ hen hao  
 big pot beef cook \_\_\_ very good

- b. \*niurou zhu \_\_\_ de guozi  
 beef cook \_\_\_ DE pot

Schematically, the contrast just described can be represented as (71a–b), where the initial argument stands for the topicalized/relativized noun phrase. (71a) represents the cases where the argument lower in the thematic hierarchy is topicalized/relativized and the higher one surfaces as the subject. (71b) represents the cases where the argument higher in the thematic hierarchy is topicalized/relativized and the lower one surfaces as the subject.



These representations seem to suggest that crossing paths create unacceptability (see, e.g. Pesetsky 1982 for the Path Containment Condition). Extending this to the object deletion cases, one might claim that deletion is always derived by first moving the to-be-deleted argument to the peripheral position of the sentence—a process like topicalization (see Johnson 2001; Wu 2002, among others). Then, the raised argument is deleted. That is, object deletion can be subsumed under topicalization, just like (71a–b).

Unfortunately, this seemingly very attractive analysis, accommodating the similarity between object deletion, topicalization and relativization by topicalizing the to-be-deleted object and through the familiar notion of crossing paths, raises several issues.

First, it is not clear that object deletion is indeed derived by first topicalizing the to-be-deleted object because deleted objects can be expressions that generally cannot undergo topicalization, such as negative polarity items, which cannot be topicalized crossing the licensing negation.

- (72) da guozi mei zhu shenme rou, xiao guozi ye mei zhu \_\_\_.  
 big pot not cook what beef small pot also not cook \_\_\_  
 ‘The big pot did not cook any beef; the small pot did not, either.’

- cf. (73) \*shenme rou, da guozi / wo mei zhu \_\_\_.  
 what meat big pot / me not cook \_\_\_  
 ‘Intended to mean: Any meat, the big pot/I did not cook.’

Other arguments can be constructed on locality conditions, along similar lines to Aelbrecht & Haegeman (2012).

Further questions should be raised as to what exactly the crossing paths are and whether they are indeed responsible for the ungrammaticality of the relevant examples. Widely accepted in the general theory is that movement of similar types interact with each other (e.g. Aoun & Li 1993; Rizzi 1990, among many others). Crossing paths are essentially the effect of minimality: the

highest possible candidate is targeted first. For instance, the COMP of the embedded clause in (74) below must attract the higher *wh*-phrase first; otherwise, the sentence is not acceptable.

- (74) a. I wonder [who<sub>i</sub> [t<sub>i</sub> said what]]  
 b. \*I wonder [what<sub>j</sub> [who said t<sub>j</sub>]]?

Different types of movement do not interact in this manner. For instance, the following sentence involves intersecting *wh*-movement and subject raising; but the sentence is acceptable. The raising of the subject from the embedded clause to the higher clause crosses the trace of the moved *wh*-phrase:

- (75) [To whom does [John seem t [t to be smart?]]]
- 

Thus, the question is whether the same type of movement is involved in the cases under consideration here. Topicalization/relativization and movement of a deleted object to the peripheral position of a clause (a case of topicalization) is an A'-movement (movement to non-argument positions); however, it is not clear that the raising of a lower argument to the subject position is an A'-movement. There is no evidence that the preverbal noun phrase in the reverse order pattern is in an A'-position. An A'-element behaves differently from an A-phrase in a number of ways. For instance, an NP that is moved to an A'-position can be reconstructed to the original A position, but not one moved to an A-position. The NP in question does not exhibit reconstruction effects.<sup>31</sup>

- (76) a. \*ziji<sub>i</sub> de dangao keyi chi [Zhangsan Lisi liang-ge ren]<sub>i</sub>  
 self de cake can eat Zhangsan Lisi two-CL person  
 cf. b. ziji<sub>i</sub> de dangao, [Zhangsan Lisi liang-ge ren]<sub>i</sub> chi.  
 self de cake Zhangsan Lisi two-CL person eat  
 'Self's cake, Zhangsan and Lisi two people eat.'

Moreover, VP-ellipsis with the subject undergoing A'-movement is possible:

- (77) [t hui zuo shi] de ren bi [t bu hui [ ]] de ren duo.  
 will do matter de person compare not will de person more  
 'The people that will work are more numerous than those that will not.'

If VP-ellipsis also requires the to-be-deleted VP to undergo A'-movement to the peripheral position, crossing paths would be created like the relativization construction above (see Aelbrecht &

<sup>31</sup> This has been controversial in the literature regarding the reconstruction possibilities of A-moved elements (see a recent work in Lebeaux 2009 and the references cited there). What matters is that sentences like (76a) are not acceptable, that is, do not exhibit reconstruction effects. It clearly contrasts with the acceptable (76b), which involves topicalization, A'-movement.

Haegeman 2012 against deriving VP-ellipsis from topicalization). The sentence is, however, acceptable.

Finally, there are other cases showing similar behavior between topicalization/relativization and object deletion, but without crossing paths being involved. These patterns concern the impossibility of unaccusative-derived causatives to allow their postverbal argument to be null (e.g. Cheng & Huang 1994; Huang 2006; Lü 1987). For instance, the following sentences adapted from Huang (2006:25, ex.(69)) involve the initial NPs base-generated as causers, that is, they are base-generated in a position higher than the position for the internal argument of the unaccusative verb, *Zhangsan*. No crossing paths are created.

(78) *zuihou zhe-kou jiu zhongyu zui-dao-le Zhangsan.*  
 last this-mouth wine finally drunk-fall-LE Zhangsan  
 ‘This last mouthful of wine finally got Zhangsan drunk.’

(79) *zhe-jian shi lei-bing-le Zhangsan.*  
 this-CL matter tire-sick-LE Zhangsan  
 ‘This matter made Zhangsan sick from being tired.’

In these cases, object deletion is not possible:

(80) a. *zuihou zhe-kou pijiu zhongyu zui-dao-le Zhangsan;*  
 last this-mouth beer finally drunk-fall-LE Zhangsan  
*keshi zuihou na-kou liejiu jingran mei zui-dao \*(Zhangsan).*  
 but last that-mouth liquor surprisingly not drunk-fall Zhangsan  
 b. *zhe-jian shi lei-bing-le Zhangsan; na-jian shi ye lei-bing-le \*(Zhangsan).*  
 this-CL matter tire-sick-LE Zhangsan that-CL matter also tire-sick-LE Zhangsan

Relativization or topicalization is not acceptable, either:

(81) a. *\*zuihou zhe-kou pijiu zhongyu zui-dao \_\_ de ren*  
 last this-mouth beer finally drunk-fall \_\_ DE person  
 b. *\*Zhangsan, zuihou zhe-kou pijiu zhongyu zui-dao-le \_\_*  
 Zhangsan last this-mouth beer finally drunk-fall-LE \_\_

(82) a. *\*zhe-jianshi lei-bing \_\_ de ren versus bei zhe-jian shi lei-bing de ren*  
 this-CL matter tire-sick \_\_ DE person by this-CL matter tire-sick DE person  
 ‘the person tired-sickened by the matter’  
 b. *\*Zhangsan, zhe-jian shi lei-bing le \_\_.*  
 Zhangsan this-CL matter tire-sick LE \_\_

Similarly, an experiencer can be added to an unaccusative verb construction, creating two argument structures. The prohibition against object deletion, topicalization and relativization of the object still holds:

- (83) a. Zhangsan si-le fuqin.  
 Zhangsan die-LE father  
 ‘Zhangsan died (his) father (experienced the death of his father).’  
 b. tamen zuotian lai-le keren.  
 they yesterday come-LE guest  
 ‘They came guests yesterday (experienced the coming of guests).’
- (84) \*object deletion  
 a. Zhangsan si-le fuqin; Lisi ye si-le \*(fuqin).  
 Zhangsan die-LE father Lisi also die-LE father  
 ‘Zhangsan had (his) father died; Lisi also died.’  
 b. tamen zuotian lai-le keren; women ye lai-le \*(keren).  
 they yesterday come-LE guest we also come-LE guest  
 ‘They had guests coming yesterday; we also came.’
- (85) a. \*topicalizing object  
 fuqin, Zhangsan si-le \_\_\_  
 father Zhangsan die-LE \_\_\_  
 b. \*relativizing object  
 Zhangsan si-le \_\_\_ de fuqin  
 Zhangsan die-LE \_\_\_ DE father

The similarity between topicalization/relativization and object deletion in these cases cannot be accommodated by some notion of crossing paths, because the initial causer or experiencer NP is base-generated in a higher position than the deleted object or the relativized/topicalized phrase. Thus, the event structure approach also faces challenges in accounting for the thematic constraint on object deletion. The next section shows that the challenge can be tackled with some notion of economy in derivation.

## 6. Derivational economy

The similarity between topicalization/relativization and object deletion in the cases in (78)–(85) provides a clue to understanding the constraint on object deletion. Consider first the impossibility of object deletion in cases like (80), whose verbs are generally unaccusatives but which can be used as causative verbs, allowing two arguments—the internal argument of unaccusatives and the causer argument of an added CAUSE light verb (see Cheng & Huang 1994; Huang 2006, 2007; Sybesma 1999, for instance). When the object is missing, the only available reading is that the verb is interpreted as an unaccusative, rather than a causative. That is, if (80a–b) can be interpreted at all, it is the last drink being drunk and the matter of falling ill from tiredness which do not make sense at all. Similarly, (84a–b) can only be interpreted as if only one argument exists and the relevant verbs are used unaccusatively—the one that died was Lisi and the ones that came were us. In other words, the experiencer of the event does not exist when the object is empty.

The generalization that emerges is this: even though Chinese allows an additional causer or experiencer argument to appear in the subject position of the structures with unaccusative verbs whose argument occupies the object position, the additional argument is lost when the object is empty. The additional argument is also lost when the object is topicalized or relativized. Why can't the additional causer or experiencer survive when the object is not overt? I show below that the answer can be found in the working of economy in derivation (see Chomsky 1995, 1998 on general conceptions of derivational economy, Aoun et al. 2001 on Move and Bind, Shima 2000 on Move over Merge, among others;<sup>32</sup> also see the various notions of economy summarized in Collins 2003 and relevant references, among others).

Consider (81)–(82). The verbs in these cases can be analyzed as unaccusatives solely or as unaccusatives dominated by one more layers of structure—CAUSE (and V is raised to combine with CAUSE). When the object is not lexically filled through object deletion or topicalization/relativization, the structure is understood as having just one argument, which is originated as the object of the unaccusative verb and raised to become the subject of the sentence. This structure is preferred over the alternative of having a second argument licensed by an additional layer of structure. More precisely, when the overt form is [Argument + Unaccusative verb], which can be analyzed as (86a) or (86b) (irrelevant details omitted), the simpler (86a) wins.

- (86) a. [Arg<sub>i</sub> + V + t<sub>i</sub>] - internal argument of unaccusative V becomes Subject  
 b. [Arg<sub>1</sub> + CAUSE-V + e<sub>2</sub>] - additional arg. + internal arg. of unaccusative V missing

A simpler structure is also the choice in (84)–(85), whose verbs ‘die’ and ‘come’ are generally subcategorized for one argument. These verbs have the option of further forming complex predicates with the internal argument to take another argument. Alternatively, it can be said that an AFFECT light verb is generated to license the experiencer argument, similar to the generation of CAUSE in the construction in (81)–(82). Regardless of which option is adopted, the two-argument construction has one more layer of structure than the one-argument construction to accommodate the second argument. Again, the more complex option is not adopted when only one argument overtly appears. In other words, when there is only one overt argument, even though the structure can potentially be analyzed as a two-argument structure, the simpler one-argument structure is adopted. The generalization can be mechanically represented as the one below, generalized from (86a–b) (Lv stands for the head whose specifier hosts the additional causer or experiencer argument. V is raised to combine with this Lv. An argument is raised to the subject position Specifier of I.)

- (87) a. Arg<sub>i-subject</sub> ... V + t<sub>i-object</sub> - internal argument of unaccusative V raised to Subject  
 b. Arg<sub>i-subject</sub> ... t<sub>i</sub> + Lv-V + e<sub>object</sub> -additional arg. + internal arg. of unaccusative V missing

<sup>32</sup> Chomsky (1995) argues for Merge over Move in terms of cost. Aoun et al. (2001) argue that Move should not be costly because it involves Copy, which is a ‘virtually conceptually necessary’ operation (p.400). Shima (2000) argues that Move is less costly than Merge—Move over Merge. The choice of a simpler structure as proposed in the text has the flavor of Move over Merge.

The structure in (87a) is simpler than the one in (87b) because it has fewer projections. The simpler structure (87a) is favored over the more complex one and the interpretation allowed by having an empty object is not available.

The adoption of a simpler structure can be straightforwardly extended to topicalization and relativization constructions, which behave like object deletion structures. They all involve argument positions that are not lexically filled and are subject to the same structural analyses. The same choice is made.<sup>33</sup>

Let us now turn to the constraint on object deletion as observed in (45)–(53). Having a structure like the one in (62), the examples with word order reflecting the thematic hierarchy such as the (a) examples of (45)–(53) will have some version of (88a) below (irrelevant details not included). For the (b) examples of (45)–(53), whose word order does not follow the thematic hierarchy, they would involve movement of a lower argument to cross a higher one in the thematic hierarchy, as in (88b). The V has been raised to *v* in (88) ('*t*' within VP is present when the subject is a non-canonical argument, raised from within VP. Recall that a canonical subject is generated outside VP).

- (88) a. Subject Arg1 is thematically higher than object Arg2  
 [Arg1<sub>subject</sub> + *v*-Lv-V (+*t*) Arg2<sub>object</sub>]  
 b. Subject Arg2 is thematically lower than object Arg1  
 [Arg2<sub>i-subject</sub> + *v*-Lv-V + Arg1<sub>object</sub> + *t*<sub>i</sub>]

Now, consider object deletion in the constructions that do not follow the thematic hierarchy as in (62). The structure available for Arg2 to be the subject of the sentence not only can have the structural analysis in (88b), but also the structural analysis in (89) below, just as in (87a–b).

- (89) [Arg2<sub>i</sub> + *v*-V + *t*<sub>i</sub>]

The difference between (88b) and (89) is that for the same SVO construction, where the object is empty, the structure can be analyzed as having just one argument which undergoes raising from the object to the subject position as in (89), or as having two arguments as in (88b), which not only contains everything that (89) has, but also an additional layer of projection licensing the generation of a second argument (Arg1). A lower argument is moved across a higher argument to become the subject. Thus, (89) is simpler and favored over (88b).

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<sup>33</sup> Considering the conception of Move being Copy and Merge in the Minimalist Program as in Chomsky (1995), this seems to suggest that the determination of the structure is based on the surface form. The issue of inclusiveness (Chomsky 1995) and whether different numerations are being compared are also relevant. In addition, how does one capture the distinction between an argument that is base-generated because of the argument structure of a verb and an argument that is added syntactically? It has been suggested that the last question is related to the thematic relation between the internal argument of the unaccusative verb and the additional argument, as in Li (forthcoming). See the concluding section and Li (forthcoming) for options to the issues raised here.

By contrast, in the cases following the thematic hierarchy, the subject is not raised from a position lower than the other argument. The subject is the one higher in the thematic hierarchy and the missing object would not have the choice between being a trace derived by the raising of the object or being the null form of the object. The lack of choices for a simpler structure makes object deletion possible.

Before closing this section, I would like to clarify when object deletion is possible in the context of this work (not considering other intervening factors such as information structure, aspect markers, syllabic structures, etc.). We have seen that object deletion is generally acceptable in the constructions following the thematic hierarchy. However, there are cases following the thematic hierarchy but not allowing object deletion. This has been demonstrated by the unacceptability of object deletion in the constructions involving unaccusatives (CAUSE-unaccusatives and AFFECT-unaccusatives). Why is there such a difference? I suggest that this is an indication that lexical information still plays a role in determining argument structure (see §5.1). The relevance of lexical information can be made clearer by minimal pair examples with the same thematic structure. Consider the cases involving [Subject<sub>Experiencer</sub> + V + Object<sub>Theme</sub>]. One instance of such constructions is the unaccusative structure with an additional experiencer argument, as illustrated in (83)–(85). In addition, it is also possible to have constructions whose verbs lexically require experiencer and theme arguments. What is important is that it is not the thematic structure [Subject<sub>Experiencer</sub> + V + Object<sub>Theme</sub>] that is responsible for the unacceptability of the object missing in the examples (84)–(85). When a verb is subcategorized for two arguments, experiencer and theme, the object can then be deleted. Take the following sentences, for instance. They involve verbs subcategorized for an experiencer and a theme, and are quite acceptable with their objects missing:

#### Experiencer Subject—Theme Object

- (90) Zhangsan diao/wang-le yixie shu; Lisi ye diao/wang-le (yixie shu).  
 Zhangsan lose/forget-LE some book Lisi also lose/forget-LE some book  
 ‘Zhangsan lost/forgot some books; Lisi also lost/forgot (some books).’
- (91) wo hen pa yi-ge laoshi; tamen ye hen pa (yi-ge laoshi).  
 I very fear one-CL teacher they also very fear one-CL teacher  
 ‘I am afraid of a teacher; they also are afraid (of a teacher).’
- (92) wo danxin bingren; tamen ye danxin (bingren).  
 I worry patient they also worry patient  
 ‘I worry about patients; they also worry (about patients).’

The two sets of examples, (83)–(85) on the one hand and (90)–(92) on the other, have the same thematic roles for their arguments—experiencer subjects and theme objects. They are only distinguished by how the arguments are generated. In the latter set, the verbs can be lexically specified as experiencer verbs that allow an experiencer subject and a theme object, while those in the former are lexically specified as unaccusative verbs, whose experiencer argument is added syntactically after the unaccusative verb and its internal argument form a complex predicate to allow for one

more argument.<sup>34</sup> This means that the notion of structural simplicity being favored is only relevant to those whose argument realizations are not required by lexical specifications. The additional experiencer or causer argument in the cases with unaccusative verbs is added syntactically, not the canonical arguments required by lexical subcategorization properties. The distinction in the relevance of lexical specifications also suggests that it cannot be the case that all arguments with the experiencer or causer theta-role are licensed by the same light verbs, and the thematic structure is only determined by layers of theta-licensing light verbs generated independent of verbs. The lexical approach outlined in §5.1 should still be important in the sense that lexical information ought to be available. The kind of lexical information needed is the thematic structure of verbs—such as whether a particular verb is an unaccusative subcategorized for an argument or a different transitive verb with two arguments (experiencer and theme).

Summarizing the discussion in §5, the relevance of thematic hierarchy to object deletion in the pairs of free ordering examples in (45)–(53) led us to search for an explanation. More empirical generalizations regarding the acceptability of object deletion were presented—the constructions involving unaccusative-causative alternations as in (78)–(82), and those with the addition of an argument licensed by complex predicates formed by the combination of verbs and their internal objects as in (83)–(85) (or by the additional AFFECT light verb). Various approaches have been considered, mainly the lexical and the event structure approach. It was suggested that an adequate account should incorporate some notion of economy. When the object position is not lexically filled, two structural analyses are possible—one with a more complex structure (having more projections) and the other a simpler structure. The complex structure yields two arguments licensed in two projections; the simpler structure, one argument in two positions. The two differ in the number of projections. The choice of simpler structure also holds with topicalization and relativization constructions, when only the comment/relative clause is considered. Within the comment/relative clause, the object position is not lexically filled and the simpler structure does not have an additional argument position that has an empty category related to the topic phrase or the modified phrase in relative constructions. The comparison of complexity in structures provides a unified account for the impossibility of object deletion and topicalization/relativization in the constructions mentioned. The definition of complexity in structures must also consider the types of verbs involved, for instance, whether a verb is lexically specified as an unaccusative verb subcategorized for one argument or a transitive experiencer verb requiring two arguments.

The proposal made here predicts that constructions with empty subjects but lexically filled objects will generally be possible because there are no choices between more complex and simpler structures, as long as a clause is required to have a subject due to the EPP. Recall that the simpler structure yields only one argument. When the object is lexically filled, it is an argument itself.

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<sup>34</sup> In an approach that takes event or aspectual structures as basic and lexical items simply as roots, not having subcategorization properties, lexical information is irrelevant in syntax (see Borer 2005; Huang 1997; Lin 2001; Ramchand 2008, among many others. Also see the decomposition and hierarchical structures of lexical items in Hale & Keyser 1993). The fact that lexical information affects deletion possibilities noted in this work indicates that the relevant lexical information should be at work in grammar. The constraint cannot be a matter of pragmatics or world knowledge.

The required presence of a subject indicates the existence of another argument. Accordingly, constructions with an empty subject such as the (c) cases of (45)–(53) must be analyzed as two-argument structures, not one-argument ones. Only one structure is available—the two-argument one. This accounts for the acceptability of subject deletion in the (c) cases of (45)–(53). The same subject–object asymmetry applies to the unaccusative constructions in (78)–(85).

## 7. Conclusion

The notion of thematic hierarchy has been controversial and whether it should exist as a theoretical construct has been questioned. This work shows that thematic hierarchy represented structurally in terms of layers of projections, as in Bowers (2010) or adapted from Lin (2001), can help account for several interesting empirical generalizations in Chinese. Coupled with some notion of economy, it captures the constraints on object deletion in constructions not obeying the noted thematic hierarchy, as well as in constructions with additional arguments syntactically (CAUSE or AFFECT added to constructions containing verbs and internal arguments). The contrast between the unacceptability of object deletion and the acceptability of subject deletion in the relevant constructions is also accounted for. Furthermore, this work shows that, even though Chinese seems to exhibit great flexibility in the number and type of arguments that can occur with specific verbs, some notion of subcategorization becomes relevant in object deletion constructions. This is necessary because of the differing acceptability as regards object deletion in constructions with identical argument structures, illustrated by the contrast between (83)–(85) on the one hand and (90)–(92) on the other. The generalization that emerges is that even though Chinese can be flexible in argument structure, object deletion is restricted. The possibility of object deletion is sensitive to lexical information and thematic hierarchy. Object deletion, in comparison to subject deletion, provides a unique window to understanding the working of grammar. The account for the constraints on object deletion also shows that thematic hierarchy can essentially be a hierarchical tree structure, rather than being regarded as a theoretical construct, simply stated as it is such as in (55).

This work also raises an important question: the notion of economy. What is its status in grammatical theory? The nature of ‘economy’ has been a subject of controversy for a long time. Collins (2003) presents a good summary of the range of issues and of the relevant literature. In this context, different ways of interpreting the notion of economy used in this work are possible. The notion of economy proposed here is that of a simpler structure being projected when there are choices. Such a choice of projecting simpler structures has been referred to as economy of derivation. However, the mechanism can also be understood in terms of representational economy, because one can say a simpler representation with fewer layers of projections should be favored. The issue of local versus global economy summarized in Collins (2003) is also relevant. One can view the comparison of structures as a notion of global economy. On the other hand, it is also possible to phrase the notion as local economy: the thematic structure of a verb determines the projections and structures. For instance, consider the unaccusative construction with only one overt argument, which could have the choice of being interpreted as the argument selected by the unaccusative verb or the argument related to an additional CAUSE or AFFECT. The former is chosen because the verb is an unaccusative verb lexically, that is, verbs are interpreted as what they are lexically, coupled with

the notion of Merge over Move (which is local, not global), therefore there is no need to compare structures globally. The unaccusativeness of relevant verbs determines the structure. For the contrasting cases in thematic hierarchy, one might say that structures are projected according to the hierarchy in (55) and Move is favored over Merge. At this point, there does not seem to be convincing evidence necessarily forcing the choice of one interpretation of economy over another. In addition, it is also possible that the relevant constraint is a processing phenomenon, rather than a grammatical condition (see Kluender & Kutas 1993 for *wh*-island as a processing phenomenon, and the most recent debate on the issue of whether subjacency is grammar or processing in Sprouse & Hornstein 2014). This is a good possibility, especially when we consider the fact that topicalization and relativization constructions behave like object deletion structures in regard to their sensitivity to the observed constraints. It is hoped that this work has broadened the empirical issues involved in the debates and will eventually make an important contribution to resolving the controversies.

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Yen-Hui Audrey Li

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## 論旨階層與衍生經濟性

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論旨階層在語法理論中的地位眾說紛紜，甚至連最基本的是否應該存在都有爭議。本文主張以結構層次來反映論旨階層可以有助於解釋有關漢語賓語省略的相關現象。漢語基本上對動詞選擇何種論元、多少論元似乎彈性很大，主賓語好像也常能互換。然而，在這些看似極大的彈性之下，事實上仍有一些限制。譬如，只有在句子的論元結構遵守論旨階層的情況下，賓語才能省略；如果論元是在句法運作中加入的，那麼賓語就不能省略。相對地，主語省略就不受此限。本文指出，這些限制可以從論旨結構層次及衍生經濟性得到合理的解釋。

關鍵詞：論旨階層，賓語省略，自由詞序，論旨結構，詞彙標示，非賓格