Causative alternation in *Zuo Tradition*

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This study examines the different variants of causative alternation in *Zuo Tradition* (左傳), an archaic Chinese narrative history from the Pre-Qin period. It is found that denominal verbs, unergative verbs, and "pure" unaccusative verbs participate actively in the alternation, and that the causative variant bears a complex relation with the agentive and putative variants; this causes problems for previous analyses. This paper proposes a two-step build-up of eventuality for causative alternation in archaic Chinese. Specifically, I propose that verbs in archaic Chinese are monadic and select only one argument. The merger of the verb with this argument is the realization of its eventuality conceptualized in the Lexicon; any further merger is determined by the eventuality composed by different light verbs in syntax. The uninitiated light verb is a placeholder with an empty argument. A specific light verb value is determined by the eventuality that is sent to the syntactic structure. Thus, the difference between all variants in causative alternation witnessed in *Zuo Tradition* lies in the different eventualities which they introduce into the syntactic configuration.

Keywords: causative alternation, archaic Chinese, Theta System, light verb, eventuality

1. Introduction of related issues in causative alternation

Causative alternation refers to a pair of verbs bearing a semantic relation to each other, as illustrated in Example (1). The intransitive (or anti-causative) variant of this alternation (1a) denotes a change of state, while the transitive (or causative) variant of this alternation (1b) denotes a bringing about of this change of state, which roughly means "cause to V-intransitive."

(1) a. *The door closes.*
b. *John closes the door.*

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Causative alternation has been a topic of much typological and theoretical discussion in generative linguistics. One issue of critical concern is the way in which eventuality is built up in this alternation. To tackle this problem, the following questions should be answered:

a. What is conceptualized in the Lexicon: i.e., if and to what extent is eventuality conceptualized in the Lexicon?
b. How are the semantics of the verb mapped into the actual eventuality of each variant in causative alternation?
c. What are the thematic and syntactic properties of the arguments participating in this alternation? and
d. What is the relation between eventuality and syntax in relation to the two variants?

These questions focus on event decomposition and thematic specification of the lexical entry and mapping to the syntactic structure. Previous studies have established an abundance of analyses of these issues, which are of great referential significance. In what follows, I shall first outline previous answers to the above questions, upon which a new proposal will be based. The rest of the paper will be used to provide evidence from archaic Chinese to support this proposal. Data used in this paper are from *Zuo Tradition/Zuozhuan*[1] (左傳: *Commentary on the "Spring and Autumn Annals"*), an archaic Chinese narrative history from the Pre-Qin period.

Question (a) can be rephrased as "How much information pertaining to syntactic computation does a lexical verb contain?" Possible answers include (A) one argument, (B) all arguments, and (C) no argument. Ever since Marantz (1984), data from subsequent studies have adequately supported that the relation of the verb to its internal argument is much closer than its relation to its external argument, which indicates that an intransitive clause has an initial internal argument but no initial external argument (cf. Harley 1995; Kratzer 1996; Rappaport Hovav & Levin 2012, among others). For instance, Harley (1995) argues that a verb must be represented, in the syntax, as two separate heads, the lower one of which selects the internal argument; while the upper one is an "Event" head which selects the external argument. Similarly, Kratzer (1996) proposes that the external argument should be "severed" from the lexical verb and be introduced by a (semi)-functional projection on top of the verbal phrase that she terms the "Voice" projection. This option directly leads to a causativization operation, i.e.,

1. The translation of the title of this book, as well as that of the example sentences adopted in this paper from the book, refer to Durrant et al. (2016).

the anti-causative variant in causative alternation is the basic form, from which the causative variant is derived.

Option (B) is supported by Chierchia (2004), Levin & Rappaport Hovav (1995; 2005), and Reinhart (2002, 2016) who claim that verbs showing causative alternation are inherently dyadic predicates which undergo a decausativization process, deriving the anti-causative variant. Reinhart (2002) further proposes a Lexicon Uniformity Principle, which dictates that the verbs in the two variants of causative alternation share the same lexical entry and have a single thematic structure, which includes all the arguments a verb is associated with as well as the semantic information of each argument. Option (C) is chosen by Hale & Keyser (1993); Borer (2005), and Ramchand (2008). Hale & Keyser (1993) deny that there is a thematic role in the lexical entry, and propose that the event structures of the predicate and the thematic status of the arguments are determined by the syntactic configurations that they enter. Similarly, Borer (2005) also denies a direct involvement of lexical entry in argument-related syntactic computation. She argues that the lexical entry only contributes as a modifier with semantic details which does not determine the representation of the argument.

As can be seen from these proposals, a choice from the three options determines one's stance concerning the second question listed above, which was: How are the semantics of the verb mapped into the actual eventuality of each variant in causative alternation? This question points to the division of labor between the syntax and the Lexicon. To wit, how much information is allowed to the Lexicon and how much is relegated to the functional structure. This, in turn, is closely related to the derivational relation between the two variants of causative alternation. Option (A) corresponds to a causativization derivational relation, while (B) corresponds to a decausativization approach. There is a third possibility, i.e., that the causative and the anti-causative variants share one and the same root[2] which conceptualizes different types of events and results in two lexical items with different ways of argument realization. In other words, a non-derivational approach. The current study does not concern itself with this matter, given the complexity of the derivational relation observed in my data – i.e., archaic Chinese.

Briefly speaking, it can be observed that causative alternation in archaic Chinese is accompanied by voicing alternation (Mei 2012). Unfortunately, previous analysis cannot reach a consensus on the direction of such alternation. Dai (2001) and Mei (2008; 2012; 2013), for instance, propose that archaic Chinese voicing change in anti-causative/causative verbs, such as 敗: **brads* 'ruined, defeated'

2. Terms that are crucial for the current analysis include root, word, syntactic category, and word meaning. All of these terms will be properly defined in §2 where archaic Chinese data are introduced and elaborated.

> 敗: **prads* 'to ruin, to defeat', is due to the devoicing effect of the causative *s- prefix (*s-*brads*>**prads*). The original voiced consonant is associated with an anti-causative verb, while the voiceless one is derived and expresses a causative meaning. Alternatively, it is proposed by Pulleyblank (1973); Sagart (1999), and Matisoff (2003), based on evidence from various Sino-Tibetan languages, that a prenasal *N is responsible for voicing alternation between causative and anti-causative verbs in archaic Chinese, e.g., 敗: **prads* 'to defeat' > 敗: *N-*prads* 'to be defeated'. The direction of this voicing alternation leads to changing a causative variant into an anti-causative one. As pointed out by Sagart & Baxter (2012), disagreement on this issue relates to the derivations being posited to explain causative alternation, as well as the semantics of the words. They also admit that in any language, some verbal notions by default have one argument while others have two, which makes it common to have both directions of such alternation. This claim is further attested by Gates et al. (2022),[3] who differentiate the anti-causative nasal prefix *N- and the sigmatic causative prefix *s- in Stau, Geshiza, and Khroskyabs, three West Gyalrongic languages. Hindi/Urdu can also undergo both phonological decausativization and phonological causativization as scrutinized by Saksena (1982); Bhatt (2003), and Butt (2003) among others. Phonological/Morphological change and its relation to causative alternation deserve full description in a separate paper (Wuyun, forthcoming). The current paper will only present some linguistic facts with regard to the relation between phonological changes and causative alternation in § 2 and the appendix where related data are presented.

Now, let us turn to the third question: What are the thematic and syntactic properties of the arguments participating in this alternation? The thematic roles (agent, theme, experiencer, etc.) represent the relation between arguments of a verb and the eventuality it denotes. The question posed here relates to (1) the semantic content of the theta roles and (2) the linking of theta roles to syntactic position. I shall start with the second issue under the frame of causative alternation. Since Jackendoff (1972), it has been generally believed that the linking between theta roles and syntactic categories is predictable. Nonetheless, an increasing number of syntactic literatures no longer consider theta roles as part of the lexical entry of a verb (cf. Harley 1995; Ramchand 2008, among others.) Moreover, almost all semantic analyses of causative alternation treat the internal argument of a verb differently from the external one. Specifically, the predicate and its internal argument semantically combine by functional application, whereas combination with the external argument is via either an Event Identifi-

3. I thank one of the anonymous reviewers for bringing Sagart & Baxter (2012) and Gates et al. (2022) to my attention.

cation (Kratzer 1996) or a Predication Principle (Chierchia 2004) which clearly connects the semantic interpretation of the external argument with eventuality. Syntactically, Marantz (1984) proposes that the external argument of a verb is not actually the argument of the verb. According to him, the semantic role of a subject is assigned by the predicate, not the verb. This line is further pursued by Harley (1995); Kratzer (1996), and Rappaport Hovav & Levin (2012). Marantz (1995) and Ramchand (2008) take a more radical position by assuming that the syntax provides the only way the mind has to represent compositional meanings.

With regard to the semantic content of the theta roles, what is relevant to the current study is the system proposed and developed by Reinhart (2002; 2016), which is termed the Theta System. This system was first proposed to solve the *open* puzzle of selection. It can be observed that the transitive alternative of unaccusatives can have an agent, causer, or instrument as its external role, as shown in Example (2).

(2) *John*$_{[\text{Agent}]}$/*A gust of wind*$_{[\text{Cause}]}$/*A key*$_{[\text{Instrument}]}$ *opened the door.*

The diversity of external theta roles poses a problem for traditional analysis, which assumes that the lexical entries should specify not only the number of theta roles they select, but also their thematic labels. Nonetheless, if the verb *open* in the example can select three different external theta roles, how can such information be stored in the Lexicon?

Reinhart (2002) solves this problem by decomposing the theta roles into two primitive features, [±c] and [±m]. All the theta roles are formally coded in terms of these two binary features, and the feature composition of clusters determines their syntactic mapping and is passed on through the derivation. The feature [c] (meaning cause change) determines whether or not the argument in question is responsible for causing the event denoted by the verb; while the feature [m] (meaning mental state) specifies whether the mental state of the argument in question is relevant to the event denoted by the verb. The combination of these two features further gives rise to nine clusters,[4] which correspond to the traditional labels of theta roles. Specifically, the traditional agent (*John*), causer (*a gust of wind*), and instrument (*a key*) as illustrated in Example (2) bring about the denoted event and are therefore positively valued regarding the feature [c], i.e., they are specified [+c]. "*John*", as agent, has a [+c +m] specification as his mental state is also relevant for the "*open-the-door*" event he takes part in, while the men-

4. These nine clusters are [+c], [+c +m], [+m], [+c −m], [−c −m], [−c +m], [−c], [−m], and [Ø]. For broader introduction and discussion on these nine clusters, refer to Reinhart (2002; 2016), Reinhart & Siloni (2005), among others.

tal state of the causer can be relevant or irrelevant[5] to the event, and hence it is unspecified with regard to the feature [m], i.e., a causer is only of feature [+c]. As for the Instrument "*a key*", it usually is inanimate, which does not bear any mental state *per se*, nor is its mental state relevant to the event, so they are specified as [+c −m]. All the arguments that participating in an event can be assigned a cluster of primitive features based on whether they are responsible for causing the event denoted by the verb (via feature [c]), and whether their mental state is relevant to the event denoted by the verb (via feature [m]). The theme, for instance, is a participant whose mental state is irrelevant to the event, nor does it trigger the event, so its feature combination is [−c −m], which corresponds to "*the door*" in Example (2). Thus, Reinhart's Theta System consists of lexical entries with feature clusters defining all the theta relations and the marking procedures that prepare the lexical entries for syntactic computation. The question is, then, How many feature clusters does a lexical entry carry when it enters syntax?

Finally, let us consider the last question: What is the relation between eventuality and syntax concerning the two variants? The core question is how to correlate the morphosyntax and the semantics of event structure in a direct way. The common idea is that the syntactic projection of arguments is based on the event structure. Both Hale & Keyser (1993) and Lin (2001) hold that syntactic categories, their elementary semantics, and the structural configurations in which they occur jointly determine the event structures, which are associated with the semantic interpretations of the proposition in question. Ramchand (2008) proposes an event-structure syntax with three subevental components, namely initiation, process, and result, which actually is a splitting up of V based on eventuality. What Reinhart's (2002) system leaves to syntax is rather limited, which involves a merger operation in accordance with the Lexicon marking. Regarding syntactic computation, all entries are merged externally if nothing rules this possibility out. However, an argument realizing a [−] cluster (e.g., a [−c −m] theme) should merge internally; while the one with a [+] cluster (e.g., a [+c] cause or a [+c +m] agent) merge externally, which is what happens in the causative variant of the alternation. It is evident that the system associates eventuality with the specific feature clusters selected by the verb, which in turn decides how the arguments participate in syntax.

It is frustrating to see from this comprehensive introduction that no consensus has been reached concerning any of these questions; this encourages me to make the issue more complicated by taking archaic Chinese into consideration. As

5. The causer in Example (2), i.e., *a gust of wind*, is inanimate, which does not bear any mental state to start with. Thus, animacy is usually regarded as one indicator that differentiates an agent role from a causer (Folli & Harley 2005).

will be illustrated in the rest of the paper, the archaic Chinese data from *Zuo Tradition* show unique characteristics concerning causative alternation, which pose new challenges to the existing proposals. Briefly speaking, a mass of denominal and deadjectival verbs, as well as numerous verbs that are typically absent from causative alternation are found participating in causative alternation in *Zuo Tradition*. Moreover, it is found that the causative variant interacts actively with agentive and putative variants, which gives rise to ambiguity at the surface representative. Before a detailed data presentation, I would like to provide a general proposal concerning causative alternation in archaic Chinese by answering the questions listed above. To start, I argue that once a lexical entry enters the syntactic system and merges with a V(erb) head, what has been conceptualized in the Lexicon realizes a one-place verb taking only one argument; i.e., part of the event structure is conceptualized in a lexical entry, which can later realize a monadic verb as the lexical entry enters the computational system. I propose that all verbs merge externally with its only argument in archaic Chinese, which is the case for both variants in causative alternation. The difference with regard to the number and the semantics of the argument is given rise to by further merger with different light verbs in syntactic computation. I activate the ninth logically possible theta cluster [Ø] from Reinhart's Theta System by assigning it to the light verb. I propose that the existence of the light verb in syntax is to accommodate the empty [Ø] cluster passed from the conceptual system. The uninitiated light verb is only a placeholder with a [Ø] cluster. A specific light verb value, such as CAUSE, DO, HAVE, is determined by the event structure that enters into the syntactic structure. Thus, the difference between causative and anti-causative variants lies in the different eventuality they introduce into the syntactic configuration via the light verb.

To note, my inquiry in this paper will be limited largely to archaic Chinese, i.e., I shall not consider other languages in this paper and the question of whether what I propose extends to other languages will have to be determined by further research. The rest of the paper is organized as follows: §2 first delineates the research scope as well as the criteria of data screening, followed by a full description of causative alternation in *Zuo Tradition*. §3 provides a summary of challenges the data may bring to current analyses via illustrating the behavior of denominal and deadjectival verbs, as well as the interaction of causative with agentive, unaccusative, unergative, and putative variants. In this section, I shall demonstrate the inadequacy of the proposals I reviewed here. §4 further provides solutions to account for these linguistic facts observed in archaic Chinese with support from previous analyses of relevant issues. And at last, §5 presents some conclusions.

2. An overview of causative alternation in *Zuo Tradition*

This section will provide an overview of the linguistic facts concerning causative alternation observed in *Zuo Tradition*, before which properly defining a group of relevant terms is in order, namely word, root, and syntactic category. This study takes Chomsky's (1995) and Marantz's (1995) generative framework by treating words as the interpreted output of the syntactic computation; whereas roots as the input of a specific syntactic environment. Roots are the minimal units of phonological-semantic features in a language, which are inserted into the computational system and merge with functional categories. In this derivational process, syntactic categories of nouns, verbs, and adjectives emerge in the context of certain functional projections. For instance,√[6]主:tjoʔ is a bare root with both phonological and semantic features, the latter of which in archaic Chinese is closely related to the form and structure of the Chinese character as explicitly defined and analyzed in *Shuowen Jiezi* (《說文解字》).[7] To note, the root is not inherently a noun (or a verb), i.e., its lexical entry is unspecified as to the syntactic category. It becomes nominal, for instance, only when it enters the syntactic computational system and merges with a D(eterminer) head and function as the complement of a verbal component as shown in Example (3a). If it further merges with a V(erb) head, it then is verbal as shown in (3b). Thus, as the result of two different syntactic derivations, the two "主" in these sentences are two words with both phonological features and syntactic categories, within which the former is taken as the "base" form due to the fact that the verbal one is the result of further merger of the nominal one with functional categories.

(3) a. 社稷 有 主 （莊公十四年）
altars of the domain have man in charge
Lit. 'The altars of the domain have a man in charge.' (Lord Zhuang 14)

b. 主 社稷 （成公十四年）
preside over altars of the domain
Lit. 'To preside over the altars of the domain.' (Lord Cheng 14)

To wit, this paper takes the two variants of causative alternation in *Zuo Tradition* as deriving from the same root by following a generative tradition. The semantics of root follows the philological tradition unless noted otherwise; whereas the syntactic category of noun, verb, or adjective, is settled for each root when it first merges with a functional category in the computational system. Now we are ready

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6. Pesetsky's (1995) notation for roots is adopted in this paper.

7. *Shuowen Jiezi* is the first comprehensive dictionary of Chinese sinograms compiled by Xu Shen from the Han dynasty. (Wang 2016: 166)

for an overview of linguistic facts with regard to causative alternation in *Zuo Tradition*. The data used in this study are adopted from the *Academia Sinica Ancient Chinese Corpus* (https://lingcorpus.iis.sinica.edu.tw/cgi-bin/kiwi/akiwi/kiwi.sh). I selected the first 1,500 of the 3,745 tokens in the category "VP causatives," and received causative use of 187 different words. These words are subject to further screening by excluding: (i) cases whose anti-causative variants are missing from *Zuo Tradition*; and (ii) cases recorded by the previous studies as involving phonological changes.[8] A total of 157 words sustained this screening, among which 88 are base verbs,[9] 36 are deadjectival verbs, and 33 are denominal verbs.

Table 1. Classification of verbs in *Zuo Tradition*[10]

BASE VERBS	立:G·rɯb 'to stand', 行:graaŋ 'to walk', 作:ʔsaags 'to rise', 結:kiid 'to knot', 廢:pads 'to waste', 定:deeŋs 'to settle', 滅:med 'to extinguish', 陳:l'iŋ 'to display', 潛:zloms 'to hide', 渝:lo 'to change', 絕:zod 'to break off', 發:pad 'to discharge', 成:djeŋ 'to complete', 覆:phug/ɯg 'to overturn', 亡:maŋ 'to perish', 遷:shen 'to

8. It is widely believed that some verbs that show causative alternation in archaic Chinese are morphologically different words written as the same character (cf. Downer 1959; Pulleyblank 1973; Mei 1988, 2008; Jin 2005a, 2005b, among others). Such morphological difference is reflected in phonological change as shown in § 1 with the 敗: **brads* 'ruined, defeated' vs. **prads* 'to ruin, to defeat' example, which has both morphological and lexicological significance, i.e., there are actually two lexical entries, namely "敗$_1$" meaning 'to be defeated' and "敗$_2$" meaning 'to defeat'. I exclude the ones that are generally regarded as morphologically different words with the same character from this study; however, I remain unconvinced on its justification, i.e., I take the two variants in causative alternation as one word. A separate paper is under preparation for the discussion of this issue (Wuyun, forthcoming). Such words in *Zuo Tradition* include: 生: 'to be born', 出: 'to come out', 飲: 'to drink', 怒: 'to anger', 昭: 'bright', 和: 'harmonious', 下: 'inferior', 雨: 'to rain', 盡: 'exhausted', 敗: 'to be defeated', 除: 'eliminate', 去: 'to leave', 毀: 'to ruin', 食: 'to eat', 壞: 'to ruin', and 遠: 'distant'. To note, this is different from what has been illustrated in Example (3), in which the two "主:tjoʔ" are taken as two words given the fact that they are of different syntactic categories, namely one nominal and one verbal. Even for cases like Example (3), these two words only exist in computational system, i.e., there is only one lexical entry of "主:tjoʔ", which can be put into different syntactic environments and realize different words as the output of syntactic computation.

9. Base verb is identified for a root merging with a V head in a verbal environment when it first enters the syntactic computation; whereas denominal and deadjectival verbs refer to the ones that first merge in a nominal or adjectival environment and then further merges to a verbal one as specified above. To wit, the syntactic category for each word is defined in terms of the merger of roots and functional categories in syntactic derivation.

10. Table 1 lists words involving causative alternation in the form of 立:G·rɯb (to stand), i.e., Chinese character: archaic Chinese phonetic notation (the translation of the meaning as verb/adjective/noun). All the phonetic notations in this paper are adopted from the onomatope by Zhengzhang (2019) unless otherwise specified.

Table 1. *(continued)*

	move', 集:zub 'to assemble', 張:taŋ 'to stretch', 止:tjɯʔ 'to stop', 降:kruuŋs 'to descend', 降:gruuŋ 'to surrender', 合:guub 'to close', 濟:ʔsliils 'to aid', 復:bug 'to return', 乘:ɦljɯŋ 'to ride', 蕩:l'aaŋʔ 'to swing', 伏:bɯg 'to hide', 稅:hljods 'to escape', 處:khljaʔ 'to stay', 畢:pid 'to finish', 益:qleg 'to increase', 閟:prigs 'to close', 通:lhooŋ 'to connect', 起:khlɯʔ 'to rise', 漏:roos 'to drip', 嫁:kraas 'to marry', 終:tjuŋ 'to end', 列:red 'to arrange in order', 落:g·raag 'to fall', 反:panʔ 'to overturn', 興:qhɯŋ 'to rise', 聚:zloʔ 'to assemble', 朝:r'ew 'to visit the court', 陷:grooms 'to sink', 存:zluun 'to exist', 猾: gruud 'to disturb', 遂:ljuds 'to complete', 替:thiids 'to replace', 卒:ʔsud 'to die', 隊:l'uuds 'to fall', 敝:beds 'to be defeated', 步:baas 'to walk', 墮:l'oolʔ 'to fall', 見:geens 'to be seen', 增:ʔsɯɯŋ 'to increase', 損:sqhuunʔ 'to damage', 登:tɯɯŋ 'to ascend', 隕:Gunʔ 'to fall', 易:leg 'to change', 閉:piids 'to close', 驚:kreŋ 'to shock', 懼:g^{w}as 'to fear', 畏:qul/s 'to fear', 煩:ban 'to worry', 殄:l'ɯɯnʔ 'to exhaust', 殘:zlaan 'to injure', 泯:minʔ 'to sink', 掉:deewGs 'to shake', 虧:kh^{w}ral 'to lose', 艾:ŋaads 'to end', 悼:lhuu 'to doubt', 夭:qrowʔ 'to die young', 懷:gruul 'to return', 靡:mralʔ 'to fall over', 靖:zleŋʔ 'to devise', 退:nhuubs 'to retreat', 順:Gljuns 'to agree', 疾:zid 'to be sick', 已:lɯʔ 'to end', 舞:maʔ 'to dance', 藏:zaaŋ 'to hide', 傷:hljaŋ 'to injure', 醉:ʔsuds 'to be drunk', 困:khuuns 'to be stranded', 隱:qɯnʔ 'to hide', 更:kraaŋ 'to change', 整:tjeŋʔ 'to set in order', 殪:qiigs 'to die'.
DEADJECTIVAL VERBS	明:mraŋ 'bright', 平:breŋ 'peaceful', 固:kaas 'solid', 利:rids/rils 'beneficial', 正:tjeŋs 'correct', 羸:rol 'thin and weak', 怠:l'ɯɯ/ʔ 'idle', 深:hljum 'deep', 新:siŋ 'fresh', 寧:neeŋ 'peaceful', 安:qaan 'peaceful', 危:ŋrol 'dangerous', 綏:snul 'peaceful', 弱:njewG 'weak', 緩:G^{w}aanʔ 'slow', 重:doŋʔ 'heavy', 淫:lɯm 'excessive', 柔:mlju 'gentle', 薄:baag 'weak', 勤:gɯn 'laborious', 老:ruuʔ 'laborious', 好:qhuus 'amicable', 厚:gooʔ 'rich', 善:djenʔ 'good', 亂:roons 'confused', 驕:krew 'arrogant', 甘:kaam 'sweet', 厲:m·rads 'sharp', 匱:gruls 'lack', 乏:bob 'lack', 豐:phuŋ 'full', 虛:qha 'empty', 多:ʔl'aal 'numerous', 瘠:zeg 'thin and weak', 肥:bɯl 'fat', 闕:khod 'empty'.
DENOMINAL VERBS	主:tjoʔ 'master', 序:ljaʔ 'order', 兆:l'ewʔ 'omen', 丹:taan 'red', 服:bɯg 'dress', 衣:qɯls 'dress', 質:tids 'hostage', 毒:duug 'poison', 館:koonʔ 'hotel', 文:mɯn 'literature', 墨:mlɯɯg 'black', 本:pɯɯnʔ 'origin', 臣:giŋ 'liege man', 辱:njog 'disgrace', 恥:nhɯʔ 'shame', 長:taŋʔ 'senior', 後:Gooʔ 'rear', 外:ŋoods 'outside', 始:hljɯʔ 'beginning', 息:slɯg 'breath', 宦:groons 'officer', 室:hlig 'family', 火:qh^{w}oolʔ/hw-uulʔ 'fire', 水:qh^{w}ljiʔ 'water', 官:koon 'official', 禍:gloolʔ 'disaster', 介:kreeds 'armor', 東:tooŋ 'east', 南:nuum 'south', 北:pɯɯg 'north', 冠:koon 'hat', 貳:njis 'two', 壹:qlig 'one'.

It can be gathered from Table 1 that archaic Chinese displays a rich causative alternation with a great variety of verbal forms ranging from base verbs to dead-

jectival and denominal verbs. The causative alternation in *Zuo Tradition* adopts exactly the same verbal form for both causative and anti-causative variants, as shown in (4–6), in which the base verb 蕩:l'aaŋʔ 'to swing', the deadjectival verb 弱:njewG 'weak', and the denominal verb 服:buɡ 'dress' in both variants take identical forms.

(4) a. 而 **蕩** 王 心 焉。 （莊公四年）
and swing Lord heart SFP
Context:[11] refer to the context of sentence (4b). This sentence is the reply of Deng Man, "Your fortune, king, is at its end! Surely the royal ancestors know this. Thus, as you approach a military affair and are about to issue a great command, 'they make your heart unsteady about it.'"
(Lord Zhuang 4)
N.B.: "蕩" is used as a causative meaning 'to make … swing', which is extended as 'to make … unsteady' given the context. (SFP stands for sentence final particle.) (N.B.: Nota bene)

b. 余 心 蕩。 （莊公四年）
my heart swing
Context: King Wu of Chu issued spears to the troops so that they could attack Sui. When he was about to begin a ritual fast, he entered his home and said to Deng Man, 'My heart is unsteady.' (Lord Zhuang 4)
N.B.: "蕩" is used as an anti-causative meaning 'to swing', which is extended as 'to be unsteady'.

(5) a. **弱** 其 國 （僖公七年）
weak his domain
Context: Guan Zhong tries to persuade the Lord of Qi from accepting the proposal of Zihua, the prince of Zheng. Guan Zhong says, "Zihua seeks the intercession of a great domain 'to weaken his own domain', he will not escape disaster." (Lord Xi 7)
N.B.: "弱" is used as a causative meaning 'to cause … to be weak', which is extended as 'to weaken'.

11. All the examples illustrating causative alternation taken from *Zuo Tradition* will be provided with adequate contexts adopted from Durrant et al. (2016) so as to be better understood, within which the translations of the example sentences will be highlighted via single quotation marks.

b. 王 **弱**, 令尹 強 （昭公元年）
king weak chief minister strong
Context: In a feast with the Prince of Chu, a Jin official sees further signs that the chief minister intends to take control of Chu. The Jin official said to Shuxiang, "The chief minister presents himself as king. What will come of it?" Shuxiang replied, "'The king is weak and the chief minister is strong.' He is capable of it." (Lord Zhao 1)
N.B.: "弱" is an adjectival predicate in this case meaning 'in a state of being weak'.

(6) a. **服** 其身, 則衣之純 （閔公二年）
dress his body and wear him unmixed color
Context: The ministers of Jin discuss the meaning of two objects, namely the clothes and the pendant, the prince of Jin gives to his son as the latter goes off to battle. Hu Tu said, "Clothes are emblems of the body's status. Therefore, 'when dressing the body, one should wear unmixed colors…'" (Lord Min 2)
N.B.: The denominal "服" is a causative meaning 'to make someone wear dress'.

b. 盛 **服** 將朝 （宣公二年）
fully dressed will go to court
Context: The Lord Ling of Jin loathed Zhao Dun and sent Chu Mi to murder him. When Chu Mi went just before sunrise, 'Zhao Dun was fully dressed in official robes and was about to go to court'. (Lord Xuan 2)
The denominal "服" is used as an anti-causative predicate meaning 'to wear dress'.

Some of the words listed in Table 1 do involve phonological changes as recorded in previous studies. Nonetheless, what gives rise to the phonological changes does not have a direct association with causative alternation as shown in Footnote 8, these words are thus saved for further discussion instead of being excluded. For a brief summarization and illustration of these words, please refer to the Appendix. For the sake of comprehensiveness, this study further checks against the phonetic notation from Lu Deming's *Jingdian Shiwen* (《經典釋文》). Twenty-seven words[12] are notated the same *fanqie*[13] phonetic for both causative and anti-

12. These 27 words are: 渝:lo, 長:taŋʔ, 降:kruuŋs, 覆:phug/ɯg, 閱:prigs, 乘:ɦljuŋ, 猾:gruud, 墮:l'oolʔ, 替:thiids, 稅:hljods, 隊:l'uuds, 陳:l'iŋ, 隕:Gunʔ, 殪:qiigs, 衣:quls, 掉:deewGs, 質:tids, 置:gruls, 冠:koon, 瘠:zeg, 老:ruuʔ, 見:geens, 重:doŋʔ, 慆:lhuu, 贏:rol, 張:taŋ, 好:qhuus.

13. The *fanqie* method generalizes the formula to "Read X as A+B", with the understanding that X has the same initial consonant as A, and that it has the same tone and final as B. (Wang 2016: 167)

causative variants; while all the others are left unnotated for the two variants, which indicates a default notation for both. In what follows, three aspects concerning these 157 verbs will be further scrutinized so as to uncover the problems archaic Chinese might bring to bear on the current analyses of causative alternation concerning the four questions raised in § 1. These three aspects are (i) the verbs that participate in the causative alternation, (ii) the behaviors of denominal and deadjectival verbs, and (iii) the interaction of causatives with the other variants, such as agentive, unaccusative, unergative, and putative.

3. Challenges to the current analyses

A closer scrutiny of the data further reveals three interesting phenomena as shown below:

a. Besides the base verbs that are generally witnessed in causative alternation in other languages – such as 止:tjɯʔ 'to stop', 合:guub 'to close', 煩:ban 'to worry', etc. – a mass of denominal verbs also participate in such alternation, such as 主:tjoʔ 'master', 質:tids 'hostage', and 恥:nhɯʔ 'shame', etc. The data also show a selectiveness regarding which argument of the verb could undergo denominalization. Specifically, the data show a close relationship between the verb and its internal argument among all arguments of the verb in question, such as the external argument, dative, or oblique argument. The only argument that can undergo denominalization and become a verb is the internal argument of the verb, which can be denominalized into either an anti-causative or a causative variant.
b. Numerous verbs that are typically absent from causative alternation are observed in *Zuo Tradition* as active participants in such alternation. Examples include verbs of motion in a lexically specified direction – 降:kruuŋs 'to descend', 起:khlɯʔ 'to rise', 登:tɯɯŋ 'to ascend', 靡:mralʔ 'to fall over', 隊:l'uuds 'to fall', 隕:Gunʔ 'to fall', 興:qhɯŋ 'to rise', 作:ʔsaags 'to rise', and 落:g·raag 'to fall', etc. – and verbs of coming into or going out of existence: 卒:ʔsud 'to die', 殪:qiigs 'to die', 夭:qrowʔ 'to die young', 存:zluun 'to exist', etc. There are also a number of unergative – causative alternation cases in the data, such as 行:graaŋ 'to walk', 乘:ɦljɯŋ 'to ride', 步:baas 'to walk', 舞:maʔ 'to dance', 疾:zid 'to be sick', and 朝:r'ew 'to visit the court', etc.
c. The causatives interact actively with agentives and putatives, which gives rise to ambiguity at the surface. Traditionally, causative alternation only has two variants: namely, causative and anti-causative. Data from *Zuo Tradition* show that two-place transitive verbs that normally denote agentivity or putativity,

such as 乘:ɦljɯŋ 'to ride', 濟:ʔsliils 'to aid', and 恥:nhɯʔ 'to shame', can also render both agentive/putative and causative variants as having two sets of theta roles. Furthermore, the same [V+DP] form may be interpreted as either a causative, a putative, or an agentive variant, which cannot be differentiated from the surface form, as will be shown in § 3.3.

In what follows, I shall first illustrate these observations via concrete examples and further specify the problems they may give rise to when considered in the light of current analyses of causative alternation.

3.1 The behavior of denominal verbs

Denominal verbs are extremely productive in archaic Chinese, as shown in this sub-section and in § 3.3. First, we need to know what kind of nominal can undergo denominalization and its semantic interpretation.

(7) a. **服** 其身, 則衣之純 (閔公二年)
dress his body and wear him unmixed color
(a repetition of (6a))
Context: The ministers of Jin discuss the meaning of two objects, namely the clothes and the pendant, the prince of Jin gives to his son as the latter goes off to battle. Hu Tu said, "Clothes are emblems of the body's status. Therefore, 'when dressing the body, one should wear unmixed colors…'"
(Lord Min 2)

b. 歸之而**質**其大子 (僖公十五年)
return him and hostage his heir apparent
Context: The high officers of Qin requested that the Prince of Jin be brought into the capital. Gongsun Zhi said, "'If you send him home but take his heir apparent hostage', you are certain to win very favorable terms.
(Lord Xi 15)

c. 晉人使陽處父盟公以**恥**之 (文公二年)
Jin leader make Yang Chufu alliance lord to shame him
Context: The ruler of Lu is humbled by Jin by being put on a par with a Jin high officer in the covenant ceremony. In summer, 'the Jin leaders sent Yang Chufu to swear a covenant with our lord in order to shame him.'
(Lord Wen 2)

d. **衣**之龙服 (閔公二年)
dress you motley clothes
Context: This sentence shares context with (7a), and this is what Hu Tu said to the son of the Jin prince: "'You have been dressed in motley clothes', which is to keep you physically at a distance." (Lord Min 2)

The denominal verbs listed above show a variety of semantics. The 服:bɯg 'dress' in (7a) means 'to cause someone to **have** dress', 質:tids 'hostage' in (7b) means 'to cause someone to **be** the hostage', while 恥:nhɯʔ 'shame' in (7c) has a meaning of 'to cause someone to **experience** shame'. In other words, the three sentences are interpreted in diverse ways, which do not involve a fixed verbal semantics. Moreover, there is no clue from the surface form to tell which verb to take and where the difference lies among these denominal verbs. Nonetheless, the difference can be formalized by following the light verb analysis proposed by Larson (1988) and later developed by Hale & Keyser (1991; 1993), Chomsky (1995; 1999), and Lin (2001), among others. Lin (2001: 77) defines light verbs as predicates of aspects of eventualities. "Syntactically they are verbs, with or without phonetic realization; semantically they are predicates of aspects that compose eventualities." It will be assumed, by following Hale & Keyser (1993) and Ramchand (2008), that the complement position of an empty verbal head is filled by a nominal material as shown in (8),[14] and that denominal verbs arise from incorporating of the nominals from complement position into the head via conflation as will be discussed later.

(8) a. $[_{vP1}$ CAUSE $[_{vP2}$ the body $[_{v2'}$ HAVE $[_{N}$ bɯg (dress)]]]]
b. $[_{vP1}$ CAUSE the prince $[_{vP2}$ $[_{v2'}$ BE/BECOME $[_{N}$ tids (hostage)]]]]
c. $[_{vP1}$ CAUSE him $[_{vP2}$ $[_{v2'}$ EXPERIENCE $[_{N}$ nhɯʔ (shame)]]]]
d. $[_{vP1}$CAUSE$[_{vP2}$him$[_{v2'}$HAVE$[_{N}$ qɯls (dress)]] BY variegated dress]]

What needs attention here is the fact that this operation of denominalization is rather selective with regard to which argument of the verb can participate. To wit, only the internal argument, namely the theme, of the lower light verb – for example, HAVE, BE/BECOME, and EXPERIENCE – can undergo denominalization and become a verb. For instance, take sentence (7d). This sentence consists of nothing but three nominals – namely 衣:qɯls 'dress', 之 'him', and 龙服 'motley clothes' –

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14. The semantic decomposition can be justified by the fact that corresponding semantic verbs are found in archaic Chinese with the same meaning. To wit, the syntactic light verbs, such as HAVE and DO, can be realized explicitly as shown below:

i. 晉 大子 圉 **為** 質 於秦 (僖公十七年)
Jin heir apparent Yu become hostage at Qin
Lit. 'The heir apparent Yu of Jin became a hostage in Qin.' (Lord Xi 17)

ii. **有** 衣 者 亦 衣， 無衣 者 亦 衣。 (戰國策)
have clothes those who also clothes$_{v}$ no clothes those who also clothes$_{v}$
Lit. 'Those who have clothes are given clothes, and those who have no clothes are also given clothes.' (Intrigues of Warring States)

為 (be/do) in (a) and 有 (have) in (b) correspond to the light verbs as decomposed in (8b) and (8d), which can be regarded as evidence for the existence of these syntactic light verbs.

which can be interpreted as "to cause him to have clothes by 'giving him) motley clothes." By taking Reinhart's Theta System, 衣:qɯls 'dress' is a theme [–c –m] cluster selected by the light verb HAVE, 之 'him' is a benefactor [–c] role, while 龙服 'motley clothes' is the argument of a prepositional phrase with an empty preposition head BY. Neither the benefactor nor the oblique argument can be denominalized in archaic Chinese, which shows an asymmetry of the internal argument of a verb with the other arguments and, in turn, a close relation of the internal argument with the verb. This might be a problem for treating each verb-concept as corresponding to one thematic structure, which includes all the arguments a verb is associated with, as proposed by Levin & Rappaport Hovav (1995; 2005) and Reinhart (2002). Suppose that all arguments are included in the verb-concept; why can the other arguments – for example, the external or the oblique ones – not undergo denominalization? Thus, one possibility is that the argument that can actually be denominalized is the real argument of the verb, and a verb can select this argument only. This is what Rappaport Hovav & Levin (2012) proposed: i.e., a verb is basically monadic, lexically selecting the theme argument only, which basically fits the linguistic facts of archaic Chinese as observed here. A subsequent question of this approach would be the assignment of the other arguments: i.e., how are they introduced into the syntax? I shall address this question in the next subsection, where more data will be incorporated.

Another interesting fact about examples (7a–c) is that none of the light verbs associated with these denominal verbs are the same – namely, HAVE-bɯg, BECOME-tids, and EXPERIENCE-nhɯʔ – which seems rather *ad hoc*. Thus, even if the denominal verb is listed as an individual entry in the Lexicon, it can by no means be listed via a concrete form of the light verb. Rather, it is listed as [$_{v}$ N], in which the v is an abstractive form with the most elementary semantics. However, I maintain my reservations about incorporating the light verb – a place holder in the syntactic structure – into the Lexicon due to a lack of evidence proving the existence of such abstract denominal verbs as a lexical entry. Alternatively, we can assume that the denominal verbs are not listed as lexical entries in the system of concept; rather this is a result of syntactic computation. What allows this operation is the existence of the light verb in syntax. I shall provide a detailed elaboration in §4. Now, let us discover more details about the behavior of causative alternation in archaic Chinese.

3.2 The interaction between causative alternators and non-alternators

Levin & Rappaport Hovav (1995) point out that some intransitive verbs that are said not to participate in the causative alternation do have causative uses. These so-called non-alternators actively participate in causative alternation in archaic

Chinese, ranging from verbs of motion in a lexically specified direction, verbs of coming into or going out of existence, to verbs of volitionally or internally-caused actions as illustrated via the three Examples in (9).

(9) a. 實 落 vs. 我 落[15] 其 實
fruit fall vs. I fall its fruit
Lit. 'The fruit falls. vs. I knock down their fruit (=I made their fruit fall).'
(Lord Xi 15)

b. 皮 之 不 存 vs. 齊桓公 存 三 亡 國
skin conj. not exist vs. Lord Huan of Qi exist three falling domain
Lit. 'The skin does not exist (Lord Xi 14) vs. Lord Huan of Qi preserved three falling domains (=made three falling domains exist).' (Lord Xi 19)

c. 撞 鍾 舞 女。vs. 使 諸大夫 舞。
strike bell dance girl vs. make all high officer dance
Lit. 'to striking bells and to make girls dance[16] (Lord Zhao 20) vs. He made the high officers dance.' (Lord Xiang 16)

落:g·raag in Example (9a) is a verb of motion in a lexically specified direction, 存:zluun in (9b) is a verb of coming into or going out of existence, and 舞:maʔ in (9c) is an unergative verb of volitionally or internally-caused action, all of which should not be observed in causative alternation. Reinhart & Siloni (2005) argue for a decausativization approach by assuming the causative variant as the base form, from which is derived the anti-causative variant. Thus, the unergative nature of verbs like 舞: maʔ 'to dance', together with the decausativization operation, rules out the possibility of causative alternation from unergative verbs, which is apparently against our observation in the archaic Chinese data. Now, let us turn to "pure" unaccusative verbs as illustrated in (9a–b). McKoon & Macfarland (2000); Wright (2002), as well as Rappaport Hovav & Levin (2012) already noticed that some "pure" unaccusative verbs do allow causative uses, although with a narrow range of subjects. For instance, the verb "blossom" is regarded as a non-alternator, but it can appear in "*Early summer heat blossomed fruit trees across the valley*." (Wright 2002: 341). To note, the subject is a natural force causer, but it cannot be an agent or an instrument. It is thus proposed that

15. The former could be regarded as a result of the latter according to the context (Lord Xi 15): The year being now in autumn, *we will knock down their fruit* and seize their timber. That is how we will prevail. If *the fruit falls* and the timber is lost, what would one expect but defeat?

16. This is used to describe a ruler who allows himself to act freely in pleasure-seeking, i.e., a profligate ruler indulges his desires and satisfies his private wishes with lofty pavilions and deep pools and *with the striking of bells and girls' dancing*. The two sentences in (9c) illustrate two ways of realizing causative event in archaic Chinese. The former uses light verbs to build up event structures; while the latter uses explicit verb 使 'to cause' for the same event structure.

the choice of theme argument determines whether the eventuality described is understood as being internally or externally caused, and that in turn determines the range of available cause subjects. Be that as it may, the selection of the theme does not seem to play a decisive role in the predicate's ability to further select an argument in archaic Chinese, as shown in (9a). Specifically, the theme of the verb 落:g·raag is the same for the anti-causative variant and the causative variant, i.e., "the fruit"; however, the causative variant further selects a causer. This fact denies the proposal from Rappaport Hovav & Levin (2012). If the theme argument is not the determinant for the introduction of an extra argument, the burden is once again passed onto syntax.

To explain these rebellious behaviors of non-alternators we first need to know why they generally do not participate in causative alternation. A closer look at these verbs shows that they are either verbs of volitionally caused actions (e.g., 行:graaŋ 'to walk', 乘:ɦljɯŋ 'to ride'), 朝:r'ew 'to visit the court') or verbs of internally caused motion (e.g., 落:g·raag 'to fall'), 卒:ʔsud 'to die', 作:ʔsaags 'to rise'). By taking Reinhart's binary features of theta roles, verbs in the former case select a [+c +m] cluster with both a cause of change (i.e., action) and a mental state (i.e., volition); whereas verbs in the latter case repel a [+c] cluster due to the internally caused nature. Thus, they are not supposed to be compatible with a causative variant due to the conflict in the features of the theta roles. Yet, such incompatibility does not hold in *Zuo Tradition*, which demonstrates an active participation of non-alternators in causative alternation with a rather legible causative vs. anti-causative correspondence. By comparing this correspondence, it is evident that the difference indeed lies in the [±c ±m] features. In all the causative cases with unergative verbs, the post-verbal arguments all lack the [+c +m] feature; whereas the same arguments, when they appear in anti-causative cases, somehow all acquire such a feature. Take, for instance, (10); the argument "inhabitant" does not volitionally take the action of "visiting the court," nor is the mental state of the inhabitant in question relevant to the action, which indicates that a [–c –m] cluster is selected by the verb 朝:r'ew 'to visit the court'. On the contrary, the only argument in the unergative sentence – i.e., "the Liege of Zheng" – deliberately chooses not to visit the court, which endows this argument with a [+c +m] cluster. Hence, the question is, what gives rise to such a discrepancy? It cannot be the verb itself; yet again, the burden is passed to syntax. Specifically, because there is no distinction between the causative variant and unaccusative/unergative variant concerning the form of the verb, what renders the difference in features of the theta roles might also be the "invisible" light verb.

(10) 鄭伯 不 **朝** vs. **朝**[17] 國人
the Liege of Zheng not visit his court vs. visit his court inhabitant
Lit. 'The Liege of Zheng (deliberately) no longer visited his court. (Lord Huan 5) vs. Hold a court audience with the inhabitants of the capital (=to make the inhabitants of the capital visit his court)' (Lord Xi 15)

One possibility is that the argument of the unergative verb is also lexically selected by the verb in the conceptual system, which is then realized via merger in syntax. In this regard, there is no difference between unaccusative verbs and unergative verbs in the Lexicon. To wit, it is possible that a root √, when it enters the computational system and merges with a V head, always becomes a one-place verb in archaic Chinese, which takes only one argument and maps externally with this argument. This is consistent with Perlmutter's (1978) hypothesis, i.e., the distinction between unaccusativity and unergativity is intended to refer to semantic predicates rather than to verbs having a certain phonological shape. The difference concerning the semantics of the argument is given rise to by a further merger of the predicate with different light verbs in the process of syntactic computation: i.e., extra arguments result from further incorporation with light verbs in archaic Chinese. Henceforth, I shall call the one and only argument lexically selected by the verb THE SOLE ARGUMENT and provide more evidence for this argument by considering the agentive and putative cases. To continue my light verb assumption with regard to the behavior of causative alternation in archaic Chinese, I assume that, excepting the sole argument, all the other arguments are selected syntactically by light verbs. For one thing, whether the anti-causative verb can take another argument depends on if the verb further incorporates with a light verb. For another, the question of which extra argument is taken also depends on the light verb and the eventuality it associates with. Now, I shall present one more issue before presenting the whole picture of my proposal.

17. The contexts for a better understanding of the contrast between these two sentences are provided below:
Context for the former sentence: The king had stripped political authority from the Liege of Zheng, which makes the Liege of Zheng stop visiting his court.
Context for the latter: The Prince of Jin sent Xi Qi to give a report to Lü Sheng and also to summon him to Qin. Lü Sheng instructed Xi Qi in what to say, "*Hold a court audience with the inhabitants of the capital* and distribute rewards in the name of the ruler."

3.3 Interaction of causative with agentive and putative variants

Causative alternation in archaic Chinese not only involves unaccusative and unergative predicates, but also transitive predicates with various realizations of their external arguments, as shown in the following three sets of examples.

(11) a. 使 公子 彭生 **乘** 公。 （桓公十八年）
make Gongzi Pengsheng ride lord
Context: Ceremonial toasts were offered to our lord. 'The Qi ruler had Gongzi Pengsheng help our lord into a carriage (=to cause the lord to ride)', and our lord expired in the carriage. (Lord Huan 18)

b. 己 皆 **乘** 乘車。 （襄公二十四年）
themselves both ride regular chariot
Context: The two officers, Zhang Ge and Fu Li, made light of Yuan Shequan. They were inside their tent and made Yuan Shequan sit outside and gave him his meal only after they had eaten. They had him drive a combat chariot and proceed while 'they themselves rode in a regular chariot'.
(Lord Xiang 24)

(12) a. a repetition of (7c)
晉人 使 陽處父 盟 公 以恥 之
Jin leader make Yang Chufu alliance lord to shame him
Lit. 'The Jin leaders sent Yang Chufu to swear a covenant with our lord in order to shame him.' (Lord Wen 2)

b. 焉 得 **恥** 之 （昭公十六年）
how get shame him
Context: Fuzi said, "That Kong Zhang failed to take his place is a disgrace for you." Zichan said, "This place has been his family's for several generations, and each generation has maintained the traditional duties, yet he has apparently forgotten its location. 'Why should this be a disgrace for me (=feel shame for him)?'" (Lord Zhao 16)

c. 楚 **恥** 無功 而 疾 戰 （昭公二十二年）
Chu shame achieve no merit and hasten battle
Context: 'Chu should hasten to do battle out of shame at having achieved no merit (=take having achieved no merit as a shame)'. It would be better to expel the Hua forces, turning this into Chu's achievement.
(Lord Zhao 22)

(13) a. （秦）以 貪 **勤** 民 （僖公三十三年）
(Qin) with greedy laborious people
Context: Jin sees an opportunity to strike at Qin by attacking the Qin army that was withdrawing from the abortive assault on Zheng. Xian Zhen of Jin said, "Qin has gone contrary to Jian Shu's advice, and 'out of greed has made its people toil (=cause its people to be laborious out of greed)'. Heaven is giving us its support. (Lord Xi 33)

b. 令尹 其 不 **勤** 民 （僖公二十八年）
Chief minister him no laborious people
Context: The chief minister would not listen to Rong Huang's advice, who then came out and said, "It will not be the gods who defeat the chief minister. 'The chief minister does not toil for the people (=to be laborious for his people).' That man defeats himself!" (Lord Xi 28)

The two sentences in (11) involve a base transitive verb 乘:ɦljɯŋ. (11a) is the causative variant meaning "to CAUSE the lord to DO ride" (which is extended as to help our lord into a carriage). The external argument "Pengsheng" is a [+c] cluster, and the post-verbal argument "the lord" is a [+c +m] cluster since "to ride" is a volitional action that must be initiated by "the lord" himself. "乘: ɦljɯŋ" in (11b) is used as a transitive verb with a direct object "regular chariot". To note, when used causatively, the transitive verb stops taking internal argument, which is attributed to the consideration of Case as will be discussed in §4. The sentences in (12) further complicate the situation by taking the putative reading into the same surface form. If we take the light verb approach here, the denominal verb 恥: nhɯʔ in (12a–c) is the sole argument of a light verb in syntax, and that is the only similarity among these sentences – they do not even share the same light verb to which they are incorporated. (12a) means "to CAUSE him to EXPERIENCE shame", which takes an external [+c] argument and a [–c +m] argument "him", typically known as the experiencer. (12b) means "to EXPERIENCE shame FOR him," and (12c) means "to TAKE having achieved no merit AS shame." (12b) and (12c) take a [–c +m] external argument, i.e., the experiencer; and "him" in (12b) is a [–c] role; whereas "having achieved no merit" in (12c) is a [–m] role.

Similar ambiguity is also observed in the deadjectival case, as shown in (13a–b). From appearance, (13a) and (13b) seem to be of the same predicate; this, however, is not the case. (13a) means "to CAUSE its people to BE laborious," in which there is an external [+c] argument "the Lord of Qin" and an internal [–c –m] (theme) argument, i.e., "people". However, (13b) means "to BE laborious FOR his people," which is an agentive variant whose external argument is a [+c +m] cluster and "people" in this sentence is a [–c] cluster; i.e., it is a benefactor headed by an empty preposition FOR. All these examples show that the same predicate form in archaic Chinese may be interpreted as either causative, putative, or agen-

tive, which cannot be differentiated from the appearance and thus causes problem for previous analyses.

Now, let us turn back to the first question from § 1: i.e., what is conceptualized in the Lexicon? If we take the full argument approach as advocated by Levin & Rappaport Hovav (1995; 2005) and Reinhart (2002; 2016), the Lexicon of 乘: ɦljɯŋ 'to ride' should accommodate at least two sets of argument structures to entertain both the causative and agentive variant. The case for the denominal verb 耻: nhɯʔ 'shame' would be even worse; however, there is no evidence of the denominal verb being conceptualized in the Lexicon with its own argument structure in the first place, as discussed in § 3.1. Then, what about the choice of no theta role in lexical entry? As has been pointed out for the denominal case, there is a clear bond between the verb and its "internal" argument. The three variants in (12) differ only in the light verb involved – the theme 耻: nhɯʔ 'shame' realized as the denominal verb is kept constant. Hence, to conceptualize the one and only argument in the Lexicon of a verb seems to be the only feasible choice. By now, it should also be plausible to assume that it is the light verb that enables us to disambiguate the seemingly identical structures in archaic Chinese. Therefore, I agree with Grohmann's (2003) proposal that thematic relations are created (at least partially) in the θ domain, part of the derivation where thematic relations are created, which corresponds to any implementation of light verbs. I further propose that it is the light verb that assigns this "external" theta-role as its sole argument. Thus, all verbs will be treated uniformly in my analysis of causative alternation in archaic Chinese as a one-place verb, which takes only one argument, be it a lexical verb or a light verb. In what follows, I shall present a more comprehensive proposal based on the phenomena observed from the data presented in this section.

4. A proposal to causative alternation in *Zuo Tradition*

Causative alternation in archaic Chinese demonstrates the following phenomena: First, it shows that the internal argument is the only argument that can undergo denominalization and become a verb, which can further enter causative alternation with different semantic interpretations. This behavior rules out the possibility of conceptualizing the full thematic structure of a verb in the Lexicon as proposed by Reinhart (2002), as well as the proposal of lexicalizing a nominal into an individual verb with a fixed set of arguments, as claimed by Hale & Keyser (1993). Second, I show that both unergative verbs and so-called "pure" unaccusative verbs can enter causative alternation, and the choice of the causer argument does not depend on the theme argument chosen by the verb. This allows us to treat these two kinds of verbs alike, i.e., they both take one and only one argu-

ment, and their further ability to select another argument is endowed by the syntax. Third, data from *Zuo Tradition* also presents an intertwined relation among causative, agentive, and putative variants. The same surface manifestation (or the same linear relation between the verb and the post-verbal argument) may turn out to bear fairly different semantic interpretations, which can only be made clear with the explication of the light verbs involved in these variants. This helps us to exclude, once again, the possibility that a full set of theta roles are listed in the Lexicon of the verbs. Because these previous analyses cannot accommodate archaic Chinese causative alternation, I revert to the four questions raised at the beginning of this paper and provide my own answers to them based on linguistic facts from the previous sections.

I propose that eventuality is built up in two steps: specifically, the realization of the eventuality that is conceptualized in the verb via merging with its sole argument, and the eventuality identified via the light verbs in syntax which introduces its own corresponding theta role. I follow Reinhart (2002, 2016) by treating theta roles as binary features, namely [±c ±m], which have an impact on both the syntactic and semantic components. This binary system helps us to discern the subtle differences between arguments in a variety of variants in the causative alternation[18] witnessed in archaic Chinese. I propose that a verb is basically monadic, lexically selecting one argument with either a [−c −m] or [−c +m] cluster only. I further argue that the merger between the verb and this sole argument in syntax is the realization of the eventuality conceptualized in the Lexicon of the verb; further merger is then determined by the event structure, which is reflected in both semantic interpretation and syntactic computation. To wit, there is no difference between unergative, unaccusative, agentive, putative, or causative for lexical roots √ in the concept system. The difference concerning the semantics of the argument arises from a further merger of the predicate with different light verbs: i.e., the extra theta role is a result of further incorporation of the predicate with light verbs in syntax. To put it differently, I argue that the light verb can also select its own theta role in syntax by taking the ninth logically possible theta cluster from Reinhart's System, the empty [Ø] cluster in my proposal, which is the theta role of an underspecified light verb as will be specified shortly. It can be assigned value in syntactic computation in accordance with the actual eventuality realized in the syntax. In this way, the light verb is the same as any lexical verb in that it assigns one unique theta role with (the most elementary) semantic content. The existence of the light verb can accommodate the empty [Ø] cluster passed from the concep-

18. Causative alternation is used in its broadest sense here, which incorporates the alternation of causative with all other semantic relations including putative, experiential, agentive, unaccusative, and unergative variants.

tual system. The uninitiated light verb is only a placeholder with this empty cluster, whereas a specific light verb value is determined by the eventuality that enters syntax. This is an intuitive way to account for wild semantic interpretations in the disguise of a superficially identical verbal form as observed in *Zuo Tradition*.

The rest of the paper will be focused on proving the legitimacy of this proposal, before which I would like to first justify my choice to adopt Reinhart's system; i.e., why do I choose [±c ±m] as the binary features of theta-role? First, the [c] feature (to cause change in an event) and [m] feature (the mental state of the participant in the event) are the two essential aspects of eventuality. The former focuses on the objective relationship – i.e., every event happens for a reason and is either internally or externally caused – while the latter specifies the subjective initiative of the participant in an event. Thus, these two features can be regarded as the two basic features that any event depends on, the choice of which is eventuality-oriented. This is the core concept of the Theta System proposed by Reinhart. What calls for special attention is that the relation between the event and the mental state of the participant in question can be determined at the lexical level: i.e., the semantics of the verb may contain the mental state of its argument and the event it conceptualizes – for instance, psycho-verbs such as 驚:kreŋ 'to shock', 畏:qul/s 'to fear', 煩:ban 'to worry', etc. But the cause of the event, on the other hand, cannot be fully determined until a complete eventuality is built up in syntax for archaic Chinese. That is to say, the sole argument that the verb selects in its conceptual system cannot be any cluster with the [+c] feature (i.e., the causer, the agent, or the instrument), which is further assigned by the light verbs CAUSE, DO or USE in syntax. Thus, it is possible for us to explain why there is causative vs. agentive alternation in *Zuo Tradition*. Hence, it leaves only the [−c −m] and the [−c +m] cluster (i.e., the theme and the experiencer) as legitimate candidates for a verb to select as its sole argument, which fits the linguistic facts we have observed. This distinction between [c] and [m] also explains the fact that the sole argument of the unergative verb has a stronger autonomy in an unergative variant than in a causative one.

Now let us turn back to the main proposal of mine, which will be justified by addressing (i) the argument structure and argument structure alternations within the proposed framework, (ii) the syntax of the light verbs and the building up of eventuality, as well as (iii) the derivation of denominal verb from the internal argument of the light verb to the main verb. I argue that the merger of a root √ with a V head always results in a one-place verb, and that all verbs merge externally with its only argument in archaic Chinese, which is the most economic operation. Thus, there is no difference between the unergative, unaccusative, and agentive, or causative in this regard. The difference concerning the semantics of the argument is given rise to by a further merger of the predicate with different

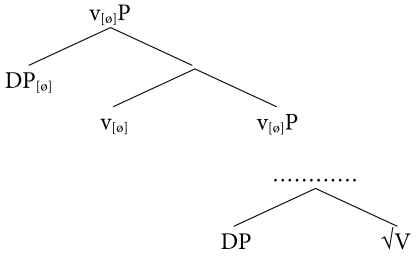
light verbs in syntax: i.e., extra argument results from further incorporation with light verbs. This argument actually follows the line drawn by Marantz (1984); Harley (1995); Kratzer (1996), as well as Rappaport Hovav & Levin (2012). What Harley (1995) argues is that a verb (even a simplex one like *hit*) must be represented in the syntax as (at least) two separate heads, the lower one of which selects the internal argument; while the upper one of which selects the external argument. The two, when combined via head-movement, are realized as one surface form, which in general fits the linguistic facts observed in § 3. Then the question shifts to how are the extra arguments syntactically introduced and furthermore how various types of eventualities are constructed syntactically?

This question is actually about the syntactic projection of arguments based on the event structure. Lin (2001); Folli & Harley (2007), and Ramchand (2008) address this question via scrutinizing the non-canonical objects in Chinese, the Italian *faire infinitif* (*FI*) causatives, as well as different verb classes in English and causativization in Hindi/Urdu. A general consensus is that phrase structures in all these languages, to a certain extent, are constructed via complementation of light verbs with substantial eventuality natures. Folli & Harley (2007), for instance, differentiate two types of vPs that the Italian *FI* light verb can embed, namely one that introduces eventualities whose initiation is not mediated by an external argument, i.e., v_{BE} or v_{BECOME}, and one that introduces eventualities whose initiation is mediated by an external argument, i.e., v_{DO} or v_{CAUSE}. The former corresponds to the unaccusative/ unergative cases; while the latter the agentive/causative variants. External arguments are licensed by different realizations of the light verb, such as CAUSE, DO, USE, etc. Then, the question that is of essence for all these analyses, mine included, is how an external argument acquires such semantic content?

I shall answer this question under Reinhart's Theta System by taking the ninth logically possible theta cluster, the empty [Ø] cluster, as the argument of an underspecified light verb. This is not a new proposal concerning the relation between the empty [Ø] cluster and the light verb because Marelj (2004) and Ackema & Marelj (2012) both argue that the empty [Ø] can occur as a verb's single theta-role, specifically in the argument structure of certain light verbs. Nonetheless, the light verb in their analyses is a semantic one, as introduced by Jespersen (1965), which refers to the verbs found in expressions such as *take a walk, give a kiss*, and *make an offer*. The term LIGHT VERB used in this paper is a Chomskyan light verb, which is merely a syntactic placeholder. A consequence would be its ability to select a theta role cluster. If it is pure syntax, can it select a theta role – even an empty one? I believe that it is possible. Since the Theta System contains theta relations of verb entries, the theta relation can be underdetermined if the verb entry is not incorporated into the system of concept, just like the light verb. Reinhart

(2016: 76) also indicates that "for the interface to be possible, each system should also contain some information that is legible to other systems. Possibly, a system can also pass on information that is not legible within that system, but is legible to others." Thus, this might suggest that light verbs do not belong in the Lexicon, or the system of concept, and that is the reason why the empty [Ø] cluster is underspecified within this system. It becomes legible only by being passed onto the computational system, where it can be assigned value via the realization of event structure in syntactic structure. Thus, light verb is no different from lexical verbs in that it takes an argument which is listed in the Lexicon with the most preliminary semantics, i.e., a [Ø] cluster. Light verb can have various realizations in syntax, to which the lexical verb merges and acquires different uses. This process also assigns a specific feature, such as [+c], [+c +m], etc., to the empty [Ø] cluster. A brief syntactic structure is presented in (14).

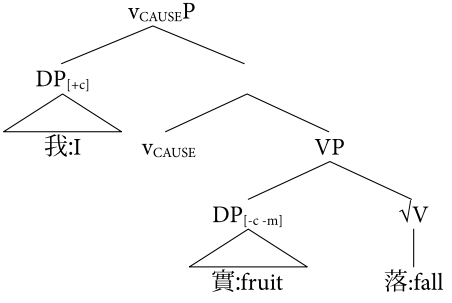
(14)



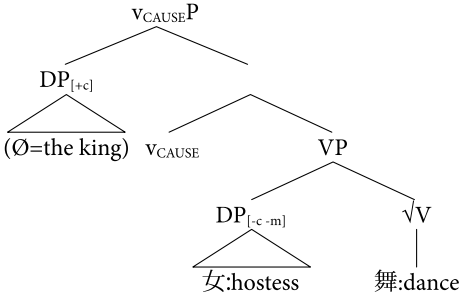
I propose a "split-VP" structure for the causative alternation in archaic Chinese by partially following Harley (1995); Folli & Harley (2007), and Ramchand (2008). The sister-to-the-verb position is a theta-position for the sole argument of the verb, i.e., the theta role of the sole argument of a verb is always assigned by that verb. I also argue that each verb – lexical or light – can assign and only assign one theta role. External arguments (such as agent or causer) are generated in the specifier position of a light verb projection, which marks the introduction of an event argument. Under this view, the computational system is rather minimalist, i.e., it is confined to external Merge and Agree. Specifically, the merger is always external given that all verbs are one-place and that the external position must always be filled. Further projection of light verbs is responsible for introducing external argument at the specifier position of the light verb head. What is interesting for this structure is what happens to the v_{CAUSE}-embedded clause and the different realization of $v_{[Ø]}P$ in (14), which gives rise to the above-observed interaction between causative and agentive, putative, unergative, as well as unaccusative variants. Now, I shall apply this tentative proposal to the data we have observed and test its legitimacy.

For causative vs. unaccusative/unergative alternation, as in (9a) and (9c), the roots √落:g·raag 'to fall' and √舞:maʔ 'to dance' first merge with a V head (√V) and become monadic verbs and lexically select a [−c −m] theme as their sole argument. The merger between the verb and its sole argument in syntax is merely the realization of the eventuality conceptualized in the Lexicon of the verb, and there is no difference between the unaccusative case and the unergative case in this regard. The two predicates further merge with a light verb CAUSE in syntax, which corresponds to the event structure of the causative variant as shown in (15a–b). The merger of the light verb with the main predicate further specifies theta feature to the empty [Ø] cluster – namely [+c] – which gives rise to a causative variant. Similarly, for the causative vs. agentive contrast, as shown in (11a–b), the monadic verb 乘:ɦljɯŋ 'to ride' first merges with its sole argument: i.e., a [−c −m] cluster, in syntax to realize its lexically conceptualized eventuality. The predicate in (11b) further merges with a light verb DO, and in turn specifies a [+c +m] cluster for its argument. The predicate thus formed is "DO-ride." As for the causative variant, the verb root first merges with a light DO in a similar way to (11b), which further merges with a light verb CAUSE in (11a), and the merger process assigns a [+c] feature to the empty [Ø]. So the predicate "乘公: ride-lord" can be interpreted as "to CAUSE-lord-DO-ride" with one lexical verb "乘: ɦljɯŋ" selecting no explicit argument, a light verb DO holding a [+c +m] agent, and another light verb CAUSE with a [+c] causer. The contrast of causativity and agentivity is illustrated in (16a–b).

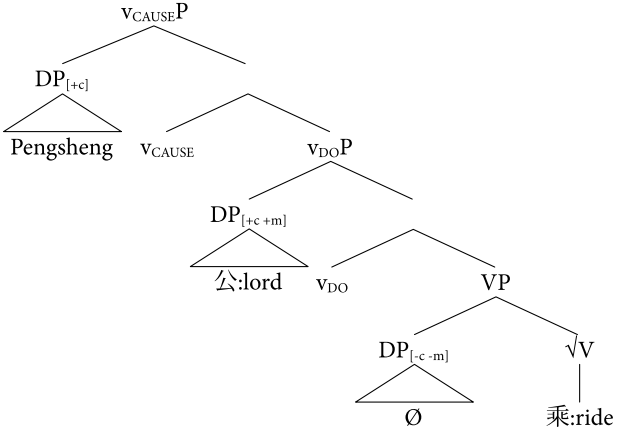
(15) a. causative variant of (9a)



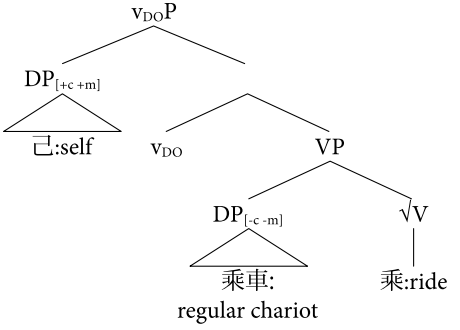
b. causative variant of (9c)



(16) a. causative variant of (11a)



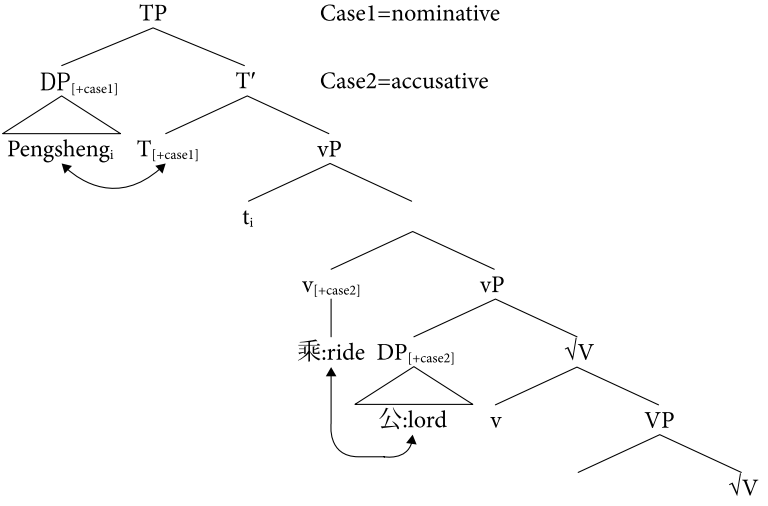
b. agentive variant of (11b)



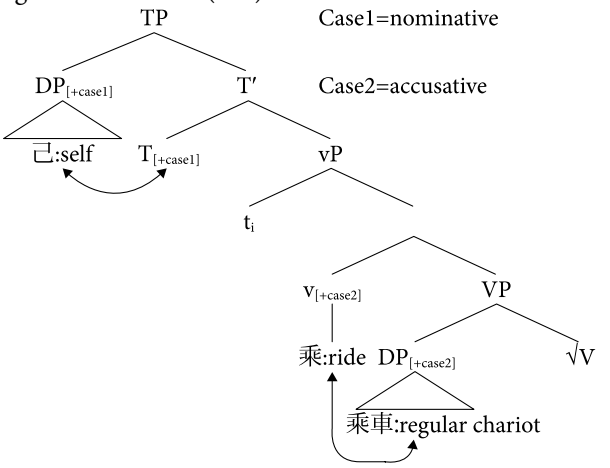
I would like to put forward the issue of Case here since the direct object, as might be noticed, is missing from the causative alternant of the transitive verb 乘:ɦljɯŋ 'to ride' in (16a), which is not incidental or a mere ellipsis if Case is taken into consideration. The interaction between causative and agentive can also be found in Italian and Japanese as discussed in Folli & Harley (2005; 2007), and Miyagawa (2001), which is structurally similar yet different from the causative variant in

Zuo Tradition as illustrated here. Take Italian *FI* causative for instance, when an intransitive verb is embedded under a causative, the single embedded argument receives an accusative case, and the matrix subject a nominative case; alternatively, when a transitive verb is causativized, the matrix subject checks nominative case, the embedded subject receives dative case, and the embedded object is marked accusative. To wit, there are three structural Case-assigning positions, namely T, causative *faire*, and the embedded vP in Italian *FI* causative construction with transitive verbs. This is where the discrepancy lies, i.e., there are only two Case-assigning positions in the causative variant of archaic Chinese, namely T and the matrix causative vP as illustrated in (16′), which is the same as the causative of intransitive case in Italian. Assuming that Case is checked after the first phase of the syntax is complete, only two arguments can be licensed by structural case in archaic Chinese causatives. Specifically, the highest light verb head is responsible for the assignment of internal structural case; and the T head is responsible for the assignment of nominative, which renders a Case-assignment relation very much alike an ECM structure.

(16′) a. causative variant of (11a)



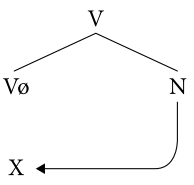
b. agentive variant of (11b)



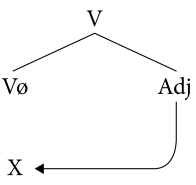
The merger with different light verbs in syntax can also intuitively explain the ambiguity we observe in archaic Chinese causative alternation. In the denominal[19] cases depicted in (12), the nominal 恥:nhɯʔ 'shame' undergoes a conflation process with light verbs of different kinds to acquire the behavior of either a causative verb (first with light verbs EXPERIENCE and forms [$v_{\text{EXPERIENCE}}$ [$_N$ nhɯʔ]], and then with CAUSE to form [v_{CAUSE} [$v_{\text{EXPERIENCE}}$ [$_N$ nhɯʔ]]], successively), an experiential verb (with EXPERIENCE: [$v_{\text{EXPERIENCE}}$ [$_N$ nhɯʔ]]), or a putative verb (with TAKE…AS: [$v_{\text{TAKE…AS}}$ [$_N$ nhɯʔ]]). It should be noted that 恥:nhɯʔ 'shame' enters the computational system as a nominal, which meets all the light verbs in further syntactic computation. As for the contrast in (13), the two superficially identical predicates are actually two very different structures, which can only be revealed via a light verb analysis. (13a) is a causative variant meaning "to CAUSE people

19. A word on the derivation of denominal and deadjective verbs should be called up here. Hale & Keyser (1993) assume a process of conflation, which involves a bare nominal and a phonologically empty verb. The conflation is a morphophonologically motivated concomitant of Merge, in which process the empty verb and its complement-position nominal fuse into a single word, and correspondingly deadjectival verb formation follows this process as shown below.

a.

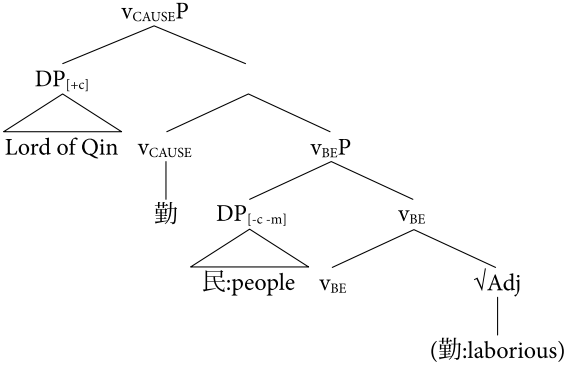


b.

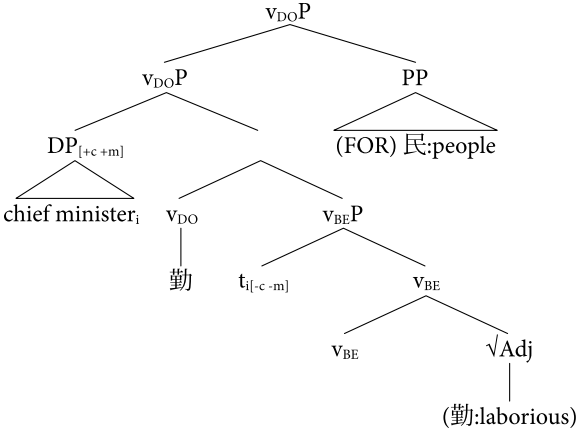


to BE laborious," where the adjectival 勤:gɯn 'laborious' first undergoes conflation with the light verb BE and turns into an deadjectival verb meaning 'BE laborious', which selects the one and only theta role "people" as its sole argument. The predicate further merges with CAUSE, whose argument "the Lord of Qin" then is endowed a [+c] feature and results in a causative reading as shown in (17a). The first merger process with the light verb BE is the same for (13b), which selects "令尹:chief minister" as its sole argument. The predicate "chief minister BE not laborious" in turn merges with another light verb DO and gains an agentive reading: i.e., the chief minister does not toil for the people. The post-verbal nominal "people" is not selected by the deadjectival verb 勤:gɯn (to be laborious) in (13b). Rather, it is a dative bearing a benefactive [–c] cluster, which is assigned by an empty preposition FOR. The contrast between the causative (13a) and the agentive (13b) is illustrated below:

(17) a. causative variant of (13a)



b. agentive variant of (13b)



To note that the sole argument of the verb, namely "chief minister", is assigned the feature cluster [−c −m] at its first merger with the verb "BE-laborious," the question is how it acquires the [+c +m] cluster as an agent in (17b)? By taking Grohmann's (2003) Prolific Domain, all the thematic relations are created in the θ domain of the computational system. The merger of the verb with its sole argument in the θ domain might not fully determine the theta-role of its argument's due to the asymmetry between the verbal semantics and the semantics of the full representation. That is, the complete theta relation can only be settled by taking the light verb, together with the argument it assigns in syntax, into consideration. Thus, the realization of the verbal eventuality (i.e., its merger with its sole argument) and the realization of the eventuality through different light verbs in the θ domain, together create the thematic relations. I thus assume that "chief minister" in (17b) acquires this new [+c +m] cluster from the light verb DO as the predicate "chief minister BE-laborious" further merges with this light verb. The involvement of the light verb DO in (17b) may explain the apparent semantic difference between "chief minister" and "people" in (17b) and (17a). To wit, they both start as the sole argument of "BE-laborious" which assigns a [−c −m] cluster to these arguments, the former then acquires a new feature of [+c +m] from light verb DO; while the latter remains [−c −m]. This acquisition is theoretically possible since what the argument acquires is a set of features, it is also necessary because only by incorporating both the eventuality of the lexical verb and the light verb can all thematic relations be created. Thus, the sole argument in (17b) is finally assigned a [+c +m] cluster traditionally known as the agent, which by the way does not violate the θ-criterion or any other constraints set upon argument structure. If this possibility can be entertained, the discrepancy between unergativity and unaccusativity can be explained in the same line. To wit, we may attribute the obvious externality of the sole argument of an unergative verb as a result of further merger with a light verb DO in syntax; this will not be further elaborated in this paper because unergativity is not our major concern here.

In order to complete this framework, there remains one fundamental question: why are there light verbs? My answer to this question, in line with Lin (2001), is to admit into the syntactic configuration a specific eventuality. If we assume that all verbs are monadic, what can be rendered in the Lexicon can be rather limited, which makes it necessary for syntax to do the rest. As mentioned earlier in this section, Reinhart holds that for the interface to be possible each system should contain some information that is legible to other systems. The existence of the light verb accommodates the empty [Ø] cluster passed from the system of concept. The uninitiated light verb is only a placeholder with an empty [Ø] cluster. A specific light verb value is determined by the event structure that enters the syntactic configuration. The difference between causative, agen-

tive, putative, unaccusative, and unergative variants observed in archaic Chinese thus lies in the different eventualities they introduce into the syntactic configuration, which in turn choose different light verbs to realize these events.

To integrate the Theta System and the syntax of light verbs, I propose that a light verb does not have independent semantic content, and any thematic role it has must be semantically vacuous, which is in line with Ackema & Marelj (2012). This role is exactly what is listed as the empty [Ø] cluster in Reinhart's Theta system. As predicted by the theory, this cluster is fully unspecified with respect to both features and values. This has direct consequences for the syntax and semantics of the structures in which the light verb is involved. If we compare the unergative/unaccusative form with its causative counterpart in archaic Chinese, there is always something extra being added to the semantics without changing the form of the verb; where does that "something extra" come from given that nothing in the appearance of the verb is different? I argue that it is the light verb that composes corresponding event structures with them, which in turn merges with the lexical verb and assigns a specific theta role with the specific semantic/event feature, such as [+c] or [+c +m]. In this way, so-called causative alternation is actually event alternation.

5. Concluding remarks

To wrap up, scrutiny of causative alternation observed in *Zuo Tradition* reveals an array of interesting phenomena that were not noticed in previous studies concerned with similar issues. This study also poses challenges to previous proposals in relation to eventuality with semantic interpretation and syntactic computation in causative alternation. This study takes the initiative by providing a thorough description of the behaviors of causative alternation in *Zuo Tradition* and, further, tries to integrate these behaviors under one explanatory framework. It can be observed that in *Zuo Tradition* causative alternation incorporates a great variety of predicates, ranging from unaccusative to unergative and even agentive, and it allows active participation of denominal and deadjectival verbs. Such flexibility is justified in this paper via a two-step buildup of eventuality in causative alternation. Eventuality in my proposal is built up in two steps: specifically, the realization of the eventuality of the verb via merging with its sole theta role and the eventuality identified via the light verb in syntax with the assignment of its own theta role.

In my analysis, verbs in archaic Chinese are monadic and select only one argument. I propose that the existence of the light verb in syntax is to accommodate the information that is passed on from the conceptual system and to make

it legible in syntax: i.e., the empty [Ø] theta cluster as adopted from Reinhart's (2002; 2016) Theta System. The uninitiated light verb is only a placeholder with a [Ø] cluster. A specific light verb value, such as CAUSE, DO, BECOME, is determined by the event structure that enters the syntactic structure. Thus, the difference between all variants in causative alternation witnessed in *Zuo Tradition* lies in the different eventualities they introduce into the syntactic configuration. By trying to answer the question about how eventuality is established in causative alternation in archaic Chinese, the proposal in this paper is only a foot in the door. Further questions, such as the derivational relation between the alternants, as well as the semantic decomposition of eventuality in each alternant, await our attention. The solution to causative alternation in archaic Chinese may further enrich our general understanding about the relation of eventuality with its semantic interpretation and syntactic computation.

Acknowledgements

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Appendix. Five situations involving phonological changes

Some of the words listed in Table 1 do involve phonological changes; nonetheless, what gives rise to the phonological changes does not have a direct association with causative alternation. These words will be briefly illustrated by differentiating the following five situations.
Situation (1): 行:graaŋ, 作:ʔsaags, 潛:zloms, 發:pad, 覆:phug/ɯg, 集:zub, 合:guub, 復:bug, 乘:ɦljɯŋ, 伏:bɯg, 處:khljaʔ, 通:lhooŋ, 嫁:kraas, 反:panʔ, 興:qhɯŋ, 聚:zloʔ, 存:zluun, 卒:ʔsud, 墮:l'oolʔ, 登:tɯɯŋ, 驚:kreŋ, 落:g·raag, 畏:qul/s, 平:breŋ, 疾:zid, 已:luɯʔ, 舞:maʔ, 藏:zaaŋ, 傷:hljaŋ, 醉:ʔsuds, 困:khuuns, 隱:qɯnʔ, and 稅:hljods.

The list contains verbs whose intransitive meanings are recorded by previous studies (Downer 1959; Chou Fa-kao 1962; Chou Tsu-mo 1966; Wang 1980, 1982; Sun 2015), while the causative meanings are not; or what have been discussed regarding phonological change in the literatures are not result from causative alternation. For instance, 合:guub 'to close', in the following example, is taken as being derived from 會:koobs, which means "to close together" (Sun 2015). No further phonological/morphological change is recorded in the previous analyses about this "derived form." Thus, this study will not associate this phonological change with causative alternation, which means all these words will be incorporated into the current discussion.

a. 楚子 合 諸侯 於沈鹿。 （桓公八年）
Master Chu gather prince at Shenlu
Lit. 'The Master of Chu gathered the princes at Shenlu.' (Lord Huan 8)
N.B.: "合", originally meaning "to gather," is used as a causative here meaning "to make … gather."

b. 鄭師 合 以 攻 之。 （桓公五年）
Zheng troop gather and strike at them
Lit. 'The Zheng troops closed ranks to strike at them.' (Lord Huan 5)

Situation (2): 結:kiid, 廢:pads, 定:deeŋs, 陳:l'iŋ, 張:taŋ, 列:red, 增:ʔsɯɯŋ, 易:leg, 殪:qiigs, and 更:kraaŋ.

The causative meanings of these words are recorded in the literatures, whereas the anti-causative meanings are not; or what have been recorded concerning phonological change are not result from causative alternation. For instance, the phonological changes of words like 結:kiid 'to knot', 陳:l'iŋ 'to display', 張:taŋ 'to stretch', 列:red 'to arrange in order', 增:ʔsɯɯŋ 'to increase' all involve a change of syntactic category from verb to noun. For instance, the derived word of 結 (kiid), as recorded in Downer (1959) and Chou Fa-kao (1962), is a nominal meaning "knot in hair, 'bun'" written as 髻(kiids). This phonological change is not related to causative alternation; thus, words of this type are put under this catalog.

Situation (3): 文:mɯn, 後:Gooʔ, 衣:qɯls, 質:tids, and 冠:koon.

This list includes nouns that can be used as denominal verbs, which is accompanied by phonological changes. However further alternation in causation does not trigger any change in phonology. Take 衣:qɯls 'dress' for instance, the meaning recorded in previous research is "upper outer garment" (Sun 2015), which enters into the syntax as a noun with a level tone (qɯl). The phonological change, i.e., changing from level to falling (qɯls), involves a change from noun to verb meaning "to make someone wear clothes/provide clothes to someone." The differentiation of this causative meaning with a transitive one, i.e., "to wear something," is not accompanied by further phonological change. It is noted that Lu Deming provides the same phonetic notation to the causative and the anti-causative variant of verbal 衣:qɯls in *Jingdian Shiwen* (《經典釋文》).

Situation (4): 始:hljɯʔ, 壹:qlig, 水:qhwljiʔ, 東:tooŋ, and 北:pɯɯg.

Words of this situation also undergo phonological change when they are used as denominal verbs; however, the derived semantics that trigger phonological change are not the meanings observed in our data. 水(qhwljiʔ), as a nominal for instance, means "water," whose phonological change is associated with a change in syntactic category into an adjective meaning "deep/profound" or a noun meaning "edema disease" (Sun 2015); however, the data collected in this study with this denominal verb present a contrast of "to flood vs. to be flooded." Again, I shall not associate these phonological changes with causative alternation and save these words for further discussion.

Situation (5): 老:ruuʔ, 正:tjeŋs, 整:tjeŋʔ, 深:hljum, 安:qaan, 重:doŋʔ, 勤:gɯn, 好:qhuus, 厚:gooʔ, 厲:m·rads, 柔:mlju, and 善:djenʔ.

The syntactic categories of these words are adjectives when first enter syntax and can be used as predicates. Similar to the previous four situations, the phonological change of this type only

involves changing adjectives into verbs or nominals; however, the verbs thus derived are not the causative counterparts of the predicative adjectives. For instance, the original meaning of 老:ruu? is 'laborious/toilsome'. Downer (1959); Wang (1980), and Sun (2015) all interpret the derived meaning of this adjective as 'to recompense', which is different from the causative meaning discussed in this paper, i.e., 'to make someone laborious'.

These five situations witness 66 words, which are all recorded as undergoing phonological change in the previous analyses. None of these words, however, are excluded from our data due to the lack of direct association of such phonological change with causative alternation. Besides these 66 words, the rest 91 are not found in previous studies in regard of phonological change of any kind. It is thus assumed that all these 157 words witness causative alternation with identical verbal forms, i.e., the causative alternation is not accompanied by any morphological/phonological change, which qualifies as a starting point of further discussion on causative alternation.

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