

The Causal Relation and Causative-Inchoative Alternation Verbs in Chinese Wordnet

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Abstract: Despite the fact that the causal relation between senses did not receive as much attention as other lexical semantic relations, such as synonymy, antonymy and troponymy, do, it is nonetheless a crucial part of lexical semantics. A related phenomenon, the causative-inchoative alternation, which is widely found in many languages, is also an issue worth exploring. By scrutinizing the causative entries provided by Chinese Wordnet (CWN), the present study aims to establish part of the causal relation between verb senses listed in the lexical resource, and to find patterns in the semantics of verbs that can undergo the alternation in question. It is observed that factors such as “change”, “embodiment”, and “metaphor” all play a role in determining the causative alternation use of a verb. In addition to the core semantics of a verb, the features of its argument, especially object, also contribute to the acceptability of the verb alternation. Moreover, more marginal semantic elements including “instrument” and “degree” are as well involved in shaping the nuances in the meaning of verbs with both the causative and inchoative uses. This research thus can have implications for not only the application of the causal relation mapping in CWN, but theoretical frameworks that aim to account for the alternation phenomenon.

Keywords: Wordnet, Causal relation, Causative-inchoative alternation, Verbs

1. Introduction

Chinese Wordnet (CWN hereafter) is a lexical resource of Mandarin Chinese in which senses of a lemma is marked with information of lexical semantic relations, such as synonymy, hyponymy, and the like. Among the most basic relations marked in WordNet and many other wordnets, the causal relation is, however, left unidentified in CWN. Despite the fact that the causal relation does not receive as much attention as other relations, such as synonymy, troponymy and meronymy, do (Fellbaum 1993; 1998), it plays a crucial role in some verb-related phenomena and the inferential process (Girju 2003; Kunze 1999, 2000). In GermaNet, the causal relation is even highlighted, for it is related to one of the most important types of verb alternation (Kunze 1999, 2000). One of the main aims of this research is thereby to establish some principles and find patterns for constructing the causal relation in CWN, based on the resources available within the system.

As previous literature suggested, the causal relation can be realized in various

ways (Hasplemath 1993), namely, as two different words (e.g. *give* and *have*), two morphologically related words (e.g. *fell* and *fall*), or the same lexical item (e.g. *break*) (Fellbaum 1990). Although the identification of the causal relation between two lemmas or senses seems rather straightforward, how exactly the cause-result pairs in earlier projects are found and determined remains unclear. In order to make a systematic investigation on this issue in Chinese, we plan to start from the third type of realization, namely the so-called “causative-alternation verbs” in Chinese.

Causative alternation or causative-inchoative alternation is widely observed in English and many other languages around the world (Hasplemath 1993; Kunze 1999; Levin and Rappaport 1994; Tang 2002; Thepkanjana 2003). It refers to a kind of alternation between the transitive and intransitive uses of the same lexical verb, without any morpho-phonological change. The transitive use of a causative-alternation verb depicts a process in which the causer causes the causee to be in a certain state, while the intransitive use mostly denotes the resulted state. The former is called the causative, and the latter the inchoative or resultative.

Various approaches have been applied to and different accounts have been proposed for the causative alternation phenomenon. According to Thepkanjana (2003), mainly three types of approaches are adopted in the past literature. The first type is the typological approach, represented by Hasplemath (1993), who investigated both the universal constraints on and language-specific preferences for the causal alternation. As for the second track, the most influential studies are Levin and Rappaport (1994, 1995), who approached this issue from a more lexically oriented perspective, arguing that the intransitive use of an alternating verb is actually derived from their causative counterpart, since the latter tends to have fewer selectional restrictions in English. Finally, a more data-oriented, corpus-based approach is adopted by later researchers (Montemagni et al. 1995; Thepkanjana 2003). Based on a large amount of real use data, these studies show that not only the semantics of the verb but also the property of its arguments may influence the alternation phenomenon.

This study adopts an approach slightly different from the above-mentioned ones. We, albeit taking a more lexically oriented perspective, will investigate the alternation phenomenon based on an online resource which is constructed with some consideration of corpus data.

2. Methodology

As mentioned earlier, most, if not all, of the previous projects on the causal relation retrieve the cause-result pair without a systematic principle. As a result, this research plans to start from the causative alternation verbs listed in CWN, along with the glosses and examples provided in the system, so as to achieve a system-internally

consistent method for mapping the causal relation between corresponding senses. The following subsections encompass a brief introduction to the database, the target verbs and the selection procedure of this research.

2.1 Database

CWN is a lexical resource for Chinese lexical semantics information constructed by Academia Sinica. It contains more than 5,600 lemmas and 13,160 senses, with the number increasing every year. It provides the basic information for each lemma included in the system, such as its pronunciation, part(s) of speech, sense(s), meaning facet(s), lexical semantic relation(s) and mappings to English synsets. Each sense or meaning facet of a lemma is also supplemented with example sentences extracted from the *Sinica Corpus* and the web.

Since one of the objectives of this study is to establish some preliminary mappings of the causal relation in CWN, we will retrieve the causative alternation verbs according to the glosses given by the system and try to find shared patterns.

2.2 Targets

In this study, we will begin with the causative ones, and try to find their intransitive counterpart. In doing so, we can make sure that there exists at least one causal reading in the senses of a lemma. In CWN, causative verbs are coded as “VHC”. A more detailed description of the procedure is elaborated in the next section.

2.3 Procedure

We thus propose the following steps as a systematic procedure to examine whether the verb can alternate between the transitive and intransitive uses after the retrieval of causative verbs.

- Step 1: Identify the causative sense of the lemma.
- Step 2: Find the possible intransitive counterpart with the identical definition terms, except for the causative verb *shi*, to the causative sense, based on the definitions given by CWN.
- Step 3: If the exact corresponding intransitive use is unavailable, a semantically approximate one is considered to be the alternative.
- Step 4: If it does not have even an approximate counterpart, it is not counted as a causative alternation verb.

The causative sense is then deemed as the cause and the intransitive the result in a

causal relation. The detailed results will be then presented in the next section.

3. Results

In total, 149 verbs coded with a VHC sense are retrieved from CWN. Based on the glosses provided by CNW, 38.26% of the causative verbs ($n = 57$) can be identified to have an exactly corresponding intransitive counterpart (categorized as the matched group), while around half of them (50.34%, $n = 76$) only have an approximate one (thus labeled the uncertain one). 11.41% of the VHC verbs ($n = 17$) are not found to have a corresponding intransitive reading. The specific patterns of the latter two categories will be discussed in the following two subsections.

3.1 The Matched Group

The matched group of causative verbs refers to the set of lemmas with a causative sense that has an exact intransitive counterpart in definition. The most frequently used patterns in the definition terms of the causative senses are illustrated in Table 1 below.

Table 1

Definition Terms	Tokens	English Translation
<i>Shi...bian(de)</i> (使...變(得))	7	<i>make...become...</i>
<i>Shi...zengjia</i> (使...增加)	4	<i>make...increase</i>
<i>Shi...jianshao</i> (使...減少)	4	<i>make...decrease</i>
<i>Shi...buV</i> (使...不 V)	3	<i>make...not V</i>
<i>Shi...gandao</i> (使...感到)	3	<i>make...feel...</i>

As can be seen from the pattern list above, these predicates frequently used in the definition of causative alternation verbs denote a “change-of-state” sense, which agrees with the observation made by previous research (Levin and Rappaport 1994). They may refer to the quantitative or qualitative change of either an internal or an external state.

In terms of the semantics of the verbs, particular trends can be generalized as follows:

- (1) Change in general: e.g. *gaibian* 改變 ‘change’
- (2) Increase/decrease in quantity or quality: e.g. *jianshao* 減少 ‘decrease’, etc.
- (3) Causation related to physical characteristics: e.g. *tsang* 髒 ‘be dirty/make dirty’, *kaikuo* 開闊 ‘be broad/broaden’, etc.
- (4) Causation related to body parts: *shun* 順 ‘(One’s hair) become smooth/smoothen

- (one's hair)', *feng* 豐 '(The hair of a particular animal) be abundant and dense/make (the hair of a particular animal) abundant and dense', etc.
- (5) Causation related to emotion or sensation: *yue* 悅 'be pleased/please', *luan* 亂 'be upset/upset', etc.
- (6) Metaphorical causation¹: *ku* 苦 'be bitter/pain', *shou* 飽 'one's fortune increases/increase one's fortune', *pengzhang* 膨脹 'be inflated/inflate', etc.

The first three verb types match the observations made in Levin and Rappaport (1994) that causative alternation verbs tend to denote change of state, especially changes in physical characteristics. Nevertheless, the latter three do not seem to be mentioned in their study. Rather, they support the proposal raised by later researchers that the arguments of the verb have an effect on the alternation (Montemagni et al. 1995; Thepkanjana 2003).

3.2 The Uncertain Group

For the uncertain group, certain discrepancies are found in the glosses of the causative verb and its approximate intransitive counterpart. These pairs, albeit not exactly matched, may reflect some subtle constraints on the alternation between a causative and an inchoative use. Hence, they can still contribute to the investigation on the issue and are worth a detailed examination.

In contrast to Levin and Rappaport (1994), it is found that the causative use of an alternation verb in Chinese is not necessarily more restricted than the intransitive use. More interestingly, the subtle differences in meaning lie in not only the semantics of arguments but that of more peripheral semantic roles, such as instrument, degree, etc, an observation that is rarely addressed in past literature. It seems that the causative or intransitive reading can, to some extent, be regarded as a troponymic counterpart of the other sense. Different types of semantic differences are listed as follows:

- (1) Subject/causer: e.g. *shuai* 摔 '(planes) crash/(**the pilot**) crash (the plane)', etc.
- (2) Object/causee: e.g. *liang* 亮 'be bright/brighten (**one's skin**)', *shi* 細 'be thin/thin (**one's waist or a certain body part**)', etc.
- (3) Instrument: e.g. *bing* 冰 'be cold/freeze (**with refrigeration equipment**)', *ma* 麻 'be dull/**anesthetize**', etc.
- (4) Causee + Instrument: e.g. *long* 隆 (bulge/augment (**a particular body part with a surgery**)), etc.
- (5) Degree: e.g. *pianyi* 便宜 'be cheap (**with the price lower than**

¹ This group refers to verbs that can alternate only when used metaphorically.

expectation)/discount’, *lei* 累 ‘be exhausted (**spending too much energy**)/tire’, etc.

These differences are all overtly specified in the definition provided by CWN. Other uncertain pairs may result from the difference in the terms used for glossing, which is not of interest in the current study.

In terms of the semantic types of verbs, the results are similar to those of the matched group. What is noteworthy for the uncertain group is that some of metaphorical causative verbs only have a non-metaphorical intransitive counterpart. For example, when *nuanhua* 暖化 ‘to warm’ is used intransitively, it can only refer to the increase in temperature of the atmosphere or the ocean. As a causative verb, this word means the improvement or softening of a negative event, which instead is a metaphorical use. This finding in fact corresponds to that of Croft (2009). Croft (2009) investigates the EAT/FEED frame and its related constructions in English based on corpus data and points out that the argument structure of a verb can be changed when it is used metaphorically. In other words, the argument structure of a verb does not simply map from the source domain to the target domain; an argument can even “emerge” through metaphorical extension. The similar phenomenon is also found in our results.

4. Discussion

The results above reveal some characteristics of the causative alternation verbs in Mandarin Chinese. First of all, as many previous studies have suggested, verbs denoting change of state, especially in physical properties, are more likely to be able to alternate between the transitive and intransitive uses. This semantic feature seems to be a universal component for causative alternation.

Second, in addition to the core semantics of the verbs, its arguments also have some constraints on the alternation as Montemagni et al. (1995) and Thepkanjana (2003) have rightly pointed out. Many verbs undergo the alternation when at least one of their arguments (usually object) is of particular body parts. This semantic feature of the object seems to have some “coercion” power (Liu 2005; Pustejovsky 1995) over the verb.

Third, emotion and body sensation also seem to play a role in the alternation. When the arguments or the verb are related to the above-mentioned features, the causative alternation is likely to be observed. Along with the second point above, it seems that the causative-inchoative alternation in Chinese is related to embodiment (see Rohrer 2007 for an in-depth discussion). When the meaning of a verb or its argument is embodied, the alternation is more likely to take place.

Fourth, as mentioned above, metaphor also contributes to the alternation phenomenon. In general, the argument structure and alternation tendency is mapped from the source domain to the target domain. However, in certain cases, a different semantic structure can emerge in the metaphorically extended use.

The last but not least observation that does not seem to be addressed by previous studies is that there may be subtle semantic differences between the causative and the resultative/inchoative in less central semantic roles, such as instruments, degrees, and time. With the careful glosses offered by CWN, a finer-grained analysis regarding this issue can be made. This phenomenon may also reflect how the Chinese speaker conceptualizes a causal scene and how the conceptualization is lexicalized in a delicate way.

5. Conclusion

Although the causal relation of verbs and the causative-inchoative alternation phenomenon in Chinese are important and interesting, they did not receive the attention that they deserve. Via the investigation of causative verbs in CWN, this issue has been addressed in the present study. We have found patterns in the gloss of senses of verbs that undergo this alternation. We have paired up the causative and resultative senses of a verb and found particular tendencies between the senses. Finally, we also have a detailed discussion on the factors that may contribute to the alternation phenomenon in question. We hope that the present study can shed some light on the studies of the causal relation and causative alternation and have some implications for the construction of online lexical resources and future research.

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