# Use a Lexical Database for Identifying Quasi-affixes in Contemporary Chinese

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ABSTRACT. *This study aims to identify quasi-affixes in contemporary Chinese based on Xiandai Hanyu Yufa Xinxi Cidian (Grammatical Knowledge-base of Contemporary Chinese), considering their degree of productivity, fixation of positioning, and semantic bleaching. Xiandai Hanyu Yufa Xinxi Cidian is a lexical database which contains detailed descriptions of the morphological and syntactic behaviors of 80,000 contemporary Chinese words. Such a quantitative study is expected to shed more light on our understanding of quasi-affixes in contemporary Chinese and further help to segment words in Chinese information processing.*
**Keywords**: Quasi-affixes, Fixation of positioning, Semantic bleaching, Contemporary Chinese

1. **Introduction.** Quasi-affixes are grammatical forms that are between affixes and content morphemes. They are productive word-formative forms in contemporary Chinese and have given rise to many derivational complex words. For example, *-re* '-mania', which can be traced back to *re* as an adjective, i.e., 'hot', has combined frequently with stem morphemes and further formed many complex words such as *jingshang-re* 'business-mania', *yimin-re* 'immigration-mania', *zhongguo-re* 'China-mania', *fangdichan-re* 'real estate-mania' and others. However, the grammatical identity of quasi-affixes in contemporary Chinese is a thorny issue in grammatical studies and thereafter in Chinese information processing. Are they words, affixes or any others? Disagreements exist. Some grammarians (e.g., Lü, 1979; Ma, 1995, etc.) treat such forms as quasi-affixes but others (e.g., Chu, 1985; Norman, 1988, etc.) treat them as affixes, though disagreements also exist concerning the scope of so-called quasi-affixes in contemporary Chinese. Correspondingly, such forms are treated either as independent words or as formative morphemes of complex words, or even affixes in Chinese information processing. Take *-re* '-mania' for example again. In *The Corpus of Contemporary Chinese by National Language Committee*[2], *-re is* annotated variously. It is annotated as a word in (2) and (3), though its grammatical function is undecided.

[2] The corpus can be accessed through http://www.cncorpus.org.

Specifically, it is annotated as an adjective in (2) but as a noun in (3). However, it is annotated as a formative morpheme in (1). On the other hand, such forms are annotated as affixes in *Xiandai Hanyu Yufa Xinxi Cidian* (Grammatical Knowledge-base of Contemporary Chinese). Obviously, disagreements and confusions have arisen everywhere.

(1) daxuesheng/n de/u 「/w jingshang/v **re/n**」/w
    college-student/n possessive/u 「/w engage-in-business/v **re/n** 」/ w
    'the business mania among college students'

(2) Qian Zhongshu/nh yu/c "/w 《/w *Weicheng*/n 》/w **re/a** "/w
    Qian Zhongshu/nh and /c "/w 《/w *Fortress Besieged* /n 》/w **re/a** "/w
    'Qian Zhongshu and the *Fortress Besieged* mania'

(3) Peng Li/nh he/c Zhongguo/ns de/u shizhuang mote/n dui/n yiqi/d xun/v fang/v Milan/ns deng/u Yidali/ns chengshi/n，/w suodaozhichu/n dou/d xianqi/v le/u zhongguo/ns **re/n**
    Peng Li/nh and/c China/ns possessive/u fashion-models/n team/n together/d patrol/v visit/v Milan/ns and-son-on/u Italy/ns city/n，/w places-they-have-been/n all/d raise/v perfective/u China/ns **re/n**
    'Peng Li and her model team visited Milan and other cities in Italy and (because of this) China mania swept every place they had been.'

This study maintains that such forms in contemporary Chinese are quasi-affixes and aims to identify them based on the database of *Xiandai Hanyu Yufa Xinxi Cidian* (Grammatical Knowledge-base of Contemporary Chinese) considering their degree of morphological productivity, fixation of positioning and semantic bleaching. These criteria will be explained immediately.

(1)   Productivity. Productivity is the ability a morpheme has to form words.

(2)   Fixation of positioning. Some morphemes occur in fixed positions of words. For example, prefixes and quasi-prefixes occur in the initial positions of words whereas suffixes and quasi-suffixes occur in the final positions of words. Meanwhile, other morphemes occur either in the initial positions of words or the final positions of words. For example, *min* 'people' occurs in the initial position of *minzhong* 'mass, people', but occurs in the final position of *renmin* 'people, mass.'

(3)   Semantic bleaching. If a morpheme shows a grammatical meaning, it is therefore said to be grammaticalized or semantically bleached. For example, *-re* is said to be grammaticalized, since it has partially lost its original meaning as an adjective, i.e., 'hot.' The meaning of a quasi-affix in contemporary Chinese is more grammaticalized than a content morpheme (e.g., *gou* 'dog' as a free morpheme, *hou* 'monkey' as a bounded morpheme) but less grammaticalized than an affix (e.g., *-zi, -er, -tou* as noun-formant suffixes).

These three criteria will separate quasi-affixes out from content morphemes and affixes. A content morpheme might be productive and stably positioned, but not grammaticalized. An affix is productive, stably positioned, and fully grammaticalized. And

finally, a quasi-affix is productive, stably positioned, and relatively grammaticalized. Previous studies (e.g., Lü, 1979; Ma, 1995) on quasi-affixes mostly identify quasi-affixes based on language intuitions of the researchers *per se*, this study, however, adopts a corpus linguistic approach. The lexical database adopted by this study contains 80,000 contemporary Chinese words and the researchers conducted an exhaustive survey on these words via the following procedures:

(1)    Sorting out productive morphemes.
(2)    Sorting out productive morphemes which are stably positioned.
(3)    Sorting out quasi-affixes by investigating their degree of grammaticalization.

The quantitative study is expected to shed more light on our understanding of quasi-affixes in contemporary Chinese and further help to segregate words in Chinese information processing.

2. **Procedures.** *Xiandai Hanyu Yufa Xinxi Cidian* (Grammatical Knowledge-base of Contemporary Chinese) is a basic linguistic knowledge-base for Chinese Information Processing. The compiling of such an electronic dictionary started in 1986 and through the continuous development in the past over years, the dictionary currently contains 80,000 contemporary Chinese words. The dictionary applies relational databases to describe expressions and their grammatical attributes and severs as a machine dictionary for automatic computer analysis and generation of Chinese sentences. This study is mostly using lexical entries from the dictionary as the base for identifying quasi-affixes. The identification work was accomplished through the following procedures: sorting out productive morphemes; sorting out productive morphemes which are stably positioned; sorting out quasi-affixes by investigating their degree of grammaticalization.

**2.1 Sorting out Productive Morphemes.** Considering that words in contemporary Chinese are mostly composed of two characters or three characters, the researchers made an exhaustive extraction of two-character-words (TCWs) and three-character-words (ThCWs) from the database. The researchers further investigated the productivity of the initial morphemes (IMs) and the final morphemes (FMs) of these words via their frequencies of occurrence. See Table 1 and Table 2 for detail. Table 1 summarizes the frequencies of 10 most frequent initial morphemes in TCWs and 10 most frequent initial morphemes in ThCWs. Table 2 summarizes the frequencies of 10 most frequent final morphemes in TCWs and 10 most frequent final morphemes in ThCWs. These two tables could be exhaustive but only 40 productive morphemes are selected for illustration. It should be noted that initial morphemes/ final morphemes in TCMs and initial morphemes/ final morphemes in ThCWs may overlap and one morpheme may have more than one sense. However, one entry is solely annotated with one sense for a concise illustration.

TABLE 1. Frequencies of 20 Most Frequent Initial Morphemes

| Ordering | IMs in TCWs | Frequencies of IMs in TCWs | IMs in ThCWs | Frequencies of IMs in ThCWs |
|---|---|---|---|---|
| 1 | *da* 'big' | 246 | *da* 'big' | 161 |
| 2 | *shui* 'water' | 180 | *dian* 'electricity' | 131 |
| 3 | *shang* 'up' | 146 | *xiao* 'small' | 114 |
| 4 | *bu* 'no' | 144 | *lao* 'old' | 103 |
| 5 | *xiao* 'small' | 140 | *shui* 'water' | 94 |
| 6 | *kai* 'to open' | 138 | *da* 'to hit' | 91 |
| 7 | *fa* 'to send out' | 137 | *zhong* 'middle' | 82 |
| 8 | *wai* 'out' | 130 | *di* 'ground, earth' | 76 |
| 9 | *zhong* 'middle' | 130 | *bai* 'white' | 71 |
| 10 | *fen* 'to separate' | 127 | *bao* 'to protect' | 69 |

TABLE 2. Frequencies of 20 Most Frequent Final Morphemes

| Ordering | FMs in TCWs | Frequencies of FMs in TCWs | FMs in ThCWs | Frequencies of FMs in ThCWs |
|---|---|---|---|---|
| 1 | *zi* 'a suffix' | 606 | *zi* 'a suffix' | 343 |
| 2 | *tou* 'a suffix' | 246 | *xing* 'nature' | 303 |
| 3 | *ren* 'people' | 214 | *ji* 'machine' | 238 |
| 4 | *xin* 'heart' | 187 | *qi* 'ware' | 215 |
| 5 | *qi* '-ish' | 175 | *xue* '-olgy' | 188 |
| 6 | *mian* 'aspect' | 146 | *ren* 'people' | 161 |
| 7 | *shou* '-ier' | 141 | *yuan* 'personnel' | 159 |
| 8 | *shui* 'water' | 139 | *hua* '-ize' | 129 |
| 9 | *shi* 'thing' | 136 | *hui* 'meeting' | 119 |
| 10 | *dao* 'road' | 133 | *pin* 'product' | 107 |

**2.2 Sorting out Productive and Stably Positioned Morphemes.** Fixed positioning is an important criterion for affixes and quasi-affixes (Ma, 1995). Prefixes and quasi-prefixes always occur in the initial positions of words, and suffixes and quasi-suffixes always occur in the final positions of words. The researchers then sorted out these productive morphemes which are stably positioned. Such morphemes in the database are either stably positioned in the initial positions of words, e.g., *chao* or in the final positions of words, e.g., *du. Chao* is a polysemous morpheme which has 3 senses according to *Xiandai Haiyu Cidian* (Dictionary of Contemporary Chinese). These senses are: (1) to surpass, to exceed; (2) be surpassing; (3) to jump over. *Du* is also a polysemous morpheme which has 15 senses

according to *Xiandai Haiyu Cidian* (Dictionary of Contemporary Chinese). These senses are: (1) measures; (2) level; (3) degree; (4) extent; (5) limit; (6) rules; (7) condition, state; (8) style of conduct; (9) manner; (10) scope; (11) consideration; (12) measure word; (13) to spend (time); (14) try to persuade someone to become a monk, nun or Taoist priest; (15) a surname.

*Chao* is frequently occurring in the initial positions of words. The frequencies for *chao* appearing in the initial positions of TCWs and ThCWs are 40 and 21, respectively. Correspondingly, the frequencies for *chao* appearing in the final positions of TCWs and ThCWs are 4 and 0, respectively. Such data show that *chao* is eligible to be a potential prefix or quasi-prefix.

*Du* is frequently occurring in the final positions of words. The frequencies for *du* appearing in the final positions of TCWs and ThCWs are 95 and 45, respectively. Correspondingly, the frequencies for *du* appearing in the initial positions of TCWs and ThCWs are 6 and 2, respectively. Such data show that *du* is eligible to be a potential suffix or quasi-suffix.

Other productive morphemes may be flexibly positioned. Take *ren* in the database for example. *Ren* is a polysemous morpheme which has 8 senses according to *Xiandai Haiyu Cidian* (Dictionary of Contemporary Chinese). These senses are: (1) human; (2) everyone; (3) adults; (4) one kind of people; (5) other people; (6) nature, character or virtue (of people); (7) body or physical states (of people) ; (8) talent; The frequencies for *ren* appearing in the initial positions of TCWs and ThCWs are 81 and 44, respectively. Meanwhile, the frequencies for *ren* appearing in the final positions of TCWs and ThCWs are 214 and 161, respectively. Such data show that *ren* is unlikely to be a potential affix or quasi-affix.

**2.3 Sorting out Quasi-affixes.** An affix/quasi-affix must meet Criterion 1 and Criterion 2. However, a content morpheme might also meet Criterion 1 as well as Criterion 2, e.g., *XX zheng* 'XX disease'. *Zheng* 'disease' appears 52 times in the database. The frequencies for *zheng* 'disease' appearing in the initial positions and in the final positions are 3 and 49, respectively. Such data show that z*heng* 'disease' is productive and stably positioned in the final postions, though it has a content meaning as an ordinary content morpheme does. Such content morphemes also include *XX ye* 'XX profession', *XX zhan* 'XX station', and *XX bu* 'XX department'. Criterion 3 is therefore necessary for sorting out qusi-affixes from affixes and content morphemes. Quasi-affixes are less grammticalized than affixes but more grammticalized than content morphemes. Such Quasi-affixes in contemporary Chinese will be further discussed in detail in the next section. Considering that one morpheme may have more than one sense, the researchers therefore carefully sifted the exact sense for a potential quasi-affix out from other senses of one polysemous morpheme and further analyzed its frequencies and degree of grammaticalization.

3. **Results and Discussions.** Following the procedures in the previous section, the researchers concluded that quasi-affixes in contemporary Chinese include 34 quasi-prefixes and 46 quasi-suffixes. See the followings for detail. Each entry is arranged by its occurrence frequency in ThCws in the database, and thereafter its sense number in *Xiandai Hanyu Cidian* (Dictionary of Contemporary Chinese). If an entry has solely one sense in *Xiandai Hanyu Cidian,* the slot for its sense number is left blank. The sense numbers of some entries are drawn from *Xiandai Haiyu Guifan Cidian* (Dictionary of Standard

Contemporary Chinese) (See further annotations).

## Quasi-prefixes

*ban-* 'half-'（20）❹; *bu-* 'in-, im-, non-, un- '（54）[3]; *chao-* 'super-'（21）❷; *da-* 'sur-'（83）[4]; *da-*（42）[5]; *da-* 'first-'（5）❽; *da-*（6）❺[6];  *dai-* 'substitute-'（27）❷; *dan-* 'single-'（12）❶[7]; *di-* 'no.-¹'（5）❶; *duo-* 'many, much-'（37）❶; *fan-* 'anti-'（36）❹; *-fan* 'pan-'（1）❸; *fei-* 'in-, im, non-, un-'（6）❺; *fu-* 'negative-'（12）❿; *fu-¹* 'vice-'（9）❶; *fu-¹* 'additional-'（3）  ❸; *ke-¹* '-able'（24）❸; *lao-*（1）**(16)** [8]; *lao-* 'elderly-'（7）❷; *lao-*（7）[9]; *lao-*（3）**(15)** 'youngest-'; *lei-* 'quasi-'（7）❷; *ling-* 'zero-'（15）❺; *ruan-* 'soft-'（31）[10]; *wei-* 'pseudo-'（10）❶; *wu-* 'non-, im-, non-, un-'（45）❶; *xiang-¹* 'mutual-'（15）❶; *xiao-* 'infra-'（35）[11]; *xiao-*（36）[12]; *xiao-*（15）[13]; *xiao-*（6）❺[14]; *zong-* 'all-'（20）❷; *zong-* 'general-'（10）❸

## Qusai-suffixes

*-dan* '-sheet, bill'（44）❻[15]; *-du* '-degree'（45）❹; *e-²* '-amount'（25）❸; *-fang²* '-aspect'（15）❷;   *-fei* '-fee'（94）❶; *-feng* '-style/fashion'（40）❺; *-gan*（30）'-feeling' ❺; *-guan* 'view'（11）❸; *-gui* '-misbehavioror'（8）❷; *-gui*（3）❼[16]; *-hua* '-ize'（129）❽; *-ji* '-machine'（238）❶; *-ji* '-meter'（36）❷; *-ji* '-strategem'（4）❸; -jia '-ist'（94）❺; *-jian* '-piece'（10）❷; *-jie* '-circles'（51）❸; *-kuang* '-holic'（5）[17]; *-li* '-power'（80）❷; *-lü* '-ratio'（95）; *-lun* '-ism'（44）❸; *-mi* '-fan'（1）❸; *-mian* '-aspect'（58）❼; *-pin* '-product'（107）❶; *-qi* '-period'（57）❷; *-qi* '-ish'（44）❽; *-qi* '-ware'（215）❶; *-qun* '-group'

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[3]  *Bu-* in this sense is to denote negation. It occurs frequently before nouns, verbs, adjectives, and nounal morphemes to form adjectives with negative meanings. Such a notion is originally drawn from *Xiandai Haiyu Cidian* (Dictionary of Contemporary Chinese) but is slightly modified by the researchers.

4  *Da-* in this sense is to denote that something is surpassing in volume, area, quantity, strength, degree, range, and etc. Such a notion is originally drawn from *Xiandai Haiyu Cidian* (Dictionary of Contemporary Chinese) but is slightly modified by the researchers.

5  *Da-* in this sense is to denote classification of things. Such a notion is defined by the researchers based on the database.

6  *Da-* in this sense is to emphasize. It occurs before nouns indicating time, e.g., *zhongwu* 'noon' or festivals, e.g., *nian* 'the Spring Festival.'

7  The sense number is adopted from *Xiandai Haiyu Guifan Cidian* (Dictionary of Standard Contemporary Chinese).

8  *Lao-* in this sense is to denote seniority among brothers and sisters. The sense number is 16.

9  *Lao-* in this sense is to denote disparaging naming. Such a notion is defined by the researchers based on the database.

10  Such a notion is defined by the researchers based on the database.

11  *Xiao-* in this sense is to denote that something is inferior in volume, area, quantity, strength, degree, range, and etc. Such a notion is defined by the researchers based on the database.

12  *Xiao-* in this sense is to denote classification of things. Such a notion is defined by the researchers based on the database.

13  *Xiao-* in this sense is to denote diminutive naming. Such a notion is defined by the researchers based on the database.

14  *Xiao-* in this sense is to denote juniority.

15  The sense number is adopted from *Xiandai Haiyu Guifan Cidian* (Dictionary of Standard Contemporary Chinese).

16  The sense number is adopted from *Xiandai Haiyu Guifan Cidian* (Dictionary of Standard Contemporary Chinese). *-Gui* in this sense is to denote diminutive naming.

17  *-Kuang* in this sense is defined by the researchers based on the database.

（3）❶; *-re* '-mania'（15）❽; *-sheng*³ '-student'（63）❶; *-shi* '-ceremony'（72）❷; *-shou* '-ier'（32）❼; *-shu* '-method, strategy'（17）❷; *-ti* '-object'（63）❷; *-wu* 'thing/object' （66）❶; *-xing '-star'*（37）❺ ;[18] *-xing* '-model'（27）❶; *-xing* '-type'（35）❷; *-xing* '-ity' （303）❸; *-xue* '-ology'（188）❹; *-yuan* '-personnel'（159）❶[19]; *-yuan* '-garden'（16） [20]; *-zhe* '-er'（101）❶; *-zhi* '-rule/regulation'（50）❹[21]; *-zhuang* '-manner'（5）❶; *-zu* '-clan' （3）❹

Such a list not only include some well-acknowledged quasi-affixes in grammatical studies, e.g., *-xing* '-ity', *-xue* '-ology', *-yuan* '-personnel', *-hua* '-ize', *-pin* '-product', *-zhe* '-er', *-lü* '-ratio', *-jia* '-ist', *-shi* '-ceremony', etc., but also include some seldom-mentioned quasi-affixes, e.g., *-ji* 'machine', *-qi* '-ware', *-fei* '-fee', *-li* '-power', etc. At the same time, it excludes some well-recognized prefixes, e.g., *chu-, lao-, di-* (noun formant prefixes), and some well-recognized suffixes, e.g., *-zi, -er, -tou* (noun-formant suffixes). The researchers also compared the list with the report of Chinese Knowledge and Information Processing Group- Academia Sinica (1996) and Liu et al.'s (1994) study and finally built up a comprehensive database for quasi-affixes in contemporary Chinese. Each quasi-affix is annotated with its frequency, pronunciation in *Pinyin*, homographic morphemes, sense, and examples. See the following tables for illustration. *Pinyin* is a system to transcribe Chinese characters into the Roman alphabets. The Chinese language examples in the paper are in *Pinyin* but their tones are not marked. However, tones of quasi-affixes in the following tables are marked on their vowels. ¯ stands for the high-level tone. ´stands for the high-rising tone. ˘ stands for the low-rising tone.`stands for the falling tone.

TABLE 3. Examples of Quasi-prefixes in Contemporary Chinese

| Quasi-prefixes in Chinese Characters | Frequency in the initial positions | *Pinyin* | Homographic Morphemes | Sense | Examples |
|---|---|---|---|---|---|
| 半 | 20 | bàn | | half- | *ban-zidong* 'half-automatic' *ban-tingchan* 'half-stop production' |
| 不 | 54 | bù | | in-, im-, non-, un- | *bu-jingqi* 'unprosperous' *bu-deijin* 'unhandy' *bu-xianghua* 'unreasonable' |
| 超 | 21 | chāo | | super- | *chao-qiangdu* 'super-intensive' *chao-ziran* |

¹⁸ The sense number is adopted from *Xiandai Haiyu Guifan Cidian* (Dictionary of Standard Contemporary Chinese).
¹⁹ The sense number is adopted from *Xiandai Haiyu Guifan Cidian* (Dictionary of Standard Contemporary Chinese).
²⁰ *-yuan* '-garden' in this sense is to denote an area for public recreation or economic development. Such a notion is defined by the researchers based on the database.
²¹ The sense number is adopted from *Xiandai Haiyu Guifan Cidian* (Dictionary of Standard Contemporary Chinese).

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 'supernatrual'<br>*chao-dangpai* 'superpartisan'<br>*chao-biaozhun* 'superstandard' |
| 大 | 83 | dà | 1 | sur- | *da-chuxue* 'massive hemorrhage'<br>*da-daoli* 'great truths'<br>*da-tabu* 'stride' |
| 大 | 42 | dà | 2 | to classify things | *da-baicai* 'Chinese cabbage'<br>*da-tiqin* 'cello'<br>*da-suda* 'hypo soda' |
| 大 | 5 | dà | 3 | to emphasize | *da-baitian* 'daytime'<br>*da-nianye* 'New Year's Eve'<br>*da-qingzao* 'early morning' |
| 大 | 6 | dà | 4 | first- | *da-jiuzi* 'wife's elder brothers'<br>*da-laopo* 'first wife' |

TABLE 4. Examples of Quasi-suffixes in Contemporary Chinese

| Quasi-suffixes in Chinese Characters | Frequency in the final positions | *Pinyin* | Homographic Morphemes | Sense | Examples |
|---|---|---|---|---|---|
| 单 | 44 | dān | | -sheet, bill | *chengbao-dan* 'files for undertaking a project'<br>*jiancha-dan* 'examination form' |
| 度 | 45 | dù | | -degree | *shushi-du* 'comfortability'<br>*huixuan-du* 'changeability'<br>*xinyu-du* 'credibility' |
| 机 | 238 | jī | | -machine | *dianbao-ji* 'telegraph'<br>*suobian-ji* 'zigzag sewing machine' |
| 界 | 51 | jiè | | -circles | *jingji-jie* 'economic circles'<br>*wenyi-jie* 'literary and |

| | | | | | art circles' |
|---|---|---|---|---|---|
| 手 | 32 | shǒu | | -ier | *quanji-shou* 'boxer'<br>*gongji-shou* 'attacker' |

4. **Conclusion.** The borderline between derivation and compounding is rather fuzzy in Chinese. This study has investigated quasi-affixes in contemporary Chinese within a corpus linguistic paradigm and extracted out 34 quasi-prefixes and 46 quasi-suffixes based on the database of *Xiandai Hanyu Yufa Xinxi Cidian* (Grammatical Knowledge-base of Contemporary Chinese). Quasi-affixes in contemporary Chinese have derived out numerous newly-coined words, which are unfortunately unlisted words in Chinese information processing. This study suggests that such neologisms should be treated as complex words rather than two separated words. Further, quasi-affixes observed by this study should be annotated separately in Chinese information processing. Finally, the researchers hope that such a quantitative study will sharpen our understanding of quasi-affixes in contemporary Chinese and will further help to segment words derived from quasi-affixes properly in Chinese information processing.

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