

# Multidimensional Analysis Tagger of Mandarin Chinese

The Multidimensional Analysis Tagger of Mandarin Chinese (MulDi Chinese) is a programme that extends Biber's (1988) analysis of English register variation to Mandarin Chinese. MulDi Chinese aims to describe dimensions of register variation and communicative effect of texts. The programme tags 53 linguistic features based on ICTCLAS (H.-P. Zhang, Yu, Xiong, & Liu, 2003) and word lists in Chinese linguistics research. It performs factor analysis to output 5 dimensions of register variation and plots the variation of the input text or corpus against 15 registers in an upsampled Brown-family (Francis & Kučera, 1964, 1971, 1979) ToRCH2014 corpus (Xu, Chen, Song, & Liu, 2017). It also offers visualisation options using existing Python packages.

## 1 Referencing the Tagger

To reference the tagger, please use the following:

Liu, N. 2019. Multidimensional Analysis Tagger of Mandarin Chinese (MulDi Chinese). Available at: <https://github.com/nnl93/Multidimensional-Analysis-Tagger-of-Mandarin-Chinese>.

MulDi Chinese is based on the ICTCLAS, and it is advised to reference ICTCLAS when MulDi Chinese is used. Please refer to <https://dl.acm.org/citation.cfm?id=1119280>.

## 2 Requirements

MulDi Chinese requires Python to run (<https://www.python.org/>). The Python packages needed are NLTK (Bird, Loper, & Klein, 2009), Python wrapper of ICTCLAS – PyNLPIR (<https://pypi.org/project/PyNLPIR/>), and Factor Analyzer ([https://factor-analyzer.readthedocs.io/en/latest/factor\\_analyzer.html](https://factor-analyzer.readthedocs.io/en/latest/factor_analyzer.html)).

### 3 List of Variables

This section describes the linguistic features used in MulDi Chinese in alphabetic order of feature names. The abbreviations are consistent with those in the English tagger (Nini, 2018, pp. 17–31). An asterisk following the name indicates the inclusion of the variable in the feature set. Note that all occurrences are standardised by the length of input text.

#### 3.1 Abstract nouns\*

MulDi Chinese counts occurrences of words in the following list (Fang, 2019) and then standardises the occurrences by the length of the input text: 社会, 问题, 生活, 经济, 关系, 作用, 中国, 现在, 情况, 时候, 人民, 活动, 方面, 科学, 条件, 思想, 过程, 影响, 方法, 要求, 技术, 事, 时间, 世界, 教育, 社会主义, 组织, 地方, 文化, 运动, 历史, 地区, 物质, 形式, 政治, 自然, 东西, 结构, 现象, 理论, 工业, 人类, 精神, 结果, 时期, 意义, 语言, 内容, 计划, 水平, 产品, 基础, 环境, 特点, 能力, 知识, 经验, 实际, 性质, 政府, 作品, 目的, 规律, 力量, 办法, 心理, 原则, 商品, 实践, 行为, 矛盾, 原因, 因素, 地位, 方向, 资本主义, 程度, 政策, 范围, 法律, 声音, 时代, 质量, 阶段, 方式, 人物, 速度, 自由, 价值, 困难, 中心, 事情, 事物, 对象, 现代, 事业, 利益, 材料, 内部, 音乐, 形象, 国际, 温度, 年代, 观点, 战争, 阶级, 希望, 家庭, 空气, 身体, 本身, 感情, 身上, 生命, 效果, 思维, 一部分, 意见, 标准, 无产阶级, 会议, 信息, 功能, 态度, 概念, 高度, 手段, 基础上, 理想, 说话, 化学, 措施, 目标, 帝国主义, 生物, 新闻, 行动, 民主, 资源, 物体, 资料, 意识, 观念, 道德, 实际上, 位置, 道路, 本质, 军事, 商业, 集体, 体系, 祖国, 机关, 意思, 机会, 习惯, 宗教, 领域, 机构, 国民经济, 形态, 哲学, 比例, 马克思主义, 类型, 成果, 脸上, 情绪, 能量, 成分, 健康, 成绩, 文艺, 空间, 品种, 主义, 主体, 规模, 形势, 方针, 意志, 责任, 队伍, 原理, 颜色, 项目, 委员会, 情感, 重点, 整体, 生产资料, 工程, 战略, 消息, 事件, 情形, 行政, 科技, 交通, 数学, 营养, 成本, 专业, 财政, 食物, 路线, 权力, 利润, 大部分, 元素.

#### 3.2 Adverbial marker *di* 地 \*

The tagger counts all occurrences of the word ‘地’ tagged as ‘particle 的/底’ then standardises the occurrences by the length of the input text.

#### 3.3 Adverbs (RB)\*

MulDi Chinese counts occurrences of all words tagged as ‘adverb’. Below is an example.

而 对于 在 流行性 传染病 蔓延 过程 中 受到 经济 损失 的 企  
业 和 个人 尚 [adverb] 无 类似 基金 的 设立。(ToRCH2014\_B27\_SEG)

### 3.4 Amplifiers (AMP)\*

MulDi Chinese counts occurrences of words in the following list and then standardises the occurrences by the length of the input text.

1. 非常, 十分, 真的, 特别, 很, 最, 肯定(Wei, 2019)
2. 挺, 顶, 极, 极为, 极其, 极度, 万分, 格外, 分外, 更, 更加, 更为, 尤其, 太, 过于, 老, 怪, 相当, 颇, 颇为, 有点儿, 有些, 最为, 越发, 越加, 愈加, 稍, 稍微, 稍稍, 略, 略略, 略微, 比较, 较, 暴, 超, 恶, 怒, 巨, 粉, 奇 (L. Wu, 2006)
3. 很大, 相当, 完全, 显著, 总是, 根本 (G. Wu & Pan, 2010)
4. 真, 真的, 一定

N.B. Amplifiers and emphatics were merged in this list.

### 3.5 Auxiliary adjectives\*

MulDi Chinese counts all occurrences of words tagged as ‘auxiliary adjective’ (Liu, Niu, & Liu, 2012) and then standardises the occurrences by the length of the input text.

突然 [auxiliary adjective] 有点 怅然 还 清晰 [auxiliary adjective] 记  
得 第 一 次 见 您 是 什 么 时 候 (ToRCH2014\_F01\_SEG)

### 3.6 Average clause length (ACL)\*

Following Hou, Huang, and Liu (2017) and Hou, Huang, Ahrens, and Lee (2019), I deem average clause length to be a salient predictor of register variation in Chinese. Clause end markers are defined as comma , , colon : , semicolon ; , and all sentence end markers (see Section 3.9; Shen, Liu, Yu, and Wong [2011]). MulDi Chinese counts the number of words (词; note the difference with characters 字) within the boundary of two clause end markers and then divides it by the total number of clauses in the input text.

### 3.7 Average clause length's standard deviation\*

Furthering the argument of Hou et al. (2017, 2019), the standard deviation of ACL is also regarded as a potential predictor. The standard deviation of ACL is obtained through Python built-in statistics package.

### 3.8 Average word length (AWL)\*

MulDi Chinese sums up the total number of characters (字) and divides it by the total count of words (词) in the input text (Cf. M. Wang, 2017; Z.-S. Zhang, 2017).

### 3.9 Average sentence length (ASL)\*

The training corpora consist of written registers, and so the sentence end is marked by punctuations including Chinese period 。, question mark ?, ellipses …… , exclamation mark !, and em dash —— (Z.-S. Zhang, 2017, p. 55 ; Shen et al. 2011). The tagger counts the number of words (词) within the boundary of two sentence end markers and then divides it by the total number of sentences in the input text.

### 3.10 Be 是 (BE)\*

The tagger counts all occurrences of 是 tagged as ‘verb 是’.

还 清晰 [auxiliary adjective] 记得 第一次 见 您 是 [verb 是] 什  
么 时候 (ToRCH2014\_F01\_SEG)

### 3.11 Chinese person names\*

The tagger counts all occurrences of the tags ‘personal name’ plus ‘Chinese’, minus by those of the tag ‘transcribed personal name’ and then standardises the occurrences by the length of the input text. Such names typically occur in fiction writing, especially adventure, mystery fiction and romance.

### 3.12 Classifiers\*

MulDi Chinese counts all occurrences of words tagged as ‘classifier’ and then standardises the occurrences by the length of the input text.

参与 侦破 了 三四百 起 [classifier] 命案 (ToRCH2014\_L01\_SEG)

### 3.13 Classical function words\*

MulDi Chinese counts occurrences of 所 tagged as 'particle 所', 将 as 'adverb', 将 as 'preposition', 之 as 'particle 之', 于 as 'preposition' and 以 as 'preposition' (Feng, 2006; Z.-S. Zhang, 2017) and then standardises the occurrences by the length of the input text.

### 3.14 Complement marker *de* 得

\* The tagger counts all occurrences of the word '得' tagged as 'particle 得' and then standardises the occurrences by the length of the input text.

### 3.15 Conditional conjuncts\* (COND)

MulDi Chinese counts the occurrences of words in the following list and then standardises the occurrences by the length of the input text: 如果, 只有, 假如, 除非, 要是, 要不是, 只要, 倘若, 倘或, 设使, 设若, 如若, 若, (Yu, 2007) and 的话 tagged as 'particle 的话', 的时候 tagged as '的', 'particle 的/底', '时候', 'noun' (C. N. Li & Thompson, 1989, p. 663).

### 3.16 Consecutive nouns\*

The tagger counts all occurrences of two consecutive nouns (Z.-S. Zhang, 2017, pp. 37–38), represented by regex <noun.\*><noun.\*>, and then standardises the occurrences by the length of the input text. In the following example, four pairs of 'consecutive nouns' (underlined) were tagged.

各省 [noun]、自治区 [noun]、直辖市 [noun] 及副省级城市 [noun]、  
新疆生产 [noun-verb] 建设 [noun-verb]兵团 [noun] 民 [noun morpheme]  
(宗)委(厅、局),各民族 [noun] 院校 [noun] (ToRCH2014\_H01\_SEG)

### 3.17 Demonstrative pronoun\* (DEMP)

MulDi Chinese finds words tagged as 'demonstrative pronoun' and then standardises the occurrences by the length of the input text.

其中 [demonstrative pronoun], 线性谐振子作为动力系统中的基础性模型, 不同形式的激励噪声对其 [demonstrative pronoun] 共振行为影响显著。 (ToRCH2014\_J01\_SEG)

### 3.18 Descriptive words\*

Descriptive words are named ‘status word’ by ICTCLAS. The tagger counts all occurrences of words tagged as ‘status word’ then standardises the occurrences by the length of the input text.

坐在桌前的女孩子已经可以用面色惨白 [status word] 来形容了 (ToRCH2014\_K01\_SEG)

### 3.19 Disyllabic negation\*

The tagger counts occurrences of 没有 tagged as ‘adverb’ and as ‘verb’ (C. N. Li & Thompson, 1989, p. 415).

### 3.20 Disyllabic words\*

The tagger counts occurrences of words in the following list reproduced from Feng (2006) and then standardises the occurrences by the length of the input text: 安定, 安装, 办理, 保持, 保留, 保卫, 保障, 报道, 暴露, 爆发, 被迫, 必然, 必修, 必要, 避免, 编制, 变动, 变革, 辩论, 表达, 表示, 表演, 并肩, 补习, 不断, 不时, 不住, 布置, 采取, 采用, 参考, 测量, 测试, 测验, 颤动, 抄写, 陈列, 成立, 成为, 承担, 承认, 持枪, 充分, 充满, 充实, 仇恨, 出版, 处于, 处处, 传播, 传达, 创立, 次要, 匆忙, 从容, 从事, 促进, 摧毁, 达成, 达到, 打扫, 大力, 大有, 担任, 导致, 到达, 等待, 等候, 奠定, 雕刻, 调查, 动员, 独自, 端正, 锻炼, 夺取, 发表, 发动, 发挥, 发射, 发生, 发行, 发扬, 发展, 反抗, 防守, 防御, 防止, 防治, 非法, 废除, 粉碎, 丰富, 封锁, 符合, 负担, 负责, 复述, 复习, 复印, 复杂, 复制, 富有, 改编, 改革, 改进, 改良, 改善, 改正, 干涉, 敢于, 高大, 高度, 高速, 格外, 给以, 更加, 公开, 公然, 巩固, 贡献, 共同, 构成, 购买, 观测, 观察, 观看, 贯彻, 灌溉, 光临, 规划, 合成, 合法, 宏伟, 缓和, 缓缓, 回答, 汇报, 混淆, 活跃, 获得, 基本, 集合, 集中, 极为, 即将, 计划, 记载, 继承, 加工, 加紧, 加速, 加以, 驾驶, 歼灭, 坚定, 减轻, 检验, 简直, 建立, 建造, 建筑, 交换, 交流, 结束, 竭力, 解决, 解释, 紧急, 紧密, 谨慎, 进军, 进攻, 进入, 进行, 尽力, 禁止, 精彩, 进过, 经历, 经受, 经营, 竞争, 竟然, 纠正, 举办, 举行, 具备, 具体, 具有, 开办, 开动, 开发, 开明, 开辟, 开枪, 开设, 开展, 抗议, 克服, 刻苦, 空前, 扩大, 来自, 滥用, 朗读, 力求, 力争, 连接, 列举, 流传, 垄断, 笼罩, 轮流, 掠夺, 满腔, 盲目, 猛烈, 猛然, 梦想, 勉强, 面临, 明明, 明确, 难以, 扭转, 拍摄, 排列, 攀登, 炮打, 赔偿, 评价, 评论, 赔偿, 评价, 评论, 破坏, 普遍, 普及, 起源, 签订, 强调, 抢夺, 切实, 侵略, 侵入, 轻易, 取得, 全部, 全面, 燃烧, 热爱, 忍受, 仍旧, 日益, 如同, 散布, 丧失, 设法, 设立, 实施, 实现, 实行, 实验, 适合, 试验, 收集, 收缩, 树立, 束缚, 思考, 思念, 思索, 丝毫, 四处, 饲养, 损害, 损坏, 损失, 缩短, 缩小, 贪图, 谈论, 探索, 逃避, 提倡, 提供,

提前, 体现, 调节, 调整, 停止, 统一, 突破, 推迟, 推动, 推进, 脱离, 歪曲, 完善, 万分, 万万, 危害, 违背, 违反, 维持, 维护, 围绕, 伟大, 位于, 污染, 无比, 无法, 无穷, 无限, 武装, 吸取, 袭击, 喜爱, 显示, 限制, 陷入, 相互, 详细, 响应, 享受, 象征, 消除, 消耗, 小心, 写作, 辛勤, 修改, 修正, 修筑, 选择, 严格, 严禁, 严厉, 严密, 严肃, 研制, 延长, 掩盖, 养成, 一经, 依法, 依旧, 依然, 抑制, 应用, 永远, 踊跃, 游览, 予以, 遇到, 预防, 预习, 阅读, 运用, 再三, 遭到, 遭受, 遭遇, 增加, 增进, 增强, 占领, 占有, 战胜, 掌握, 照例, 镇压, 征服, 征求, 争夺, 争论, 整顿, 证明, 直到, 执行, 制定, 制订, 制造, 治疗, 中断, 重大, 专心, 转入, 转移, 装备, 装饰, 追求, 自学, 综合, 总结, 阻止, 钻研, 遵守, 左右.

### 3.21 Disyllabic prepositions (BPIN)\*

The tagger counts the occurrences of the following words, 按照, 本着, 按着, 朝着, 趁着, 出于, 待到, 对于, 根据, 关于, 基于, 鉴于, 借着, 经过, 靠着, 冒着, 面对, 面临, 凭借, 顺着, 随着, 通过, 为了, 围绕, 向着, 沿着, 依据 tagged as ‘preposition’. The list is reproduced from Fang (2018).

### 3.22 Downtoners (DWNT)\*

The tagger counts occurrences of words in the following list (X. Lu, 2004) and then standardises the occurrences by the length of the input text: 一点, 有点, 有点儿, 稍, 稍微, 有些.

### 3.23 Exclamations\*

The tagger counts all occurrences of the tag ‘exclamation mark’ and then standardises the occurrences by the length of the input text.

### 3.24 Existential 有\* (EX)

The tagger counts occurrences of 有 tagged as ‘verb 有’.

### 3.25 First-person pronouns\* (FPP1)

我, 我们

### 3.26 Hedges\* (HDG)

The tagger counts occurrences of words in the following list (G. Wu & Pan, 2010) and then standardises the occurrences by the length of the input text: 可能, 可以, 也许, 较少, 一些, 多个, 多为, 基本, 主要, 类似, 不少.

### 3.27 Honorific titles\*

The tagger counts occurrences of words in the following list (L. Wang, 2014) and then standardises the occurrences by the length of the input text: 千金, 相公, 姑姥爷, 伯伯, 伯父, 伯母, 大伯, 大哥, 大姐, 大妈, 大爷, 大嫂, 嫂夫人, 大婶儿, 大叔, 大姨, 哥, 姐, 大娘, 妈妈, 奶奶, 爷爷, 姨, 老伯, 老兄, 老爹, 老大爷, 老爷爷, 老太太, 老奶奶, 老大娘, 老板, 老公, 老婆婆, 老前辈, 老人家, 老师, 老师傅, 老寿星, 老太爷, 老翁, 老爷子, 老丈, 老总, 大驾, 夫人, 高徒, 高足, 官人, 贵客, 贵人, 嘉宾, 列位, 男士, 女士, 女主人, 前辈, 台驾, 太太, 先生, 贤契, 贤人, 贤士, 先哲, 小姐, 学长, 爷, 诸位, 足下, 师傅, 师母, 师娘, 人士, 长老, 禅师, 船老大, 大师, 大师傅, 大王, 恩师, 法师, 法王, 佛爷, 夫子, 父母官, 国父, 麾下, 教授, 武师, 千岁, 孺人, 圣母, 圣人, 师父, 王尊, 至尊, 座, 少奶奶, 少爷, 金枝玉叶, 工程师, 高级工程师, 经济师, 讲师, 教授, 副教授, 教师, 老师, 国家主席, 国家总理, 部长, 厅长, 市长, 局长, 科长, 校长, 烈士, 先烈, 先哲, 荣誉军人, 陛下, 殿下, 阁下, 阿公, 阿婆, 大人, 公, 公公, 娘子, 婆婆, 丈人, 师长, 义士, 勇士, 志士, 壮士.

### 3.28 HSK Level I vocabulary\*

150 words, reproduced from Hanban (2012)

### 3.29 HSK Level III vocabulary\*

600 words (450 in operationalisation, level I words and duplicates removed), reproduced from Hanban (2012)

### 3.30 HSK Level VI vocabulary\*

5000 words (4400 in final list, level I, level III and duplicate words removed), reproduced from Hanban (2012)

### 3.31 Imperfect aspect markers\*

The tagger counts all occurrences of the word ‘着’ tagged as ‘particle 着’, the word ‘在’ tagged as ‘preposition’, ‘正在’ tagged as ‘adverb’, ‘起来’ tagged as ‘directional verb’ and ‘下去’ as ‘directional verb’ (McEnery & Xiao, 2010, p. 12) and then standardises the occurrences by the length of the input text.



### 3.32 Indefinite pronouns (INPR)\*

The tagger counts occurrences of words in the following list and then standardises the occurrences by the length of the input text: 任何, 谁, 大家, 某, 有人, 有个, 什么.

### 3.33 Interrogative pronouns\*

The tagger counts words tagged as ‘interrogative pronoun’, such as 什么, 谁, and 多少, minus those tagged as ‘predicate interrogative pronoun’ such as 怎么, 为何, and 为什么 (tagged as WH-words).

### 3.34 Lexical density\*

The tagger counts occurrences of any open-class type of verbs (\*verb), nouns (\*noun), adjectives (\*adjective), and adverbs (\*adverb) (Jurafsky & Martin, 2019, pp. 144–145), and divides the occurrences by the length of the input text and then multiplies the result by 1000.

### 3.35 Modal particles\*

The tagger counts all occurrences of words tagged as ‘modal particle’ and ‘interjection’ then standardises the occurrences by the length of the input text.

### 3.36 Modifying adverbs\*

The tagger counts the occurrences of the following words tagged as ‘adverb’: 也, 都, 又, 才, 就, 就是, 倒是, 越来越, 一边, 再, 甚至, 却, 原本, 只, 毕竟, 仍然, 反正, 刚, 常常, 已经, 就要, and 连 tagged as ‘particle 连’, 等 tagged as ‘particle 等/等等/云云’.

### 3.37 Monosyllabic negation\*

The tagger counts occurrences of 别 tagged as ‘adverb’, 不 ‘as ‘adverb’, 没 as ‘verb’, and 没 as ‘adverb’ (C. N. Li & Thompson, 1989, p. 415).

### 3.38 Monosyllabic verbs\*

The tagger counts occurrences of words tagged as any type of verb ‘\*verb’ that have a length of one.

### 3.39 Nominalisation (NOMZ)\*

The tagger counts occurrences of tags ‘noun-adjective’, ‘noun-verb’ (Z.-S. Zhang, 2017, pp. 39–40), and any ‘verb’ followed by 的 (‘的’, ‘particle’) (C. N. Li & Thompson, 1989, pp. 575–576) and then standardises the occurrences by the length of the input text.

### 3.40 Other personal pronouns\*

The tagger counts all occurrences of words tagged as ‘personal pronoun’, minus counts of 我, 你, 她, 他, and 它 (plurals are automatically included).

### 3.41 Perfect aspect markers (PEAS)\*

The tagger counts all occurrences of the words ‘了’ tagged as ‘particle 了/喽’ and the word ‘过’ tagged as ‘particle 过’ (McEnery & Xiao, 2010, p. 11) and then standardises the occurrences by the length of the input text.

### 3.42 Performative verbs

The tagger counts all occurrences of words tagged as ‘performative verb’ and then standardises the occurrences by the length of the input text.

### 3.43 Private verbs (PRIV)\*

The tagger counts the occurrences of the following words tagged as ‘verb’: 三思, 三省, 主张, 了解, 亲信, 以为, 企图, 会意, 伤心, 估, 估摸, 估算, 估计, 估量, 低估, 体会, 体味, 信, 信任, 信赖, 修省, 假定, 假想, 允许, 关心, 关怀, 内省, 决定, 决心, 决意, 决断, 决计, 准备, 准许, 凝思, 凝想, 凭信, 分晓, 切记, 划算, 判断, 原谅, 参悟, 反对, 反思, 反省, 发现, 发觉, 吃准, 合计, 合谋, 同情, 同意, 否认, 听信, 听到, 听见, 哭, 喜欢, 喜爱, 回味, 回忆, 回念, 回想, 回溯, 回顾, 图谋, 图, 坚信, 多疑, 失望, 失身, 妄图, 妄断, 宠信, 害怕, 察觉, 寻思, 尊敬, 尊重, 小心, 希望, 平静, 幻想, 当做, 彻悟, 得知, 忆, 忖度, 忖量, 忘, 忘却, 忘怀, 忘掉, 忘记, 快乐, 念, 忽略, 忽视, 怀念, 怀想, 怀疑, 怕, 思忖, 思想, 思索, 思维, 思考, 思虑, 思量, 恨, 悟, 悬想, 情知, 惊恐, 想, 想像, 想来, 想见, 想象, 愉快, 意会, 意想, 意料, 意识, 感到, 感动, 感受, 感悟, 感想, 感激, 感觉, 感觉, 感谢, 愤怒, 愿意, 懂, 懂得, 打算, 承想, 承认, 担心, 拥护, 捉摸, 掂掇, 掂量, 掌握, 推度, 推想, 推敲, 推断, 推测, 推理, 推算, 推见, 措意, 揆度, 揣度, 揣想, 揣摩, 揣摸, 揣测, 支持, 放心, 料想, 料, 斟酌, 断定, 明了, 明察, 明晓, 明白, 明知, 明确, 晓得, 权衡, 梦想, 欢迎, 欣赏, 武断, 死记, 沉思, 注意, 洞察, 洞彻, 洞悉, 洞晓, 洞达, 测度,

浮想, 淡忘, 深信, 深思, 深省, 深醒, 清楚, 清楚, 满意, 满足, 激动, 热爱, 熟悉, 熟知, 熟虑, 爱, 爱好, 牢记, 犯疑, 狂想, 狐疑, 猛醒, 猜, 猜度, 猜忌, 猜想, 猜测, 猜疑, 玄想, 理会, 理解, 琢磨, 生气, 生疑, 畅想, 留心, 留神, 疏忽, 疑, 疑心, 疑猜, 疑虑, 疼, 盘算, 相信, 盼望, 省察, 省悟, 看, 看到, 看见, 看透, 着想, 知, 知悉, 知晓, 知道, 确信, 确定, 确认, 空想, 立意, 笃信, 笑, 答应, 策划, 筹划, 筹算, 筹谋, 算, 算计, 粗估, 约摸, 置疑, 考虑, 考量, 联想, 腹诽, 臆度, 臆想, 臆断, 臆测, 自信, 自省, 蒙, 蓄念, 蓄谋, 衡量, 裁度, 要求, 观察, 觉察, 觉得, 觉悟, 觉醒, 警惕, 警觉, 计划, 计算, 计较, 认为, 认可, 认同, 认定, 认得, 认知, 认识, 讨厌, 记, 记取, 记得, 记忆, 设想, 识, 试图, 试想, 详悉, 误会, 误解, 谋划, 谋算, 谋虑, 赞同, 赞成, 走神儿, 起疑, 轻信, 轻视, 迷信, 迷信, 追忆, 追怀, 追思, 追想, 透彻, 通晓, 通, 遐想, 遗忘, 遥想, 酌情, 酌量, 醒, 醒悟, 重视, 铭记, 阴谋, 顾全, 顾及, 预卜, 预想, 预感, 预料, 预期, 预测, 预知, 预见, 预计, 预谋, 领会, 领悟, 领略, 高估, 高兴, 默认 (A. Lu & Zhang, 2007; Chen, 2009; Q. Li, 2016).

### 3.44 Phrasal coordination (PHC)\*

The tagger counts the occurrences of the following words: 和, 以及, 而, 与, 并, 以至, 及, 并且, 而且, 不但, 而且.

### 3.45 Public verbs (PUBV)\*

The tagger counts occurrences of the following words tagged as ‘verb’.

1. 表示, 称, 道, 说, 讲, 质疑, 认为, 坦言 (Xin, 2013)
2. 指出, 告诉, 呼吁, 解释 (G. Wu & Pan, 2010)
3. 问 and 建议

### 3.46 Questions\*

The tagger counts all occurrences of the tuple (‘?’ , ‘question mark’) and then standardises the occurrences by the length of the input text.

### 3.47 Second-person pronouns\* (SPP2)

The tagger counts the occurrences of the following words: 你, 你们, 您, 您们.

### 3.48 seem/appear (SMP)\*

The tagger counts occurrences of words in the following list and then standardises the occurrences by the length of the input text: 好像, 好象, 貌似, 似乎.

**3.49 Simile\***

The tagger counts all occurrences of the words ‘仿佛’ tagged as ‘adverb’, ‘宛若’ tagged as ‘verb’, ‘如’ tagged as ‘verb’, all words tagged as ‘particle 一样/一般/似的/般’, the word ‘像’ tagged as ‘verb’ and ‘preposition’ and then standardises the occurrences by the length of the input text.

**3.50 Third-person pronouns\* (TPP3)**

The tagger counts occurrences of words in the following list and then standardises the occurrences by the length of the input text: 她, 他, 他们, 她们, 它, 它们.

**3.51 Total other nouns excluding nominalisation\* (NN)**

The tagger counts occurrences of the tags ‘noun’, ‘noun morpheme’, and ‘proper noun’, minus those tagged as ‘noun-adjective’ (nominalisation), ‘noun-verb’ (nominalisation), ‘pronoun’, and ‘noun of locality’.

**3.52 WH-words (WH)\***

The tagger counts occurrences of the tag ‘predicate interrogative pronoun’.

**3.53 Unique words\***

Unique words are words that only appear once in a text. Unique words ratio is generated by MulDi Chinese.

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