

UMR annotation of Chinese verb compounds

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Outline

- ▶ Introduction
- ▶ Types of Chinese verb compounds
- ▶ Why are they a “pain in the neck” for UMR (or any predicate-argument structure) annotation?
- ▶ Our proposed solution

An example

- ▶ Chinese verbs compounds are typically in the form of $V_1 - V_2$, with various syntactic and semantic relations between them

运动员跑-坏了鞋。

Athlete run-break PF shoe .

“The athlete broke (her/his) shoes because of running (too much).”

Classification of Chinese verb compounds based on compositionality and grammaticalization

- ▶ Compositional verb compounds
- ▶ (Semi-)grammaticalized verb compounds
 - ▶ V_2 belongs to a closed set of verbs that expresses aspect and direction
 - ▶ V_2 is not selective with respect to which V_1 to co-occur with
- ▶ Non-compositional verb compounds
 - ▶ The meaning of the verb compound cannot be predicted from its component verbs

An example compositional verb compound

(1) 这 件 衣服 小王 买-贵 了

This CL clothes Xiaowang buy-costly PF.

“Xiaowang bought this piece of clothes at a high price.”

An example grammaticalized verb compound

(2) 他递-过来 了 一 杯 水

he hand-come PF one cup water

“He handed over a glass of water.”

Also 送-过来 (“send over”), 拿-过来 (“bring over”), 扔-过来 (“throw over”), 运-过来 (“transport over”), 传-过来 (“pass over”), 爬-过来 (“crawl over”), ...

An example non-compositional verb compound

- (3) 他喜欢褒-贬 人.
he like praise-criticize others.
"He likes to pass judgment on others"

An alternative (more common) classification

Classification based (mostly) on the syntactic relation between V_1 and V_2 :

- ▶ Resultative verb compounds
- ▶ Directional verb compounds
- ▶ Verb copula verb compounds
- ▶ Subordinating verb compounds
- ▶ Coordinating verb compounds

Resultative verb compound

V_2 is the result of V_1 :

- (4) 他买-亏 了 这 衣服
he buy-lose-money PF this clothes
“He bought this dress at a loss.”

Directional verb compound

V_2 is the direction of V_1 :

(5) 他递-过来 了 一 杯 水

he hand-come PF one glass water

“He handed over a glass of water.”

Verb copula verb compounds

V_2 is a copula verb that introduces an argument for V_1 :

(6) 小王 被 看作-是好 人

xiaowang BEI see-be good person

“Xiaowang is viewed as a good person.”

Subordinating verb compound

V_1 modifies V_2 :

- (7) 猎人 活-捉 了 这 只 老虎。
hunter alive-catch PF this CL tiger .
“The hunter caught this tiger alive.”

Coordinating verb compound

V_1 and V_2 are coordinated:

- (8) 他喜欢褒-贬 人.
he like praise-criticize others.
"He likes to pass judgment on others"

Semantic relations between the component verbs

- ▶ If they are compositional, the semantic relations between them can be one of...
 - ▶ Result (or cause of)
 - ▶ Temporal
 - ▶ Concessive
 - ▶ Goal
- ▶ If they are grammaticalized, V_2 ...
 - ▶ expresses direction
 - ▶ contributes aspect
 - ▶ introduces an argument

Result

(9) a. 运动员跑-坏了鞋。

Athlete run-break PF shoe .

"The athlete broke (her/his) shoes because of running (too much)."

b. 他买-亏了这衣服

he buy-lose-money PF this clothes

"He bought this dress at a loss."

Temporal

(10)

这 件 衣服 小王 买-贵 了

This CL clothes Xiaowang buy-costly PF.

“Xiaowang bought this piece of clothes at a high price (or when the price is high).”

猎人 活-捉 了 这 只 老虎。

hunter alive-catch PF this CL tiger .

“The hunter caught this tiger alive (or while the tiger is alive).”

Concessive

(11) 这 口 井 小张 挖-浅 了

This CL well Xiaozhang dig-shallow PF.

“Xiaowang dug this well but it was too shallow.”

Direction

(12) 他递-过来 了 一 杯 水

he hand-come PF one cup water

“He handed over a glass of water.”

Aspect

(13) 小孩写-完 了 作业。

kid write-finish PF homework.

“The kid finished doing his homework.”

Aspect

(14) 小孩吃-掉 了 糖果。

Kid eat-drop PF candy.

“The kid ate up the candy.”

Introducing an argument

(15) 小王 被 看作-是好 人

xiaowang BEI see-be good person

“Xiaowang is viewed as a good person.”

Introducing an argument

(16) 气旋 增强-成 风暴

Cyclone intensify-become storm.

“The cyclone intensifies into a storm”.

Non-compositional verb compounds

- (17) a. 购买前 要 三-思 。
- buy before should three-think
- “(You) need to think twice before (you) buy (it)”
- b. 该 产业 能 带-动 经济 发展 。
- This industry can drag-move economy development.
- “This industry can spur economic development. ”
- c. 他 喜欢褒-贬 人。
- he like praise-criticize others.
- “He likes to pass judgment on others”

Modality infix in verb compounds

- (18) a. 柜子 打-得-开
cabinet open-ABL-open
“The cabinet can be opened.”
- b. 柜子 打-不-开
cabinet open-NEG-open
“The cabinet cannot be opened.”

Why are they a “pain in the neck” argument structure annotation?

- ▶ Annotating the argument structure of these compounds with Probank-style of annotation requires defining the argument structure of each compound, but...
- ▶ Compositional and grammaticalized verb compounds are productive, and exhaustively listing them in a lexicon is hard if not impossible
- ▶ Distinguishing compositional and non-compositional, grammaticalized vs non-grammaticalized verb compounds requires sophisticated linguistic training, reducing the pool of qualified annotators

(Partial) solution

- ▶ Decomposing compositional verb compounds to reduce the total number of predicates that need to be recorded in the lexicon
- ▶ Annotating each grammaticalized verb compound as a single predicate, but grouping them together based on V_1 in the verb compound, as the argument structure is primarily that of V_1 , similar to how verb particle constructions are treated in Propbank frame files. This still results in a large number of role sets, but at least verb compounds with the same V_1 are connected.
- ▶ No good answer for lowering the linguistic training requirement

Compositional-resultative

运动员跑-坏了鞋。

Athlete run-break PF shoe .

“The athlete broke (her/his) shoes because of running (too much).”

(x2b / 跑-01 [pao, “running”]

:Arg0 (x1 / 运动员 [yundongyuan,
“athlete”]

:cause-of (x2a / 坏-01[huai, “break”]

:Arg0 (x4 / 鞋 [xie, “shoe”]))))

compositional-resultative

他买-亏 了 这 衣服
he buy-lose-money PF this clothes

“He bought this dress at a loss.”

(x2a / 买-01[mai, “buy”]
 :Arg0 (i / individual-person
 :ref-person 3rd
 :ref-number Singular)
 :Arg1 (x5 / 衣服 [yifu, “clothes”]
 :mod (x4 / 这 [zhe, “this”]))
 :cause-of (x2b / 亏-01[kui, “at a loss”]
 :Arg0 i)
 :aspect Performance)

Compositional-temporal

这 件 衣服 小王 买-贵 了

This CL clothes Xiaowang buy-costly PF.

“Xiaowang bought this piece of clothes at a high price.”

(x2a / 买-01[mai, “buy”]
:Arg0 (x1 / 小王 [Xiaowang, (name)])
:Arg1 (x5 / 衣服 [yifu, “clothes”]
:mod (x4 / 这 [zhe, “this”]))
:temporal (x2b / 贵-01 [gui, “costly”]
:Arg0 x5)
:aspect Performance)

Compositional-temporal

猎人 活-捉 了 这 只 老虎。

hunter alive-catch PF this CL tiger .

“The hunter caught this tiger alive.”

(x1 / 捉 [zhuo, “catch”]

:Arg0 (x2 / 猎人 [lieren, “hunter”])

:Arg1 (x3 / 老虎 [laohu, “tiger”]

:mod (x4 / 这 [zhe, “this”])

:unit (x5 / 只 [zhi, CL]))

:temporal (x6 / 活 [huo, “alive”]

:aspect Performance)

Compositional-concessive

这 口 井 小张 挖-浅 了
This CL well Xiaozhang dig-shallow PF.

“Xiaowang dug this well but it was too shallow.”

(x5a / 挖-01 [wa, “dig”]
:aspect Performance
:Arg0 (i / individual-person
:name (n / name
:op “小张” [Xiaozhang]))
:Arg1 (x3 / 井 [jing, “well”]
:mod (x1 / 这 [zhe, “this”])
:unit (x2 / 口 [kou, CL]))
:Arg1-of (b / but-91
:Arg2 (x5b / 浅 [qian,
“shallow”]
:Arg0 x3)))

Compositional-Directional

老师 走-进 学校
teacher walk-enter school.

“The teacher walked into the school.”

(x2a / 走 [zou, “walk”]
:Arg0 (x1 / 老师 [laoshi, “teacher”])
:goal (x2b / 进 [jin, “enter”]
:Arg0 x1
:Arg1 (x3/ 学校 [xuexiao,
“school”]))
:aspect Performance)

Grammaticalized-directional

他递过来 了一 杯 水

he hand-come PF one cup water

“He handed over a glass of water.”

(x2a / 递过来-01 [diguolai, “hand over”])

:Arg0 (i / individual-person

:ref-person 3rd

:ref-number Singular)

:Arg1 (x6 / 水 [shui, “water”])

: quant 1

: unit 杯 [bei, “cup”])

:aspect Performance)

Grammaticalized-perfective

小孩写-完 了 作业。

kid write-finish PF homework.

“The kid finished doing his homework.”

(x2 / 写完 [xie, “write”]

:Arg0 (x1 / 小孩 [xiaohai, “kid”])

:Arg1 (s2 / 作业 [zuoye, “homework”])

:aspect Performance)

Grammaticalized-perfective

小孩吃-掉了 糖果。

Kid eat-drop PF candy.

“The kid ate up the candy.”

(x2 / 吃掉-01 [chidiao, “eat up”]

:Arg0 (x1 / 小孩 [xiaohai, “kid”])

:Arg1 (x3 / 糖果 [tangguo, “candy”])

:aspect Performance)

Grammaticalized-copula

小王 被 看作-是好 人
xiaowang PAS see-is good person

“Xiaowang is viewed as a good person.”

(x3 / 看作-01 [kanzuo, “viewed as”]
 :Arg1 (i / individual-person
 :name (n / name
 :op “小王” [Xiaowang]))
 :Arg2 (x5 / 人 [ren, “person”]
 :mod (x4 / 好 [hao, “good”]))
 :aspect Performance)

Grammaticalized-copula

气旋 增强-成 风暴
Cyclone intensify-become storm.

“The cyclone intensifies into a storm”.

(x2a / 增强-01 [zengqiang, “intensify”]
 :Arg1 (x1 气旋 [qixuan, “storm”])
 :Arg2 (x2b / 成 [cheng, “become”]
 :Arg0 x1
 :Arg1 (s1x4 / 风暴 [fengbao,
 “storm”]))

Non-compositional compounds-resultative

该产业能带-动经济发展。

This industry can drag-move economy development.

“This industry can spur economic development. ”

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(x4 / 带动-01 [daidong, "drag" + "move"
                    = "spur"]
:Arg0 (x2 / 产业 [chanye, "industry"]
      :mod (x1 / 该 [gai, "this"]))
:Arg1 (x6 / 发展-01 [fazhan,
                    "development"]
      :Arg1 (x5 / 经济 [jingji,
                      "economy"])))
:modstr NeutAff)
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Non-compositional verb compounds-subordinate

Non-compositional verb compounds are treated as single predicates:

购买前 要 三-思 。

buy before should three-think

“(You) need to think carefully before (you) buy (it)”

(x4 / 三思 [sansi, “think carefully”]
 :temporal (x2 / 前 [qian, “before”]
 :op (x1 / 购买[goumai,
 buy])))
 :aspect Process)

Non-compositional verb compound-coordination

Non-compositional verb compounds are treated as single predicates:

他喜欢褒-贬 人。
he like praise-criticize others.

"He likes to pass judgment on others"

(x1 / 喜欢-01 [xihuan, "like"]
 :Arg0 (x3 / individual-person
 :ref-person 3rd
 :ref-number Singular)
 :Arg1 (x2 / 褒贬-01 [baobian,
 "pass judgment on"])
 :Arg0 x3
 :Arg1 (x4/人 [ren, "people"])))

Modality infix in verb compounds

Modal annotation for modality infix:

柜子 打-得-开

cabinet open-ABL-open

“The cabinet can be opened.”

(x2a / 打开-01 [dakai, “open”]

:Arg1 (x1 / 柜子 [guizi, “cabinet”])

:aspect State

:MODSTR NeutAff)

Modality infix in verb compounds

Modal annotation for modality infix:

柜子 打-不-开

cabinet open-NEG-open

“The cabinet cannot be opened.”

(x2a / 打开-01 [dakai, “open”]

:Arg1 (x1 / 柜子 [guizi, “cabinet”])

:aspect State

:MODSTR FullNeg)

Summary

- ▶ Provides a classification of Chinese verb compounds in terms of compositionality, grammaticalization, syntactic and semantic relations between component verbs
- ▶ Proposes how each type of verb compounds should be annotated in UMR