

Unsevering the external argument: evidence from V-*de/bu*-V compounds in Mandarin Chinese

Wenkai Tay

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taywenkai.com



- 1 Introducing arguments
- 2 Mandarin *V-de/bu-V* compounds
- 3 Proposal
- 4 Prediction
- 5 Alternative analysis
- 6 Conclusion

Argument structure



- (1) *John arrived the vase.
The vase arrived.

Argument structure



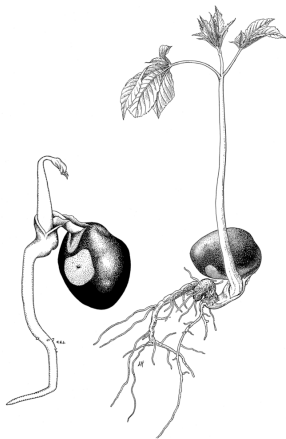
- (1) *John arrived the vase.
The vase arrived.
- (2) John destroyed the vase.
*The vase destroyed.

Argument structure

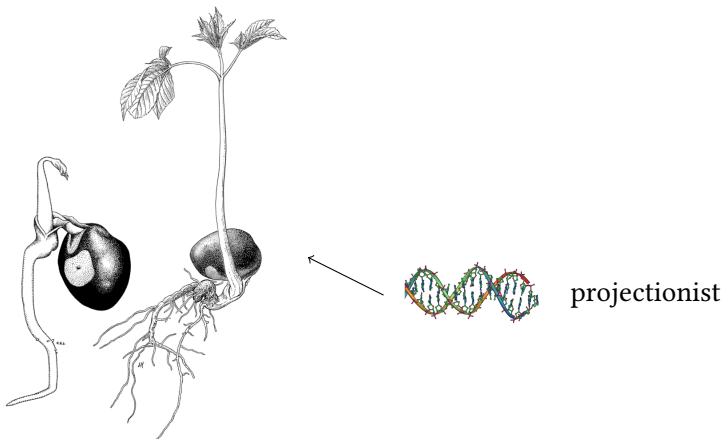


- (1) *John arrived the vase.
The vase arrived.
- (2) John destroyed the vase.
*The vase destroyed.
- (3) John broke the vase.
The vase broke.

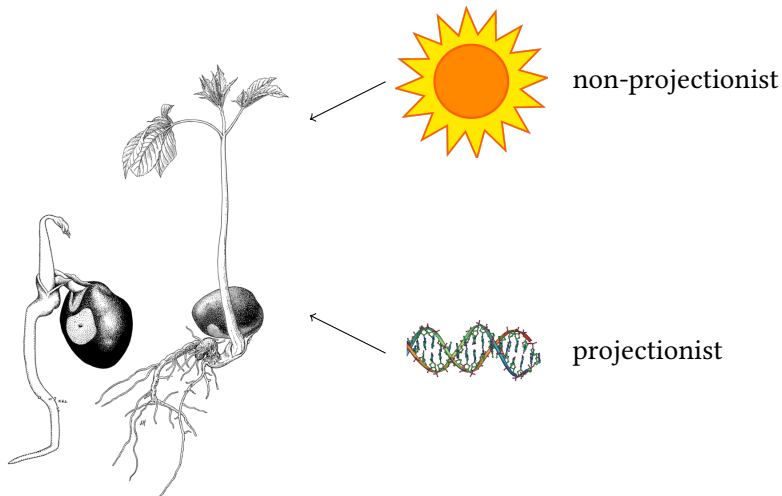
Two approaches to argument structure



Two approaches to argument structure



Two approaches to argument structure



Two approaches to argument structure

Projectionist approach



Non-projectionist approach



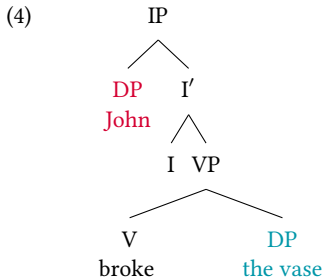
Two approaches to argument structure



Projectionist approach



Non-projectionist approach



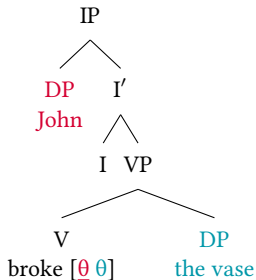
Two approaches to argument structure



Projectionist approach



(4)



Non-projectionist approach

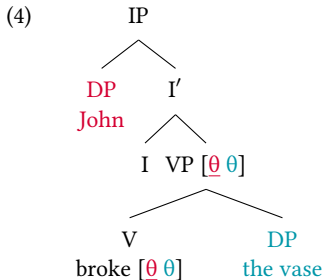


Two approaches to argument structure

Projectionist approach



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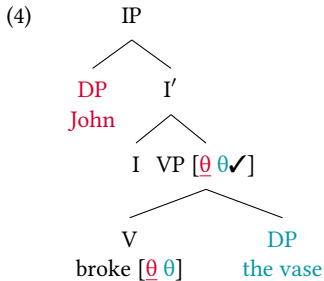


Two approaches to argument structure

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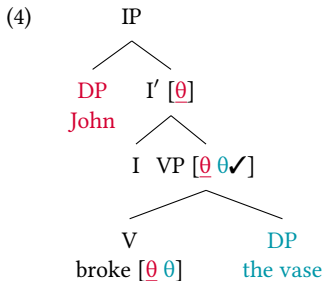
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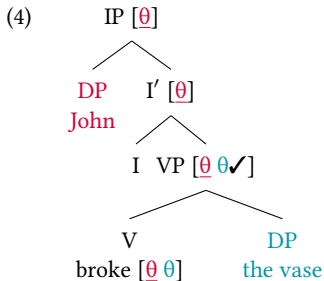


Two approaches to argument structure

Projectionist approach



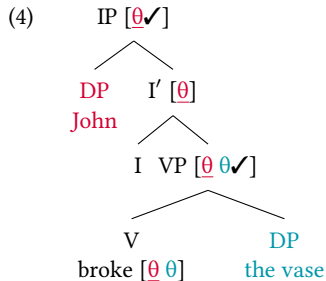
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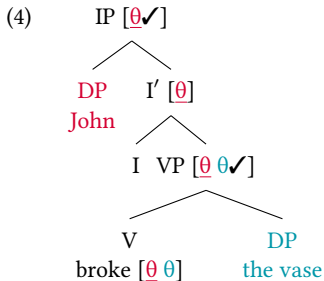
Non-projectionist approach



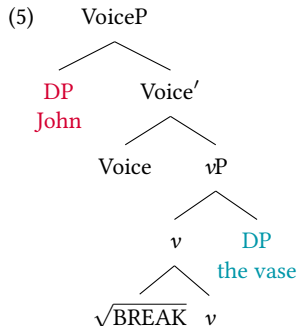
Two approaches to argument structure



Projectionist approach



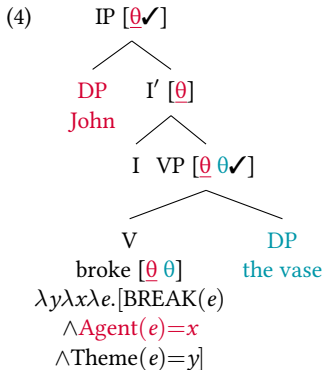
Non-projectionist approach



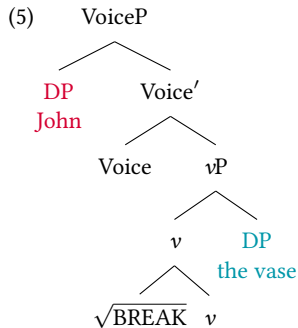
Two approaches to argument structure



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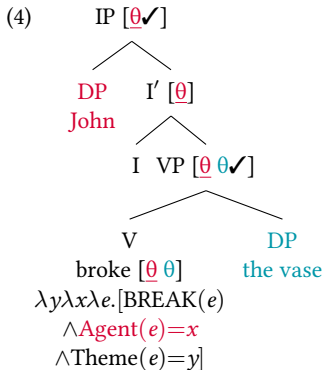
Non-projectionist approach



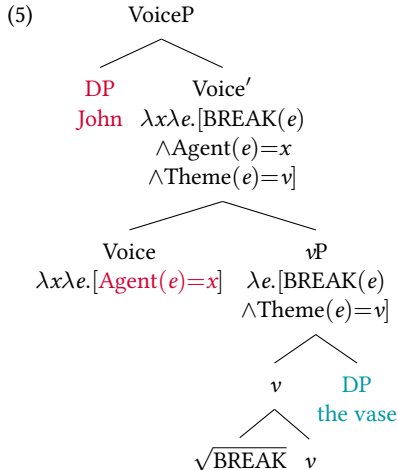
Two approaches to argument structure



Projectionist approach



Non-projectionist approach



Against the non-projectionist approach



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- Kratzer (1996) proposed that the external argument be severed from the verb (see also Marantz 1984).
- Lin (2001) proposed that all arguments in Mandarin verbs are introduced by light verbs external to the lexical verb.
- However, I will show that V-*de/bu*-V compounds in Mandarin Chinese provide evidence against the non-projectionist approach.



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- V-*de/bu*-V compounds are derived from V-V resultative compounds.

(6) 老魏踢断了那条木板。

Lǎo Wèi *tī-duàn-le* *nà* *tiáo* *mùbǎn*.

Lao Wei kick-snap-PFV that CLF plank

‘Lao Wei caused the plank to snap by kicking it.’

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(7) 老魏踢{得/不}断那条木板。

Lǎo Wèi *tī-{dé/bù}-duàn* *nà tiáo mùbǎn.*

Lao Wei kick-DE/BU-snap that CLF plank

‘Lao Wei **could/n’t** cause the plank to snap by kicking it.’

- The element *de* contributes a modal interpretation.

(8) 老魏踢得断那条木板。

Lǎo Wèi tī-dé-duàn nà tiáo mùbǎn.

Lao Wei kick-DE-snap that CLF plank

‘Lao Wei can make that plank snap by kicking.’

(Williams 2005:256)

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(9) 老魏能踢断那条木板。

Lǎo Wèi **néng** tī-duàn nà tiáo mùbǎn.

Lao Wei can kick-snap that CLF plank

‘Lao Wei can make that plank snap by kicking.’

- A V-*bu*-V compound is the negation of its V-*de*-V counterpart.

(10) 老魏踢不断那条木板。

Lǎo Wèi tī-bù-duàn nà tiáo mùbǎn.

Lao Wei kick-BU-snap that CLF plank

‘Lao Wei cannot make that plank snap by kicking.’

(adapted from Williams 2005:256)

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Lǎo Wèi tī-**bù**-duàn nà tiáo mùbǎn.

Lao Wei kick-**BU**-snap that CLF plank

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(11) 老魏不能踢断那条木板。

Lǎo Wèi **bù néng** tī-duàn nà tiáo mùbǎn.

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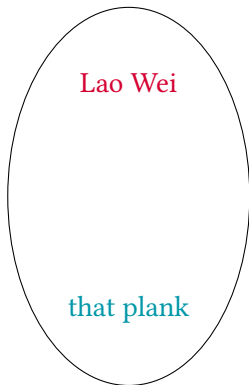
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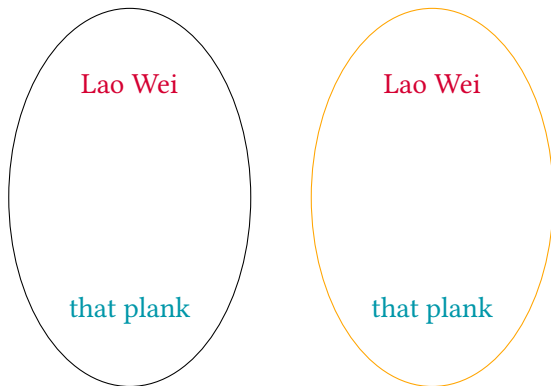
See Appendix for actuality implicatures in V-*bu*-V compounds.

Mandarin V-*de*/*bu*-V compounds



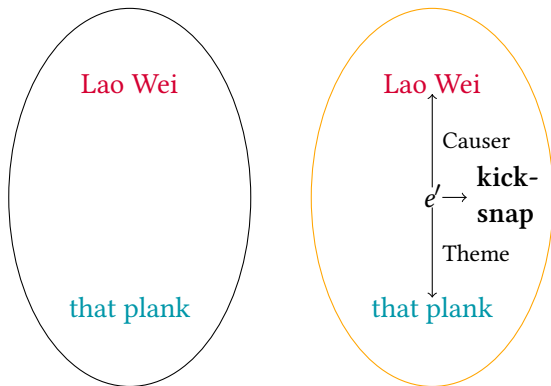
actual world w

Mandarin V-*de*/*bu*-V compounds



actual world w \xrightarrow{R} possible world w'

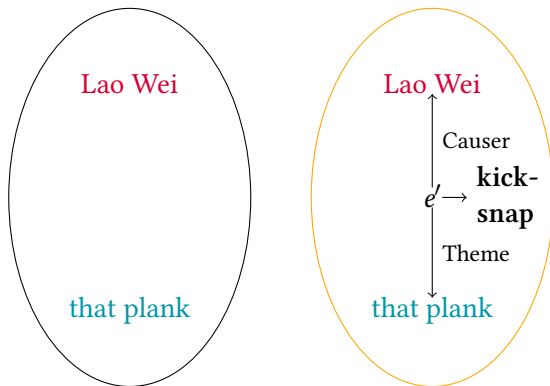
Mandarin V-*de*/*bu*-V compounds



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Mandarin V-*de/bu*-V compounds

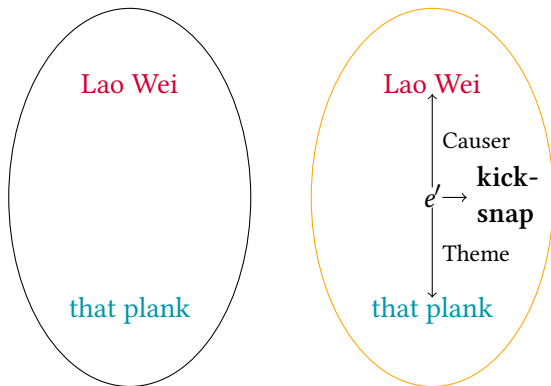
- ★ The modal element *de/bu* takes scope over the thematic relation between V-V and its arguments.



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Mandarin V-*de/bu*-V compounds

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actual world w \xrightarrow{R} possible world w'

See Appendix for the full semantics of *de/bu*.

Recap



- What introduces the thematic relation between a verb and its external argument?

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 - **Projectionist** approach: the **verb** itself



- What introduces the thematic relation between a verb and its external argument?
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 - **Non-projectionist** approach: an external functional head, e.g. **Voice**



- What introduces the thematic relation between a verb and its external argument?
 - Projectionist approach: the verb itself
 - Non-projectionist approach: an external functional head, e.g. Voice
- Mandarin *V-de/bu-V* compounds contain a modal element *de/bu* that takes scope over the thematic relation between V-V and its external argument.



- What introduces the thematic relation between a verb and its external argument?
 - Projectionist approach: the verb itself
 - Non-projectionist approach: an external functional head, e.g. Voice
- Mandarin *V-de/bu-V* compounds contain a modal element *de/bu* that takes scope over the thematic relation between V-V and its external argument.
- Which of the two approaches can explain this fact?



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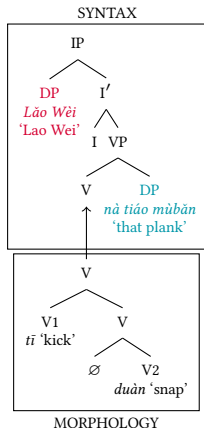
- V-V resultatives are compounds built in morphology, not syntax.

(12) 老魏踢断了那条木板。

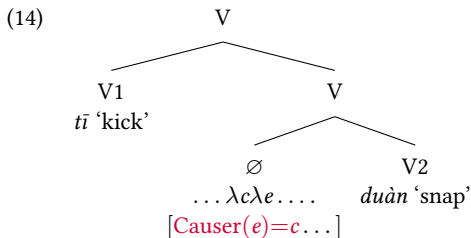
Lǎo Wèi tī-duàn-le nà tiáo mùbǎn.
Lao Wei kick-snap-PFV that CLF plank

‘Lao Wei caused the plank to snap by kicking it.’

(13)



- V-V resultatives contain a null affix \emptyset that introduces the thematic relations between V-V and its arguments.

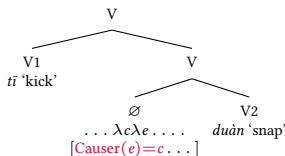


See Appendix for the full semantics of V-V resultative compounds.

- V-*de/bu*-V compounds contain a modal element *de/bu* that takes scope over the thematic relation between V-V and its external argument.

V-V compound:

(15)

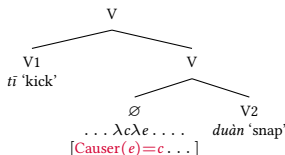


See Appendix for the full semantic derivation of V-*de/bu*-V compounds.

- V-*de/bu*-V compounds contain a modal element *de/bu* that takes scope over the thematic relation between V-V and its external argument.

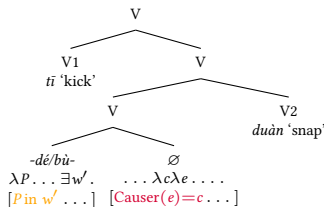
V-V compound:

(15)



V-*de/bu*-V compound:

(16)

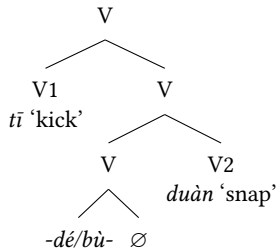


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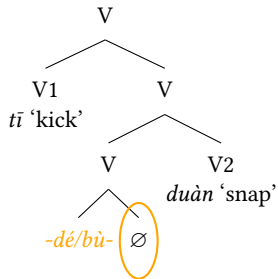


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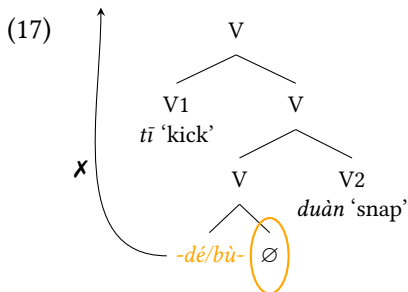
(17)



(17)



- ★ The modal element *de/bu* cannot take scope over any material external to the V-*de/bu*-V compound.

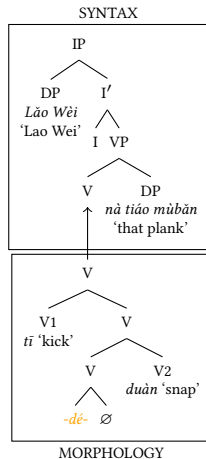


Low modal *dé*:

(19) 老魏踢得断那条木板。

Lǎo Wèi tī-*dé*-duàn nà tiáo mùbǎn.
Lao Wei kick-*DE*-snap that CLF plank

'Lao Wei can make that plank snap by kicking.'



Prediction

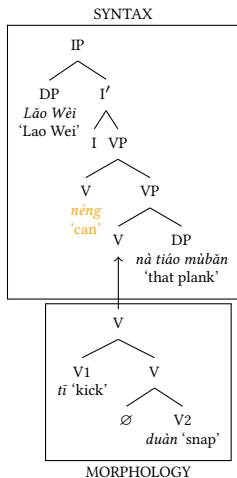


High modal *néng* 'can':

(18) 老魏能踢断那条木板。

Lǎo Wèi *néng* tī-duàn nà tiáo mùbǎn.
Lao Wei can kick-snap that CLF plank

'Lao Wei can make that plank snap by kicking.'

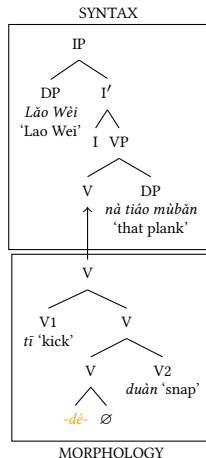


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Prediction #1: **de/bu* > *bǎ*

In a *bǎ*-construction, the canonical object appears in a preverbal position.

(20) 老魏踢断了那条木板。

Lǎo Wèi *tī-duàn-le* *nà* *tiáo* *mùbǎn*.

Lao Wei kick-snap-PFV that CLF plank

‘Lao Wei kicked and snapped that plank.’

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(21) 老魏把那条木板踢断了。

Lǎo Wèi bǎ nà tiáo mùbǎn tī-duàn-le.

Lao Wei BA that CLF plank kick-snap-PFV

‘Lao Wei affected that plank by kicking and snapping it.’

Prediction #1: **de/bu* > *bǎ*

The modal *néng* ‘can’ can take scope over *bǎ*...

(22) 老魏(不) 能把那条木板踢断。

Lǎo Wèi (bù) néng bǎ nà tiáo mùbǎn tī-duàn.

Lao Wei not can BA that CLF plank kick-snap

‘Lao Wei can(not) affect that plank by kicking and snapping it.’

Prediction #1: **de/bu* > *bǎ*



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Lao Wei not can BA that CLF plank kick-snap

‘Lao Wei can(not) affect that plank by kicking and snapping it.’

...but the modal element *de/bu* cannot take scope over *bǎ* (Wu 2004).

(23) # 老魏把那条木板踢得/不断。

#Lǎo Wèi bǎ nà tiáo mùbǎn tī-dé/bù-duàn.

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#Lǎo Wèi bǎ nà tiáo mùbǎn tī-dé/bù-duàn.

Lao Wei BA that CLF plank kick-DE/BU-snap

(i) ‘Lao Wei affected that plank by being (un)able to kick it and snap it.’ (#*bǎ* > *de/bu*)

Prediction #1: **de/bu* > *bǎ*



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Lao Wei BA that CLF plank kick-DE/BU-snap

(i) ‘Lao Wei affected that plank by being (un)able to kick it and snap it.’ (#*bǎ* > *de/bu*)

(ii) ‘Lao Wei was (un)able to affect the plank by kicking and snapping it.’ (**de/bu* > *bǎ*)

Prediction #2: **de/bu* > *bèi*

In a *bèi*-construction (\approx passive), the canonical object appears in subject position.

(24) 老魏踢断了那条木板。

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Lǎo Wèi tī-duàn-le nà tiáo mùbǎn.

Lao Wei kick-snap-PFV that CLF plank

‘Lao Wei kicked and snapped that plank.’

- (25) 那条木板被老魏踢断了。

Nà tiáo mùbǎn bèi Lǎo Wèi tī-duàn-le.

that CLF plank BEI Lao Wei kick-snap-PFV

‘That plank was affected by Lao Wei kicking and snapping it.’

Prediction #2: **de/bu* > *bèi*

The modal *néng* ‘can’ can take scope over *bèi*...

(26) 那条木板(不)能被老魏踢断。

Nà tiáo mùbǎn (bù) néng bèi Lǎo Wèi tī-duàn.
that CLF plank not can BEI Lao Wei kick-snap

‘That plank can(not) be affected by Lao Wei kicking and snapping it.’

Prediction #2: **de/bu* > *bèi*



The modal *néng* ‘can’ can take scope over *bèi*...

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‘That plank can(not) be affected by Lao Wei kicking and snapping it.’

...but the modal element *de/bu* cannot take scope over *bèi* (Wu 2004).

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(27) # 那条木板被老魏踢得/不断。

#Nà tiáo mùbǎn bèi Lǎo Wèi tī-dé/bù-duàn.
that CLF plank BEI Lao Wei kick-DE/BU-snap

(i) ‘That plank was affected by Lao Wei being (un)able to kick it and snap it.’

(#*bèi* > *de/bu*)

Prediction #2: **de/bu* > *bèi*



The modal *néng* ‘can’ can take scope over *bèi*...

(26) 那条木板(不)能被老魏踢断。

Nà tiáo mùbǎn (bù) néng bèi Lǎo Wèi tī-duàn.
that CLF plank not can BEI Lao Wei kick-snap

‘That plank can(not) be affected by Lao Wei kicking and snapping it.’

...but the modal element *de/bu* cannot take scope over *bèi* (Wu 2004).

(27) # 那条木板被老魏踢得/不断。

#Nà tiáo mùbǎn bèi Lǎo Wèi tī-dé/bù-duàn.
that CLF plank BEI Lao Wei kick-DE/BU-snap

(i) ‘That plank was affected by Lao Wei being (un)able to kick it and snap it.’

(#*bèi* > *de/bu*)

(ii) ‘That plank was (un)able to be affected by Lao Wei kicking and snapping it.’

(**de/bu* > *bèi*)

Prediction #3: **de/bu* > Adv

The modal *néng* ‘can’ can take scope over a manner adverb...

(28) 老魏(不) 能轻而易举地踢断那条木板。

Lǎo Wèi (bù) néng qīngéryījǔ-de tī-duàn nà tiáo mùbǎn.

Lao Wei not can effortlessly kick-snap that CLF plank

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‘Lao Wei was (un)able to effortlessly kick and snap that plank.’

...but the modal element *de/bu* cannot take scope over a manner adverb (Wu 2004).

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(i) ‘Lao Wei was effortlessly (un)able to kick and snap that plank.’

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(**de/bu* > effortlessly)

(adapted from Williams 2014:321)

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(adapted from Williams 2014:321)

See Appendix for examples of Adv > *de/bu*.

Prediction #4: (**de/bu* > FreqP)

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(30) 张三能击倒李四三次。

Zhāngsān *néng* jī-dǎo Lǐsì sān cì.

Zhangsan can hit-fall Lisi three time

‘Zhangsan could knock Lisi out three times.’

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(31) ?张三击得倒李四三次。

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Intended: ‘Zhangsan could knock Lisi out three times.’ (**de/bu* > FreqP)

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Context: Zhangsan and Lisi are in a boxing competition. To win, Zhangsan must knock Lisi out three times.

Scenario 2: Zhangsan only knocks Lisi out two times.

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 ‘Zhangsan could not knock Lisi out three times.’

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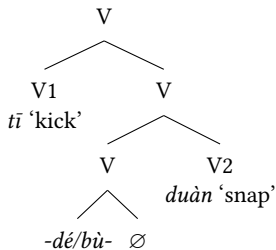
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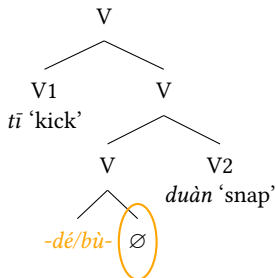
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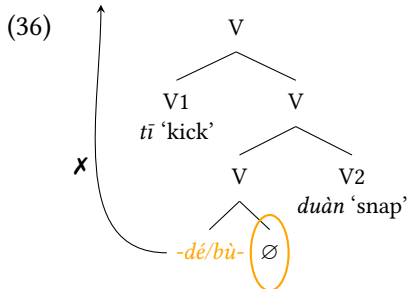
- ★ The modal element *de/bu* cannot take scope over any material external to the V-*de/bu*-V compound. (36)



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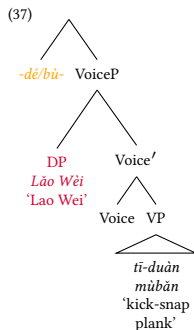
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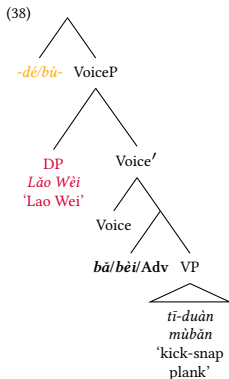
- 1 Introducing arguments
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- 4 Prediction
- 5 Alternative analysis**
- 6 Conclusion

- Alternative: sever both the external argument and *de/bu* (Tsai 2001; cf. Wu 2004 and Williams 2005).



See Appendix for a discussion of other alternatives.

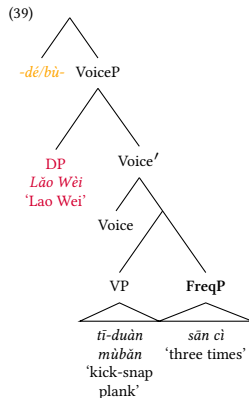
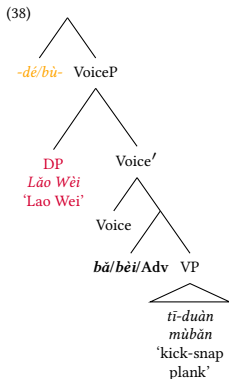
- If *de/bu* is severed from a V-*de/bu*-V compound, one might expect that material could intervene between *de/bu* and V-V.



Alternative analysis



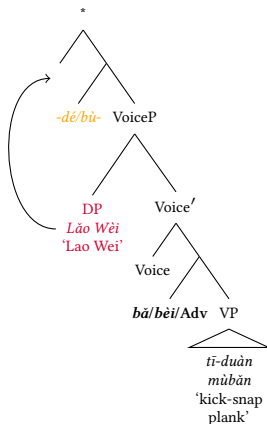
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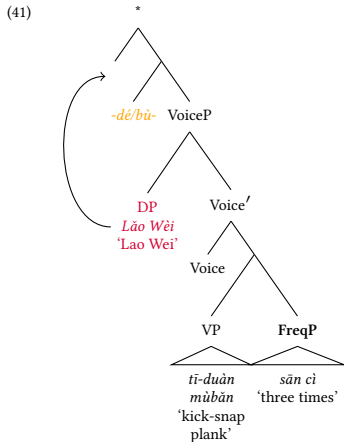
- It could be claimed that *bǎ*, *bèi* and preverbal modifiers cannot be merged below the modal element *de/bu*, as they would intervene between *de/bu* and its phonological host V-V...

(40)



Alternative analysis

- ...but this explanation cannot rule out postverbal modifiers merged below the modal element *de/bu*.



See Appendix for a discussion of V-*de/bu*-V compounds and bare NumP subjects.

Recap



- Mandarin V-*de/bu*-V compounds contain a modal element *de/bu* that takes scope over the thematic relation between V-V and its external argument.

- Mandarin *V-de/bu-V* compounds contain a modal element *de/bu* that takes scope over the thematic relation between *V-V* and its external argument.
- Projectionist approach:



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 - The modal element *de/bu* takes scope over the null affix \emptyset which introduces the thematic relations between *V-V* and its arguments.



- Mandarin *V-de/bu-V* compounds contain a modal element *de/bu* that takes scope over the thematic relation between *V-V* and its external argument.
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- Mandarin *V-de/bu-V* compounds contain a modal element *de/bu* that takes scope over the thematic relation between *V-V* and its external argument.
- Projectionist approach:
 - The modal element *de/bu* takes scope over the null affix \emptyset which introduces the thematic relations between *V-V* and its arguments.
 - The modal element *de/bu* cannot take scope over any material external to the *V-de/bu-V* compound.
- An alternative, non-projectionist analysis makes incorrect predictions about the scope facts.



- 1 Introducing arguments
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Conclusion





- I have proposed a novel syntactic and semantic analysis of V-*de/bu*-V compounds in Mandarin Chinese.

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- To the extent that this proposal is on the right track, it can be taken as evidence against the view that the external argument of a predicate is introduced by a functional head like Voice.

Thank you!



Special thanks to:

- Hans van de Koot, Shiao Wei Tham, Norman Yeo and audiences at UCL and NUS for feedback on earlier versions of this material
- Jiajia Chen, Jiaoyang Cui, Yiling Huo, Olivia Liu, Erying Qin for judgements
- Zheng Shen for organising this event



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- 7 Mandarin V-*de/bu*-V compounds
- 8 Actuality implicatures
- 9 Semantics of V-V compounds
- 10 Semantics of V-*de/bu*-V compounds
- 11 **de/bu* > Adv
- 12 Alternative analyses
- 13 Bare NumP subjects

Mandarin V-*de/bu*-V compounds

Not all disyllabic predicates have V-*de/bu*-V counterparts.

(42) 张三明白了李四的意思。

Zhāngsān míngbái-le Lǐsì de yìsì.

Zhangsan understand-PFV Lisi DE meaning

‘Zhangsan understood what Lisi meant.’

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(43) *张三明 {得/不} 白李四的意思。

**Zhāngsān míng-{dé/bù}-bái Lǐsì de yìsì.*

Zhangsan under-DE/BU-stand **Lisi** DE meaning

Intended: ‘Zhangsan {can/cannot} understand what Lisi meant.’

Mandarin V-*de/bu*-V compounds



V-*de/bu*-V = modal *de/bu* + V-V resultative

Mandarin V-*de/bu*-V compounds



$$V\text{-}de/bu\text{-}V = \text{modal } de/bu + \underbrace{V\text{-}V \text{ resultative}}_{\text{change of state}}$$

Mandarin V-*de/bu*-V compounds



$$\underbrace{V-de/bu-V}_{\text{state}} = \text{modal } de/bu + \underbrace{V-V}_{\text{change of state}} \text{ resultative}$$

Mandarin V-*de/bu*-V compounds

Sentences with V-*de/bu*-V compounds are stative.

(44) * 踢 {得/不} 断那条木板!

**Tī-{dé/bù}-duàn nà tiáo mùbǎn!*

kick-DE/BU-snap that CLF plank

‘*Be able/unable to kick and snap that plank!’



But V-*de/bu*-V compounds can in principle undergo aspectual coercion (De Swart 1998) into a change-of-state interpretation.

But V-*de/bu*-V compounds can in principle undergo aspectual coercion (De Swart 1998) into a change-of-state interpretation.

(45) 才睡了一个小时困得快睁不开眼睛了。

cái shuì-le yī gè xiǎoshí kùn-dé kuài zhēng-bù-kāi-le
only sleep-PFV one CLF hour tired-DE almost open.eye-BU-open-PFV
yǎnjīng le
eye SFP

‘I only slept an hour, and was so tired that I almost became unable to open my eyes.’
(BCC)



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(46) 祖母一看不见了父亲，她顿时慌了。

Zǔmǔ *yī* *kàn-bù-jiàn-le* *fùqīn*, *tā* *dùnshí* *huāng-le*.
grandmother once look-BU-perceive-PFV father 3SG suddenly panic-PFV
'Once Grandmother became unable to see Father, she suddenly panicked.' (BCC)

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(47) 那个老人再也听不见了声息。

Nà *gè* *lǎorén* *zài* *yě* *tīng-bù-jiàn-le* *shēngxī*.
that CLF old.person again also hear-DE/BU-perceive-PFV sound
'That old person became unable to hear a sound again.' (BCC)

Mandarin V-*de/bu*-V compounds



The state that V-*de/bu*-V compounds introduce can be shifted in time.

Mandarin V-*de/bu*-V compounds



The state that V-*de/bu*-V compounds introduce can be shifted in time.

Context: Lao Wei could not kick and snap that plank last year, but after a year of training, he can kick and snap that plank this year.

Mandarin V-*de/bu*-V compounds



The state that V-*de/bu*-V compounds introduce can be shifted in time.

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(48) #老魏去年踢得断那条木板。

#*Lǎo Wèi* qùnián tī-dé-duàn nà tiáo mùbǎn.

Lao Wei last.year kick-DE-snap that CLF plank

‘Last year, Lao Wei was able to kick and snap that plank.’

Mandarin V-de/bu-V compounds



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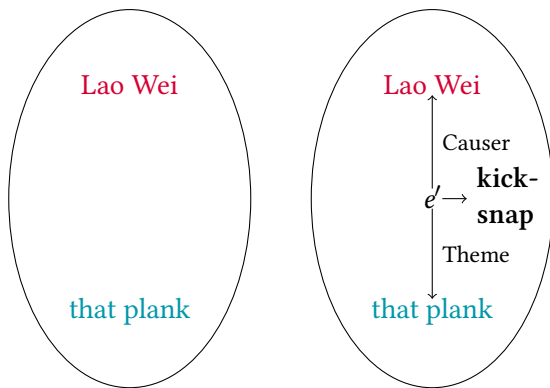
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Mandarin V-*de/bu*-V compounds

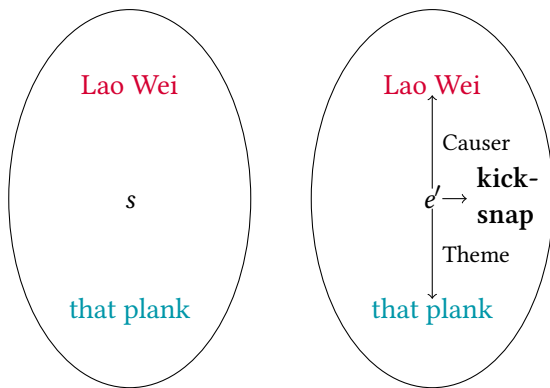
Modals return a (stative) eventuality in the actual world (Homer 2011; see also Hacquard 2006, 2009, 2010; Skibra 2020).



actual world $w \xrightarrow{R} \text{possible world } w'$

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- 10 Semantics of V-*de/bu*-V compounds
- 11 **de/bu* > Adv
- 12 Alternative analyses
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It may seem that *de/bu* takes scope only over V2 and not V1 because negative V-*bu*-V compounds have an actuality implicature which positive V-*de*-V compounds typically lack.

(50) 老魏踢得断那条木板。

Lǎo Wèi tī-dé-duàn nà tiáo mùbǎn.

Lao Wei kick-DE-snap that CLF plank

‘Lao Wei can make that plank snap by kicking.’

Not: ‘Lao Wei managed to make that plank snap by kicking.’

(adapted from Williams 2005:256-257)

(51) 老魏踢不断那条木板。

Lǎo Wèi tī-bù-duàn nà tiáo mùbǎn.

Lao Wei kick-BU-snap that CLF plank

‘Lao Wei cannot make that plank snap by kicking.’

Or: ‘Lao Wei did not manage to make that plank snap by kicking it.’

(adapted from Williams 2005:256-257)

But actuality implicatures or entailments have been observed in ability modals more generally.

- (52) *Yusuf havaii-jahaaz uraa sak-aa (#lekin us-ne havaii-jahaaz nahĩĩ*
Yusuf air-ship fly can-PFV but he air-ship NEG
uraa-yaa)
fly-PFV

‘Yusuf could fly the airplane, but he didn’t fly the airplane.’

(Bhatt 1999:176)

- (53) *Yusuf havaii-jahaaz uraa sak-taa hai/thaa (lekin vo havaii-jahaaz*
Yusuf air-ship fly can-IPFV be.PRS/be.PST but he air-ship
nahĩĩ uraa-taa hai/thaa)
NEG fly-IPFV be.PRS/be.PST

‘Yusuf is/was able to fly airplanes but he doesn’t/didn’t fly airplanes.’

(Bhatt 1999:176)

The actuality implicature in a negative V-*bu*-V compound arises due to pragmatic reasons.

(54) 老魏踢得断那条木板。

Lǎo Wèi tī-dé-duàn nà tiáo mùbǎn.

Lao Wei kick-DE-snap that CLF plank

‘Lao Wei can make that plank snap by kicking.’

Not: ‘Lao Wei managed to make that plank snap by kicking.’

(adapted from Williams 2005:256-257)

(55) 老魏踢不断那条木板。

Lǎo Wèi tī-bù-duàn nà tiáo mùbǎn.

Lao Wei kick-BU-snap that CLF plank

‘Lao Wei cannot make that plank snap by kicking.’

Or: ‘Lao Wei did not manage to make that plank snap by kicking it.’

(adapted from Williams 2005:256-257)

The actuality implicature in a negative *V-bu-V* compound arises due to pragmatic reasons.

Context: Lao Wei kicked the plank in the actual world and the plank snapped.

(56) 老魏踢断了那条木板。

Lǎo Wèi tī-duàn-le nà tiáo mùbǎn.

Lao Wei kick-snap-PFV that CLF plank

‘Lao Wei made that plank snap by kicking.’

(57) 老魏踢得断那条木板。

Lǎo Wèi tī-dé-duàn nà tiáo mùbǎn.

Lao Wei kick-DE-snap that CLF plank

‘Lao Wei can make that plank snap by kicking.’

Not: ‘Lao Wei managed to make that plank snap by kicking.’

(adapted from Williams 2005:256-257)

The actuality implicature in a negative *V-bu*-*V* compound arises due to pragmatic reasons.

Context: Lao Wei kicked the plank in the actual world but the plank did not snap.

(58) 老魏没踢断那条木板。

Lǎo Wèi méi tī-duàn nà tiáo mùbǎn.

Lao Wei not kick-snap that CLF plank

‘Lao Wei did not make that plank snap by kicking.’

(59) 老魏踢不断那条木板。

Lǎo Wèi tī-bù-duàn nà tiáo mùbǎn.

Lao Wei kick-BU-snap that CLF plank

‘Lao Wei can make that plank snap by kicking.’

Or: ‘Lao Wei did not manage to make that plank snap by kicking it.’

(adapted from Williams 2005:256-257)



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\emptyset denotes a macroevent e with two subevents: a causing event e_1 and a caused event e_2 .

$$(60) \llbracket \emptyset \rrbracket = \dots \lambda e \dots \exists e_2 \exists e_1. [\text{CAUSE}(e, e_1, e_2) \dots]$$

Proposal

\emptyset denotes a macroevent e with two subevents: a causing event e_1 and a caused event e_2 .

$$(60) \llbracket \emptyset \rrbracket = \dots \lambda e \dots \exists e_2 \exists e_1. [\text{CAUSE}(e, e_1, e_2) \dots]$$

The semantic content of e_2 and e_1 are supplied by the semantic predicates denoted by V2 and V1.

$$(61) \llbracket \emptyset \rrbracket = \lambda \mathbf{R}_2 \lambda \mathbf{R}_1 \dots \lambda e \dots \exists e_2 \exists e_1. [\text{CAUSE}(e, e_1, e_2) \wedge \dots \wedge \mathbf{R}_2(\mathbf{e}_2, \dots) \wedge \mathbf{R}_1(\mathbf{e}_1, \dots)]$$

Proposal

\emptyset denotes a macroevent e with two subevents: a causing event e_1 and a caused event e_2 .

$$(60) \llbracket \emptyset \rrbracket = \dots \lambda e \dots \exists e_2 \exists e_1. [\text{CAUSE}(e, e_1, e_2) \dots]$$

The semantic content of e_2 and e_1 are supplied by the semantic predicates denoted by V_2 and V_1 .

$$(61) \llbracket \emptyset \rrbracket = \lambda R_2 \lambda R_1 \dots \lambda e \dots \exists e_2 \exists e_1. [\text{CAUSE}(e, e_1, e_2) \wedge \dots \wedge R_2(e_2, \dots) \wedge R_1(e_1, \dots)]$$

\emptyset adds a causer.

$$(62) \llbracket \emptyset \rrbracket = \lambda R_2 \lambda R_1 \dots \lambda c \lambda e \dots \exists e_2 \exists e_1. [\text{CAUSE}(e, e_1, e_2) \wedge \text{Causer}(e) = c \wedge R_2(e_2, \dots) \wedge R_1(e_1, \dots)]$$

Proposal

\emptyset binds all available arguments of e_2 denoted by V2...

$$(63) \llbracket \emptyset \rrbracket = \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda e \dots \exists e_2 \exists e_1. [\text{CAUSE}(e, e_1, e_2) \wedge \text{Causer}(e) = c \wedge R_2(e_2, y) \wedge R_1(e_1, \dots)]$$

\emptyset binds all available arguments of e_2 denoted by V2...

$$(63) \llbracket \emptyset \rrbracket = \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda e \dots \exists e_2 \exists e_1. [\text{CAUSE}(e, e_1, e_2) \wedge \text{Causer}(e) = c \wedge R_2(e_2, y) \wedge R_1(e_1, \dots)]$$

but none of the arguments of e_1 denoted by V1.

$$(64) \llbracket \emptyset \rrbracket = \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda e \exists \mathbf{x}_2 \exists \mathbf{x}_1 \exists e_2 \exists e_1. [\text{CAUSE}(e, e_1, e_2) \wedge \text{Causer}(e) = c \wedge R_2(e_2, y) \wedge R_1(e_1, \mathbf{x}_1, \mathbf{x}_2)]$$



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The thematic relations between V-V and its arguments are explicitly introduced under the scope of the modal element.

$$(65) \llbracket d\acute{e} \rrbracket = \lambda P \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda s \exists w'. [R(s, w') \wedge [\exists e'. P(R_2, R_1, y, c, e')]] \text{ in } w'$$

The thematic relations between V-V and its arguments are explicitly introduced under the scope of the modal element.

$$(65) \llbracket d\acute{e} \rrbracket = \lambda P \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda s \exists w'. [R(s, w') \wedge [\exists e'. P(R_2, R_1, y, c, e')]] \text{ in } w'$$

cf. Tham (2012):

$$(66) \llbracket d\acute{e} \rrbracket = \lambda P \lambda w \exists w' \exists e. [R(w)(w') \wedge P(e)] \text{ in } w'$$

The thematic relations between V-V and its arguments are explicitly introduced **under the scope of the modal element**.

$$(65) \llbracket d\acute{e} \rrbracket = \lambda P \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda s \exists w'. [R(s, w') \wedge [\exists e'. P(R_2, R_1, y, c, e')]] \text{ in } w'$$

cf. Tham (2012):

$$(66) \llbracket d\acute{e} \rrbracket = \lambda P \lambda w \exists w' \exists e. [R(w)(w') \wedge P(e) \text{ in } w']$$

It is possible to analyse modal *bù* as the negation of *de*.

$$(67) \llbracket de \rrbracket = \lambda P \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda s \exists w'. [R(s, w') \wedge [\exists e'. P(R_2, R_1, y, c, e')]] \text{ in } w'$$

$$(68) \llbracket bù \rrbracket = \lambda P \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda s \neg \exists w'. [R(s, w') \wedge [\exists e'. P(R_2, R_1, y, c, e')]] \text{ in } w'$$

It is possible to analyse modal *bù* as the **negation** of *de*.

$$(67) \llbracket de \rrbracket = \lambda P \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda s \exists w'. [R(s, w') \wedge [\exists e'. P(R_2, R_1, y, c, e')]] \text{ in } w'$$

$$(68) \llbracket bù \rrbracket = \lambda P \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda s \neg \exists w'. [R(s, w') \wedge [\exists e'. P(R_2, R_1, y, c, e')]] \text{ in } w'$$

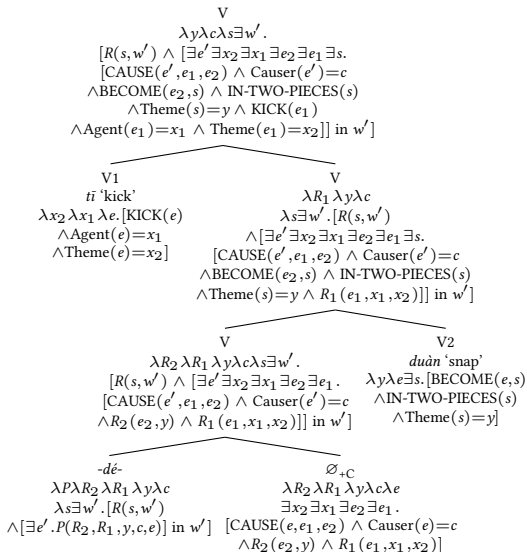
Alternatively, it is possible to analyse modal *bù* as *bù(dé)*, i.e., a simple negation marker *bù* + a null allomorph of modal *dé*.

$$(69) \llbracket bù \rrbracket = \lambda Q. \neg Q$$

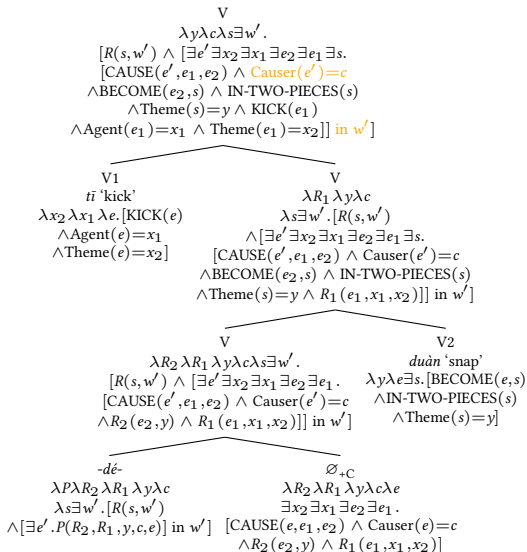
$$(70) \llbracket dé \rrbracket = \lambda P \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda s \exists w'. [R(s, w') \wedge [\exists e'. P(R_2, R_1, y, c, e')]] \text{ in } w'$$

$$(71) \llbracket bù(dé) \rrbracket = \llbracket bù \rrbracket (\llbracket dé \rrbracket) \\ = \lambda P \lambda R_2 \lambda R_1 \lambda y \lambda c \lambda s \neg \exists w'. [R(s, w') \wedge [\exists e'. P(R_2, R_1, y, c, e')]] \text{ in } w'$$

(72)



(72)





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Prediction #3: **de/bu* > Adv



A manner adverb can take scope over the modal *néng* ‘can’...

(73) 坐在沙发上的程潇慢慢地不能睁开眼睛了。

Zuò zài shāfā de Chéngxiāo mànmande bù néng zhēng-kāi
sit at sofa DE Chengxiao slowly not can open.eye-open
yǎnjīng le.
eye SFP

‘Sitting on the sofa, Chengxiao slowly became unable to open his eyes.’

Prediction #3: **de/bu* > Adv



A manner adverb can take scope over the modal *néng* ‘can’...

- (73) 坐在沙发上的程潇慢慢地不能睁开眼睛了。

Zuò zài shāfā de Chéngxiāo mànmande bù néng zhēng-kāi
sit at sofa DE Chengxiao slowly not can open.eye-open
yǎnjīng le.
eye SFP

‘Sitting on the sofa, Chengxiao slowly became unable to open his eyes.’

- (74) 你已经慢慢地不能找到自己的梦想了。

Nǐ yǐjīng mànmande bù néng zhǎo-dào zìjǐ de mèngxiǎng le.
you already slowly not can search-reach self DE dream SFP

‘You have already slowly become unable to find your own dream.’

Prediction #3: **de/bu* > Adv



...and the modal *néng* ‘can’ can take scope over a manner adverb.

(75) 老魏(不) 能轻而易举地踢断那条木板。

Lǎo Wèi (bù) néng qīngéryìjǔ-de tī-duàn nà tiáo mùbǎn.

Lao Wei not can effortlessly kick-snap that CLF plank

‘Lao Wei was (un)able to effortlessly kick and snap that plank.’

Prediction #3: **de/bu* > Adv



A manner adverb can take scope over a V-*de/bu*-V compound...

(76) 坐在沙发上的程潇慢慢地睁不开眼睛了。

Zuò zài shāfā de Chéngxiāo mànmande zhēng-bù-kāi yǎnjīng le.
sit at sofa DE Chengxiao slowly open.eye-BU-open eye SFP

‘Sitting on the sofa, Chengxiao slowly became unable to open his eyes.’ (Internet)
(Adv > *de/bu*)

Prediction #3: **de/bu* > Adv



A manner adverb can take scope over a V-*de/bu*-V compound...

(76) 坐在沙发上的程潇慢慢地睁不开眼睛了。

Zuò zài shāfā de Chéngxiāo mànmande zhēng-bù-kāi yǎnjīng le.
sit at sofa DE Chengxiao slowly open.eye-BU-open eye SFP

‘Sitting on the sofa, Chengxiao slowly became unable to open his eyes.’ (Internet)
(Adv > *de/bu*)

(77) 你已经慢慢地找不到自己的梦想了。

Nǐ yǐjīng mànmande zhǎo-bù-dào zìjǐ de mèngxiǎng le.
you already slowly search-BU-reach self DE dream SFP

‘You have already slowly become unable to find your own dream.’ (Internet)
(Adv > *de/bu*)

Prediction #3: **de/bu* > Adv



...but the modal element *de/bu* cannot take scope over a manner adverb.

(78) #老魏轻而易举地踢得/不断那条木板。

#Lǎo Wèi qīngéryìjǔ-de tī-dé/bù-duàn nà tiáo mùbǎn.

Lao Wei effortlessly kick-DE/BU-snap that CLF plank

(i) 'Lao Wei was effortlessly (un)able to kick and snap that plank.'

(#effortlessly > *de/bu*)

(ii) 'Lao Wei was (un)able to effortlessly kick and snap that plank.'

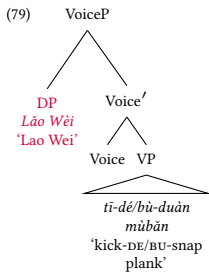
(**de/bu* > effortlessly)

(adapted from Williams 2014:321)



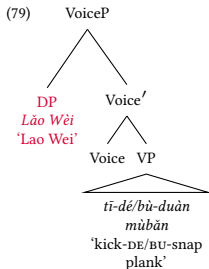
- 7 Mandarin V-*de/bu*-V compounds
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Alternative #1:

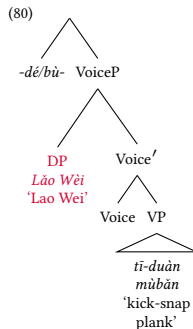


Alternative #2:

Alternative #1:



Alternative #2:



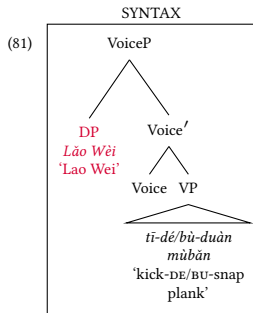
Alternative #1



Alternative #1a:

Alternative #1b:

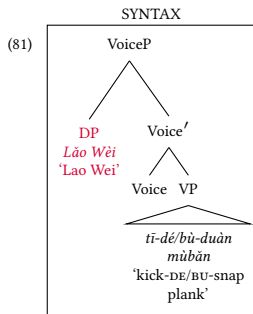
Alternative #1c:



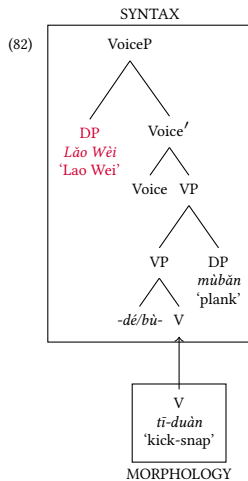
Alternative #1



Alternative #1a:



Alternative #1b:

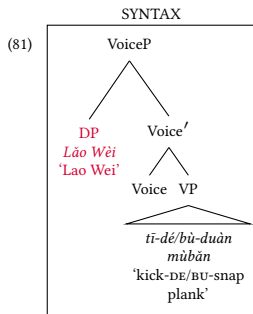


Alternative #1c:

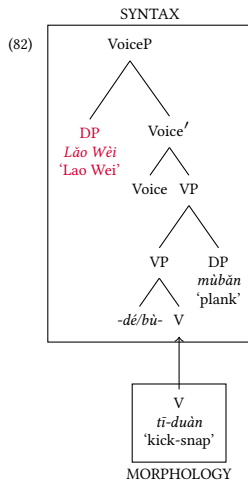
Alternative #1



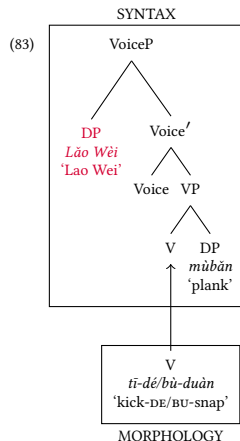
Alternative #1a:



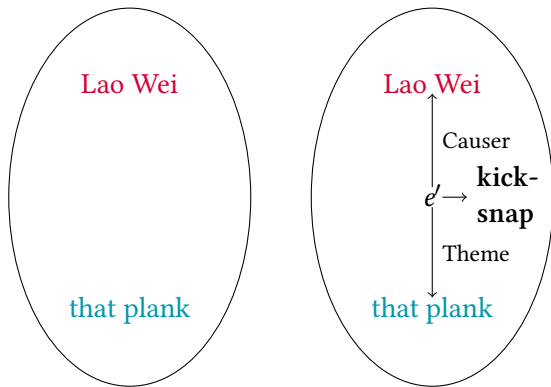
Alternative #1b:



Alternative #1c:

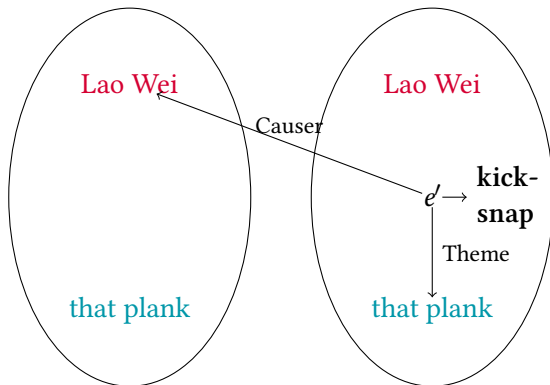


Alternative #1



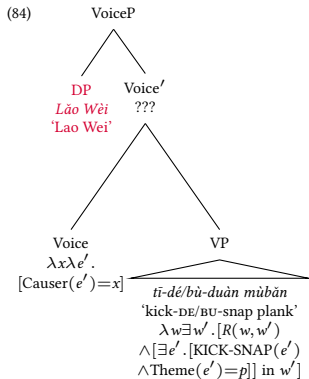
actual world $w \xrightarrow{R}$ possible world w'

Alternative #1

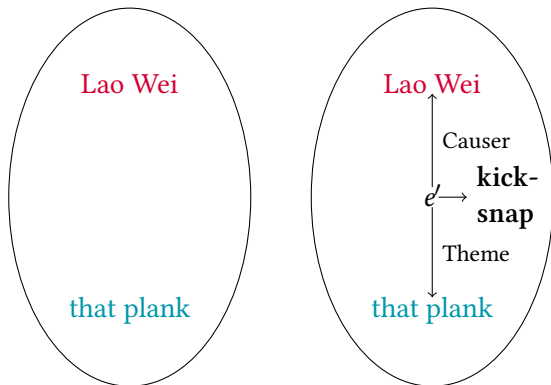


actual world $w \xrightarrow{R}$ possible world w'

Alternative #1

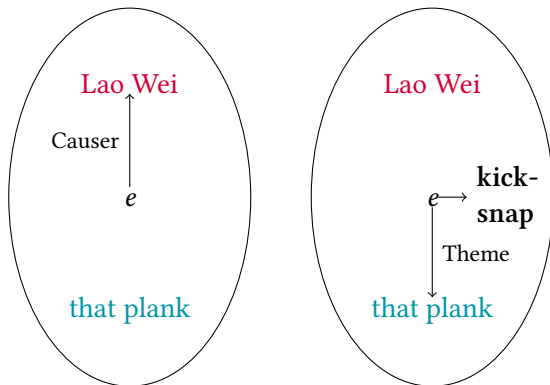


Alternative #1



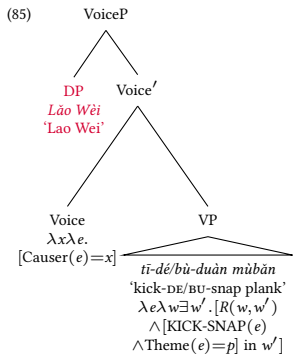
actual world w \xrightarrow{R} possible world w'

Alternative #1



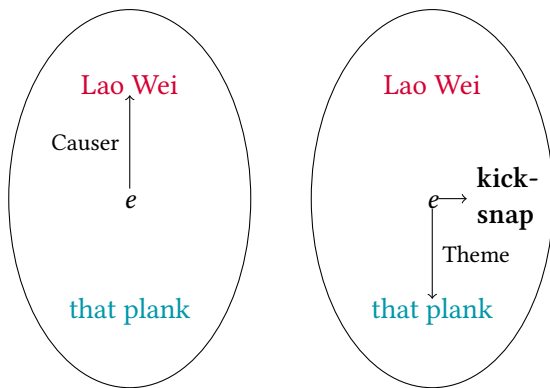
actual world $w \xrightarrow{R}$ possible world w'

Alternative #1



Alternative #1

But the event e in the actual world w is not always identical to the event e in the possible world w' (Skibra 2020).



actual world $w \xrightarrow{R}$ possible world w'

If the event e in the real world is identical to the event e in the possible world, one would predict that we could modify the event in the possible world with a manner adverb, but this prediction is not borne out.

(86) #老魏轻而易举地踢得/不断那条木板。

#*Lǎo Wèi qīngéryījǔ-de tī-dé/bù-duàn nà tiáo mùbǎn.*
Lao Wei effortlessly kick-DE/BU-snap that CLF plank

(i) 'Lao Wei was effortlessly (un)able to kick and snap that plank.'

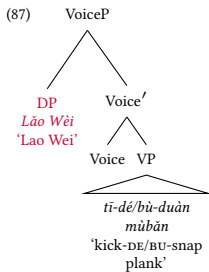
(#effortlessly > *de/bu*)

(ii) 'Lao Wei was (un)able to effortlessly kick and snap that plank.'

(**de/bu* > effortlessly)

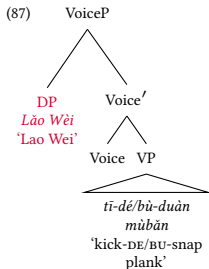
(adapted from Williams 2014:321)

Alternative #1:

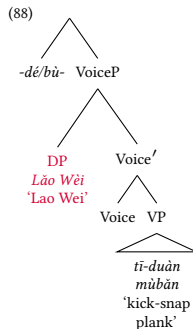


Alternative #2:

Alternative #1:



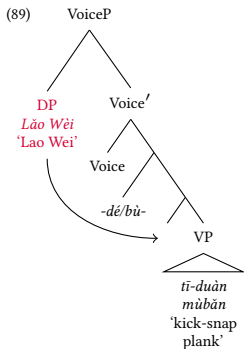
Alternative #2:



Alternative #2



Alternative #2a:

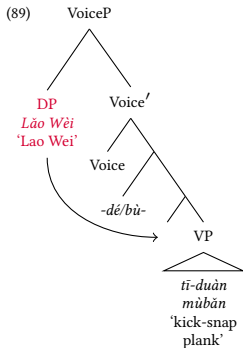


Alternative #2b:

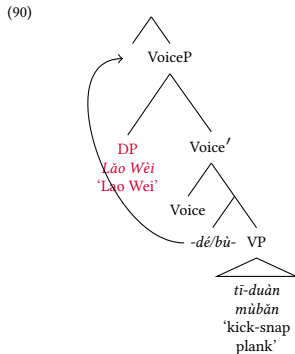
Alternative #2



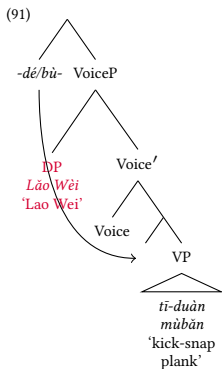
Alternative #2a:



Alternative #2b:



Alternative #2c:

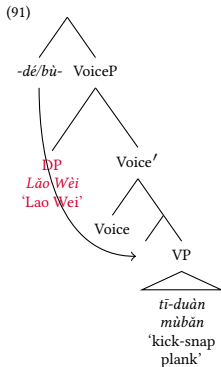


Alternative #2d:

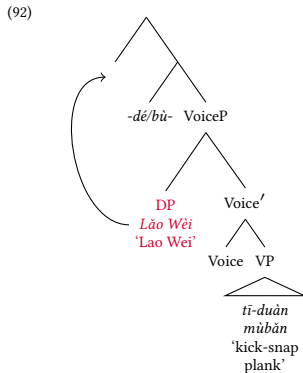
Alternative #2



Alternative #2c:



Alternative #2d:





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Alternative #2



Alternative #2 also gives the wrong readings for sentences with a bare NumP subject.

(93) 三个人就推得倒那辆车。

Sān gè rén jiù tuī-dé-dǎo nà liǎng chē.
three CLF people then push-DE-topple that CLF car

‘(A group of) three people could make that car topple by pushing.’

(Williams 2005:258)

Alternative #2



Alternative #2 also gives the wrong readings for sentences with a bare NumP subject.

(93) 三个人就推得倒那辆车。

Sān gè rén jiù tuī-dé-dǎo nà liǎng chē.
three CLF people then push-DE-topple that CLF car

‘(A group of) three people could make that car topple by pushing.’

(Williams 2005:258)

(94) 这条鳄鱼又大又肥，几个人也拉不动它。

Zhè tiáo èyú yòu dà yòu féi, jǐ gè rén yě
this CLF crocodile both big and fat a.few CLF people also
lā-bù-dòng tā.
pull-BU-move it

‘This crocodile was so big and fat, a few people could not make it budge by pulling it.’ (BCC)

Suppose the bare NumP subject is an existential quantifier:

(95) 三个人 *sān gè rén* ‘three people’ = $\exists x. [\text{person}(x) \wedge |x|=3]$ (to be revised)

Alternative #2



Alternative #2 gives a reading of the positive V-*de*-V compound that is too weak.

(96) 三个人推得倒那辆车。

Sān gè rén tuī-dé-dǎo nà liǎng chē.
three CLF people push-DE-topple that CLF car

Not: 'It is possible that there exists a group of three people who pushed that car over.' (too weak)

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Not: 'It is possible that there exists a group of three people who pushed that car over.' (too weak)

(97) 三个人推不倒那辆车。

Sān gè rén tuī-bù-dǎo nà liǎng chē.
three CLF people push-BU-topple that CLF car

'It is not possible that there exists a group of three people who pushed that car over.'



But in addition to individual-denoting readings, bare NumPs also have a quantity-denoting reading that lacks existential force (Li 1998).

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(98) * 三个学生在学校受伤了。

**Sān gè xuéshēng zài xuéxiào shòushāng le.*
three CLF student at school hurt SFP

Intended: 'Three students were hurt at school.'

(Li 1998:694)

But in addition to individual-denoting readings, bare NumPs also have a quantity-denoting reading that lacks existential force (Li 1998).

(98) *三个学生在学校受伤了。

**Sān gè xuéshēng zài xuéxiào shòushāng le.*
three CLF student at school hurt SFP

Intended: 'Three students were hurt at school.'

(Li 1998:694)

(99) 有三个学生在学校受伤了。

Yǒu sān gè xuéshēng zài xuéxiào shòushāng le.
have three CLF student at school hurt SFP

'There are three students hurt at school.'

(Li 1998:694)

Suppose the bare NumP subject is not an existential quantifier, but denotes a property:

(100) $\llbracket \text{三个人 } s\bar{a}n\ g\grave{e}\ r\acute{e}n \text{ 'three people'} \rrbracket = \lambda x. [\text{person}(x) \wedge |x|=3]$

Suppose the bare NumP subject is not an existential quantifier, but denotes a property:

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The unbound variable x is bound by a silent GEN operator (\approx *generally*).

(101) $\llbracket \text{GEN} \rrbracket = \lambda Q \lambda P. \text{GEN } x. (P(x))(Q(x))$

If we assume that bare NumP subjects are bound by a generic operator, the readings are incoherent.

(102) 三个人推得倒那辆车。

Sān gè rén tuī-dé-dǎo nà liǎng chē.
three CLF people push-DE-topple that CLF car

Not: 'It is possible that a group of three people generally pushed that car over.'

If we assume that bare NumP subjects are bound by a generic operator, the readings are incoherent.

(102) 三个人推得倒那辆车。

Sān gè rén tuī-dé-dǎo nà liǎng chē.
three CLF people push-DE-topple that CLF car

Not: 'It is possible that a group of three people generally pushed that car over.'

(103) 三个人推不倒那辆车。

Sān gè rén tuī-bù-dǎo nà liǎng chē.
three CLF people push-BU-topple that CLF car

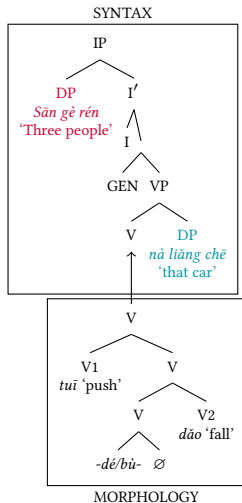
Not: 'It is not possible that a group of three people generally pushed that car over.'

(104) 三个人推 {得/不} 倒那辆车。

Sān gè rén tuī-dé/bù-dǎo
 three CLF person push-DE/BU-topple
nà liǎng chē.
 that CLF car

‘Three people could/n’t push that car over.’

(105)



We now get the right readings.

(106) 三个人推得倒那辆车。

Sān gè rén tuī-dé-dǎo nà liǎng chē.
three CLF people push-DE-topple that CLF car

‘A group of three people generally can push that car over.’

We now get the right readings.

(106) 三个人推得倒那辆车。

Sān gè rén tuī-dé-dǎo nà liǎng chē.
three CLF people push-DE-topple that CLF car

‘A group of three people generally can push that car over.’

(107) 三个人推不倒那辆车。

Sān gè rén tuī-bù-dǎo nà liǎng chē.
three CLF people push-BU-topple that CLF car

‘A group of three people generally cannot push that car over.’