A Tale of Two Peripheries: Evidence from Chinese adverbials, light verbs, applicatives and object fronting

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0. Introduction

This paper sets out to join a recent inquiry into the peripheral area around the edge of vP along the line of Belletti (2004, 2005). It is suggested that, in comparison with other languages more agglutinating in nature, Chinese provides an ideal testing ground for this venture in that its linguistic expressions are often constructed analytically (cf. Huang 2004), and their "loosened" parts may spread over functional projections in a minimalist manner, i.e., Merge instead of Move very much in line with the notion of Lexical Courtesy. We show that their distribution concentrates on two specific areas, that is, the vP periphery vs. the left periphery in Rizzi's (1997) sense, which in turn are associated with comitativity and causality respectively through the syntax-semantics interface.

1. Inner Adverbials vs. Outer Adverbials

1.1. How-why Alternations in a Wider Context

Since Collins's (1991) seminal work on the asymmetry between why and how come in English, there is a growing interest in studying the distribution and interpretation of wh-adverbials across languages. What we have observed in Chinese is another line of division in terms of their syntactic distribution, i.e., inner wh-adverbials vs. outer wh-adverbials, roughly corresponding to the classic distinction between sentential adverbs and VP-adverbs (cf. Tsai 2008a). Here we would like to argue that the division between the vP periphery and the left periphery is most easily seen in this inner-outer dichotomy: When zenme appears before a future modal, it gets interpreted as causal, as in (1a). In contrast, it receives an instrumental reading in a postmodal position, as in (1b): 2

(1) a. tamen zenme hui chuli zhe-jian shi?   [outer how > modal]
    they how will handle this-Cl matter
    'How come they will handle this matter?'

1 I benefit greatly from discussion with Adriana Belletti, Lisa Cheng, Candice Cheung, Yang Gu, James Huang, K. A. Jayaseelan, Kazunori Kikushima, Audrey Li, Luther Liu, Keiko Murasugi, Paul Portner, Mamoru Saito, Arthur Stepanov, Rint Sybesma, Sze-Wing Tang, Ting-Chi Wei, Iris Wu, and Barry Yang. Special thanks to Memo Cinque, Richie Kayne, and Luigi Rizzi for their inspiration and encouragement over the years. The research leading to this article is sponsored by the Chiang Ching-kuo Foundation for International Scholarly Exchange, by the Research Center for Humanities and Social Sciences of National Tsing Hua University, and by the National Science Council of Taiwan (NSC 89-2411-H-007-046; NSC 94-2411-H-007-020; NSC 96-2411-H-007-026)

2 Built upon Chomsky's (2000) observation that Merge preempts Move, Tsai (1994b, 1999) defines the lexical courtesy as follows:

(i) If a language has the option of Merge, it will always use it.

2 The abbreviations used in this paper are glossed as follows: 1S: first person singular; 3S: third person singular; Acc: accusative case; Aff: affective marker; AppP: applicative phrase; AV: actor voice; Cl: classifier; Dat: dative case; Eth.dat: ethic dative; EvalP: evaluative phrase; Foc: focus marker; FP: focus phrase; Inc: inchoative aspect; IntP: interrogative phrase; Lnk: linker; Nom: nominative case; Obl: oblique case; Past: past tense; Prf: perfective aspect; Q: question particle; Rea: realis mood; Res: resultative aspect; Top: topic marker.
b. tamen hui *zenme* chuli zhe-jian shi? [modal > inner *how*]
   they will how handle this-Cl matter
   'How will they handle this matter?'

There are two forms of Chinese *why* as well: It is shown by (2a) that outer *why* patterns with an adverb, and can never appear after the future modal, and the interpretation is strictly a reason question. On the other hand, inner *why* behaves more like a PP, and typically appears after the future modal, resulting in a purpose question, as illustrated by (2b):

(2) a. Akiu *weishenme* hui zou? [outer *why* > modal]
   Akiu why will leave
   ‘Why would Akiu leave?’

   b. Akiu hui *wei(-le) shenme* cizhi? [modal > inner *why*]
   Akiu will for(-LE) what resign
   ‘For what purpose would Akiu resign?’

In fact, as noted by Stepanov & Tsai (2008), there are also two types of *why*-questions in Russian: *počemu*, a reason *why*, must appear above negation, as in (3a), whereas its purpose counterpart, *začem*, cannot, as in (3b):

(3) a. *počemu* vy ne skazali mne ob etom?
   WhyR you not said me-dat about this
   ‘For what reason didn’t you tell me about this?’

   b.* *začem* vy ne skazali mne ob etom?
   WhyP you not said me-dat about this
   ‘For what purpose didn’t you tell me about this?’

On the other hand, while it is impossible to put *počemu* ‘whyR’ in the scope of negation by forming an indefinite *wh*, the same practice is perfectly fine with *začem* ‘whyP’, as evidenced by the contrast between (4a,b):

(4) a.* mne ne-*počemu* tuda xodit’.
   me-dat not-whyR there to-go
   ‘I have no reason in going there’

   b. mne ne-*začem* tuda xodit’.
   me-dat not-whyP there to-go
   ‘I have no purpose in going there’

This is reminiscent of the negative island effects on Chinese outer *why*, as illustrated by the contrast between (5a,b). On the other hand, the inner *why*, by virtue of assuming a PP form, can indeed be rescued by an indefinite construal under negation (cf. Tsai 1994a,b, Stepanov & Tsai 2008), as in (6):

(5) a. Akiu *weishenme* bu likai?
   Akiu why not leave
   ‘Why didn’t Akiu leave?’
b. * Akiu bu **wei**shenme likai?
   Akiu not why leave

(6) Akiu bu **wei**(-le) shenme likai. ta zhi shi bu naifan le!
   Akiu not for(-LE) what leave he only be not patient Inc
   ‘Akiu left for no purpose. He was just growing impatient!’

Furthermore, a recent fine-grained study of Japanese *wh*-adverbials also reveals that *nande* can be interpreted as either reason or instrumental, depending on its syntactic position as well as its categorial status (cf. Fujii et al. to appear), as exemplified by the ambiguity displayed by (7a,b):

(7) Mari-wa nande kaetta-no?
   Mari-Top NANDE left-Q
   a. ‘How did Mari leave?’ [instrumental]
   b. ‘Why did Mari leave?’ [reason]

The above ambiguity thus provides another fine example of *how-why* alternations in Tsai's (2008a) sense, which can be dissolved by replacing *nande* with its uncontracted counterpart *nani-de* 'what-with', presumably a PP in syntactic terms, as in (8a), or by adding a de-D-linking marker *mata* 'on.earth', as in (8b):³

(8) a. Mari-wa nani-de kaetta-no?
   Mari-Top what-with left-Q
   ‘With what (means) did Mari leave?’ [instrumental]
   b. Mari-wa nande mata kaetta-no?
   Mari-Top NANDE on.earth left-Q
   ‘Why on earth did Mari leave?’ [reason]

Interestingly enough, only instrumental *nande* (call it *nande*¹) and its PP form can appear below certain sentential adverbials such as *kanarazu* 'necessarily' or *tokidoki* 'sometimes', as shown by (9a). In contrast, the corresponding reason question is blocked in the same configuration, as shown by (9b):

(9) Hiroshi-wa kanarazu/tokidoki nande¹/nani-de okayu-o taberu-no?
   Hiroshi-Top necessarily/sometimes how/what-with rice.congee-Acc eat-Q
   a. ‘How does Hiroshi necessarily/sometimes eat rice congee?’ [instrumental]
   b.∗ ‘Why does Hiroshi necessarily/sometimes eat rice congee?’ [*reason]

On the other hand, when *nande* appears above those adverbials with *mata*, the reading is distinctively reason (call it *nande*²), and the instrumental question is blocked instead, as evidenced by (10a,b):

(10) Hiroshi-wa nande² mata kanarazu/tokidoki okayu-o taberu-no?
   Hiroshi-Top why on.earth necessarily/sometimes rice.congee-Acc eat-Q

³ It should be pointed out here that *nande* does not have the usual manner reading like English *how*. Also, as noted by Fujii et. al (2010), if *mata* does not form an intonation group with *nande*, then it is interpreted as 'again', and the instrumental reading does come out.
4

a. # 'How on earth does Hiroshi necessarily/sometimes eat rice congee?' [*instrumental]
b. 'Why on earth does Hiroshi necessarily/sometimes eat rice congee?' [reason]

On the historical front, we can also find evidence for the inner-outer dichotomy in Tsou: First consider (11a): Mainenu 'how' starts as a verbal predicate linked to the main predicate by the conjunction ho, though in the latter stage of development ho has evolved into a complementizer introducing a control complement (cf. Tsai & Chang 2003, Tsai 2007a):

(11) a. m-i-ta **m-ainenu** ho m-i-ta eobak-o ta-Mo'o 'e-Pasuya?
   AV-Rea-3S AV-how Lnk AV-Rea-3S hit-AV Obl-Mo'o Nom-Pasuya
   'How did Pasuya hit Mo'o?' [instrumental/manner/resultative]
   (Lit.) 'Pasuya hit Mo'o and how?'

b. m-i-ta **m-ainenu** [ci m-i-ta eobak-o ta-Mo'o] 'e-Pasuya?
   AV-Rea-3S AV-how such.that AV-Rea-3S hit-AV Obl-Mo'o Nom-Pasuya
   'How come Pasuya hit Mo'o?' [causal]
   (Lit.) 'How was Pasuya such that he hit Mo'o?'

c. m-i-ta **m-ainci** eobak-o ta-Mo'o 'e-Pasuya?
   AV-Rea-3S AV-why hit-AV Obl-Mo'o Nom-Pasuya
   'Why did Pasuya hit Mo'o?' [reason]

Mainenu can also be construed as a matrix predicate taking a finite clause headed by ci 'such.that' as its complement, as evidenced by (11b). As a result, a causal question is formed. The further development has seen a collapsing of the bi-clausal structure, with mainenu and ci contracted into a sentential adverbial mainci 'why', as shown in (11c). We therefore have another case of the inner-outer distinction cutting across how-questions and why-questions.

1.2. Inner Selfhood vs. Outer Selfhood

It is worthwhile to note that there is a strong correspondence between outer adverbials and eventuality construals, in particular, event-level causation. Namely, when we ask a why-question, we are essentially presupposing the existence of a cause or reason for the current event, and asking the addressee to point out what it is (cf. Karttunen 1977, Bromberger 1992). At this level, outer wh-adverbials always scope over the subject. As a result, they do not observe the agentivity restriction like their inner counterparts such as instrumental how and purpose why. The latter is strictly agent-oriented, expressing a kind of proto-comitativity associated various usages of English with (cf. Tsai 2008a). As evidenced by the absence of instrumental readings in the unaccusative construction (12) and the locative-existential construction (13), non-agent subjects are only compatible with outer wh-adverbials:

(12) na-ben shu zenme/*zenmeyang chu-xian-le?
   that-Cl book how come/how show-up-Prf
   a. 'How come that book showed up?'
   b.# 'By what means did that book show up?'

(13) cong faguo zenme/*zenmeyang lai-le san-ge gongchengshi?
   from France how come/how come-Prf three-Cl engineer
   a. 'How come three engineers came from France?'
b.# 'By what means did three engineers come from France?'

The same asymmetry obtains for the pair of Chinese why's as well, as illustrated below:

(14) na-ben shu weishenme/*wei(-le) shenme chu-xian-le?
     that-Cl book why/for(-LE) what show-up-Prf
a. 'Why did that book show up?'

b.# 'For what purpose did that book show up?'

(15) cong faguo zenme/*wei(-le) shenme lai-le san-ge gongchengshi?
      from France why/for(-LE) what come-Prf three-Cl engineer
a. 'Why did three engineers come from France?'

b.# 'For what purpose did three engineers come from France?'

As a matter of fact, a parallel to the inner-outer dichotomy can be found in Chinese reflexive adverbials as well: In (16a), the premodal ziji is interpreted as anti-causal (e.g., without others' coercion/persuasion), while in (16b), its postmodal counterpart is construed as anti-comitative (i.e., without others' company/help):

(16) a. Akiu ziji hui chuli zhe-jian shi. [outer self > modal]
      Akiu self will handle this-Cl matter
      'Akiu will handle this matter on his own initiative/voluntarily.'

b. Akiu hui ziji chuli zhe-jian shi. [modal > inner self]
   Akiu will self handle this-Cl matter
   'Akiu will handle this matter alone/in person.'

Again, we found the subject agentivity effects on inner reflexive adverbial construals: As shown by unaccusative sentences like (17) and locative-existential sentences like (18), only the anti-causal readings survive, whereas the anti-comitative readings are blocked:

(17) na-ben shu ziji chu-xian-le.
      that-Cl book self show-up-Prf
a. 'That book shows up by itself (i.e., without human intervention).'

b.# 'That book shows up alone.'

(18) cong faguo ziji lai-le san-ge gongchengshi.
      from France self come/how come-Prf three-Cl engineer
a. 'From France came three engineers without invitation.'

b.# 'From France came three engineers by themselves/in person.'

These parallels lead us to the conclusion that outer wh-adverbials patterns with outer reflexive adverbials in expressing (anti-)causality, while inner wh-adverbials patterns with inner reflexive adverbials in expressing (anti-)comitativity (i.e., a with-relation in the sense of Parsons (1995)). Based on Rizzi's split-CP analysis, we propose to associate the property of outer adverbials with the left periphery, while attributing the property of inner adverbials to the vP periphery in the spirit of Belletti (2002, 2003) and Jayaseelan (2007). The two peripheries roughly correspond to the edges of two strong phases, i.e., CP and vP, along the line of Chomsky (1999, 2000). We may thus visualize this inner-outer dichotomy in the following diagram:
Building upon Ramchand's (2003) distinction between the causation projection and the process projection within vP, we implement the insight in terms of a causative phrase (CauP) in the left periphery to encode the eventuality causation mentioned above (also cf. Shlonsky & Soare 2011). The Spec of CauP thus readily provides a locus for outer reflexive and wh-adverbials, except perhaps for the causal zenme, which may well serve as the head of the interrogative phrase (IntP), patterning with perché in Italian and how come in English (see Tsai 2008a for detailed discussion). In contrast, inner reflexive and inner wh-adverbials are agent-oriented in nature. They serve as a vP-adjunct in syntax, while behaving like a focus operator in terms of semantics (cf. Tsai, to appear).

Argumental reflexives, on the other hand, either stay within VP as anaphors, typically subject-oriented, or situate high above as logophors in the so-called source phrase (SrcP), typically speaker-oriented (cf. Huang & Liu 2000).

All in all, the syntax-semantics correspondences of Chinese inner/outer adverbials thus provide a strong argument for the proposed two-periphery analysis. As a point of interest, it is worthwhile to note that a doubled strong pronoun in a vP-internal focus position in Italian can produce an adverbial-like "in person" reading (cf. Belletti 2005), as shown below:

(20) Maria manderà suo fratello, invece **Gianni** verrà **lui**.
Maria will.send her brother but **Gianni** will.come he
'Maria will send her brother, but Gianni will come himself/in person.'
In a sense, this so-called "strong pronoun doubling" provide cross-linguistic support for our proposal to tie inner *Self* with the vP periphery. We will return to the connection between focus construals and the vP periphery below.

2. Inner Light Verb vs. Outer Light Verb

Another case in favor of our claim has to do with the fact that there are also two classes of Chinese light verbs which, rather surprisingly, displays the now familiar inner-outer asymmetry (cf. Tsai 2007b): The first class includes eventuality predicates such as CAUSE, as first discussed in the seminal work of Huang (1994, 1997). It is argued that the syntax-semantics mismatch of (21) can be resolved by analyzing its underlying structure in parallel to (22), where a lexical causative verb *rang* is present, and the resultative verbal complex *chi-de* is returned to its normal position:4

(21) na-dun fan *chi-de* Akiu huomaosanzhang.
that-Cl meal eat-Res Akiu furious
'That meal made Akiu eat such that he became furious.'

(22) na-dun fan *rang* Akiu *chi-de* huomaosanzhang. [lexical light verb]
that-Cl meal cause Akiu eat-Res furious
'That meal made Akiu eat such that he became furious.'

Specifically, we entertain the possibility that in (21), there is an implicit causative predicate CAUSE, situated in exactly the same position as its lexical counterpart in (22), as illustrated in (23a):

(23) a. na-dun fan CAUSE Akiu *chi-de* huomaosanzhang. [outer light verb]
    that-Cl meal cause Akiu eat-Res furious
⇒ b. na-dun fan *[chi-de]k+CAUSE* Akiu tk huomaosanzhang. [raising-to-outer v]
    that-Cl knife eat-Res Akiu furious

This implicit predicate takes a Cause as its external argument, and an effect event as its complement. (21) is thus derived by raising the resultative verb to CAUSE, which is phonologically defective and requires verb-raising to fulfill the PF requirement.5

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4 From our point of view, the raising-to-CAUSE construal discussed here should not be taken to be an instance of incorporation, in that the light verb is implicit and syntactically separate from the main verb. Huang (2004), in particular, points out that Chinese differs from English in forming analytic syntactic constructions. One fine example comes from light verbs such as *da* 'hit': While English uses the nominal verb *telephone*, Chinese employs its "decomposed" counterpart *da dianhua* 'hit telephone/do telephoning'. It is in this sense that we take the above causative construals as an instance of verb movement rather than incorporation. Also, as noted by a reviewer, there are some differences between the implicit causative light verb and its lexical counterpart. It may well be the case that CAUSE is actually a grammaticalized version of *rang* 'cause', with the latter still keeping most of its verb characteristics.

5 Here an interesting issue raised by a reviewer has to do with the contrast between the following two examples:

(i) a. kewen nian-de xuesheng kouganshezao.
text read-Res student thirsty
'The text made students read till thirsty.'

b. * laoshi nian-de xuesheng kouganshezao.
teacher read-Res student thirsty
Intended meaning 'The teacher made students read till thirsty.'

It is pointed out that a nonagentive subject is compatible with the implicit outer light verb CAUSE, while an agentive subject is not. This is unexpected given the following legitimate usages of their lexical counterpart
The second class of light verbs involves various construals associated with dynamic properties and contrastive foci, e.g., instrumental, locative, and benefactive (cf. Lin 2001, Feng 2003, 2005, among others). Take the instrumental construal like (24) for example: Here we have another case of syntax-semantics mismatch, which can once again be paraphrased as a sentence with a lexical light verb *yong* 'use', as in (25):

(24) ni qie na-ba dao, wo qie zhe-ba dao.
you cut that-Cl knife I cut this-Cl knife
'You (will) cut with that knife, and I (will) cut with this knife.'

(25) ni *yong* na-ba dao qie, wo *yong* zhe-ba dao qie. [lexical light verb]
you use that-Cl knife cut, wo use this-Cl knife cut
'You (will) cut with that knife, and I (will) cut with this knife.'

On the assumption that (24) has an implicit light verb USE corresponding to *yong* in terms of both syntax and semantics, as in (26a), we may derive the sentence by raising the verb *qie* 'cut' to USE, as sketched in (26b):

(26) a. ni USE na-ba dao qie, wo USE zhe-ba dao qie. [inner light verb]
you use that-Cl knife cut, wo use this-Cl knife cut.

⇒ b. ni *qie* +USE na-ba dao *qie*, wo *qie* +USE zhe-ba dao *qie*. [raising-to-inner v]
you cut that-Cl knife wo cut this-Cl knife

In terms of syntax, the first class of light verbs is most likely to head a functional projection on the CP layer, which we may call "outer light verbs". The second class, in contrast, presumably heads the vP projection. Hence the notion of "inner light verbs". To really tease them apart, we may employ two syntactic criteria: The first one involves Chinese verb-copying, which is essentially a vP-internal phenomenon. Just as our theory predicts, raising-to-CAUSE, where the landing site is beyond the vP periphery, is not subject to verb-copying, as evidenced by (27a). In contrast, raising-to-USE is fully compatible with verb-copying, since it only involves an inner light verb position within the vP periphery, as evidenced by (27b):

(27) a. * na-dun fan *chi* +USE wo *chi* -de huomaosanzhang. [outer light verb]
that-Cl meal eat I eat-Res furious

*bmake* in both cases:

(ii) a. kewen rang xuesheng nian-de kouganshezao.
text make student read-Res thirsty
‘The text made students read till thirsty.’
b. laoshi rang xuesheng nian-de kouganshezao.
teacher make student read-Res thirsty
‘The teacher made students read till thirsty.’

As noted in the review, the ungrammaticality of (ib) results from some form of thematic conflict. On the other hand, it should be equally pointed out that there are two types of causation that are often encoded morpho-syntactically, i.e., agentive causation vs. eventual causation (roughly corresponding to the agentive-nonagentive distinction of Causers in Pesetsky’s works on psych-verbs). Along this line, it is not unreasonable to suggest that the inner-outer dichotomy also applies to the lexical causative light verb *rang* in (iia,b), while its implicit counterpart CAUSE always occupies the outer light verb position in Chinese. As a result, CAUSE can never host an agentive subject *laoshi* ‘teacher’ at the edge of vP, hence the ungrammaticality of (ib). In addition, this move fairs very well with the general pattern of *wh*- and reflexive adverbials in that only inner adverbials observe subject agentivity.
'That meal made Akiu eat such that he became furious.'

b. wo qiेk+USE na-ba dao qiеk-de zhi maohan. [inner light verb]
you cut that-Cl knife cut-Res continuously sweat
'I used that knife to cut such that I sweat continuously.'

The second test has to do with light verbs' ability to take various types of postverbal complements: As we have seen in (23), an outer light verb like CAUSE typically involves a resultative construal, presumably encoded by a result projection in the sense of Ramchand (2003). In addition, there is another type of implicit outer light verb which may be dubbed as COST (cf. Gu 2002). Take (28) for instance: here the main verb *kan-le* raises to COST in the now familiar fashion, which typically introduces a duration expression such as *yi xiawu* 'one afternoon' in the postverbal position.\(^6\)

(28) zhe-ben shu  [*kan-le*]k+COST wo  t_k yi xiawu.
this-Cl book read-Prf me one afternoon
'This book took me one afternoon to read.'

Inner light verbs, however, fails the second test. On the one hand, raising-to-USE is not allowed in presence of a resultative complement such as *hen lei* 'very tired' in (29a), whereas the resultative construal is perfectly compatible with the corresponding lexical light verb, as evidenced by (29b):\(^7\)

(29) a. * wo  [qiе-de]k+USE na-ba dao t_k he lei.
I cut-Res that-Cl knife very tired
'I cut with this knife till very tired.'

b. wo yong zhe-ba dao qiе-de he lei.
I use this-Cl knife cut-Res very tired
'I cut with this knife till very tired.'

On the other hand, the same restriction is duly observed by the duration construal of (30a), where the main verb *qiе* is prevented from adjoining to the implicit light verb USE. In contrast, (30b) shows that raising-to-USE does not pose any problem for its lexical counterpart *yong*, just as we might expect from the above pattern of contrasts:

(30) a. * ni qiеk+USE na-ba dao t_k wu fenzhong.
you cut that-Cl knife five minutes
'You (will) cut with that knife for five minutes.'

b. ni yong na-ba dao qiе wu fenzhong.
you use that-Cl knife cut five minutes

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\(^6\) As noted by a reviewer, the extensive inventory of Chinese light verbs could be an issue. In fact, the theoretical status of Chinese light verbs is still quite debatable: For instance, we may take AFFECT to be an applicative morphemes on a par with African languages (Tsai 2009, Lee 2012). It is equally possible to reduce COST to CAUSE, in that the former can be further decomposed into 'cause ... to spend ...'). The exact treatment, however, is beyond the scope of this paper, where we will focus on the core cases discussed in Huang (1994,1997), Feng (2003, 2005), and Lin (2001).

\(^7\) The exact cause of the deviance of (29a) is not entirely clear. One way to think of this issue is to suggest that raising-to-USE may create an obligatory object control configuration. As a result, the deviance of (29a) is attributed to the implausible pragmatic construal ‘till the knife became very tired’.
'You (will) cut with that knife for five minutes.'

In terms of semantics, it is not difficult to see the interpretive similarity between outer adverbials and outer light verbs (i.e., they both involve causality), as well as that between inner adverbials and inner light verbs (i.e., they both involve a *with*-relation between an Instrument/Comitant and its corresponding event (cf. Parsons 1995, Tsai 2005b). All the above observations clearly point to the conclusion that it is imperative to separate outer and inner light verbs in terms of their syntactic topography under the cartographic approach (cf. Rizzi 1997 and Cinque 1999, among many others), as sketched below (RC: resultative complement):

(31) Topography of Chinese light verbs:

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TopP
  Topic
    Top'
    Top
      vP.outer ≈ causation projection
      Cause
        v'
      outer light verb ← CAUSE TP
      Subj
        T'
        T
          TP
          vPinner
            tk
            t'
            v'
            inner light verb ← USE VP ≈ process projection
            Instrument
              V-de
              RC ≈ result projection
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From the cross-linguistic perspective, it has been reported in the literature that there are two tiers of causative projections, where the inner-outer distinction is based on various morpho-syntactic criteria (see, for instance, Svenonius 2005). Furthermore, our theory predicts that inner and outer light verbs should be able to appear together in the sentential projection in question. This is indeed borne out. As shown by (32), we may combine the causative and instrumental usages in one sentence, where the external argument *na-ba dao* 'that knife' appears to play both roles as Cause and Instrument:

(32) na-ba dao qie-de wo hen lei.
    that-Cl knife cut-Res I very tired
    'That knife made me cut with it till very tired.'

Here we propose that *na-ba dao* is actually thematically related to CAUSE in the left periphery, and gets identified with the instrument argument in Spec-VP through null operator movement in the classic sense (cf. Chomsky 1977, 1985). On the other hand, the main verb
qie-de first combines with the inner light verb USE through head movement. The resulting verbal complex then adjoins to the outer light verb CAUSE. The whole derivation can be visualized in the following tree diagram:

A reviewer raises a couple of potential problems with this null operator analysis: On the conceptual side, it is unclear whether a causative predicate may take a null operator construction as its complement. This point of technicality is well-taken though we see no a priori reason why the outer light verb cannot work like tough-predicates or Chinese long passives. On the empirical side, this analysis wrongly predicts that (32) should allow a resumptive pronoun for the null operator construal, as shown by the ungrammaticality of (i):

(i) * [na-ba dao] k [Opk [qie-de wo ta hen lei]].

That knife made me cut with it till very tired.'

This restriction on the resumptive strategy, however, may have a very simple explanation: Namely, here the subject of CAUSE is inanimate, and an inanimate argument typically does not license a resumptive pronoun in Chinese, as evidenced by the deviance of (iib):

(ii) a. kwen_k, wo hen xihuan e_k.

The same pattern obtains for Chinese long passives with an inanimate subject, as illustrated by the following contrast:

(iii) a. kwen_k bei wo shandiao-le e_k.

As a matter of fact, the unavailability of the resumptive strategy is most likely due to the [+human] origin of Chinese third person pronoun, whose distribution is still highly restricted when construed as inanimate.
3. Inner Affective vs. Outer Affective

It is instructive to note that there is also an inner-outer distinction between Mandarin affective construals (cf. Tsai 2012). (34a) presents a typical case of outer affective construals, which are marked by an applicative head *gei*, and arguably located in the left periphery:

(34) a. ta juran  [gei wo] he-le san-ping jiu! [outer affective]
    he unexpectedly Aff me drink-Prf three-bottle wine
    'Unexpectedly, he drank three bottles of wine on me!'

b. ta juran he-le wo san-ping jiu! [inner affective]
    he unexpectedly drink-Prf me three-bottle wine
    'Unexpectedly, he drank three bottles of wine on me!'

The inner affective of (34b), on the other hand, appears in the form of a "pseudo double object construction (pseudo-DOC)", in that there is no directional possession between the Affectee *wo* and the Theme *san-ping jiu*.

In terms of semantics, there is a truth-conditional distinction between the two types of affective construals: In the scenario that a doctor asked a patient not to drink wine at home, but the patient did not follow the instruction, the doctor may utter (34a), but not (34b). As a matter of act, Mandarin inner affective construals require static possession between the two objects, i.e., the Affectee *wo 'me'* and the Theme *san-ping jiu 'three bottles of wine'*, in direct contrast with the "to-the-possession-of" interpretation typically associated with English low applicatives such as *Mary baked Bill a cake*.

In terms of pragmatics, Mandarin outer affectives are strictly speaker-oriented: The ungrammaticality of (35a) indicates that it can only be a first-person singular pronoun, hence speaker-oriented. By contrast, the same restriction is not observed for inner affectives in (34b), as evidenced by the well-formedness of (35b):

(35) a. * ta juran  [gei women/ni/nimen/ta/tamen] he-le san-ping jiu!
    he unexpectedly GEI us/you/you(pl.)/him/them drink-Prf three-Cl wine
    'He drank two bottles of wine on us/you/you(pl.)/him/them unexpectedly.'

b. ta juran he-le [women/ni/nimen/ta/tamen] san-ping jiu!
    he unexpectedly drink-Prf us/you/you(pl.)/him/them three-Cl wine
    'He drank two bottles of wine on us/you/you(pl.)/him/them unexpectedly.'

Furthermore, while it is very awkward to employ an outer affective in a declarative sentence such as (36a), its inner affective counterpart in pseudo-DOCs is quite compatible with the same environment, as evidenced by the grammaticality of (36b):

(36) a. ?? ta zuotian  [gei wo] he-le san-ping jiu. [declarative]
    he yesterday Aff me drink-Prf three-bottle wine
    'Yesterday, he drank three bottles of wine on me.'

b. ta zuotian he-le wo san-ping jiu. [declarative]
    he yesterday drink-Prf me three-bottle wine
    'Yesterday, he drank three bottles of wine on me.'
From a cross-linguistic point of view, the so-called ethical datives in Modern Greek (as well as Romance languages in general) presents an interesting comparison with Mandarin outer affectives (cf. Perlmutter 1971; Jaeggli 1982; Cuervo 2003; Michelioudakis & Sitaridou 2008, among others). As shown in (37), there is also a speaker/addressee-oriented restriction on the high applicative usage of these dative clitics, which typically express some sort of affectedness between an individual and an event:

\[(37) \text{mu/su} /\text{tu} \text{ arostise i Maria.} \]
\[
\begin{array}{l}
\text{me/you/him fell.ill Maria} \\
\text{‘Maria fell ill on me/you/him.’}
\end{array}
\]

Furthermore, Modern Greek ethical datives also require licensing from imperative, optative, subjunctive or negative moods, as shown by the contrast between (38a) and (38b):

\[(38)\]
\[
\begin{array}{l}
\text{a. na } \text{mu prosechis! [imperative]} \\
\text{Subj Eth.dat.1S take.care} \\
\text{‘Take care, for my sake!’}
\end{array}
\]
\[
\begin{array}{l}
\text{b. }?\text{? } \text{mu prosechis. [”?declarative]} \\
\text{Eth.dat.1S take.care} \\
\text{‘You take care, for my sake.’}
\end{array}
\]

This is very much in line with the outer affective construals in Mandarin, which are disallowed in declarative sentences, as we have already seen in (36a).

It is also reported by Kikushima (2013) that in Japanese, the transference verb *kureru* can appear in the similar environment to CP-related high applicative in Chinese. As shown below, the applicative morpheme is attached to the main verb *okuru* ‘send’, and roughly means ‘give (me)’. The resulting interpretation can be either beneficiary, as in (39a), or adversative, as in (39b):

\[(39) \text{Taroo-ga Hanako-ni nimotu-o okutte-kure-ta.} \]
\[
\begin{array}{l}
\text{Taroo-Nom Hanako-Dat package-Acc send-KURERU-Past} \\
\text{a. ‘Taroo sent Hanako a package for my sake.’} \\
\text{b. ‘I was adversely affected by Taroo's sending Hanako a package.’}
\end{array}
\]

To sharpen the above intuition further, we may spell out the first-person dative Affectee, and add an evaluative adverb *odoroitakotoni* 'surprisingly' which carries the exclamative force. As shown by (40b), the reading is very much in line with the outer affective in Mandarin:

\[(40) \text{odoroitakotoni Hanako-ga watasi-ni yubiwa-o katte-kure-ta!} \]
\[
\begin{array}{l}
\text{surprisingly Hanako-Nom I-Dat ring-Acc buy-KURERU-Past} \\
\text{a. ‘Surprisingly, Hanako bought a ring for my sake!’} \\
\text{b. ‘Surprisingly, Hanako bought a ring on me!’}
\end{array}
\]

In terms of structural distribution, Kikushima (2009) also points out that *kureru* always scopes over other transference verbs such as *yaru* 'give' and *morau* 'receive', as illustrated by (41) and (42) respectively:
(41) isya-ga Taroo-o tasukete-yatte-kure-ta.
   doctor-Nom Taroo-Acc help-give-KURERU-Past
   a. 'The doctor helped Taroo for my sake.'
  b. 'The doctor helped Taroo on me.'

(42) Taroo-ga isya-ni tasukete-moratte-kure-ta
    Taroo-Nom doctor-Dat help-receive-KURERU-Past
   a. 'Taro had the doctor help him for my sake.'
   b. 'Taro had the doctor help him on me.'

By comparing the following examples, it becomes clear that it is impossible to reverse the word order between kureru and yaru, as in (43a), and that between kureru and morau, as in (43b):

    doctor-Nom Taroo-Acc help-KURERU-give-Past

    doctor-Nom Taroo-Acc help-KURERU-receive-Past

Given the mirror principle effects, this indicates that kureru locates much higher than other verbal elements, presumably within the same range of Mandarin outer affectives.

It is therefore reasonable to suggest that outer affectives differs from their inner counterparts in situating on the CP layer rather than the VP layer. We propose to take the affective marker gei in (36a) to head a high applicative project in the left periphery, which hosts the first-person Affectee in question. The high applicative head then raises to the evaluative phrase (EvaP), and the subject DP topicalizes to the sentence-initial position. We may visualize the relevant derivations in the following tree diagram:

(44)

Inner affectives, on the other hand, involve an implicit applicative head Aff. In a pseudo-DOC such as (36b), after V adjoins to Aff, the [V-Aff] complex mediates a static possessive relation between the Affectee and the Theme. We thus place the Affectee argument in the Spec of a "middle" applicative projection in-between vP and VP, as shown below:
4. Inner Focus vs. Outer Focus

Our last case has to do the curious specificity effects on object fronting in Chinese, which provides further evidence for our distinction between the two peripheries: It is possible to use the future adverbial mingtian 'tomorrow' as a delimitator to distinguish two preverbal focus positions in Mandarin (cf. Tsai 2008b): As shown in the following contrastive focus construction, if an object is preposed in-between mingtian and the main verb, it is interpreted either definite, as in (46a), or nonspecific, as in (46b):

(46) women mingtian zhurou chi, niurou bu chi. [inner focus]
we tomorrow pork eat, beef not eat
a. 'Tomorrow we will eat the pork, but not the beef.'
b. 'Tomorrow we will eat pork, but not beef.'

Given that the future adverbial is associated with the IP layer, it is reasonable to assume that the object in question is situated in the peripheral area of vP, presumably at the Spec of an inner focus phrase (FocP_{inner}). On the other hand, if the object raises to a place higher than mingtian, the nonspecific reading is blocked, as in (47b), and only the definite reading survives, as evidenced by (47a):

(47) women zhurou mingtian chi, niurou houtian chi. [outer focus]
we pork tomorrow eat beef day-after-tomorrow eat
a. 'We will eat the pork for tomorrow, and the beef for the day after tomorrow.'
b. # 'We will eat pork for tomorrow, and beef for the day after tomorrow.'

This is a good indication that the fronted object in question has acquired topicality of some sort in front of the future adverbial, presumably at the Spec of an outer focus phrase in the left periphery.

Our observation is strengthened by the fact that a numeral NP can undergo object fronting only when they are specific or definite. This restriction is illustrated by the following contrast: In (48a), the numeral NP liang-ben shu 'two books' is raised to a position below the future adverbial, and receives a non-specific reading. By contrast, it is prevented from landing above the future adverbial, as in (48b), since unlike bare NPs, it is impossible for a numeral NP to receive an interpretation other than nonspecific:
(48) a. women mingtian liang-kuai zhurou fang bingxiang,
we tomorrow two-Cl pork put refrigerator
san-kuai zhurou fang chufang.
three-Cl pork put kitchen
'Tomorrow we put two chunks of pork in the refrigerator, and three in the kitchen.' 

b.* women liang-kuai zhurou mingtian fang bingxiang,
we two-Cl pork tomorrow put refrigerator
san-kuai zhurou fang chufang.
three-Cl pork put kitchen
'Tomorrow we put two chunks of pork in the refrigerator, and three in the kitchen.' 

On the other hand, one may rescue the outer focus construal by adding a demonstrative such as zhe 'this', as in (49a), or an existential modal such as you 'have', which produces some sort of partitive interpretation, as in (49b):

(49) a. women zhe liang-kuai zhurou mingtian fang bingxiang,
we this two-Cl pork tomorrow put refrigerator
na san-kuai zhurou fang chufang.
that three-Cl pork put kitchen
'Tomorrow we put these two chunks of pork in the refrigerator, and those three chunks of pork in the kitchen.' 

b. women you liang-kuai zhurou mingtian fang bingxiang,
we have two-Cl pork tomorrow put refrigerator
you san-kuai zhurou fang chufang.
have three-Cl pork put kitchen
'Tomorrow we put two chunks of the pork in the refrigerator, and those three chunks of the pork in the kitchen.' 

In addition to the semantic distinction mentioned above, there is also a syntactic test for our distinction of Chinese foci: It has been noted in the literature that only a base-generated topic allows left dislocation through the resumptive pronoun strategy (cf. Cinque 1990, among others). Chinese displays exactly the same pattern: As evidenced by the contrast between (50a,b), a typical topic can be associated with a bound pronoun in-situ, whereas a fronted object cannot:

(50) a. Akiu a, wo hen taoyan (ta k).
Akiu Top I very hate him
'As for Akiu, I hate him.' 

b. wo Akiu taoyan (*ta k), Xiaodi bu taoyan (*ta j).
I Akiu hate him Xiaodi not hate him
'I hate AKIU, but not XIAODI.' 

When applying the resumptive pronoun test to our inner-outer dichotomy, it becomes clear that the strategy is available only for an object raised above the future adverbial mingtian 'tomorrow', as in (51a); the same construal is blocked for object-fronting below mingtian, evidenced by (51b):
(51) a. wo Akiu, mingtian jian-de-dao (ta_i), [outer focus]
I Akiu tomorrow meet-can-reach him
Xiaodi_k jiu jiang-bu-dao (ta_k) le.
Xiaodi then meet-not-reach him Inc
'Akiu, I can meet him tomorrow, but not Xiaodi.'

b. wo mingtian Akiu_k jian-de-dao (*ta_i), [inner focus]
I tomorrow Akiu meet-can-reach him
Xiaodi_k jiu jiang-bu-dao (*ta_k) le.
Xiaodi then meet-not-reach him Inc
'I hate AKIU, but not XIAODI.'

All these facts point to the conclusion that the fronted object in an outer focus position is actually a contrastive topic (also known as a focus topic), which must be definite or specific by nature. In comparison, an inner focus is found in-between FinP (which hosts the future adverbial) and VP (which is headed by the main verb), presumably situated in the Spec of FocP_{inner} in the vP periphery:

(52) Topography of inner and outer focus (irrelevant details omitted):

```
TopP
  Subj  Top'
    Top  FocP_{outer}
      Obj  Foc'
        Foc  FinP
          mingtian  FinP
            <Subj>  Fin'
              Mood_{irr}  FocP_{inner}
                Obj  Foc'
                  Foc  vP
                    <Subj>  v'
                      v  VP
                        <Obj>  ...
```

In this picture, there are two ways to derive the semantic distinction of the two types of Chinese foci: One is to assume that there is an existential operator associated with the implicit irrealis mood (Mood_{irr}), which may license a nonspecific indefinite in the inner focus position. By contrast, an outer focus is simply too high for this construal, hence the
definiteness/specificity effects in question.

The other way is to side with Tsai (2001) in claiming that the domain of existential closure (i.e., nuclear scope) is not associated with VP (cf. Diesing 1990), but defined by notion of syntactic predicate. In the case of (47) and (48b), the syntactic predicate is formed by verb raising to Mood_{irr} at LF. Consequently, an indefinite in the outer focus position is well beyond the scope of existential closure, and must be licensed in a "marked" manner. On the other hand, its inner counterparts in (46) and (48a) are subject to the default existential quantification, and receives the nonspecific interpretations, just as predicted.

5. Ins and Outs in Perspective
5.1. Adverbials vs. Focus

To complete the whole picture, it is imperative to put all classes of ins and outs against one another for a final showdown. The mapping result would look like the following topography:

(53) TopP > IntP > EvaP > AppIP_{high} > FP_{outer} > vP_{outer} > TP > FP_{inner} > vP_{inner} > AppIP_{mid} > VP

Let’s deal with each dueling challenge one by one. First we locate Mandarin outer how in-between topics and foci, as it is higher than both inner and outer foci, as in (54a,b), but lower than a (discourse) topic, as in (54c). On the other hand, inner how appears lower than either an inner focus, as in (54d), or an outer focus, as in (54e):

(54) a. Akiu zenate mingtian zhrou chi, niorou bu chi ne?
   Akiu how tomorrow pork eat beef not eat Q_{wh}
   'How come tomorrow Akiu will eat pork, but not beef?'
   [outer how > inner focus]

b. Akiu zenate zhrou mingtian chi,
   Akiu how pork tomorrow eat
   niorou houtian chi ne?
   beef the-day-after-tomorrow eat Q_{wh}
   'How come tomorrow Akiu will eat the pork, but not the beef?'
   [outer how > outer focus]

c. zhrou a, Akiu zenate mingtian chi ne?
   pork Top Akiu how tomorrow eat Q_{wh}
   'The pork, how come Akiu will eat it tomorrow?'
   [topic > outer how]

d. Akiu mingtian zhrou zenate chi, niorou you zenate chi?
   Akiu tomorrow pork how eat beef also how eat
   'Tomorrow, how will Akiu eat pork, and how will he eat beef?'
   [inner focus > inner how]

e. zhrou Akiu mingtian zenate chi,
   pork Akiu tomorrow how eat
   niorou houtian you zenate chi?
   beef the-day-after-tomorrow also how eat
   'How will Akiu eat the pork tomorrow, and how will he eat the beef
the day after tomorrow?'
[outer focus > inner how]

Furthermore, in parallel to outer how, outer self appears higher than both inner and outer foci, as in (55a,b), but below a (discourse) topic, as in (55c):

(55) a. Akiu shi ziji zhurou chi, niurou bu chi de.
Akiu SHI self pork eat beef not eat DE
'lt is on his own initiative that Akiu eats pork, but not beef.'
[outer self > inner focus]

b. Akiu shi ziji zhurou mingtian chi,
Akiu SHI self pork tomorrow eat
niurou houtian chi de.
beef the-day-after-tomorrow eat DE
'It is on his own initiative that Akiu will eat the pork tomorrow, and eat the beef the day after tomorrow.'
[outer self > outer focus]

c. zhurou a, Akiu shi ziji mingtian chi,
pork Top Akiu SHI self tomorrow eat
houtian bu chi de.
the-day-after-tomorrow not eat DE
'The pork, it is on his own initiative that Akiu will eat it tomorrow, but not on the day after tomorrow.'
[topic > outer focus]

Likewise, inner self is on a par with inner how in occurring below either an inner focus, as in (56a), or an outer focus, as in (56b):

(56) a. Akiu mingtian zhurou ziji chi, niurou fen bieren chi.
Akiu tomorrow pork self eat beef share others eat
'Tomorrow Akiu will eat pork by himself, and share beef with others.'
[inner focus > inner self]

b. Akiu zhurou mingtian ziji chi, niurou fen bieren chi.
Akiu pork tomorrow self eat beef share others eat
'Tomorrow Akiu will eat the pork by himself, and share the beef with others.'
[outer focus > inner self]

5.2. Affectives vs. Focus

As for Mandarin high applicatives, the outer affectives stands firmly above both inner and outer foci, just as one might expect from their speaker-oriented construals in the left periphery:

(57) a. Akiu juran gei wo zhurou chi, niurou bu chi.
Akiu unexpectedly GEI me pork eat beef not eat
'Unexpectedly Akiu ate pork, but not beef on me.'
[outer affective > inner focus]
b. Akiu juran gei wo zhurou mingtian chi,
Akiu unexpectedly GEI me pork tomorrow eat
niurou houtian chi.
befo the-day-after-tomorrow eat
'Unexpectedly Akiu will eat the pork tomorrow,
but the beef the day after tomorrow on me.'
[outer affective > outer focus]

As shown in the contrastive focus construals of (58a,b), it is impossible to raise the objects
further to the right of the outer affective. On the other hand, it is perfectly fine to place a topic
in front of the outer affective, as evidenced by (58c):

(58) a.* Akiu juran zhurou gei wo mingtian chi,
Akiu unexpectedly pork GEI me tomorrow eat
niurou houtian chi.
befo the-day-after-tomorrow eat
'Unexpectedly Akiu will eat the pork tomorrow,
but the beef the day after tomorrow on me.'
[*outer focus > outer affective]

b.* Akiu zhurou juran gei wo mingtian chi,
Akiu pork unexpectedly GEI me tomorrow eat
niurou houtian chi.
befo the-day-after-tomorrow eat
'Unexpectedly Akiu will eat the pork tomorrow,
but the beef the day after tomorrow on me.'
[*outer focus > outer affective]

c. zhurou a, Akiu juran gei wo mingtian chi.
pork Top Akiu unexpectedly GEI me tomorrow eat
'the pork, unexpectedly Akiu will eat it on me tomorrow.'
[topic > outer affective]

Finally, when we apply the same test to the pseudo-DOCs, is becomes clear both inner
and outer foci are situated above the inner affective: As in (59a), the fronted objects zhurou
'pork' and niurou 'beef' occur higher than the affected object wo 'me'; when raised further
above the temporal adverbial zuotian 'yesterday', these objects occupy the even higher outer
focus position, as shown in (59b):

(59) a. Akiu zuotian zhurou chi-le wo san-jin,
Akiu yesterday pork eat-Prf me three-kilogram
niurou chi-le wo si-jin.
befo eat-Prf me four-kilogram
'Yesterday Akiu ate three kilos of pork and four kilos of beef on me.'
[inner focus > inner affective]

b. Akiu zhurou zuotian chi-le wo san-jin,
Akiu pork yesterday eat-Prf me three-kilogram
niurou chi-le wo si-jin.
beef eat-Prf me four-kilogram
'Yesterday Akiu ate three kilos of pork and four kilos of beef on me.'
[outer focus > inner affective]

5.3. Adverbials vs. Light Verbs

How about the locus of light verbs? It turns out that Mandarin outer how appears above the outer light verb CAUSE (which attracts the main verb): As we can tell from the contrast between (60a,b), zenme 'how' here is interpreted as causal rather than instrumental, a telltale sign of outer wh-adverbials. Furthermore, it is impossible to place zenme below the outer light verb, as evidenced by (61):

(60) na-ba dao zenme [qie-de]+CAUSE ni zhi maohan ne?
    that-Cl knife how cut-Res you continuously sweat Q_wh
     a. How come that knife made you cut such that you kept sweating? [causal]
     b. # How did that knife make you cut such that you kept sweating? [#instrumental]
    [outer how > outer light verb]

(61)*na-ba dao [qie-de]+CAUSE zenme ni zhi maohan ne?
    that-Cl knife cut-Res how you continuously sweat Q_wh

By contrast, when we put zenme in front of the inner light verb USE (which again attracts the main verb), it can be interpreted as either causal or instrumental, as illustrated by the ambiguity of (62):

(62) Akiu zenme [qie]+USE na-ba dao ne?
    Akiu how cut that-Cl knife Q_wh
     a. How come Akiu cut with that knife? [causal]
     b. How did Akiu cut with that knife? [instrumental]

Likewise, outer self is found in a position higher than the outer light verb in the left periphery: As indicated by the absence of the anti-comitative interpretation in (63b), inner self is not allowed in front of CAUSE. In comparison, the anti-causal reading of (63a), though marginal for pragmatic reasons, is still intelligible:

(63)* na-ba dao ziji [qie-de]+CAUSE ta hen teng.
    that-Cl knife self cut-Res him very painful
     a. That knife made him cut painfully all by itself. ['anti-causal]
     b. # That knife alone made him cut painfully. [#anti-comitative]
    [outer self > outer light verb]

It is also instructive to note that inner self cannot follow CAUSE either, as evidenced by (64), presumably due to the lack of a vP periphery in this particular construction:

(64)* na-ba dao [qie-de]+CAUSE ziji wo zhi maohan.
    that-Cl knife cut-Res self me continuously sweat

Also in parallel to their interrogative counterparts, inner self and outer self precede the inner light verb: As illustrated below, both anti-causal and anti-comitative readings are available for the reflexive adverbial construal in front of USE:
Akiu cut with that knife out of his own initiative. [anti-causal]
b. Akiu cut with that knife by himself. [anti-comitative]

It can then be concluded that outer adverbials can only occur above outer light verbs, while inner adverbials are situated in-between inner and outer light verbs. We thus move a step closer to mapping a comprehensive topography of all the ins and outs involved.

5.4. Affectives vs. Light Verbs

Now we may proceed to the question how Mandarin affectives fair with light verbs: It seems that outer affectives, just like outer adverbials, precede both inner and outer light verbs, as evidenced by (61a,b):

(61) a. na-ba dao juran gei wo [qie-de]+CAUSE that-Cl knife unexpectedly GEI me cut-Res Xiaodi zhi maohan.
Xiaodi continuously sweat
'Unexpectedly that knife made Xiaodi cut such that he kept sweating on me.'
[outer affective > outer light verb]
Akiu unexpectedly GEI me cut that-Cl knife
'Unexpectedly Akiu cut with that knife on me.'
[outer affective > inner light verb]

On the other hand, albeit a bit marginal, both inner and outer light verbs can be found higher than inner affectives in pseudo-DOCs such as (62a,b):

(62) a. ? na-ba dao qie-de wo qie-diao-le ziji yi-gen shouzhitou.
that-Cl knife cut-Res I cut-off-Prf self one-Cl finger
'That knife made me cut such that I cut off a finger on myself.'
[outer light verb > inner affective]
b. Akiu qie na-ba dao qie-diao-le ziji yi-gen shouzhitou.
Akiu cut that-Cl knife cut-off-Prf self one-Cl finger
'Akiu cut with that knife such that he cut off a finger on himself.'
[inner light verb > inner affective]

5.5. Focus vs. Light Verbs

Now how about pitching object fronting and inner light verb con struals against each other? We have no difficulty in placing an inner focus in front of an inner light verb, as seen in (63a) and (64a); the same can be said about the outer focus in (63b) and (64b) (recall that we can tell inner and outer focci apart by their positions relative to temporal adverbial such as mingtian 'tomorrow' and zuotian 'yesterday'):

(63) a. wo mingtian zhe-ba dao [qie]+USE, na-ba dao bu [qie]+USE.
I tomorrow this-Cl knife cut that-Cl knife not cut
'Tomorrow I will cut with this knife, but not that knife.'
[inner focus > inner light verb]

b. wo zhe-ba dao mingtian [qie]+USE,
I this-Cl knife tomorrow cut
na-ba dao houtian [qie]+USE.
that-Cl knife the-day-after-tomorrow cut
'I will cut with this knife tomorrow, and that knife the day after tomorrow.'
[outer focus > inner light verb]

(64) a. Akiu zuotian zhe-ba dao [qie-de]+USE zhi maohan,
Akiu yesterday this-Cl knife cut-Res continuously sweat
na-ba dao que [qie-de]+USE xiao-hehe.
that-Cl knife but cut-Res laugh-profusely
'Akiu cut with this knife such that he kept sweating, while he cut
with that knife such that he was very much satisfied.'
[inner focus > inner light verb]

b. Akiu zhe-ba dao zuotian [qie-de]+USE zhi maohan,
Akiu this-Cl knife yesterday cut-Res continuously sweat
qiantian que [qie-de]+USE xiao-hehe.
the-day-before-yesterday but cut-Res laugh-profusely
'Akiu cut with this knife the day before yesterday such that he kept sweating,
while he cut with it yesterday such that he was very much satisfied.'
[outer focus > inner light verb]

The situation with outer light verbs proves a bit harder to resolve: Let's first consider
the follow case, where CAUSE co-occurs with the information focus in the typical object
positions:

(65) zhe-ben shu [du-de]+CAUSE wo mingnian hao xiang qu Xila.
this-Cl book read-Res I next.year very.much like go Greece
'This book made me read such that next year I would very much like to visit Greece.'

Next we place the object in-between a temporal adverbial such as mingnian 'next.year' and
the main predicate, as in (66a): Here a contrastive focus interpretation is required to license
the construal, and the outer light verb CAUSE clearly has the structural advantage over the
fronted object Xila 'Greece':

(66) a. zhe-ben shu [du-de]+CAUSE wo mingnian Xila hao
this-Cl book read-Res I next.year Greece very.much
xiang qu, Aiji jiu bu zenme xiang qu le.
like go Egypt then not how like go Inc
'This book made me read such that next year I would very much like
to visit Greece, while far less so for Egypt.'
[outer light verb > inner focus]

b. zhe-ben shu Xila [du-de]+CAUSE wo mingnian hao
this-Cl book Greece read-Res I next.year very.much
xiang qu, Aiji jiu bu zenme xiang qu le.
Though a bit awkward, it is also possible to raise the object further to the left of CAUSE and the temporal adverbial, i.e., to the outer focus position in (66b).

5.6. Adverbials vs. Affectives

Finally, we should put adverbials and affectives together, and see how they fair with each other: (67) represents a realis sentence where only the instrumental reading of inner how is disallowed:

(67) Akiu \text{zenme} pao le?
\quad Akiu how run.away Inc
\quad a. 'How come Akiu ran away?' [outer how: causal]
\quad b.\# 'How did Akiu run away?' [inner how: instrumental]

This restriction may be due to the tense-anchoring effect of the inchoative aspect, which blocks the LF movement of inner how. Outer wh-adverbials, by contrast, always scope over TP, and the causal reading of (67a) is therefore not affected. Now when we add an outer affective in the construction, it becomes clear that outer how may c-command the Affectee, as in (68a), but not vice versa, as in (68b).

(68) a. Akiu \text{zenme} gei wo pao le?
\quad Akiu how GEI me run.away Inc
\quad 'How come Akiu ran away on me?'
\quad [outer how > outer affective]
\quad b.* Akiu \text{gei wo zenme} pao le?
\quad Akiu GEI me how run.away Inc
\quad [*outer affective > outer how]

Furthermore, there is no way for an inner affective to scope over outer how, since the Affectee involved is deeply embedded in the pseudo-DOC such as (69):

(69) Akiu \text{zenme} he-le wo san-ping jiu?
\quad Akiu how drink-Prf me three-bottle wine
\quad 'How come Akiu drank three bottles of wine on me?'
\quad [outer how > inner affective]

The next step is to examine inner wh-adverbials against Mandarin affectives. (70) is an irrealis construction where inner how can only follow the volitional modal xiang 'would.like'. This is indicated by the fact that the causal reading of outer how is blocked here, as illustrated by the contrast of (70a,b):

(70) Akiu xiang \text{zenme} qu taibei?
\quad Akiu would.like how go Taipei
\quad a.# 'How come Akiu would like to go to Taipei?' [outer how: causal]
\quad b. 'How would Akiu like to go to Taipei?' [inner how: instrumental]
Once again we throw in an outer affective to test the water, as in (71). Here the Affectee wo 'me' must scope over the volitional modal (and inner how by transitivity):

(71) ?Akiu juran gei wo xiang zenme qu taipei?  
Akiu unexpectedly GEI me would.like how go Taipei  
'How would Akiu like to go to Taipei on me unexpectedly?'  
[outer affective > inner how]

On the other hand, when we substitute an inner affective for its outer counterpart, as in (72), inner how naturally precedes the Affectee in the indirect object position, since it is situated in the vP periphery:

(72) Akiu xiang zenme he wo san-ping jiu?  
Akiu like how drink me three-bottle wine  
'How would Akiu like to drink three bottles of wine on me?'  
[inner how > inner affective]

After exhausting all the possible combinations of the ins and outs in Mandarin, we are now in a position to map out their relative heights in both peripheries, as visualized below:
6. Concluding Remarks

All in all, we have drawn evidence from adverbials, applicatives, light verbs, object fronting, and their interactions to verify the existence of the \( vP \) periphery, and to explore the uncharted territory in the \( vP \) periphery, which presents a sharp contrast with the left periphery in expressing (proto-)comitativity rather than causality in terms of the range of its interpretative potentials. Hopefully, this study will bring us a step closer to the full understanding of syntax-semantics mapping under the cartographic approach.
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