

The Hows of *Why* and The Whys of *How**

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0. How come *how come*?

This paper sets out to investigate a curious *how-why* alternation, where *how* is construed as causal rather than manner. English, for one, provides an illustrious example:

- (1) a. How come Akiu left without saying anything?
b. How is it that Akiu left without saying anything?

Both (1a,b) are to be understood as a causal question, with *how* patterning with *why* and behaving more like a matrix predicate. However, this sort of construal is not productive enough in English to reveal the ins and outs of the *how-why* alternation. Chinese *how*, on the other hand, provides a full spectrum of interpretive possibilities such that we are able to piece together a clearer picture. Let's start with a brief preview of some interesting properties of *zenme*, a Chinese *how*, which has three types of interpretation: One is manner, which can be further divided into two subtypes, i.e., the method reading, as in (2a), and the style reading, as in (2b):¹

- (2) a. Akiu zenme zou?
Akiu how leave
'By what means/way will Akiu leave?'
(**Answer:** by bus, by interstate 15, etc.)
- b. Akiu (pingchang) zenme shuijiao?
Akiu usually how sleep
'With what style does Akiu (usually) sleep?'
(**Answer:** faceup, facedown, on one side, etc.)

* I benefit tremendously from discussing with Teresa Griffith, Naomi Harada, Jim Huang, Utpal Lahiri, Audrey Li, Jonah Lin, Luther Liu, Sze-wing Tang, and Matthew Whelpton. I am also grateful to Francesca Del Gobbo, Hidehito Hoshi, and Kazue Takeda for their painstaking proofreading and helpful comments.

¹ The method-style distinction is largely based on Aoun's (1986) dichotomy between instrumental and manner *how*, except that we use "manner" as a general term for *by what means*, *by what way*, *in what way*, and *with what style*. We group the first three readings as "method", and the last one as "style".

Another type of interpretation of *zenme* is causal: As shown in (3a) and (3b), once we add a perfective aspect to the predicates in (2a,b), the reading of *zenme* is not method or style anymore. Instead, (3a) questions the cause of Akiu's leaving, and (3b) that of Akiu's sleeping:²

- (3) a. Akiu zenme zou-le?
Akiu how leave-Prf/Inc
'Why has Akiu left?'
- b. Akiu zenme shuijiao-le?
Akiu how sleep-Prf/Inc
'Why has Akiu slept?'

The third reading has something to do with the notion of degree, similar to English *how* in *how many*. However, degree *how* can only be construed as indefinite in Chinese. This can be illustrated by the contrast between (4) and (5):

- (4) * Akiu zenme congming?
Akiu how smart
'How smart is Akiu?'
- (5) Akiu bu zenme congming.
Akiu not how smart
'Akiu is not so smart.'

In this paper, we would like to focus on the first two readings, and ask the following questions:

- I. What are the syntactic and semantic conditions on this *how-why* alternation?
- II. How come the *how-why* alternation is even possible?
- III. How does the *how-why* alternation fit into our general theory of *wh*-dependencies?

² The abbreviations used in this paper are glossed as follows: AV: actor voice; Cau: causative marker; Comp: complementizer; Dur: durative aspect; Exp: experiential aspect; Ger: gerundive; Inc: inchoative aspect; Neg: negation; IP: immediate past; Nom: nominative; Obl: oblique; Past: past tense; Pres: present tense; Prf: perfective aspect; Prg: progressive aspect; Q: question particle; RC: result clause; Res: resultative aspect; RP: remote past; Top: topic marker.

The second question, in particular, deserves further elaboration: It should be pointed out that there seems to be a cross-linguistic tendency where *how* may change into *why*, but not vice versa. Question II should therefore be further divided into two parts.³

IV. How does a causal reading come along?

V. Why is there a *how-why* asymmetry in terms of meaning-shifting?

We believe that the two issues are closely related, but should be addressed individually. In section one, we will give a preliminary survey of the syntactic distributions and semantic interpretations of *zenme*. Section two will provide a basic semantics of a causal question, where *how come* is envisioned as a question over the causation between a pair of events, i.e., $\langle E_{\text{cause}}, E_{\text{effect}} \rangle$. By comparing resultative questions (e.g., *how did John perform yesterday?*), section three shows that a resultative *how* is simply the opposite of a causal *how* in a causal relationship. Namely, a causal *how* is about E_{cause} , whereas a resultative *how* is about E_{effect} . Section four proceeds to examining purpose questions (e.g., *what will John kill for?*). We argue that the *wh*-adjuncts in question are organized in such a way that their syntactic distributions reflect the ontology of a causal relation, i.e., $\text{cause} > \text{manner/purpose} > \text{result}$. Section five wraps up our analyses by providing an account of the locality conditions on causal and style questions in terms of unselective binding and relativized

³ In addition to Chinese and English, a similar construal is also found in Tsou, a Formosan language belonging to the Austronesian family. First consider (ia). The word order of Tsou is basically VOS. So the *wh*-word in the sentence-initial position is actually the predicate of the whole sentence, and the nominative marker *na-* is a prefix, not a suffix, which defines the boundary between the subject and the predicate. Therefore the whole thing following *na-* is the subject, presumably a head-internal relative. The internal head in question is *hia*, meaning 'way'. So the literal translation of (5a) is 'How is the way Pasuya will beat Mo'o?' (data from M. Chang 1998):

- (i) a. mi-ta mainenu na-[mi-ta hia eobako ta Mo'o ta Pasuya]?
 IP-he how.AV Nom IP-he way beat.AV Obl Mo'o Nom Pasuya
 'How did Pasuya beat Mo'o?'
 b. moso mainenu ci-[moso eobako ta Mo'o 'e Pasuya]?
 RP how.AV Comp RP beat.AV Obl Mo'o Nom Pasuya
 'Why did Pasuya beat Mo'o?'

(ib), on the other hand, is a bit unusual, in that it sports a complementizer *ci-* in the place of *na-*. As you can see, the predicate of (ib) is still *mainenu* 'how', but the reading changes into causal: 'How is it that Pasuya beat Mo'o?'

Seediq, on the other hand, encodes the *how-why* alteration in terms of compounding, patterning with similar construals in Japanese (cf. footnote 3). This point is illustrated by the following contrast (*-m-* is an infixal actor/active voice marker; data from C.-L. Chang 1996):

- (ii) a. h-m-uwa-mesa p-huqin lqedi ka bubu?
 how-AV-how-saying Cau-die fly Nom mother
 'How did Mother kill the fly?'
 a. h-m-uwa p-huqin lqedi ka bubu?
 how-AV-how Cau-die fly Nom mother
 'Why did Mother kill the fly?'

This observation, in a way, confirms that the morphological makeup of Seediq is Japanese-type. For issues concerning the typology of Tsou and Seediq *wh*-construals in a broader context, see Tsai (1999b).

minimality.

1. Conditions on the *how-why* alternation

There are a number of ways to disambiguate *zenme* with respect to the *how-why* alternation. We may classify them into three groups: First, causal *zenme* scopes over modal verbs and sentential adverbials, as in (6), (8) and (10). Modal verbs and sentential adverbials in turn scopes over manner *zenme*, except that the reading can only be method, but not style, as in (7), (9), and (11):

Modal verbs:

- (6) Akiu zenme hui/bixu/neng/keyi/yinggai zou?
Akiu how will/must/can/may/should leave
a. #By what means will/must/can/may/should Akiu leave?
b. #With what style will/must/can/may/should Akiu leave?
c. 'Why would/must/can/may/should Akiu leave?'

- (7) Akiu hui/bixu/neng/keyi/yinggai zenme zou?
Akiu will/must/can/may/should how leave
a. 'By what means will/must/can/may/should Akiu leave?'
b. #With what style will/must/can/may/should Akiu leave?'
c. #Why will/must/can/may/should Akiu leave?'

Adverbs of quantification:

- (8) Akiu zenme zongshi/changchang/henshao xi che?
Akiu how always/often/seldom wash car
a. #By what means does Akiu always/often/seldom wash the car?'
b. #With what style does Akiu always/often/seldom wash the car?'
c. 'Why does Akiu always/often/seldom wash the car?'

- (9) Akiu zongshi/changchang/henshao zenme xi che?
Akiu always/often/seldom how wash car
a. 'By what means does Akiu always/often/seldom wash the car?'
b. #With what style does Akiu always/often/seldom wash the car?'
c. #Why does Akiu always/often/seldom wash the car?'

Temporal and spatial adverbials:

- (10) Akiu zenme zhe-ge shihou/zai zheli xizao?
Akiu how this-Cl time at here bathe
a. #'By what means is Akiu going to take a bath this hour/here?'
b. #'With what style is Akiu going to take a bath this hour/here?'
c. 'Why is Akiu taking a bath this hour/here?'
- (11) Akiu zhe-ge shihou/zai zheli zenme xizao?
Akiu this-Cl time at here how bathe
a. 'By what means is Akiu going to take a bath this hour/here?'
b. #'With what style is Akiu going to take a bath this hour/here?'
c. #'Why is Akiu taking a bath this hour/here?'

Second, causal and style *zenme* cannot appear in the classic environment which licenses indefinite *wh*'s, e.g., modality, negative, and A-not-A constructions (cf. Huang 1982, Lee 1986, Cheng 1991, Audrey Li 1992, among many others). As we can see in (12), when *zenme* scopes over *keneng* 'possibly', a modality adverb, it can only be construed as causal:⁴

- (12) Akiu zenme keneng ban zhe-ge huiyi?
Akiu how possibly organize this-Cl conference
a. #'What is the means x such that it is possible for Akiu to organize the conference by x?'
b. #'What is the style x such that it is possible for Akiu to organize the conference with x?'
c. 'Why is it possible for Akiu to organize this conference?'

When *keneng* scopes over *zenme*, only the method reading is allowed. It can be either interrogative, as in (13a), or indefinite, as in (14a):

⁴ There is also a pragmatic side of this construal, in that when one utters (12), he or she is essentially denying the possibility that Akiu can organize the conference. So it is perfectly possible to say something like (i):

(i) Akiu zenme keneng ban zhe-ge huiyi? ta you mei qian.
Akiu how possibly organize this-Cl conference he again have-not money
'How can Akiu organize this conference? He didn't even have the money.'

But the curious thing is that we can still answer the question by (ii):

(ii) Yinwei ta mai-le fangzi (lai chou qian).
because he sell-Prf house come raise money
'Because he sold his house (to raise the money).'

Therefore, there still is a fine line between syntax and pragmatics, i.e., between the form and the use of a sentence.

- (13) Akiu keneng zenme ban zhe-ge huiyi?
 Akiu possibly how organize this-CI conference
- 'What is the means x such that it is possible for Akiu to organize the conference by x?'
 - #'What is the style x such that it is possible for Akiu to organize the conference with x?'
 - #'Why is it possible for Akiu to organize this conference?'
- (14) Akiu keneng zenme dezui-le ren, suoyi yizhi chu-bu-liao shu.
 Akiu possibly how offend-Prf person so still publish-not-finish book
- 'It is possible that Akiu offended someone in some way (e.g., by swearing a lot), so he is still unable to publish his book.'
 - #'It is possible that Akiu offended someone in some style (e.g., quickly), so he is still unable to publish his book.'
 - #'It is possible that Akiu offended someone for some reason, so he is still unable to publish his book.'

Next consider (15), where *zenme* scopes over negation. The only reading available is again causal:

- (15) Akiu zenme bu xi che?
 Akiu how not wash car
- #'How doesn't Akiu wash the car?'
 - 'Why doesn't Akiu wash the car?'

When negation scopes over *zenme*, as in (16), even the method reading is out:

- (16) *Akiu bu zenme xi che?
 Akiu not how wash car
 '*How doesn't Akiu wash the car?'

But this can be attributed to semantic or pragmatic factors rather than inner island effects in Rizzi's (1990) sense, since we cannot talk about the manner of a nonexistent action or event. Now compare (17), where a negative adverb is substituted for negation:

- (17) ?Akiu cong-bu zenme xi che?
 Akiu ever-not how wash car
- 'By what means did Akiu never wash the car?'
 - #'With what style did Akiu never wash the car?'

c. #'Why did Akiu never wash the car?'

The sentence is much better than (16). The reason is that *congbu* 'never' actually patterns with adverbs of quantification in allowing the method reading. As it turns out, only the degree reading survives under the scope of negation, construed as indefinite and ranging over degrees of frequency (cf. (5)):

- (18) Akiu bu zenme (chang) xi che.
Akiu not how often wash car
'Akiu didn't wash the car so often.'

Finally, if we place *zenme* above an A-not-A question, as in (19), the sentence is just bad. We think the problem has to do with the fact that *yes-no* and *wh*-questions are not compatible in a given scope domain:⁵

- (19)*Akiu zenme shi-bu-shi dezui-le bie ren?
Akiu how be-not-be offend-Prf other person
'*How/why is it true or not that Akiu offended others?'

On the other hand, when the A-not-A question scopes over *zenme*, only an indefinite reading is available, as in (20c), whereas the interrogative readings of (20a,b) are ruled out for the same reason as (19):

- (20) Akiu shi-bu-shi zenme dezui-le bie ren?
Akiu be-not-be how offend-Prf other person
a. #'What is the way x such that it is true or not that Akiu offended others in x?'
b. #'What is the style x such that it is true or not that Akiu offended others with x?'
c. 'Is it true or not that Akiu somehow offended others?'

The third group of data shows that, rather surprisingly, the presence of aspect markers and the choice of predicates also make a difference. As we can tell from (21-23), as well as (2a,b), manner *how* does not get along with aspects in Chinese. Namely, all these questions are causal, not method or style:

⁵ For a fine-grained semantics of this incompatibility, see Lahiri (1991) and Chierchia (1993), where the type of deviance mentioned above is attributed to the unavailability of a functional reading in a *yes-no* question.

- (21) Akiu zenme zai-shuijiao?
 Akiu how Prg-sleep
 a. #How is Akiu sleeping?
 b. 'Why is Akiu sleeping?'
- (22) Akiu zenme chuan-zhe tuoxie?
 Akiu how wear-Dur slipper
 a. #How is Akiu wearing slipper?
 b. 'Why is Akiu wearing slipper?'
- (23) Akiu zenme qu-guo meiguo?
 Akiu how go-Exp America
 a. #How has Akiu been to America?
 b. 'Why has Akiu been to America?'

Moreover, manner *how* doesn't get along with stative predicates and noncausative psych verbs, as evidenced by (24) and (25) respectively:

- (24) Akiu zenme zheme mang/congming?
 Akiu how so busy/smart
 a. #How is Akiu so busy/smart?
 b. 'Why is Akiu so busy/smart?'
- (25) Akiu zenme xihuan/pa Xiaodi?
 Akiu how like/fear Xiaodi
 a. #How does Akiu like/fear Xiaodi?
 b. 'Why does Akiu like/fear Xiaodi?'

Even with causative constructions, the manner reading is out as long as the causer is nonagentive:

- (26) zhe-chu dianying zenme zheme taohao/xia-ren?
 This-CL movie how so pleasing/scare-people
 a. #How is this movie so pleasing/scary?
 b. 'Why is this movie so pleasing/scary?'

- (27) na-ping jiu zenme [CAUS+[zui-de]_i] Akiu_k t_i [PRO_k zhan-bu-qilai]?
 that-CL wine how drunk-Res Akiu stand-not-up
 a. #'How does that bottle of wine intoxicate Akiu such that he cannot stand up?'
 b. 'Why does that bottle of wine intoxicate Akiu such that he cannot stand up?'

(26) contains a causative psych predicate, while (27) contains an implicit causative light verb, adjoined by the main predicate *zui-de* (cf. Huang 1988, 1992, 1994a,b). In both cases, the causer subject is not an agent, and the only reading available is causal. This causal-manner asymmetry breaks down in agentive causative constructions like (28), where both the causal and manner readings are possible:

- (28) Akiu zenme taohao/xia Xiaodi?
 Akiu how please/scare Xiaodi
 a. 'How does Akiu please/scare Xiaodi?'
 b. 'Why did Akiu please/scare Xiaodi?'

Given what we have seen above, the following four descriptive generalizations are in order:⁶

- (29) a. The syntactic position for causal *zenme* is much higher than its method and style counterparts. It must scope over typical sentential operators (i.e., predicates of events), presumably adjoining to I' or IP. Method *zenme* and style *zenme*, on the other hand, behave more in line with VP modifiers.

⁶ As noted by Naomi Harada (p.c.), the distinction among the three types of *how*-construal in Japanese is encoded in morphology rather than syntax, as illustrated below:

- (i) a. doo-yat-te 'how-do-Ger' → manner *how*
 b. doo-si-te 'how-do-Ger' → causal *how*
 c. doo-mo 'how-any' → indefinite degree *how*

Their distribution is more or less conditioned by the presence of sentential operators (e.g., tenses, modals, negation, etc.) as evidenced by the contrasts below:

- (ii) a. Taroo-wa doo-yat-te/*doo-si-te syuppatu su-ru no?
 Taroo-Top how-do-Ger leave -Pres Q
 'By what means will Taroo leave?'
 b. Taroo-wa doo-si-te/*doo-yat-te syuppatu si-ta no?
 Taroo-Top how-do-Ger leave -Past Q
 'Why did Taroo leave?'
 c. Taroo-wa doo-mo kasiko-ku na-i.
 Taroo-Top how-any clever-Inf Neg-Pres
 'Taroo is not so clever.'

On the other hand, aspectuality does not seem to have impact on the interpretation of Japanese *how*. Her observation echoes a broader discrepancy between Chinese and Japanese *wh*-construals. That is, the former is sentential in nature, and the latter phrasal (cf. Nishigauchi 1990, Watanabe 1992, Tsai 1994b, 1999).

- b. Causal *zenme* and style *zenme* are neither subject to interrogative construals when scoped over by modals and sentential adverbials, nor subject to existential closure (i.e., construed as indefinite *wh*'s) when situated in intensional contexts.
- c. Causal *zenme* is licensed by aspectuality, while manner *zenme* is not.
- d. Manner *zenme* is sensitive to the agenthood of its subject, while causal *zenme* is not.

2. Why ask why?

Now we will take on the more difficult issue as to the origin of a causal question. First we would like to offer a rather sketchy semantics of *why*.⁷ When a speaker uttered a causal question like (30a), he or she essentially did two things: One is to presuppose (30b), as it seems odd to put (30a) to someone who does not know (30b) as a fact; the other is to question the cause of (30b):

- (30) a. Why did Akiu leave without saying anything?
 b. Akiu left without saying anything.

Therefore, when we ask why, we are essentially eliciting answers as to how an event comes about, or what results in the event at issue. In the case of (30), Akiu's leaving without saying anything is the effect, and the speaker wants to know the cause. So in the following scenario (31), the answer to (30a) would be "Akiu was offended by a sailor who swore a lot":

- (31) Akiu was offended by a sailor who swore a lot. As a result, Akiu left without saying anything.

It follows that when we ask why, we are concerned about the causation between two events. This causal relation can therefore be defined as a causative predicate taking a pair of events as its arguments, as in (32a):⁸

- (32) a. CAUSE (e_1, e_2) \leftrightarrow e_1 results in e_2
 b. $\lambda P \exists s (\forall P \wedge P = \text{CAUSE}(s, t) \wedge t = \wedge \text{Akiu left without saying anything'})$

⁷ Here we consider only a subset of *why*-questions, i.e., those which clearly involves eventuality. We neither concern ourselves with *why*-questions containing an indicative statement (e.g., *why is the sky blue?*), nor with related epistemological issues, e.g., those raised by Bromberger (1992) from a philosophical point of view.

⁸ We attribute the factual flavor of (30b) (i.e., the complement of *why*) to the presupposition of *why*-questions, following Bromberger (1992), and maintain that the internal argument of CAUSE is an event, not a fact (cf. Vendler 1967).

In light of this causation analysis, (30a) can be said to have (32b) as its semantic representation in the vein of Hamblin (1973) and Karttunen (1977).⁹ (32b) denotes the set that contains, for each event *x*, the proposition that *x* causes Akiu's leaving without saying anything. So what (32b) expresses as a question is the following: When one asks *Why did Akiu leave without saying anything?*, he wants to know the set of all true answers as to what caused Akiu's leaving without saying anything.

As far as we can see, there are three consequences following from this proposal: First, the theory provides a rationale for the widely held assumption that *why* is an adjunct with sentential scope, behaving very much like a matrix predicate (cf. Rizzi 1990, Collins 1991, Jo-wang Lin 1992, Ishii 1997, Epstein 1998, among others). It also becomes clear why causal *zenme* must take scope over sentential operators.¹⁰ Second, since a causal question presupposes the existence of a resultant event, it is just natural that the realis tense is preferred. Under this view, *how come* simply means "how does the resultant event come about?".¹¹ Third, since all the aspectual construals discussed above involve the realis tense, we now have a straightforward solution to why the causal reading is obligatory in (2a,b) and (21) to (23).¹²

There are, however, a few cases where the causation analysis does not quite apply. Namely, it works reasonably well in presence of a future modal, as the tense is clearly realis in (33a):

- (33) a. Akiu zenme hui zou? (epistemic modal)
 Akiu how will leave
 'Why would (# will) Akiu leave?'
- b. Akiu zenme yinggai/bixu zou? (deontic modal)
 Akiu how should/must leave
 'Why should/must Akiu leave?'

⁹ This proposal is inspired by Whelpton's (1995, 1999) works on telic clauses such as (i), where the event of Akiu's leaving without saying anything is said to be a remarkable outcome of the event of Akiu's meeting a sailor, as formulated in (ii):

(i) Akiu met a sailor, only to leave without saying anything.
 (ii) TELOS ($\langle e_1, e_2 \rangle \leftrightarrow e_2$ is the remarkable outcome of e_1)

¹⁰ It is also possible to detect similar effects in English with proper contexts and focuses, as exemplified by the following two causal questions (Matthew Whelpton p.c.):

(i) a. How can Mary be so beautiful (given what we know about her parents!)?
 b. How did Mary (manage to) NEVER/SELDOM/ALWAYS/SOMETIMES/RARELY wash her car (under those conditions)?

¹¹ In Collins (1991), *how-come* is envisioned as a verbal complex of some sort, serving as the head of CP.

¹² Alternatively, if Jonah Lin (1999) is on the right track, there may well be an implicit tense/aspect operator in Chinese, blocking manner construals in the same way as negation.

- c. Akiu zenme gan/yuanyi/neng zou? (control modal)
 Akiu how dare/is willing to/has the ability to leave
 'Why does Akiu dare to leave?'
 'Why is Akiu willing to leave?'
 'Why has Akiu the ability to leave?'

But when the future modal is replaced by a deontic or control modal, as exemplified by (33b,c) respectively, the causal-realis correlation breaks down. The crucial difference, in my opinion, lies in the intuition that (33b,c) do not seem to involve causation, at least not between two events. We would like to entertain the possibility that the internal argument of CAUSE can be either eventual or propositional. In the case of (33b,c), the pseudo causative predicate in question (call it CAUSE') takes a proposition as its internal argument, and has a semantics similar to (34a):

- (34) a. CAUSE' (e, Q) \leftrightarrow e makes Q true
 b. $\lambda P \exists s (\forall P \wedge P = \text{CAUSE}'(s, Q) \wedge Q = \wedge \text{Akiu should/must/dare/is willing to/has the ability to leave})$

Here we do not have a resultant event as postulated in (32a). Instead, a proposition enters into the causal relation, where an eventuality causes the proposition to be true. (33b,c) therefore have a semantics like (34b). Under this view, it is in principle possible for CAUSE to be ambiguous between (32a) and (34a), which, interestingly enough, is attested when we consider cases involving a possibility modal:

- (35) Akiu zenme keneng zou? (possibility modal)
 Akiu how possibly leave
 'Why can/could Akiu leave?'

Here both the realis tense and the irrealis tense are applicable, and the modal types appear to play a major role in constraining the complementation of *zenme*. A true account, it seems, calls for a fine-grained semantics of the interaction between tense and modality, which is clearly beyond the scope of this paper. We will therefore leave the issue open here.

A curious question arises in this context as to why we cannot say something like (36a):

- (36) a.* How go Akiu left without saying anything?
 b. How are things going?

One way to think about this puzzle is to say that, since *how come* is about the cause, *how go* has to be about the result. As a matter of fact, this is exactly what happens in (36b), where *how* is construed as resultative rather than causal. This line of thinking leads to our investigation of resultative *how* in the next section.

3. The *how* family

First note that there are actually two *how*'s in Chinese, i.e., *zenme* 'how' and *zenme-yang* 'how-manner'. The syntax and semantics of the two Chinese *how*'s overlap, but they also differ in a number of ways: In terms of syntax, *zenme* always occurs preverbally, whereas *zenme-yang* must follow modals and sentential adverbials, as shown by (37a) and (37b) respectively:

(37) a.* *ge*, Akiu shang-ci chang-de zenme?
song Akiu last-time sing-Res how
'How did Akiu sing last time?'

b.* Akiu zenme-yang shang-ci chang-ge?
Akiu how-manner last-time sing-song

In terms of semantics, both postmodal *zenme* and preverbal *zenme-yang* allow method and style readings. In contrast, premodal *zenme* is construed as causal, while postverbal *zenme-yang* is construed as resultative or style. First compare (38a,b). *Zenme-yang* 'how-manner', just like postmodal *zenme*, can be construed either as method, as in (38a), or as style, as in (38b):

(38) Akiu shang-ci zenme-yang chang-ge?
Akiu last-time how-manner sing-song
'How did Akiu sing last time?'

Answer: a. *yong houlong* 'with throat' (method)
b. *hen dasheng* 'very loudly' (style of action)

Next compare (39a,b). (39a) responds to the resultative reading, answering that the performance of Akiu's singing is not so good. On the other hand, (39b) responds to the style reading, saying that the effect of Akiu's singing is too loud.

(39) ge, Akiu shang-ci chang-de zenme-yang?

song Akiu last-time sing-Res how-manner

'How did Akiu perform in singing last time?'

Answer: a. bu zenme-yang 'not so (good)' (resultative)

b. tai dasheng 'too loud' (style of resultant state)

The distribution of Chinese *how* is summarized in Table 1:¹³

Table 1.

	premodal	in-between	postverbal
<i>zenme</i>	causal	method	*
		style of action	
<i>zenme-yang</i>	*	method	resultative
		style of action	style of resultant state

It is also instructive to note that all the conditions on postmodal *zenme* mentioned above apply to preverbal *zenme-yang* as well, as evidenced by the deviance throughout (40) and (41):

Aspects:

(40) a.* Akiu zenme-yang zou-le?
Akiu how-manner leave-Prf/Inc

b.* Akiu zenme-yang shuijiao-le?
Akiu how-manner sleep-Prf/Inc

c.* Akiu zenme-yang zai-shuijiao?
Akiu how-manner Prg-sleep

d.* Akiu zenme-yang chuan-zhe tuoxie?
Akiu how-manner wear-Dur slipper

¹³ Here "premodal" is a collective term for all the positions preceding sentential operators, which include modal verbs, adverbs of quantification, temporal/spatial adverbials, negation, A-not-A questions, and modality adverbs (see section one for detailed discussions).

- e.* Akiu zenme-yang qu-guo meiguo?
 Akiu how-manner go-Exp America

Stative, Psych, and causative predicates:

- (41) a.* Akiu zenme-yang zheme mang/congming?
 Akiu how-manner so busy/smart
- b.* Akiu zenme-yang xihuan/pa Xiaodi?
 Akiu how-manner like/fear Xiaodi
- c.* zhe-chu dianying zenme-yang zheme taohao/xia-ren?
 This-CL movie how-manner so pleasing/scare-people
- d.* na-ping jiu zenme-yang [CAUS+[zui-de]_i] Akiu_k t_i [PRO_k zhan-bu-qilai]?
 that-CL wine how-manner drunk-Res Akiu stand-not-up

By contrast, the agentive psych-verb construction again licenses manner construals:

- (42) Akiu zenme-yang taohao/xia Xiaodi?
 Akiu how-manner please/scare Xiaodi
 How does Akiu please/scare Xiaodi?' (method and style of action)

This indicates that both postmodal *zenme* and preverbal *zenme-yang* are subject to Agent-control, and adjoined to an intermediate projection between Verb and Infl, which is reminiscent of rationale clauses in Whelpton's (1995, 1999) sense:

- (43) John_k bought some videos (in order) [PRO_k to have something to watch over the weekend].

Postverbal *zenme-yang*, on the other hand, is not selective at all with respect to control (cf. Huang 1988, 1992, Tsai 1994a), behaving more like a complement rather than an adjunct. First compare (44a,b). (44a) responds to the resultative question, answering that Akiu is tired. Hence a case of subject control. On the other hand, (44b) responds to the style question, answering that the effect of Akiu's running is very fast. Here the whole result clause can be viewed as a predicate in William's (1980) sense, predicating upon the resultant state of the running event:

(44) Akiu pao-de [_{RC} PRO zenme-yang]?

Akiu run-Res how-manner

'How did Akiu perform in running?'

Answer: a. hen lei 'very tired' (resultative)

b. hen kuai 'very fast' (style of resultant state)

Next compare (45a,b). (45a) corresponds to the resultative reading, stating that the matter in question is successful, which counts as an instance of Theme control. (45b), on the other hand, corresponds to the style reading, stating that Akiu has handled the matter in a no-nonsense style:

(45) zhe-jian shi, Akiu ban-de [_{RC} PRO zenme-yang]?

this-CL matter Akiu handle-Res how-manner

'How did Akiu perform in handling this matter?'

Answer: a. hen chenggong 'very successful' (resultative)

b. hen liluo 'very straightforward' (style of resultant state)

(46) is a bit more complicated, which, according to Huang (1992), involves a complex predicate formed by the main predicate *ban-de* and the result clause:

(46) Akiu ba zhe-jian shi [_{complex predicate} ban-de [_{RC} PRO zenme-yang]]?

Akiu BA this-CL matter handle-Res how-manner

'How did Akiu make this matter by handling it?'

Answer: a. hen chenggong 'very successful' (causative-resultative)

b.# hen liluo 'very straightforward'

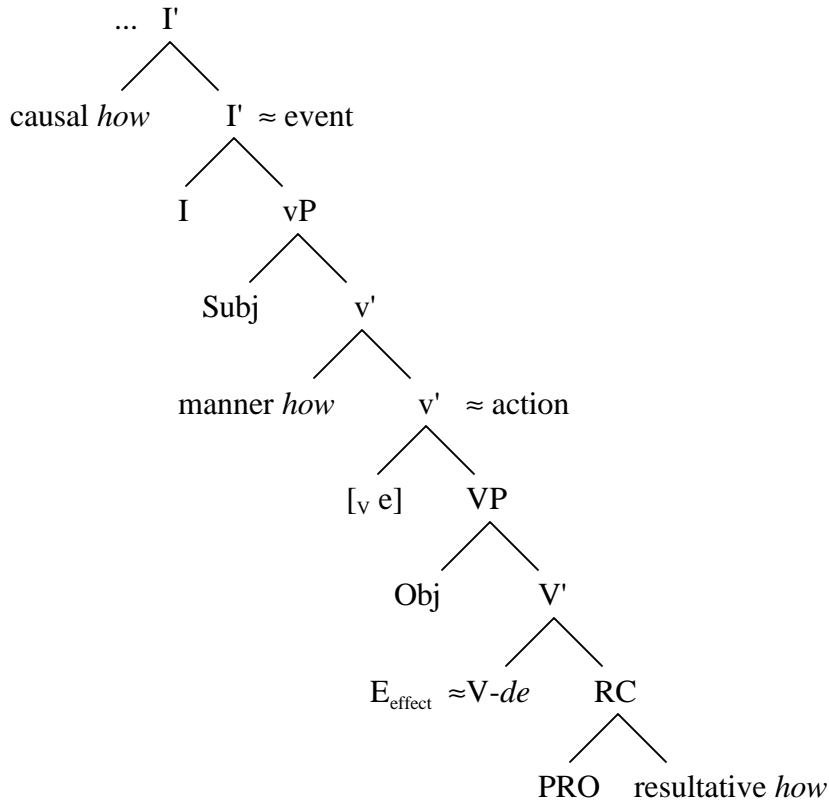
This complex predicate in turn predicates upon the object *zhejian shi* 'this matter', and by doing so, blocks the style reading, since the open place *e* of the result clause must be taken by the object in this particular configuration. Therefore, the key to form a resultative question lies in the bottom of a sentence rather than the top, as sketched below (v: light verb; V: lexical verb):¹⁴

¹⁴ The structural distinction between preverbal and postverbal *zenme-yang*'s traces back to McConnel-Ginet's (1982) dichotomy between Ad-VP and Ad-Verb, as shown by the contrast of (ia,b) (also cf. Huang 1992, Tsai 1997):

(i) a. John quickly/* fast finished the job. (Ad-VP: VP modifier)

b. John finished the job quickly/real fast. (Ad-Verb: stative predicate)

(47)



Firstly, when *zenme* modifies I', which corresponds to an event, it is construed as a causative predicate taking the event as its complement. Hence the causal reading (cf. section two). Secondly, when *zenme* modifies v', which corresponds to an action, naturally it requires an agent to be its subject. As a result, either the method reading or the style (of action) reading emerges. Finally, the result clause headed by *zenme* predicates upon a resultant event/state introduced by the resultative marker *-de*. If the subject of this secondary predication is an event, then we get the resultative reading. If the subject in question corresponds to a state, the style (of state) reading slips in.

4. The *why* couple

All things being considered, the picture cannot be completed without checking with the real *why* in Chinese. Parallel to Chinese *how*, there are also two types of Chinese *why*, i.e., *weishenme* 'why' and *wei(-le) shenme* 'for what'. Anything we said about causal *zenme* holds for *weishenme* as well. Take the following modal constructions for example:

- (48) a. Akiu weishenme hui/bixu/neng/keyi/yinggai zou?
Akiu why will/must/can/may/should leave

'Why would/must/can/may/should Akiu leave?'

- b.* Akiu hui/bixu/neng/keyi/yinggai weishenme zou?
Akiu will/must/can/may/should why leave

As evidenced by the contrast between (48a,b), *weishenme* cannot stay in the scope of a modal verb, and must be interpreted as causal. *Wei(-le) shenme*, on the other hand, is in complementary distribution with *weishenme* in presence of sentential operators, and is typically construed as a purpose question.¹⁵ This point can be made clear by comparing (49a) with (49b):¹⁶

- (49) a. Akiu hui/bixu/neng/keyi/yinggai wei(-le) shenme cizhi?
Akiu will/must/can/may/should for(-Prf) what resign
'For what (purpose) will Akiu resign?'

- b.* Akiu wei(-le) shenme hui/bixu/neng/keyi/yinggai cizhi?
Akiu for(-Prf) what will/must/can/may/should resign

The same pattern holds throughout (50) and (51):

Aspects:

- (50) a. Akiu weishenme/*wei(-le) shenme zou-le?
Akiu why/for(-Prf) what leave-Prf/Inc
- b. Akiu weishenme/*wei(-le) shenme shuijiao-le?
Akiu why/for(-Prf) what sleep-Prf/Inc

¹⁵ As Teresa Griffith (p.c.) points out, modern English *why* derives from the instrumental case of *hw{t}* 'what' in middle and old English (i.e. MnE *why* < ME *hwi* < OE *hwy*Ń). This lends support to our intuition that *wh*-adjuncts such as *weishenme* is essentially a grammaticalized PP, where the head noun has been incorporated and the category as a whole has changed into adverb. The same observation carries over to the distinction between *pourquoi* 'why' and *pour quoi* 'for what' in French.

¹⁶ The purpose reading is not obligatory for *wei(-le) shenme* 'for what'. When interpreted as causal, for instance, it may appear higher than some of the modal verbs:

- (i) Akiu wei(-le) shenme bixu/yinggai cizhi?
Akiu for(-Prf) what must/should resign
'For what (reason) must/should/may/will/can Akiu resign?'

The same construal, however, is never available when *wei(-le) shenme* stays in the scope of sentential operators. For the ease of exposition, I will systematically leave out this marked usage where the distinction is irrelevant.

- c. Akiu weishenme/*wei(-le) shenme zai-shuijiao?
 Akiu why/for(-Prf) what Prg-sleep
- d. Akiu weishenme/*wei(-le) shenme chuan-zhe tuoxie?
 Akiu why/for(-Prf) what wear-Dur slipper
- e. Akiu weishenme/*wei(-le) shenme qu-guo meiguo?
 Akiu why/for(-Prf) what go-Exp America

Stative, Psych, and causative predicates:

- (51) a. Akiu weishenme/*wei(-le) shenme zheme mang/congming?
 Akiu why/for(-Prf) what so busy/smart
- b. Akiu weishenme/*wei(-le) shenme xihuan/pa Xiaodi?
 Akiu why/for(-Prf) what like/fear Xiaodi
- c. zhe-chu dianying weishenme/*wei(-le) shenme zheme taohao/xia-ren?
 This-CL movie why/for(-Prf) what so pleasing/scare-people
- d. na-ping jiu weishenme/*wei(-le) shenme [CAUS+[zui-de]]
 that-CL wine why/*or(-Prf) what drunk-Res
 Akiu_k t_i [PRO_k zhan-bu-qilai]?
 Akiu stand-not-up

Just like the causal-manner contrasts of *zenme* 'how', the causal-purpose asymmetry breaks down in agentive psych-verb constructions:

- (52) Akiu weishenme/wei(-le) shenme taohao/xia Xiaodi?
 Akiu why/for(-Prf) what please/scare Xiaodi
 Why/For what (purpose) does Akiu please/scare Xiaodi?

Purpose *why*, therefore, patterns with method *how* in Chinese, which is not only reminiscent of rationale clauses in English, but has an obvious semantic connection to them. Namely, it is the intention of the agent which is at stake here. In light of this observation, we are now in a position to attempt an explanation for the *how-why* asymmetry of meaning shifting. First let's put the *how*

family and the *why* couple side by side in Table 2:

Table 2.

	premodal	in-between	postverbal
<i>zenme</i>	causal	method	*
		style of action	
<i>zenme-yang</i>	*	method	resultative
		style of action	style of resultant state
<i>wei(-le) shenme</i>	*	purpose	*
<i>weishenme</i>	causal	*	*

With the geometry of the *how-why* alternation in mind, we would like to entertain the following view: For premodal and postverbal positions, the range of semantic interpretations is highly restricted: The former involves causal construals, and the latter resultative construals, each corresponding to one of the two event arguments of the causative predicate, i.e., CAUSE(e_{cause} , e_{effect}). From this angle, it is misleading to say that the meaning of *how* has somehow shifted. Rather, it is the syntactico-semantic geometry which supplies, if not determines, the interpretations of premodal *zenme* and postverbal *zenme-yang* (cf. (47)). The syntactic projection in-between, on the other hand, is packed with VP-modifiers sensitive to agentivity. From a functional point of view, there is simply no basis for a semantic merger between *how* and *why*, because the need for disambiguation is paramount.

5. Big picture

Finally, let's take a look at the big picture behind the *how-why* alternation. First, we would like to point out a crucial generalization about Chinese *wh*-constructions. That is, *wh's-in-situ* that resist existential closure are exactly those sensitive to syntactic islands. As we have discussed above in some details, style *how*, causal *how*, and causal *why* can neither stay in the scope of sentential operators, nor be construed as existential. As it turns out, in contrast to other Chinese *wh's-in-situ*, they are also the ones that observe island constraints, as summarized in Table 3 (cf. Huang 1982, Jo-wang Lin 1992, Tsai 1994a,b):

Table 3.

Chinese <i>wh-in-situ</i>	Strong/ <i>Wh</i> -island	Non-bridge verb	Others
<i>who</i>	ok	ok	ok
<i>what</i>	ok	ok	ok
<i>where</i>	ok	ok	ok
<i>when</i>	ok	ok	ok
resultative <i>how</i>	ok	ok	ok
method <i>how</i>	ok	ok	ok
purpose <i>why</i>	ok	ok	ok
style <i>how</i>	*	*	ok
causal <i>how</i>	*	*	ok
causal <i>why</i>	*	*	ok

The proposal we have in mind for this correlation has a direct bearing upon the morphological makeup of Chinese: First assume that (53a) is set as the value for Chinese-type languages in building an operator-variable pair:

(53) *Lexical Merger Parameter* (Tsai 1994b, 1999a, also cf. Aoun & Li 1993):

- a. Chinese-type: merging operators into CP or IP
- b. Japanese-type: merging operators into PP or DP
- c. English-type: merging operators into D⁰ or N⁰

It follows that an implicit question operator is in principle available in a Chinese sentential projection. Furthermore, only nouns may introduce variables in situ. Genuine adverbs such as causal *why* and style *how* must raise to introduce a variable, i.e., by leaving a trace. As a result, only nominals (i.e., constituents containing a noun head, including PPs and predicate nominals) are subject to unselective binding. This is because the semantic types of nouns are typically individuals and events, which are subject to predication or quantification. In contrast, the semantic types of adverbs are typically predicates of actions or events (as VP/IP modifiers), and those of stative properties (as AP modifiers).

To see how this proposal works, let's consider (54) first. Here again we find that it is impossible for *weishenme*, a causal *why*, to stay in the scope of a possibility operator:

- (54) * Akiu keneng weishenme ban zhe-ge huiyi
 Akiu possibly why organize this-Cl conference
- a. 'Why is it possible for Akiu to organize the conference?'
 - b. 'It is possible for Akiu to organize the conference for some reason.'

To license the interrogative construal of (54a), *weishenme* must raise over the possibility operator *keneng* to check the operator feature on C, a typical relativized minimality violation (Rizzi 1990), as illustrated by the following LF:

- (55) *weishenme*_k Akiu keneng t_k ban zhe-ge huiyi?
 why Akiu possibly organize this-CI conference

(54a) is thus ruled out by the Minimal Link Condition (cf. Chomsky 1995). The condition requires the link between *weishenme* and its trace to be the shortest, which, however, cannot be the case, because there is an closer A'-specifier to the *wh*-trace, i.e., *keneng* 'possibly'. To license the indefinite reading of (54b), it is essential for *weishenme* to introduce a variable in situ for the sake of existential closure, which option is also blocked owing to its categorial status, i.e., a genuine adverb. As a result, there is no way to assign a legitimate LF to (54), and the derivations in question fail to converge.

Next consider (56), where *wei(-le) shenme* 'for what' can be construed either as interrogative, as in (56a), or as indefinite, as in (56b):

- (56) a. Akiu keneng *wei(-le) shenme* ban zhe-ge huiyi?
 Akiu possibly for(-Prf) what organize this-CI conference
 'What can Akiu organize the conference for?'
 b. Akiu keneng *wei(-le) shenme cai* ban zhe-ge huiyi.
 Akiu possibly for(-Prf) what just organize this-CI conference
 'It is possible that Akiu organizes the conference just for some purpose.'

The noun head *shenme* 'what' of (56a) is unselectively bound by the sentential question operator supplied by the Chinese-type setting of the Lexical Merger Parameter.¹⁷ Since there is no movement involved, the Minimal Link Condition is irrelevant. Consequently, (57a) emerges as a legitimate LF:

- (57) a. Op_{x[Q]} Akiu keneng *wei(-le) shenme(x)* ban zhe-ge huiyi?
 Akiu possibly for(-Prf) what organize this-CI conference

¹⁷ This proposal owes its insight to Aoun's (1986) observation that there is a semantic distinction between French *pourquoi* 'why' and *pour quoi* 'for what', i.e., causal vs. purpose, which in turn is attributed to their distinct categorial status, i.e., adverb vs. PP.

- b. Akiu keneng \exists_x (wei(-le) shenme(x) cai ban zhe-ge huiyi)
 Akiu possibly for(-Prf) what just organize this-CI conference

If it so happens that no question operator merges to CP, existential closure associated with *keneng* applies instead, licensing the *wh*-in-situ in question (also cf. Cheng 1991). This gives rise to the existential reading of (56b) by producing another legitimate LF (57b).¹⁸

An argument for this approach comes from so-called *wh*-donkey sentences (cf. Cheng & Huang 1996), where a universal operator is merged to license a pair of identical *wh*'s-in-situ, each of which resides in a separate clause. This results in the conditional construal of (58a):

- (58) Akiu hui zenme qu, wo jiu hui zenme qu.
 Akiu will how go I then will how go
 a. For every means/way *x*, if Akiu will go by *x*, then I will go by *x*.
 b.# For every style *x*, if Akiu will go with *x*, then I will go with *x*.

The style reading of (58b), as expected, is blocked. This is because style *zenme*, as an adverb, does

¹⁸ As noted by Kazue Takeda (p.c.), although *doo* 'how' can be interpreted as result, method, or style, as illustrated by (ia-c) respectively, it does not occur multiply in Japanese:

- (i) John-wa kabin-o doo kowasita-no
 top vase-acc how broke-Q
 'How did John break the vase?'
Answer: a. konagona-ni
 pieces-into
 'into pieces' (result)
 b. hanmaa-de tatai-te
 hammer-with hitting
 'by hitting with a hammer' (method)
 c. nan-no tamerai-mo naku
 any-gen hesitation NEG
 'with no hesitation' (style)

The same observation obtains for Chinese. Causal and manner *how*'s do not cooccur, as in (iia); causal and resultative *how*'s are not compatible either, as in (iib):

- (ii) a. *Akiu zenme keyi zenme-yang ban zhe-jian shi ne?
 Akiu how may how-manner deal this-CI matter Q_{wh}
 b. *Akiu zenme keyi ba zhe-jian shi ban-de zenme-yang ne?
 Akiu how may BA this-CI matter deal-Res how-manner Q_{wh}

This is somewhat unexpected under our approach: While there is no room for more than one *wh*-adverb in a given clause domain, extra *wh*-nominals should not be a problem as they are subject to unselective binding. In other words, (iia,b) should be fine when *zenme-yang* is construed as method and resultative respectively. The reason, in my opinion, has something to do with the way unselective binding works in Chinese. First consider the scenario where both a *wh*-adverb and a *wh*-nominal appear:

- (iii) [Op_x [C [... wh_y ... wh_x ...]]]

Note that since Op merges to CP by default in Chinese (presumably checking off the operator feature on C), there is no place for the *y*-indexed *wh*-adverb to go. The result may well be a case of vacuous quantification.

not introduce a variable in situ, and unselective binding from the universal operator is bound to fail. The causal construal of (59) is ruled out by the same token:

- (59)* Akiu zenme hui qu, wo jiu zenme hui qu.
Akiu how will go I then how will go
'For every reason x, if Akiu will go for x, then I will go for x.'

The method reading of (58a), on the other hand, is licensed on a par with that of *zenme-yang* 'how-manner' in (60):

- (60) Akiu hui zenme-yang qu, wo jiu hui zenme-yang qu.
Akiu will how-manner go I then will how-manner go
a. For every means/way x, if Akiu will go by x, then I will go by x.
b.# For every style x, if Akiu will go with x, then I will go with x.

That is, we will take the position that method *zenme* is headed by an empty noun, just as *zenme-yang* is headed by *-yang* 'manner'. It is this head noun and its overt counterpart that makes the unselective binding possible in (58a) and (60a).¹⁹

The same analysis carries over to the following contrast between causal and purpose *why* without further stipulations:

- (61) Akiu hui wei(-le) shenme zi-sha, wo jiu hui wei(-le) shenme zi-sha
Akiu will for(-Prf) what self-kill I then will for(-Prf) what self-kill
'For every purpose x, if Akiu will kill himself for x, then I will kill myself for x.'

- (62)* Akiu weishenme hui zi-sha, wo jiu weishenme hui zi-sha
Akiu why will self-kill I then why will self-kill
'For every reason x, if Akiu will kill himself for x, then I will kill myself for x.'

As noted by Audrey Li and Luther Liu (p.c.), there are some marginal cases where *weishenme* may participate in the *wh*-donkey construal:

¹⁹ As Hidehito Hoshi (p.c.) points out, *doo* 'how' can only adjoin to a verbal head in Japanese, as in *doo-si-te* 'how-do-Ger'. Consequently, **doo-yoo-ni-si-te* 'how-manner-Dat-do-Ger' is out, while *dono-yoo-ni-si-te* 'which-manner-Dat-do-Ger' is fine. The same thing happens in English, given Collins's (1991) view that *how-come* forms a verbal unit in C. *Zenme-yang*, on the other hand, seems to involve a phrasal structure when it is interpreted as method (a bare PP) or resultative (a predicate nominal). See Tsai (1994a,b, 1999a) for a more detailed discussion.

(63)? zuotian Akiu weishenme mei hui-jia, wo jiu weishenme mei huijia
 yesterday Akiu why have-not return-home I then why have-not return-home
 'For every reason x, if for x Akiu didn't go home yesterday, then for x I didn't
 go home yesterday.'

This, however, does not necessarily constitute a counterexample to our analysis. One way to approach the problem is to treat (63) as a reduced form of (64):

(64) zuotian Akiu wei(-le) shenme mei hui-jia,
 yesterday Akiu for(-Prf) what have-not return-home
 wo jiu wei(-le) shenme mei hui-jia
 I then for(-Prf) what have-not return-home
 'For every reason x, if for x Akiu didn't go home yesterday,
 then for x I didn't go home yesterday.'

Here *wei(-le) shenme* 'for what' can only be causal, as it scopes over negation (cf. footnote 13). The head noun *shenme* thus saves the day for the unselective binding construal in question. This move is further supported by the fact that causal *zenme*, without the option of assuming the form of a PP, is consistently blocked from the same construction, as evidenced by (65):

(65)* zuotian Akiu zenme mei hui-jia, wo jiu zenme mei hui-jia.
 yesterday Akiu how have-not return-home I then how have-not return-home

Another alternative is to explore Jim Huang's (p.c.) intuition that (63) has a different kind of register from (62): (63) has a factual flavor to it, which in turn hints at an E-type pronoun construal. Namely, it is to be understood as 'for exactly the same reason Akiu didn't go home, I didn't go home yesterday'. We will leave the choice open here.

6. Concluding remarks

It becomes clear at this stage that the seemingly random *how-why* alternations are in fact shaped by a number of factors:

I. *The semantics of a casual relation:*

The causation analysis provides a formal basis where we are able to work out not only the semantics of a subset of causal questions, but also the semantics of a resultative question. The causal-realis correlation also seems to follow as long as the internal argument of the causative predicate is eventual rather than propositional.

II. *The type of syntactic projection subject to modification:*

The ontology of *how*-construals (i.e., cause>manner>result) is attributed to the type of syntactic projection *zenme* modifies, roughly corresponding to I', v', and the V-*de* complex. Causal *how* modifies I', hence a predicate of event. Manner *how* modifies v', hence a predicate of action and sensitive to subject agentivity. Resultative *how* heads a result clause, which as a whole predicates upon a resultant event/state in absence of a control relation. Under this view, the *how-why* asymmetry of meaning-shifting is essentially an illusion. It is the semantico-syntactic geometry that sets up the groundwork for a particular interpretation in a particular structural position.

III. *The type of syntactic projection that an operator may adjoin to:*

Given that Chinese may merge an implicit question operator to a sentential projection, *wh*'s-in-situ are in principle unselectively bound by the sentential operator. We then have a straightforward account as to why island effects are largely lost in Chinese.

IV. *The fundamental difference between nouns and adverbs:*

The residue of the above unselective binding approach consists of exactly those *wh*'s that can neither stay in the scope of sentential operators, nor be construed as existential, i.e., style *how*, causal *how*, and causal *why*. Since these *wh*-adverbs do not introduce variables in situ, the only way for them to take a sentential scope is to undergo LF movement. We therefore derive the locality effects throughout (6-20) in a principled way.

The name of the game, therefore, lies in factoring out some of the factors, and revealing the true nature of the others. We have demonstrated in this paper that there is a way to approach the *how-why* alternations in a productive manner, though part of this project still remains inconclusive (e.g., the influence of modality on the semantics of causation). Hopefully, this study will contribute to the building of a more sophisticated theory of the syntax-semantics interface, and deepen our understanding of question formation in general.

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