Master Thesis

On Chinese Negative-Wh Constructions and
Causal/Denial-*How* Questions

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Appendix: List of abbreviations

1sg	First person singular
2sg	Second person singular
3sg	Third person singular
2pl	Second person plural
ACC	Accusative
AE	Actuality Entailment
CL	Classifier
CONJ	Conjuntive
COP	Copula
DEM	Demonstrative
DUR	Durative
EAS	Empty Answer Set
EXP	Experiential
FOC	Focus marker
ILL	Illative
IMPF	Imperfective
IWHQ	Interrogative Wh-Question
Lit.	Literally
MNM	Metalinguistic Negation Marker
NWHC	Negative Wh-Construction
NWHQ	Negative Wh-Question
NOM	Nominative
NPI	Negative Polarity Item
PFV	Perfective marker
PI	Polarity Item
POT	Potential morpheme
PPI	Positive Polarity Item
PRG	Progressive
PST	Past
Q	Question particle
TOP	Topic marker
VM	Verbal modifier

1   Introduction

The present thesis aims to analyze two kinds of questions in Chinese that have not yet received much attention. One of them expresses negation, and is called a *Negative Wh-Construction* (NWHC) by Cheung (2008; 2009).

(1)   **The Negative Wh-Construction**

Tā {nǎ lǐ/nǎr / zěnme} yǒu zài   túshūguǎn lǐ chī fàn   (ne)?!   [Mandarin]
He {where   / how}   have be.at library   in eat meal (Q)

'No way did he eat anything in the library.'
(Lit: 'Where did he eat anything in the library?!')

Such questions convey the speaker's disapproval of some preceding utterance, they are non-standard and count as an emphatic utterance. The other one to be looked at is a kind of *how*-question, which is two-faceted. The Chinese question word *zenme* can be glossed in English as 'how' or 'how come': this question word is associated with causal questions. Its peculiarity is that besides asking for causes, as in (2a), it can also express denial at the same time, as in (2b). Following Tsai (2008), I will call questions that ask for a cause *causal questions* or will refer to them as the *causal reading* of a *zenme* question, while causal questions that are more likely to convey denial will be called *denial questions* or *zenme* questions having a *denial reading*.

(2)   **Causal- and denial-*zenme***

    a. Akiu zěnme qù le   Táiběi?   [Mandarin]
        Akiu how   go PFV Taipei
        'How come Akiu goes to Taipei?'

    b. Akiu zěnme kěyǐ qù   Táiběi?
        Akiu how   go PFV Taipei
        'How can Akiu go to Taipei? (He should not go!)'

It is hard to draw a line between causal and denial *zenme* questions, because 'neutral' causal questions also have the ability to have a denial reading along with the causal one, too. In English, in Hungarian and in Chinese, at least, a *how come* question can always be pronounced in a conversational situation where it conveys the speaker's negative attitude. But, as I will suggest later, there are *zenme* questions that are more likely to convey denial, in a way that their causal reading becomes suppressed. The reason for this variation has not yet been investigated.

As for *how* questions, there are two important contrasts noted by Tsai, both of which are crucial in the present analysis of denial-*zenme* questions. *Zenme* in (3a) can have both a manner/instrumental (thus a very low) interpretation and a causal one. But when the predicate is marked for aspect, as in (3b), the only reading available is the causal one.

(3) **Contrast 1**: With a perfective marker, only a causal reading is available

    a. Akiu *zĕnme* qù Táibĕi?   [Mandarin]
       Akiu how   go Taipei
       'How (by what means) will Akiu go to Taipei?'

    b. Akiu *zĕnme* qù le   Táibĕi?
       Akiu how   go PFV Taipei
       'How come Akiu went to Taipei?'

The second contrast concerns *zenme*-questions which favor a denial reading. Being under the modal, *zenme* in (4a) can never have a causal or denial interpretation, while in the presence of a modal, a denial reading is favored, given that *zenme* precedes it.

(4) **Contrast 2**: Causal and denial readings are only available above the modal

    a. Akiu kĕyĭ zĕnme qù Táibĕi?   [Mandarin]
       Akiu can how   go Taipei
       'How can Akiu go to Taipei?'

    b. Akiu zĕnme kĕyĭ qù Táibĕi?
       Akiu how   can go Taipei
       'How come Akiu could go to Taipei?'
       Also conveying: 'Akiu can't/shouldn't go to Taipei.'

The research questions that I aim to answer are the following:

(5) **Research Questions**
    1. Do Mandarin NWH-words and causal/denial-*zenme* share the same place in syntax?
    2. In what way are NWHCs different from 'ordinary' negation in Mandarin?
    3. What is it that gives rise to the causal and the denial interpretation of *zenme* questions?

Before presenting the data and addressing the research questions, it is relevant for the discussion of these questions to clarify some further terms.

Questions can be represented by a question operator and a *sentence radical*, which is a proposition. These are shown informally in (6).

(6)   a. Who did you see?

        b. Question operator: which x such that x is a human

        c. Sentence radical: You saw x.

Krifka states that any theory of questions should consider the kinds of answers that can possibly be given. The term *congruent answer* (borrowed from Arnim von Stechow) is of key importance in his account, which stands for answers that "satisfy the informational need expressed by the question, depending on the granularity level of the conversational background of the question" (Krifka 2011, p. 1750). A congruent answer for (6a) would be '(I saw) Sam.', where 'Sam' belongs to the set that variable x ranges over (the set of humans).

Questions can qualify as questions based on their formal properties (the presence of question words or question particles). As for their semantics, the meaning of a question can be represented as a set of propositions that are possible answers to it (Hamblin 1973). Pragmatically, questions are requests of information. Krifka (2011) calls questions that have all three properties *canonical questions.* There are utterances though that are questions according to some but not all of these aspects, consider the examples in (7):

(7)   a. It's raining?

        b. Could you pass the salt?

        c. Who would go there by bike?

(7a) is a so-called rising declarative: it has the form of a declarative (not counting intonation), but expresses a request for information. (7b) is a directive in a polite disguise, and (7c) is a rhetorical question, that qualifies as a question both syntactically and semantically, but not pragmatically, as it is known to not ask for an answer. Such questions, Krifka (2011) called *non-canonical.*

As for the target question types of this thesis, there are both canonical and non-canonical occurrences of them. Causal- and denial-*zenme* questions have the formal properties of questions, their question words quantify over a set of propositions that express causes. But pragmatically, besides expressing a request for answers, they can also express the speaker's denial, thus they can be both canonical and non-canonical. The difference between them, as I will later argue, is that in denial-*zenme* questions (that is, in questions that are more likely to express denial than cause), the canonical reading can even be suppressed by the denial reading. NWHCS are non-canonical: even though syntactically, they have most of the properties of wh-questions, pragmatically, their illocutionary force is more like that of assertions, instead of a request for information.

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2 Causal/denial-*zenme*'s and NWHCs

When looking at the syntactic distribution of these question words, which is provided by the works of Cheung (2008; 2009) and Tsai (2008), some parallels can be observed. In this section, it will be shown that based on the syntactic tests these authors used, causal- and denial-*zenme*, as well as NWH-words should share the same position in the syntactic tree.

2.1 The Negative Wh-Construction

Cheung (2008; 2009) is the only one so far who reports about the special use of wh-words which makes the question equal to a negative assertion, the Negative Wh-Constructions (NWHCs) or Negative Wh-Questions (NWHQs). Cheung concentrated on Cantonese, but the phenomenon has been observed in several unrelated languages such as English, Korean, Japanese, Hebrew, Hindi, Malay and Mandarin[1].

(8)   a. Koei bindou jau hai toushugun sik je aa3?!   [Cantonese]
         he where have be.at library eat thing Q
         'No way did he eat anything in the library.'
         (Lit: Where did he eat anything in the library?!)

      b. {Eti/Ettehkey} John-i 60 sal i-ni?!   [Korean]
         {where/how} John-NOM 60 year.old be-Q
         'No way is John 60 years old.'
         (Lit: Where/How is John 60 years old?!)
         (Cheung 2009, p. 298)

In the following subsections, the properties of Mandarin NWHCs will be looked at, as described in Cheung (2008; 2009).

2.1.1 The semantic and pragmatic properties of NWHCs (Cheung 2008)

In Standard Mandarin, the following question words can be used as NWH-words: *(zai) na li, nar* 'where' and *zenme* 'how'.

(9)   Tā {nǎ lǐ/nǎr / zěnme} yǒu zài túshūguǎn lǐ chī fàn (ne)?!   [Mandarin]
      He {where / how} have be.at library in eat meal (Q)

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[1] NWHQs are distinguished from other question types by the use of "?!". As for the Cantonese examples, the question particle *aa3*, Cheung marks its tone value in order to distinguish it from other sentence-final markers.

'No way did he eat anything in the library.'

(Lit: 'Where did he eat anything in the library?!')

In these constructions, the wh-words are not associated with their typical quantification domains. In canonical questions, *(zai) na li* and *(zai) nar* 'where' would range over places, and *zenme* 'how' over causes. Note that in (8a) and (9), the sentences contain both *where* and *at the library*, yet they are well-formed and make sense. The fact that the constituent *at the library*, that otherwise would serve as a congruent answer to a *where*-question, is no answer in this case to the wh-element shows that wh-elements must quantify over something else. Cheung suggests that NWH-words range over conversational backgrounds[2], and he calls this phenomenon *wh-domain-anomaly*. Different languages use a different number of NWH-words; some but not all of them can be used interchangeably with each other. Also, the fact that speakers can hardly tell the difference in meaning between NWHCs with the same sentence radical, differing only in which NWH-words they have is considered by Cheung as a support for the wh-domain-anomaly.

Cheung, in analyzing Cantonese, adopts the widespread view that wh-elements on their own lack quantificational force and whether they express existential or universal quantification, for example, is determined by a licenser (see Cheng (1991; 1994) for Chinese and Lipták (2001) for Hungarian). He proposes that the special negation-like meaning of a NWHC is due to a silent "Empty Answer Set morpheme" (EAS) (Cheung 2008, p. 108). Thus when a question is uttered, the utterance cannot function as a canonical question due to the wh-domain-anomaly and the silent EAS morpheme. The EAS morpheme gives rise to an entailment that the set of possible answers is empty – which in turn serves as an answer. He argues that the semantics of NWHQs should allow a mapping from the sentence radical p into its negation ¬p, which can be sketched as follows:

(10)   NWHC = NWH-word + p (the sentence radical) → ¬p
       where

(11)   NWH-word = EAS + wh-word

The licenser of NWHs is the silent EAS morpheme c-commanding the question operator Q as in (12)[3]. What Cheung proposes is that NWH-words express quantification

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[2]Cheung uses the term *conversational background* in his (2009) paper, but in his dissertation (2008), he uses *doxastic worlds*, by which he means worlds that are compatible with what the speaker knows.

[3]In Cheung (2009), however, the meaning of NWHQs is derived without the EAS morpheme, it is explained by the conventional implicatures in (13) alone.

over the associated conversational background[4], instead of their own quantificational domains. The question will serve as a negation because the EAS guarantees that the set of conversational backgrounds will prove to be empty, which turns the polarity of the sentence radical to the opposite.

(12)   The Empty Answer Set morpheme (Cheung 2008, p. 108)
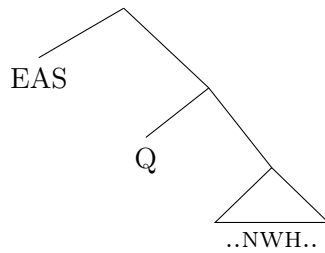
There are some discourse-related conditions that have to be fulfilled in order for NWHCs to be used felicitously. Firstly, ¬p, the negated sentence radical should be "believed" by the speaker. Secondly, there is a conflicting view condition, which means that the speaker should believe that the discourse participant believes the opposite of the speaker's belief (p). And thirdly, the speaker believes that the discourse participant should share her belief (¬p) (Cheung 2009, p. 300). As for the nature of these beliefs, Cheung considers them conventional implicatures, rather than presuppositions, because of their ability to introduce novel information in the discourse. All three conditions must be met for a NWH-interpretation, as Cheung (2008, chapter 4) proves in length. The semantic meaning and felicity conditions of NWHQs are summarized in (13).

(13)   The meaning and function of NWHCs (Cheung 2009, p. 306).

1. At-issue meaning: ¬p

2. Conventional Implicatures:

   (a) Conflicting View Condition: The speaker thinks that the discourse participant believes that p

   (b) Mis-Conclusion Condition: The speaker thinks that the discourse participant should have every reason to believe that ¬p

Entailing a negative answer is a characteristic that, according to most, is a feature of rhetorical questions, so the question arises whether NWHCs are a subtype of rhetorical questions. Cheung (2008) addresses this question and concludes that they are not,

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[4]In Cheung (2008), these are called *doxastic worlds*, indicating a set of possible worlds according to the speaker's belief, though in Cheung (2009), the term *conversational background* is used.

for which he uses the wh-domain-anomaly of NWH-words and the discourse-related constraints specified in (13) as main arguments[5]. Also, consider his example:

(14)   After all, who loves you most? Your wife, of course.

Cheung argues that rhetorical questions like (14) prove that not all rhetorical questions entail a negative answer.

2.1.2   The syntax of NWHCs as proposed in Cheung (2008)

NWHCs only use a small subset of the wh-words that are available in a given language, and, what is more, they cannot be substituted by any synonyms[6]. As (15a) and (15b) show, while I(nterrogative)WHQs remain well-formed and can be substituted by wh-expressions that quantify over the same domains (times) in (15a), NWHQs in (15b) do not survive the same changes to synonyms.

(15)   a. Since when/Since what time/Since which year/etc. has John watched talk-shows every evening?

  b. Since when/*Since what time/*Since which year does John watch talkshows every evening?!
      Intended: 'John does not watch talkshows every evening'.

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[5]There are several strong arguments for the rhetorical question status of NWHCs though. Rhetorical wh-questions (RWHQ) have a quasi-declarative nature, which becomes even more salient when used as responses to questions, called *rhetorical questions as retorts* by Schaffer (2005):

(1)   a. How reliable is he?
  b. How shallow is the ocean?
      (Schaffer 2005, p. 436)

Cheung (2008) admits that the tests for rhetorical questionhood, one of which is shown below, do not rule out NWHCs .

(2)   a. After all, do phonemes have anything to do with language? (RWHQ)
  b. After all, since when do biologists need all that math and physics?! (NWHQ)
      (Cheung 2009, p. 301)

Despite Cheung's arguments, it is still not impossible (neither undesirable) to consider NWHCs as rhetorical questions. Even if there are so many more constraints that apply to NWHCs than to 'ordinary' rhetorical questions, NWHCs can still be a special subset of them. However, for the present thesis, this question is not relevant.

[6]In the 20 languages looked at by Cheung, most have two or three NWH-words, Cantonese is the only one that has five. In some cases, synonymous question words can be part of the set of NWH-words, as it is the case in Chinese with *nar* and *na li* 'where', but apart from these cases, substituting by synonyms is not productive.

The unmarked position for adjunct wh-phrases, thus the canonical interpretations of *where* and *how* arises from low positions. Cheung's observation for Cantonese is that unless the NWH-word appears higher than the modal *wui* 'will', as in (16a), it is not possible to interpret the sentence as a NWHC. Also, for an IWHQ-interpretation, the question word *bindou* 'where' will need *hai* 'be-at', and in this form, it can precede or follow the modal.

(16)   a. Keoi bindou wui maai ce aa3?!   [Cantonese]
           he   where will buy car Q
           Lit: 'Where will he buy a car?!'
           'No way will he buy a car' (NWHQ)

        b. Keoi (wui) *(hai) bindou (wui) maai ce aa3?
           he   (will) *(at) where (will) buy car Q
           'Where will he buy a car?' (IWHQ)
           (Cheung 2008, p. 23)

The positions available for wh-words in NWHCs is more restricted than the positions in IWHCs. Cheung compares the possible positions of wh-words in IWHQs and NWHQs, and what he concludes is that there is only one available for NWH-words in Cantonese.

(17)   IWHQ: **wh** Keoi **wh** hoji **wh** maanmaangam Ø taan bui gaafe aa3   [Cant.]
        NWHQ: Ø   Keoi **wh** can Ø   slowly   Ø enjoy cup coffee Q
        (Cheung 2008, p. 43)

The presence of modal or auxiliary verbs in such questions is strongly preferred in Cantonese, while in Mandarin, this tendency is not reported to be as strong.

(18)   John {bindou/geisi} *(jau) hai cat dim   daa dinwaa bei   [Cantonese]
        John {where/when} (have) at 7   o'clock hit phone to

        nei aa3?!
        you Q

        'No way did John call you at 7 o'clock.'
        (Cheung 2008, p. 40)

As for the base position of wh-words in Cantonese, Cheung proposed that in NWHQs, they are base-merged in an IP above the IP that hosts modals. In wh-in-situ languages, they stay in the same position and get bound by the Q morpheme; in wh-fronting languages, they move to the specifier of IntP in the CP domain which is below ForceP.

(19)　The base-position and landing site of a NWH-word in ah-fronting languages as proposed by (Cheung 2008, p. 39)

```
                    ForceP
                   /      \
               Force       IntP
                          /    \
                       NWH↗     Int′
                        ⋮      /     \
                        ⋮     Q      FocusP
                        ⋮           /      \
                        ⋮        Focus      FinP
                        ⋮                  /    \
                        ⋮               Fin      IP
                        ⋮                       /   \
                        ⋮                    NWH     IP
                        ⋯⋯⋯⋯                      /   \
                                             MODAL    VP
                                                      /\
                                                     /··\
                                                    ‾‾‾‾
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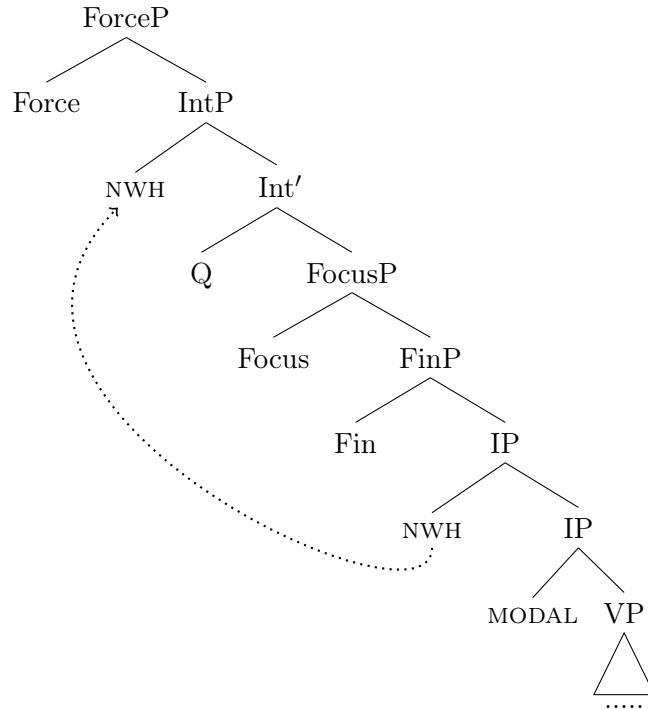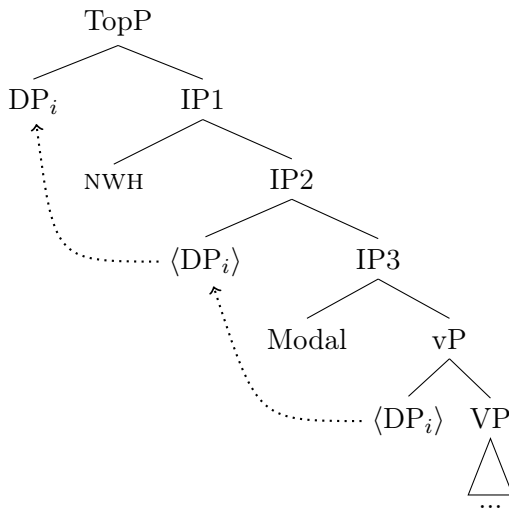
Given that Cantonese NWH-words can appear before and after the subject, he argues that subjects can appear in two different positions: the subject DP either moves up to TopP or stays in Spec,vP, its base-generated position according to Cheng (1991).

(20)　The post-subject position of a NWH-word

```
              TopP
             /    \
         DP_i      IP1
          ↑       /   \
          ⋮    NWH     IP2
          ⋮          /    \
          ⋯⋯ ⟨DP_i⟩      IP3
                    ↑    /   \
                    ⋮  Modal   vP
                    ⋮         /  \
                    ⋯⋯⟨DP_i⟩    VP
                                /\
                               /··\
                              ‾‾‾‾
```

(21) The pre-subject position of a NWH-word

```
              TopP
               |
              IP1
             /    \
          NWH     IP2
                   |
                  IP3
                 /    \
             Modal     vP
                      /  \
                   DP_i   VP
                          /\
                         /__\
                          ...
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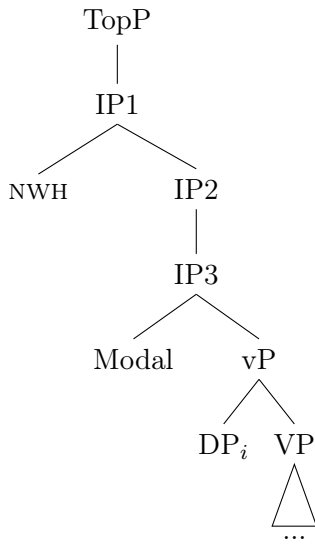
Cheung constructed (19) so that they fit into the cartographic account's picture of the left periphery as proposed by Rizzi given in (22):

(22) Force (Top*) Int (Top*) Foc (Top*) Fin IP
(Rizzi 2001, p. 289)

He then tests in what sequence Cantonese NWH-words and topics can stand in the sentence, and concludes that regardless of whether the topic is temporal, base-generated or derived via movement, it cannot be preceded by a NWH-word (Cheung 2008, p. 58). What he observed in Korean and English parallels the findings in Cantonese. Both in English and in Korean, sentential adverbs such as *frankly* and *solcikhi* 'honestly' (its Korean counterpart), precede NWH-words, just as Cantonese sentential adverbs do:

(23) a. Nei bo dinnou   ne, bindou jau jan   jung-gwo aa3?!   [Cantonese]
        you CL computer TOP where   have person use-EXP   Q

     b. *Bindou, nei bo dinnou   ne, jau jan   jung-gwo aa3?!
        where   you CL computer TOP have person use-EXP   Q
        'No way has anyone used your computer.'

     c. Lousat gong aa, bindou wui jau gam do   haakjan lei sik
        frank speak TOP, where will have so   many customer come eat
        maanfaan aa?!
        dinner   Q

d. *Bindou, lousat gong aa, wui jau gam do haakjan lei sik
where frank speak TOP will have so many customer come eat
maanfan aa?!
dinner Q
'Frankly speaking, no way will so many customers come to have dinner.'
(Cheung 2008, p. 58–59)

Based on the standard cartography of the left periphery (22) and the fact that topics must precede NWH-words, he concludes that NWH-words are base-merged below the CP-domain, namely to the edge of IP1, as shown in (20) or (21)

In what follows, NWH-words will be positioned in Mandarin using the diagnostics Cheung did, thus by looking at word order patterns to see their position relative to topics, to the subject and to modal auxiliaries[7].

Mandarin topics cannot follow NWH-words, just as in Cantonese.

(24) a. Nà tái diànnǎo, wǒ {nǎr/nǎ lǐ} (yǒu) yòng-guó (ne)?   [Mandarin]
      that CL computer, I where (have) use-EXP Q
      'No way have I used that computer.'

   b. *{(Zài) nǎr/nǎ lǐ}, nà tái diànnǎo, wǒ (yǒu) yòng-guó (ne)?
      where that CL computer I (have) use-EXP Q
      Intended: 'No way have I used that computer.'

Temporal topics, such as *zuótiān* 'yesterday' and sentential topics such as *tǎnbái de shuō* 'honestly speaking' cannot follow NWH-words either.

(25) a. Zuótiān, wǒ {nǎr/nǎ lǐ} (yǒu) yòng-guó nà tái diànnǎo (ne)? [Mand.]
      yesterday I where (have) use-EXP that CL computer Q
      'Yesterday, no way have I used that computer.'

   b. *Zài {nǎr/nǎ lǐ}, zuótiān wǒ (yǒu) yòng-guó nà tái diànnǎo (ne)?
      at where yesterday I (have) use-EXP that CL computer Q
      Intended: 'Yesterday, no way have I used your computer.'

   c. Tǎnbáide shuō, tā {nǎr/nǎ lǐ} kěyǐ bāngzhù wǒ?
      frankly speak he where can help I
      'Frankly, there is no way he can help me.'

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[7]The claims made by Cheung (2008; 2009) are intended to have cross-linguistic validity. He focuses on Cantonese but supports his claims with data from other wh-in-situ languages such as Hindi or Korean, and in some cases, he shows Mandarin Chinese data as well. Apart from his data, there is no literature on the syntax or semantics of Mandarin Chinese NWHCs that is known to me. Therefore, the claims that I make about Mandarin Chinese in this thesis are based on the grammatical judgments of native speakers who do not speak non-standard Chinese dialects.

d. *Zài {nǎr/nǎ lǐ}, tǎnbáide shuō, tā kěyǐ bāngzhù wǒ?
at   where   frankly   speak he can help   I
Intended: 'Frankly, there is no way he can help me.'

As far as the position relative to the subject is concerned, Mandarin wh-words can precede the subject, but in order to have a NWH-reading, they must follow it. Thus, even though (26a) is grammatical, the only interpretation available is the canonical one, while (26b) is interpreted as a NWHC, expressing negation and/or disapproval from the part of the speaker.

(26)   a. Zài {nǎr/ nǎ lǐ} tā kěyǐ mànmànde hē   yì bēi kāfēi (ne)? [Mandarin]
            at where   he can slowly   drink one cup coffee (Q)
            'Where can he drink a cup of coffee slowly?' (IWHQ)

        b. Tā {nǎr/nǎ lǐ} kěyǐ   mànmànde hē yì bēi   kāfēi (ne)?
            he where   can slowly drink   one cup coffee (Q)
            'No way can he drink a cup of coffee slowly.' (NWHQ)

This pattern is somewhat different from what we saw in the Cantonese data. For a NWH-interpretation in Cantonese, the post-subject position is preferred, although it is possible for NWH-words to precede the subject, in which case, a modal or an auxiliary needs to follow them.

(27)   a. John {bindou / dim} wui maai go   bun syu   aa3?!   [Cantonese]
            John {where / how} will buy DEM CL   book Q
            'No way will John buy the book.'

        b. {Bindou / dim} *(jinggoi) nei sai   wun aa3?!
            {where   / how} should   you wash dish Q
            'No way should you wash the dishes. [I should do it.]'
            (Cheung 2008, p. 40–41)

As for the position relative to modals, Mandarin shows the same restrictions as Cantonese does, namely that NWH-words cannot follow modals, or else they get an IWH-interpretation, as in (28).

(28)   Tā kěyǐ {nǎr/nǎ lǐ} mànmànde hē   yì bēi kāfēi (ne)?   [Mandarin]
        He can where   slowly   drink one cup coffee (Q)
        'Where can he drink a cup of coffee slowly?' (IWHQ)

Just as in Cantonese and English, NWHCs are a root phenomenon in Mandarin Chinese as well. The NWH-element in (29) cannot take wide scope from within the embedded clause.

(29) *Tā yīnwèi [Akiu {nǎr / nǎ lǐ} kěyǐ qù Táiběi]?!   [Mandarin]
      he   think [Akiu where   can go Taipei]
      Intended: 'He thinks there is no way Akiu can go to Taipei.'

Based on what Cheung (2008) proposed for the position of NWH-words in wh-in-situ languages (which he supports by Cantonese but not Mandarin data), the same structure can be concluded, the only difference would be the optionality of subject movement. While in Cantonese, it can stay in vP or move above the NWH-word, in Mandarin, the subject would have to move, or else the sentence receives a canonical reading. Mandarin NWHCs thus looks like (20).

2.2 Causal/denial-*zenme*

Even though *why* and causal/denial *how* have a similar meaning in many languages, that is, both can require an answer that is a reason, they are not synonyms and cannot be used interchangeably. There are several types of *how*'s in Chinese, which can be distinguished both in syntax and in semantics. I start out with listing some of the properties of *how come* in light of Collins (1991), followed by what Tsai (2008) observed about the Chinese counterpart of it.

Chris Collins (1991) observed that *how come* cannot take wide scope from an embedded clause the same way *why* does. (30a) is ambiguous between a matrix and an embedded scope reading of *why*, while (30b) only allows a matrix reading.

(30)   a. Why did John say Mary left?

       b. How come John said Mary left?
          (Collins 1991, p. 33)

Why can participate in question-quantifier interactions, but not *how come*. Thus, (31a) can yield a pair-list reading, but not (31b).

(31)   a. Why did everybody hate John?

       b. How come everybody hates John? (no distributive reading)
          (Collins 1991, p. 38)

The so-called tenseless *why*-clauses in English cannot host *how come*.

(32)   a. Why go to the store, when there is orange juice at home?

       b. *How come go to the store?
          (Collins 1991, p. 34)

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A rhetorical reading is not available with *how come*, as noted by Collins.

(33) a. Why would John leave?

   b. *How come John would leave?
      (Conroy 2006, p. 2)

Collins (1991) concluded that *how come* and *why* must originate from different syntactic positions. His tests were also used by Tsai (2008) for Chinese. *Zenme* 'how/how come' in Chinese can appear in two forms, *zenme* and *zenmeyang*: the former is never allowed in a post-verbal position (having a resultative or descriptive reading), and the latter is never available in a pre-modal position. Since *zenmeyang* cannot have a causal reading (Li & Thompson 1989, p. 524), the availability of this form can set causal/denial-*zenme* apart from the other uses of it.

(34) Akiu zěnme(*yàng) kěyǐ qù Táiběi?   [Mandarin]
      Akiu how   can go Taipei
      'How (not: by what means) can Akiu go to Taipei?'
      (Tsai 2008, p. 85)

There are distinct positions available for different kinds *zenme*'s in Chinese. The way Tsai (1999; 2008) set apart event-predicate modifying *zenme* from causal- and denial-*zenme* is of crucial importance. He proved by several syntactic tests that *zenme* that quantifies over event predicates is below the position of modals in the structure of the Chinese sentence (hence the term 'inner' *how*), while the other two types can only be above modals (hence the term 'outer' *how*).

2.2.1   Delimiting inner and outer *zenme*'s

Zenme, when preceding a modal, cannot be interpreted as an event-modifying predicate, modals are thus delimiters between what Tsai called 'outer' (causal/denial) and 'inner' (event-modifying) *zenme*'s. Besides modals, there are at least four other types of elements in Chinese that can serve as delimiters. Adverbs of quantification (35) and control verbs (36) block the manner reading of *zenme*, just as modals do, while negation (37) blocks both the instrumental and the manner reading. In other words, if *zenme* appears above these elements, it acts as a sentential operator, while below them, it becomes a question word that quantifies over restrictive event predicates.

(35) a. Tā zěnme(*yàng) {chángcháng / zǒngshì} chǔlǐ   zhè-zhǒng shì? [Mand.]
         He how   {often   / always}   handle this-kind   matter
         'How come he often/always handled this kind of matter?'

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b. Tā {chángcháng / zǒngshì} zěnme(yàng) chǔlǐ   zhè-zhǒng shì?
   He often   / always   how   handle this-kind   matter
   'By what means did he often/always handle this kind of matter?'

(36) a. Akiu zěnme(*yàng) {dǎsuan / jìhuà} qù Táiběi?   [Mandarin]
         Akiu how   {intend / plan} go Taipei
         'How come Akiu intends / plans to go to Taipei?'

      b. Akiu {dǎsuan / jìhuà} zěnme(yàng) qù Táiběi?
         Akiu {intend / plan} how   go Taipei
         'By what means does Akiu intend/plan to go to Taipei?'

(37) a. Akiu zěnme(*yàng) bù xǐ   chē?
         Akiu how   not wash car
         'How come Akiu won't wash the car?'

      b. *Akiu bù zěnmeyàng xǐ   chē?
         Akiu   not how   wash car
         Intended: 'How will Akiu not wash the car?'
         (Tsai 2008, p. 95–96)

Tsai uses Collins's (1991) observation on clausal complements as another source of evidence for the division between inner and the outer wh's. The Chinese parallel of (30) is (38), where causal *zenme* cannot appear in a clausal complement.

(38) a. *Akiu rènwéi Xiaodi zěnme huì chǔlǐ   zhè-jiàn shì?   [Mandarin]
         Akiu   think Xiaodi how   can resolve this-kind matter

      b. *Akiu rènwéi zěnme Xiaodi huì chǔlǐ   zhè-jiàn shì?
         Akiu   think how   Xiaodi can resolve this-kind matter
         Intended: '*How come Akiu thinks [t [Xiaodi will handle this matter]]?'
         (Tsai 2008, p. 102)

The Mandarin counterpart of *how come* in multiple questions is not available either, regardless of the order of the question words.

(39) *Shéi zěnme qù le   Táiběi?   [Mandarin]
       who how   go PFV Taipei
   Lit.: '*Who how come went to Taipei?'

Tsai observed that while *weishenme* 'why' interacts with quantifier subjects, given certain word order restrictions are observed between the quantifier subject and the wh-word, causal *zenme* does not interact with them, regardless of whether *zenme* precedes

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or follows the subject. That is, neither of the questions in (40) can have a reading that yields a pair-list as an answer.

(40) a. (Nǐmen), zěnme měigerén huì dài yì-běn shū?   [Mandarin]
    you guys how   everyone will bring one-CL book

b. (Nǐmen), měigerén zěnme huì dài yì-běn shū?
    you guys everyone how   will bring one-CL book

'How come everyone will bring one book?' (how come: wide scope)

(Tsai 2008, p. 100)

This makes Tsai conclude that causal *zenme* must be positioned even higher in the left periphery than reason *weishenme* 'why', which is an IP-modifier. Tsai proposes the following topography for the left periphery (fitting in the picture proposed by Rizzi (2001; 2004)), in which causal *zenme* is in IntP and denial-*zenme* is on the leftmost edge, in ForceP.

(41) The position of denial- and causal-*zenme* according to Tsai (2008, p. 113).
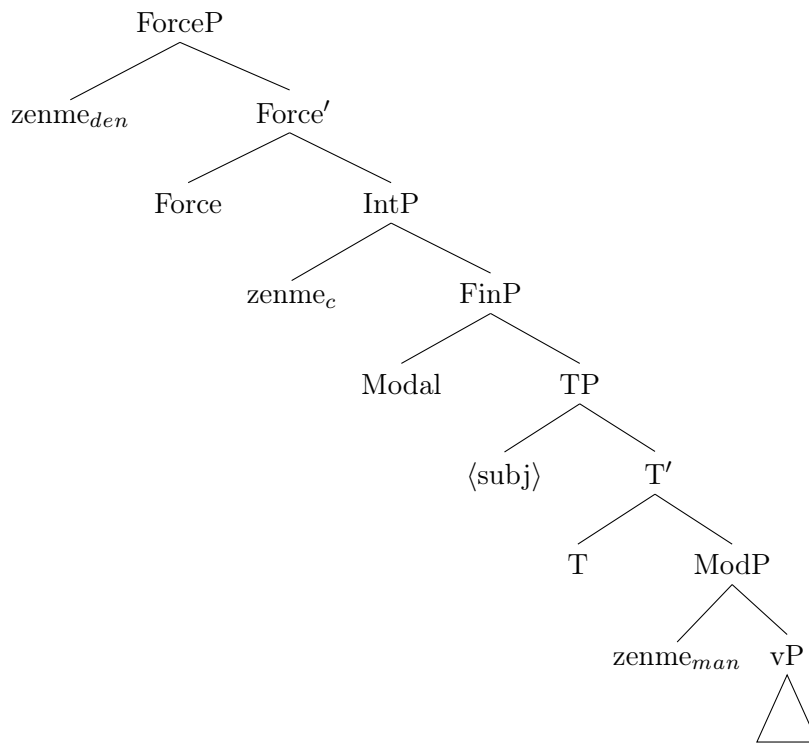
As noted by Tsai, presuppositions play an important role in the interpretation of both outer *zenme*'s. A *how* question presupposes the truth of its sentence radical, just like a

why question. Both (42a) and (42b) presuppose that the sky is blue. By asking (42a), the speaker wants to hear the reason for this proposition, which might be a scientific explanation. But (42b) also presupposes that something caused the sky to become blue. This cause-related presupposition then gives rise to a counter-expectation on the part of the speaker, which in this case is that the sky should not be blue.

(42)   a. Tiānkōng wèishénme shì lánde?   [Mandarin]
           sky   why   COP blue
           'Why is the sky blue?'

        b. Tiānkōng zěnme shì lánde?
           sky   how   COP blue
           'How come the sky is blue?'
           (Tsai 2008, p. 89)

Tsai makes it explicit (p. 89), that following Hamblin (1973), he regards questions as quantifying expressions combined with a "speech act of eliciting information concerning the cause event". Quantification belongs to the semantic part of the meaning of such a question, while the speech act belongs to the pragmatic part of it. The advantage of splitting the two dimensions of question meaning becomes clearer when we try to integrate the above mentioned counter-expectation into the meaning of (42b): this way, the pragmatic meaning can be accounted for, without affecting the semantic part. The difference between causal and denial *zenme*-questions is thus reflected in syntax: denial-conveying *zenme* questions have their question word in ForceP while causal ones are in IntP (41).

2.3 The position of denial-*zenme* and NWH-words in Mandarin

In this section, the positions of causal/denial-*zenme* and NWH-words will be compared. Do they share the same syntactic position? Given that representations provided by Cheung (2008) in (19) and Tsai (2008) in (41) are somewhat different, and Mandarin NWHCs slightly differ from Cantonese ones, I aim at creating one structure so that the structural similarities and differences between them would be visible. Also, I will try to accommodate a pragmatic projection in the syntactic tree that would host the negative attitude of the speaker.

2.3.1 Syntactic distribution

In the representation of NWHQs in wh-in-situ languages given by Cheung in (19) (repeated here for convenience in (43)), the NWH-word is at the left edge of the IP.

(43) The base-position of a NWH-word as proposed by Cheung (2008:39)

```
              ForceP
             /      \
          EAS       IntP
                   /    \
                  Q    FocusP
                       /    \
                   Focus    FinP
                           /    \
                        Fin      IP
                                /   \
                             NWH     IP
                                    /   \
                                MODAL   VP
                                        /\
                                       ....
```
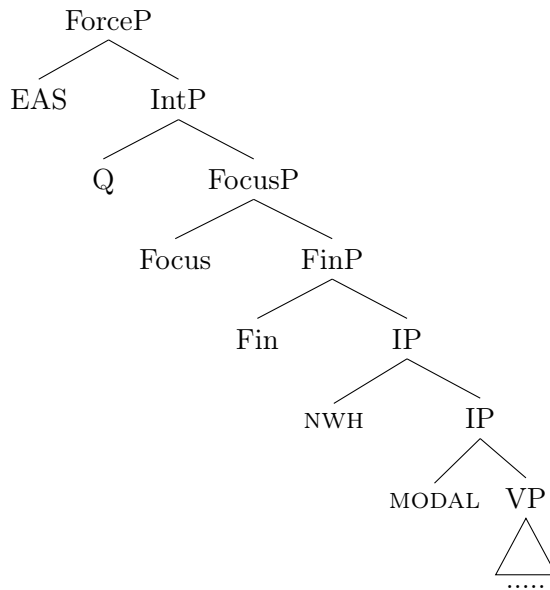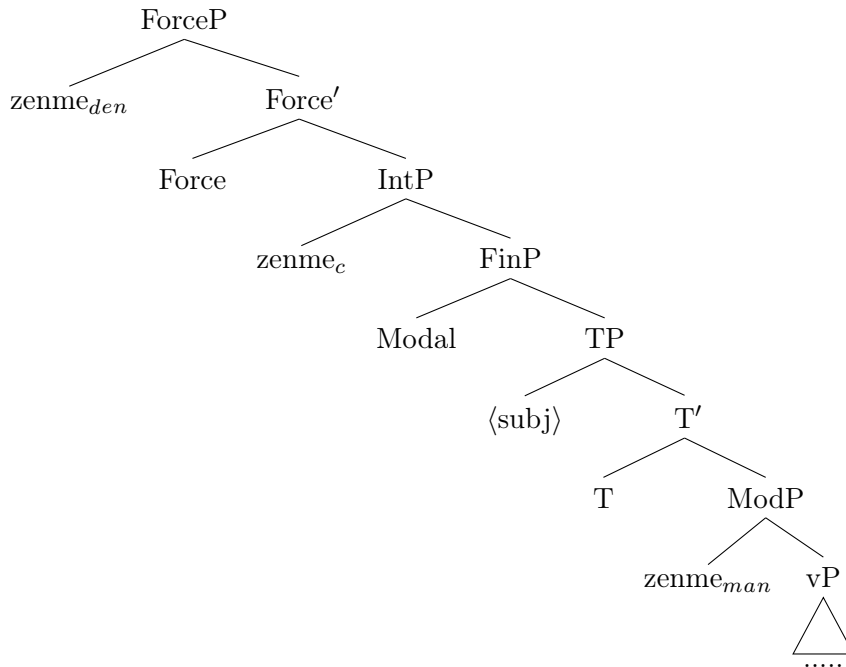
Tsai (who subscribed to the view that there is a Tense projection in Mandarin) uses a Tense projection, as seen in (41) (repeated here as (44)), and puts the modals above it, to FinP.

(44) The position of denial- and causal-*zenme* according to Tsai (2008, p. 113)

```
                 ForceP
                /      \
         zenme_den     Force'
                      /      \
                  Force       IntP
                             /    \
                       zenme_c     FinP
                                  /    \
                              Modal     TP
                                       /   \
                                  ⟨subj⟩    T'
                                           /   \
                                          T     ModP
                                               /    \
                                       zenme_man    vP
                                                    /\
                                                   ....
```

The modals are in very different positions in the two structures. In (43), they are in the lower IP, while in (44), they are in the lower part of the CP-domain, in FinP. Before proposing a structure that could unite the two representations so that they would become comparable, NWH-words and outer *zenme* will pass some distributional tests. Given that in one way or another, both question kinds are associated with denial, the question is whether there are any differences in the syntactic distribution of NWH-words and denial-*zenme* in Mandarin Chinese. In what follows, the delimiters proposed by Tsai (2008) for outer *zenme* and by Cheung (2008) for NWHCs will be looked at.

Modals. Regardless of where we put modals in the syntactic tree, both causal/denial-*zenme* and NWH-words need to precede them, or else they are interpreted as questions about event-modifying predicates, as Contrast 2 showed for *zenme* and example (28), among others, for NWH-words.

Subjects. Nwh-words cannot precede the subject, as it was shown in examples (26a) and (26b), contrarily to what has been observed in Cantonese. Outer *zenme*'s are reported by Tsai (2008) to be able to precede the subject, although this option was ruled out by one of my consultants.

(45) ᐟ⁾Zěnme Akiu kěyǐ qù Táiběi?   [Mandarin]
     how   Akiu can go Taipei
     'How come Akiu can go to Taipei?'

As mentioned before, *zenme* is one of the wh-elements in Mandarin that can be used in NWHCs, but it can also serve as a question word in causal and denial-*how* questions. Since the two can appear in the same position (post-subject and pre-modal), such sentences should be ambiguous, which was confirmed by native speakers.

(46) Tā zěnme kěyǐ mànmànde hē   yì bēi kāfēi (ne)?   [Mandarin]
     he how   can slowly   drink one cup coffee (Q)
     'How come he can drink a cup of coffee slowly?' (denial-*how* question)
     'No way can he drink a cup of coffee slowly.' (NWHQ)

Topics. Neither NWH-words nor denial-*zenme* can precede a topic, at least this is what a test with the optional topic marker *ne* shows. As for NWHCs, it was shown in section 2.1.2 that they cannot precede topics. In Contrast 1, Tsai showed that having the perfective marker *le* in (47a) makes a question with *zenme* unambiguously a causal/denial question.

In such sentences, even if *zenme* can precede *Akiu*, *Akiu* can only be a subject, but not a topic.

(47) a. Akiu (ne),   zěnme kěyǐ qù Táiběi?   [Mandarin]
          Akiu (TOP) how   can go Taipei

          'As for Akiu, how can he go to Taipei? (He shouldn't go!)'

     b. *Zěnme Akiu (ne)   kěyǐ qù Táiběi?
          how   Akiu (TOP) can go Taipei

          Intended: 'As for Akiu, how come he can go to Taipei? (He shouldn't go!)'

Quantifiers.   Tsai (2008) observed that denial-*zenme* cannot be c-commanded by adverbs of quantification. The same holds for NWH-words.

(48) a. Tāmen {nǎr/nǎ lǐ / zěnme} {chángcháng / zǒngshì}   [Mandarin]
          They   {where   / how}   {often   / always}

          chǔlǐ   zhè-zhǒng shì?
          handle this-kind   matter

     b. *Tāmen {chángcháng / zǒngshì} {nǎr/nǎ lǐ / zěnme} chǔlǐ   zhè-zhǒng
          They   {often   / always} {where   / how}   handle this-kind
          shì?
          matter

          Intended: 'No way did they often/always handle this kind of matter.'

Control verbs.   Control verbs were listed among the delimiters between inner and outer *zenme*'s. Apparently, they also group NWH-words in the outer domain.

(49) a. Akiu {nǎr / nǎ lǐ / zěnme} {dǎsuan / jìhuà} qù Táiběi?   [Mandarin]
          Akiu {where   / how}   {intend / plan} go Taipei

     b. *Akiu {dǎsuan / jìhuà} {nǎr / nǎ lǐ / zěnme} qù Táiběi?
          Akiu {intend / plan} {where   / how}   go Taipei

          Intended: 'No way does Akiu intend / plan to go to Taipei.'

Negation.   We have seen that negation served as a delimiter between inner and outer *zenme*'s. The position of wh-words with respect to negation words also predicts their interpretation: for a NWHC, it is necessary that NWH-words be above negation.

(50) a. Akiu {nǎr/nǎ lǐ / zěnme} bù xǐ   chē?   [Mandarin]
          Akiu {where   / how}   not wash car

b. *Akiu bù {năr/nă lĭ / zĕnme} xĭ   chē?
Akiu not {where   / how}   wash car
Intended: 'Now way Akiu doesn't wash the car.'

No matter.   In Tsai (2008), *no matter* constructions serve as a further test to detect outer *zenme*'s, which are ungrammatical in such sentences. NWHCs seem to pattern with them.

(51)   a. Wúlùn   Akiu huì zĕnme(yàng) qù Táibĕi, wŏ dōu bú zàihu. [Mandarin]
No matter Akiu can how   go Taipei, I   all   not care

'No matter how (by what means) Akiu can go to Taipei, I don't care.'

b. *Wúlùn   Akiu zĕnme huì qù Táibĕi, wŏ dōu bu zàihu.
No matter Akiu how   can go Taipei, I   all   not care

Intended: 'No matter how come Akiu can go to Taipei, I don't care.'

c. *Wúlùn   Akiu {năr / nă lĭ / zĕnme} huì qù Táibĕi, wŏ dōu bú zàihu.
No matter Akiu {where   / how}   can go Taipei, I   all   not care

Intended: 'No matter if Akiu can't go to Taipei, I don't care.'

Embedded clauses.   As Tsai (2008) notes, denial-*zenme* cannot take wide scope from a clausal complement, and Mandarin NWH-words share this property. Similarly, NWH-words are restricted to root clauses, which makes them unable to take wide scope from within an embedded clause. (52c) is just as ungrammatical as (52a) and (52b). Cheung (2008) argues that the unavailability of a NWH-interpretation in (52) is due to the unavailability of a ForceP in the embedded clause, which is supposed to host the silent Empty Answer Set morpheme.

(52)   a. *Akiu rènwéi [Xiaodi zĕnme huì chŭlĭ zhè jiàn shì]?   [Mandarin]
Akiu think [Xiaodi how   can solve this CL   matter]

b. *Akiu rènwéi [zĕnme Xiaodi huì chŭlĭ zhè jiàn shì]?
Akiu think [how   Xiaodi can solve this CL   matter]

Lit.: 'Akiu thinks [how come Xiaodi can solve this matter].'

c. *Akiu rènwéi [Xiaodi {năr / nă lĭ / zĕnme} huì chŭlĭ zhè jiàn shì]?
Akiu think [Xiaodi {where   / how}   can solve this CL   matter]
Intended: 'Akiu thinks there is no way Xiaodi can solve this matter.'

Those predicates that do embed outer *zenme* questions only let the causal reading to survive.

(53) a. Wǒ bù zhīdǎo zěnme Akiu kěyǐ lái.   [Mandarin]
          I   not know   how   Akiu can come

     b. Wǒ bù zhīdǎo Akiu zěnme kěyǐ lái.
          I   not know   Akiu how   can   Akiu come
          'I don't know how come Akiu could come.'

Multiple questions.   Also, just as denial-*zenme*'s, neither of the NWH-words can appear in multiple questions, regardless of whether they follow IWH-words, as in (54), or precede them.

(54) a. *(Nǐmen,) shéi zěnme huì chǔlǐ zhè jiàn shì?   [Mandarin]
          (you)   who how   can solve this CL   matter
          Lit.: '*Who how come can solve this matter?'

     b. *(Nǐmen,) shéi {nǎr / nǎ lǐ / zěnme} huì chǔlǐ zhè jiàn shì?
          (you)   who {where   / how}   can solve this CL   matter
          Lit.: '*Who can no way solve this matter?'

2.3.2   Summary of syntactic tests

The results of the syntactic tests of Mandarin denial-*zenme* and NWH-words (*nar, na li, zenme*) in this chapter are summarized in (55).

(55)   The pattern of availability of the different wh-words in different positions.

test	NWH-words	outer *zenme*	inner-*zenme*
follow modals	no	no	yes
precede subjects	no	%	yes
precede topics	no	no	yes
scope interactions with quantifiers	no	no	yes
under control verbs	no	no	yes
under negation	no	no	yes
no matter	no	no	yes
in embedded clauses	no	no*	yes
multiple questions	no	no	yes

* Only the causal reading can survive embedding, if possible at all

It looks like all the tests that Tsai (2008) or Cheung (2008) found relevant for setting outer *zenme* apart from inner *zenme*'s also can tell ɪᴡʜ-readings from ɴᴡʜ-readings. And, at the same time, all the syntactic properties of Cantonese ɴᴡʜs observed by Cheung (2008) that fit Mandarin ɴᴡʜs also fit Mandarin outer *zenme*'s. But the two researchers placed them differently in syntax. While Cheung placed it into the head of IntP (with the EAS-morpheme above it in the Force head), Tsai assigned that place for causal-*zenme*, and put denial-*zenme* in Spec,ForceP.

The question that now arises is whether there are any further syntactic differences between the question words under discussion. To answer this question, Tsai's reasons behind placing denial-*zenme* and causal-*zenme* to different positions are discussed first. As for denial-*zenme*, it is placed into the head of ForceP, which is necessary, as he argues, "to reflect the change of illocutionary force: namely, the speech act involved has shifted from eliciting information to denial" (Tsai 2008, p. 108).

He does not present any specific syntactic tests that prove that the two *zenme*'s are put in two different heads in the CP-domain – even though apart from the pragmatic differences, namely the difference in illocutionary force, they do not differ in their syntactic distribution. The only reason to put them in different positions is explained by the difference in their pragmatics.

Nevertheless, the cartographic account of the left periphery (Rizzi 2001) allows one or more topics between ForceP and IntP, see (22). If so, the position of the two *zenme*'s with respect to a topic should entail these differences: if *zenme* precedes the topic, it should have both a causal and a denial reading, while if a topic can precede *zenme*, the latter should be interpreted only as a causal question, without the denial reading. Topichood in Chinese can be marked by an optional topic marker *ne* (Li & Thompson 1989). The fact that Akiu, the intended topic in (47), cannot appear with *ne* means that in this case, if *Akiu* were to precede *zenme*, it can only be a subject. Thus, it looks like *zenme* cannot precede a topic. If so, it cannot be placed to ForceP.

Since the framework of both Tsai and Cheung relies on the cartographic account of the left periphery as proposed by Rizzi (1997; 2001), arguments such as the ones concerning (47) should be considered valid, which means that denial-*zenme* cannot be placed to ForceP.

At the same time, note that when outer *zenme* gets embedded, the denial reading does not arise, just a causal one (53). This justifies Tsai's decision to place them into separate positions, because, as Cheung argues, embedded clauses do not have a ForceP. To reconcile this picture with the predictions of the cartographic approach to the left periphery, one could argue against the reliability of the "topic-tests". Among the pro-

moters of alternatives to the cartographic account, some claim that topics do not have fixed positions in the left periphery anyway (Neeleman et al. 2009).

In sum, either one stays in the cartographic framework and excludes ForceP as a possible position for outer *zenme* having a denial reading or one pursues alternative ways. Since the accounts provided by Tsai and Cheung both rely on the cartographic account, I will try to fit them both within it.

2.4 The speaker's attitude in syntax

So far, what has been observed about NWHCs and outer *zenme* questions is that they seem to share the same position in syntax and they both convey a negative attitude on the part of the speaker, though in somewhat different ways.

Tang (2015) argues, following Cinque (1999), that the left periphery can and should host pragmatic CP projections, such as a Speech Act Phrase, an Evaluation Phrase or an Evidential Phrase. There is in principle no limit to how many and what kind of projections there can be to involve pragmatics into syntax which is both an advantage and a disadvantage. Tang's suggestions come from how Austin thought about speech acts (which was adapted to syntax by J. R. Ross). According to the performative hypothesis, the syntactic projections hosting pragmatic features cannot be seen on the surface, because of the rule of performative deletion, but Tang shows evidence from Arabic and Thai that proves the existence of them (which Tang calls *pragmatic layers*).

In line with this is what Huang & Ochi (2004) suggested: they proposed that the negative attitude of the speaker or the matrix subject should be represented by a ☺P in syntax (sic).

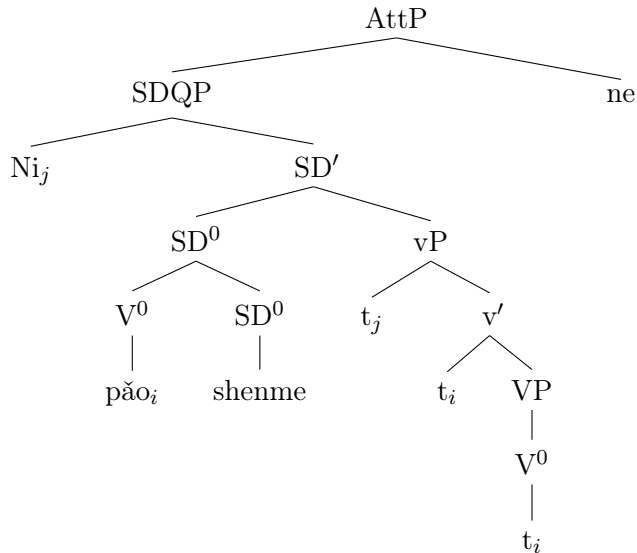(56)   The Attitude Phrase ☺P as proposed by Huang & Ochi (2004)
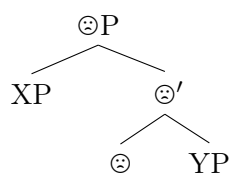
Pan (2014) uses a similar projection, AttP to derive what he calls the *Surprise-Disapproval* interpretation of Chinese *shenme* 'what'.

(57) The Surprise-Disapproval Question Phrase as proposed by Pan (2014)

Nǐ   pǎo shénme ne? [Mandarin]
you run what   Q

'Why are you running?'

Lit.: 'What are you running?!'

```
                              AttP
                      ┌─────────┴──────────┐
                    SDQP                    ne
              ┌──────┴──────┐
            Ni_j           SD′
                      ┌─────┴─────┐
                    SD⁰           vP
                ┌────┴────┐    ┌───┴───┐
               V⁰        SD⁰  t_j      v′
               │          │        ┌───┴───┐
             pǎo_i      shenme    t_i     VP
                                           │
                                          V⁰
                                           │
                                          t_i
```

In his view, because of the surprise-disapproval interpretation of this special *shenme*, it is reasonable to think of it as the head of a Surprise-Disapproval Question Phrase (SDQP), to which the main verb moves from the VP to adjoin it. The syntactic distribution of the special *shenme* is restricted to post-verbal positions, just as canonical *shenme*.
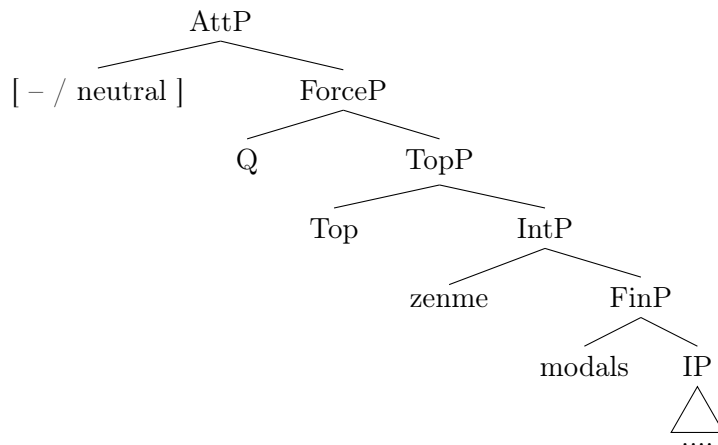
In sum, I have shown some proposals that try to include the speaker's viewpoint in syntax. Similarly to these suggestions, I will argue for a representation which can host the speaker's negative attitude.

2.4.1 Denial-*zenme* and NWHQs in a pragmatic projection

Following what the above authors suggested, denial-*zenme*'s and NWHCs could also be represented in pragmatic projections. Following Huang & Ochi (2004), I propose that the speaker's denial in case of these questions be hosted by an Attitude Phrase, that has a negative or neutral value in its head. Given that any test on the distribution of NWH-words and outer *zenme* so far grouped them together, there is no reason not to put them into the same position. This position could be IntP because the question
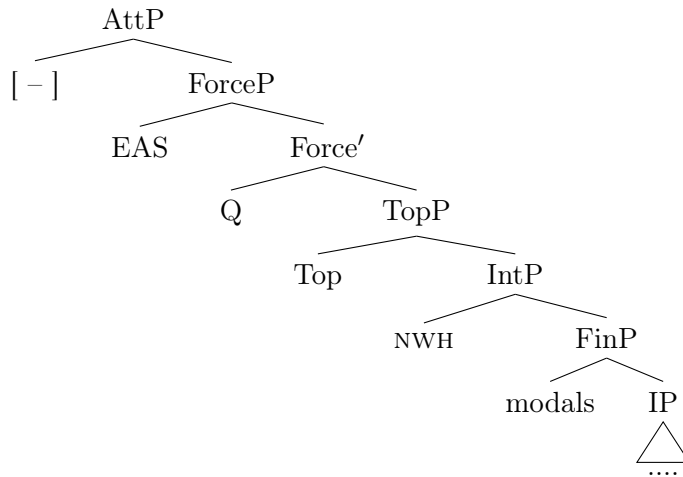
words determine the question status of the utterance, and also because it is above modals (irrespective of whether they are in the lower IP as Cheung proposed it or in FinP, as Tsai did). As for AttP, the value of the Att head can be negative or neutral, depending on whether the question has a causal or a denial interpretation.

(58)   Causal/denial-*zenme*

```
                    AttP
          ┌──────────┴──────────┐
   [ – / neutral ]            ForceP
                        ┌───────┴───────┐
                        Q             TopP
                                 ┌──────┴──────┐
                                Top          IntP
                                       ┌──────┴──────┐
                                     zenme          FinP
                                               ┌──────┴──────┐
                                             modals         IP
                                                            /\
                                                           /__\
                                                           ....
```
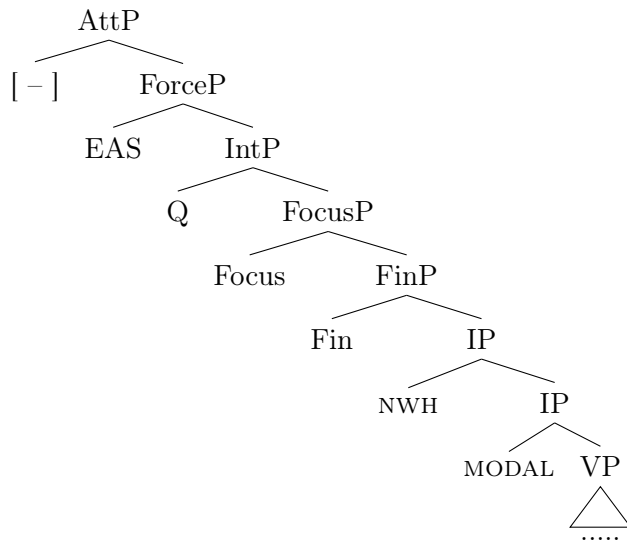
As for the NWH-interpretation, the EAS-morpheme can be added in Spec,ForceP, as Cheung (2008) suggested. This way, both the negating character of NWHQs and the speaker's negative attitude can be expressed. Recall that Cheung specified it as a prerequisite for the felicitous use of NWHCs that the speaker have a negative attitude toward the preceding utterance. It follows that for NWHCs, the value of Att can only host a negative feature. The Attitude projection needs to be high in the structure, because embedding tests showed that the speaker's negative attitude cannot be inherited by embedded NWHCs. Causal/denial-*zenme* questions allow at maximum the causal reading in embedding, while NWHCs can only have a canonical interpretation, which Cheung explains by the lack of the EAS morpheme. Since the EAS morpheme sits in ForceP, AttP needs to be at least as high in the structure as ForceP is: there is no AttP in embedded clauses.

(59) Nwhcs

```
                    AttP
           ┌─────────┴─────────┐
        [ − ]               ForceP
                       ┌────────┴────────┐
                     EAS              Force′
                                ┌────────┴────────┐
                                Q              TopP
                                        ┌────────┴────────┐
                                       Top             IntP
                                                ┌────────┴────────┐
                                              NWH             FinP
                                                        ┌────────┴────────┐
                                                     modals            IP
                                                                       △
                                                                       ....
```

However, this representation allows topics below the IntP, if Rizzi's cartography of the left periphery is assumed to hold, thus below nwh-words and outer *zenme*, which, as we have seen, is not grammatical. This problem, Cheung (2008) avoided by putting nwh-words below the lowest Topic position, to the edge of IP. (60) shows the tree suggested by Cheung, with an Attitude projection in it.

(60) The position of the nwh-words as proposed by Cheung (2008), extended by AttP

```
                    AttP
           ┌─────────┴─────────┐
        [ − ]               ForceP
                       ┌────────┴────────┐
                     EAS              IntP
                                ┌────────┴────────┐
                                Q              FocusP
                                        ┌────────┴────────┐
                                      Focus           FinP
                                                ┌────────┴────────┐
                                               Fin              IP
                                                        ┌────────┴────────┐
                                                      NWH              IP
                                                                ┌────────┴────────┐
                                                             MODAL            VP
                                                                              △
                                                                              .....
```

For causal/denial-*zenme* questions, there would be no EAS morpheme in the Force head and the value of Att could host both 'negative' and 'neutral' values. Such a structure can account for facts about embedding: the value of Att can give rise to a denial reading

only in the matrix sentence but not in embedding, which suggests that the AttP cannot be present in embedded clauses. Embedding is possible in both outer *zenme* questions and NWHCs, but they will lack a denial reading, and NWH-words will be interpreted canonically.

However, there are problems that remain unsolved. The common property of pragmatic projections proposed by Cinque (1999) and Tang (2015) is that the expression of the pragmatic layers can morphologically interact with the expression of other functional categories in the clause, such as Tense, for example, or they can be detected in the order of adverbs. That is: unless there is some visible evidence in syntax, the assumption of AttP is not legitimate. AttP is thus dependent on whether there are any patterns to observe in other functional projections that can be attributed to this projection, which does not seem to be the case here.

There is a theory-related objection as well: as van Craenenbroeck (2009) argues, the cartographic approach is already running the risk of not being so minimalistic any more. A further enrichment of the left periphery in line with the cartographic account is therefore not desirable. Pragmatic functional layers can be numerous, and due to the "one feature one head" principle, they should all be different projections – such an enrichment of the apparatus clearly outweighs the advantages of the cartographic account.

Regardless of the way of representing the structure of these questions, the answer to the first research question is that NWH-words in Mandarin and causal/denial-*zenme*'s share the same position in syntax, at least based on Cheung's and Tsai's distributional tests.

3   The metalinguistic nature of NWHCs

The second research question which aims at answering in what ways NWHCs and 'ordinary' negation are different, takes us to *metalinguistic negation*, a term coined by Laurence R. Horn. The properties of metalinguistic negation will be demonstrated by examples from different languages. It will be shown that NWHCs (that is, the special use of NWH-words) share all the properties of metalinguistic negation suggested by Horn (1985; 1989). Also, they fit in an extended model of responding assertions proposed by Farkas & Bruce (2010) and extended by Teixeira de Sousa (2015), which can serve as a further support for their metalinguistic status.

3.1 Metalinguistic negation

In European Portuguese, negation that affects the truth-value of a proposition is expressed by a preverbal negation word (Martins 2010; 2014). That is, in out-of-the blue negations, the negation word *não* precedes the predicate.

(61) Eu não estou   preocupado.   [European Portuguese]
     I   not COP-1sg worried
     'I am not worried.'

When the negation is a reaction to a previous utterance, it can be realized differently: in this case, the particles *lá* 'there', *cá* 'here', *agora* 'now' and *uma ova* 'a fish's roe' can be used instead of *não* 'no'. They appear in a post-verbal position (only *uma ova* is restricted to the periphery), and are glossed as metalinguistic negation markers (MNMs).

(62)   a. Tu estás   um pouco preocupado, não estás?   [E. Portuguese]
       You COP-2sg a   little worried,   not COP-2sg?
       'You are a little worried, aren't you?'

     b. Eu não estou   um pouco preocupado. Estou   morto de preocupação.
       I   not COP-1sg a   little worried.   COP-1sg dead   of worry

     c. Eu estou   agora um pouco preocupado. Estou   morto de preocupação.
       I   COP-1sg MNM a   little worried.   COP-1sg dead   of worry
       'I am not a little worried. I'm worried like crazy.'
       (Martins 2014, p. 638)

Martins argues that *lá*, *cá* and *agora* express metalinguistic negation in the sense of Horn (1985).

(63)   Metalinguistic Negation
     "Metalinguistic negation [is] a device for objecting to a previous utterance on any grounds whatever"
     "a speaker's use of negation to signal his or her unwillingness to assert, or accept another's assertion of, a given proposition in a given way; metalinguistic negation focuses not on the truth or falsity of a proposition, but on the assertability of an utterance" (Horn 1989, p. 363)

A quintessential characteristic of metalinguistic negation is that it is able to express objection in a way that it does not imply the falsity of the corresponding affirmative proposition at the same time. Rather, it expresses the speaker's refusal to integrate

something into the common ground, for whatever reason. This does not make it impossible though for propositional negation to have a metalinguistic interpretation – cf. (62b) that uses 'ordinary' negation and (62c) –, however, languages can have particles that are used exclusively as markers of metalinguistic negation, as Martins (2010) argues is the case in European Portuguese.

Martins (2010) shows syntactic evidence for her claim that metalinguistic negation is not simply a matter of pragmatics. She bases this claim of hers on Horn's (1985) linguistic tests of metalinguistic negation to be presented below with examples from different languages.

Firstly, metalinguistic negation needs to be "licensed" in the discursive context, and it has to be a contradiction to a preceding assertion. Unless there is a previous utterance, (64b) cannot be used felicitously. Hence the infelicity of a conversation-opening utterance having the MNM *agora* in it.

(64)   a. Hoje não estás   com boa cara. O que se passa?   [E. Port.]
              today not COP-2sg with good face the what happen-3sg
              'You don't look good today. What happened?'

        b. #Hoje estás   agora com boa cara. O que se passa?
              today COP-2sg MNM with good face the what happen-3sg
              '#Like hell you look good today. What happened?'
              (Adapted from Martins (2014, p. 640))

Secondly, metalinguistic negation does not license NPIs, in contrast to propositional negation, which licenses NPIs. The lack of this ability, as (65c) shows, proves that the negation is not a propositional one (English, however, does not differentiate morphologically between propositional and metalinguistic negation).

(65)   a. Chris managed to solve some problems.

        b. Chris didn't manage to solve any problems.

        c. Chris didn't manage to solve {some/*any problems} – he solved them easily.
           (Martins' (2014) example adapted from Horn (1989, p. 368))

(66)   a. Tu é   que conheces uma pessoa que sabe   arranjar isto. [E. P.]
              you COP-3sg that know-2sg a   person that know-3sg fix   this
              'You do know someone that can fix this'

        b. Eu não conheço   ninguém que saiba   arranjar isso.
              I   not know-1sg nobody that know-3sg fix   that

c. Eu conheço   agora {alguém/*ninguém}   que saiba   arranjar
I   know-1sg MNM {somebody/*nobody} that know-CONJ.3sg fix
isso.
that
'I don't know anyone who can fix that'.
(Martins 2014, p. 642)

Thirdly, metalinguistic negation markers, in contrast to regular negation words, are
compatible with PPIs.

(67)   a. Még mindig esik.   [Hungarian]
still   rain-3sg
'It is still raining'

b. A fené-t {esik   még mindig / *nem esik   már}!
the hell-ACC {rain-3sg still   / *not   rain-3sg any more}
'Like hell it {still rains / *isn't raining any more}!'

In addition to Horn's linguistic tests, Martins notes that embedding serves as a further
test in setting propositional and metalinguistic negation apart.

(68)   a. O Pedro disse que não vendeu o   carro.   [E. Portuguese]
the Pedro said that not sold   the car

b. *O Pedro disse   que vendeu   agora o   carro.
the Pedro say.PST.3sg that sell.PST.3sg MNM the car
'Pedro said that he didn't sell the car'
(Martins 2010, p. 571)

Similarly to European Portuguese, Brazilian Portuguese also uses different kinds of
negation that are not interchangeable. *Não* 'not' can precede or follow the verb, and it
can do both at the same time as well (Teixeira de Sousa 2015)[8].

(69)   Three ways of negation in Brazilian Portuguese

a. {Não/num} vou   à   festa.
not   go-1sg to.the party
Neg1: não V

b. {Não/num} vou   à   festa não.
not   go-1sg to.the party not
Neg2: não V não

---

[8]*Não* 'not' can reduce to *num* in a preverbal position.

34

c. Vou   à   festa não
go-1sg to.the party not
Neg3: V não

'I'm not going to the party'
(Teixeira de Sousa 2015, p. 27–28)

Teixeira de Sousa claims that the negation patterns shown in (69) are three distinct types of negation. Apart from the difference in standardness (Neg1 is considered standard), Neg2 and Neg3 also differ in their syntactic distribution. Neg3 can only be used as a responding assertion, it cannot appear in any kind of embedded clause, and it can only serve as metalinguistic negation. Neg1 and Neg2 can be both in propositional (or, as Teixeira de Sousa calls it, semantic) and metalinguistic negations.

3.2   Responding assertions

Before looking at Chinese metalinguistic negation, the notion of *responding assertion* is introduced. Responding assertions are reactions to previous utterances that show an uncommon pattern of polarity items. Normally, when agreeing with a previous utterance, the polarity of the responding assertion is the same as that of the previous utterance's was. When disagreeing, the polarity of the responding assertion is the opposite of the previous one. In the model of Farkas and Bruce (2010), polarity is captured by absolute polarity features [–] and [+], while agreement and disagreement is expressed by the relative polarity features [same] and [reverse].

(70)   a. Anne: Same is home. / Is Sam home? [+]

    b. Ben: Yes he is. [same,+]

    c. Connie: No, he isn't. [reverse,–]

(71)   a. Anne: Sam is not home. / Is Sam not home? [–]

    b. Ben: Yes he is. [reverse,+]

    c. Connie: No, he isn't. [same,–]
    (Farkas & Bruce 2010, p. 109)

Martins (2014) uses Farkas and Bruce's model in formulating the discourse-related function of metalinguistic negation. She argues that neither of these combinations represents the function of metalinguistic negation, however. What we see in her examples of metalinguistic negation is a disagreeing reaction, but surprisingly, its absolute polarity feature is the same as the initiating assertion's was. Farkas and Bruce's 2x2 model

provides no room for such cases. This, she proposes, can be solved by adding a third relative polarity feature, [objection]. (72) shows the possibilities of responding assertions, including Martins' [objection] feature and the two ungrammatical possibilities.

(72) The model of responding assertions extended by [objection], a third relative polarity feature as proposed by Martins (2014, p. 664)

Initiating assertion	Agree [same]	Agree *[reverse]	Disagree [same]	Disagree [reverse]
Sam is home [+]	Yes he is. [same,+]	*Yes, he isn't. *[same,–]	The hell he is! [objection,+]	No, he isn't. [reverse,–]
Sam isn't home [–]	No, he isn't. [same,–]	*No, he is. *[same,+]	Yes, he is. [reverse,+]	The hell he isn't! [objection,–]

(73) The relation between responding assertions, metalinguistic negation/objections and propositional negation.
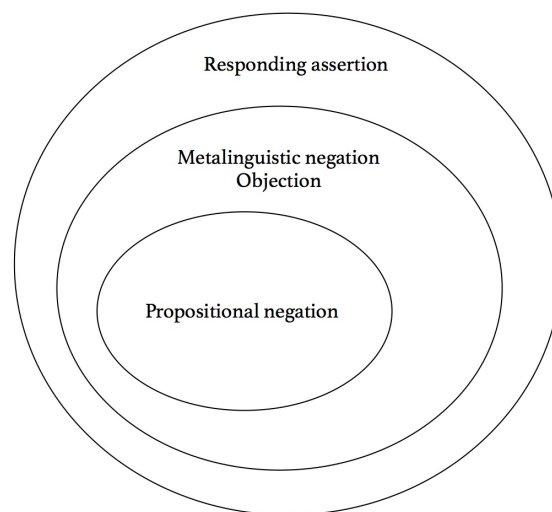
A responding assertion can express metalinguistic negation, which can target different aspects of a preceding utterance: its phonetic realization, its register or its implicatures, but it can also target the truth value of it. In the latter case, it equals (semantically) to propositional negation. Since discourse-related constraints play an important role in the felicitous use of metalinguistic negation, propositional negation words can be used more freely, that is, in more constructions. In sum, in some languages at least, metalinguistic

negation cannot be reduced to a pragmatic phenomenon, because Martins and Teixeira de Sousa showed that there are differences that are visible even in syntax. The distribution of polarity items is such a difference, as well as their restricted syntactic distribution.

3.3 Propositional and metalinguistic negation in Mandarin Chinese

In this subsection, it will be shown that NWHQs fit in the categorization provided by Martins in (72) as it shares several characteristics of responding assertions and metalinguistic negation.

Licensing in discourse. The most obvious feature of Mandarin NWHCs is that such utterances need licensing in discourse. For Cheung (2008), it is a sine qua non prerequisite for NWHCs to be preceded by a statement to which they can serve as a reaction. Even if NWHCs convey negation, they are not interchangeable with the propositional negation structures that could serve as their paraphrases.

Implicature negation. Mandarin NWHCs can be used to negate implicatures: (74a) is a case of negating a scalar implicature. The default meaning of (74a) conveys that Zhangsan reached at least the minimum points necessary to pass the exam, because truth-conditional meaning of a scalar predication marks the lower bound of the scale (Horn 1985, p. 136).

(74b) negates the truth-conditional meaning, thus it conveys that Zhangsan did not reach the lower bound required for passing. But along with the truth-conditional meaning of the predicate, a scalar implicature arises that marks the upper bound of the scale, which in this case would be 'passed with average results'. The negation in (74c) targets the content of the implicature, not the truth-conditional meaning.

(74)   a. Zhāngsān tōngguò kǎoshì le.   [Mandarin]
            Zhangsan pass   exam PFV
            'Zhangsan passed the exam.'

          b. Zhāngsān méi yǒu tōngguò kǎoshì. Tā zhǐ dé le   shí fēn.
            Zhangsan not have pass   exam   he only get PFV 10 percent
            'Zhangsan didn't pass the exam. He only got 10 percent.'

          c. Zhangsan nǎ lǐ zhǐ tōngguò kǎoshì?! Ta hái dé le   yì bǎi fēn!
            Zhangsan where only pass   exam   he even get PFV 100   percent
            'Zhangsan didn't just pass the exam, he did 100 percent!'

This does not mean that NWH-words cannot target truth-conditional meaning, however. The negation word *mei* in (74c) can be substituted by a NWH-word in some propositional negations, too.

(75) Zhāngsān {nǎr /nǎ lǐ / zěnme} yǒu tōngguò kǎoshì?!   [Mandarin]
      Zhangsan {where   / how}   have pass   exam

      (Tā dé le   shí fēn.)
      (he get PFV 10 percent)

      'No way did Zhangsan pass the exam. (He only got ten percent.)'

The difference between (74b) and (75) lies in the discourse-related constraints specified by Cheung (2008) given in (13), that the speaker should believe that her conversational partner has opposite belief (that Zhangsan passed the exam), although she has all the reasons to believe that Zhangsan could not pass it.

The Mandarin Chinese equivalent of Horn's example of implicature negation is given in (76a). The conjunction of two propositions can be negated, as in (76b). (76c) negates an implicature of a certain temporal sequence that can arise with conjunctions.

(76) a. Tāmen jiéhūn shēng le   xiǎohái.   [Mandarin]
         they   marry born PFV baby
         'They got married and had a baby.'

      b. Méi, tāmen hái méi jiéhūn yě   méi   háizi.
         not they   yet not marry also not.have child
         'They didn't marry and they have no children.'

      c. Tāmen nǎ lǐ   jiéhūn shēng le   xiǎohái? Tāmen shì   xiān shēng le
         they   where marry born PFV baby   they   FOC first born PFV
         xiǎohái hòu   jiéhūn!
         baby   after marry
         'They didn't get married and had children: they had a baby and only then
         did they get married!'

Restricted distribution. There are fewer positions in which Mandarin NWH-words can appear than positions in which propositional negation words can. Cheung (2008; 2009) restricts them to root clauses, to a position that is too high to be used interchangeably with propositional negation words. (77) shows that *nar* cannot replace *bu* 'not' in a structure with double negation, and (78) shows that sentential subjects cannot host NWH-words, similarly to what Teixeira de Sousa observed about Brazilian Portuguese metalinguistic negation (Neg2 and Neg3).

(77) a. Xièxie, wǒ cónglái bù xīyān.
thanks, I never not smoke
'No thanks, I never smoke.'

      b. *Xièxiè, wǒ cónglái nǎr xīyān?!
thanks, I never where smoke
Intended: 'No thanks, I never smoke.'

(78) a. [Bù chōuyān] yǒuyí jiànkāng.
not smoke benefit health
'Not smoking is good for your health.'

      b. [*Zài nǎr chōuyān] yǒuyí jiànkāng.
where smoke benefit health
Intended: 'Not smoking is good for your health.'

The distribution of Mandarin NWH-words thus fits the description of MNMs in European and Brazilian Portuguese in that there are a number of syntactic construction where propositional negation words can appear but MNMs cannot.

Polarity items.   Importantly, Mandarin NWHQs fail to license negative polarity items, proven by the ungrammaticality of (79), which makes their metalinguistic negation-like character even more obvious.

(79) *Zhāngsān {nǎr/nǎ lǐ / zěnme} xiāngxìn rénhérén?!   [Mandarin]
Zhangsan {where / how} believe anybody
Intended: 'No way does Zhangsan believe anybody.'

As far as the model of Farkas & Bruce (2010) updated by Martins (2014) is concerned, which is summarized in (72), Mandarin Chinese fits in this framework. NWHQs can be characterized by the combination of the absolute polarity item that is the same as the initiating assertion's was and the relative polarity item [objection][9]. This property also holds for denial-*zenme* questions.

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[9]Negative polarity items (NPIs) are known to be sensitive to non-veridical contexts (Giannakidou 2011). However, the previous section showed that metalinguistic negation markers cannot cooccur with them. Anti-veridical contexts are also expected to host NPIs, and NWHCs are anti-veridical, because they convey a negated proposition and are homogeneous (which means that the possible worlds involved in the representation of the sentence that hosts the polarity item contain either only the positive or the negated version of a proposition). This could be a problem for the theory of polarity items, or it can be used as another tool that shows that metalinguistic negation is not part of semantics. However, we have seen from the Portuguese and Mandarin examples, that the truth-conditional meaning can also be subject to metalinguistic negation. Reconciling these facts with the proposed theories is not a problem to be handled in this thesis.

Since propositional negation words, *bu* and *mei* 'not' in Chinese can also be used in objections, and NWHCs can also be used to convey propositional negation, the question arises whether there is any advantage in adapting Horn's theory to NWHCs and to the denial reading of causal-*zenme* questions. Even if both can convey both negation and objection, there are cases when only MNMs or only propositional negation words can be used, as suggested by Martins (2014). For implicature negation, only MNMs are available, while in embedded positions, only ordinary negation words can appear. Their availability in both kinds of negation thus does not reduce the advantages of such an analysis.

The answer to the second research question thus refers to metalinguistic negation: NWHQs are indeed different from propositional negations. Not only are they different in the way they are licensed in discourse, as both Cheung and metalinguistic-negation-theorists suggested, but in the distribution of polarity items in them as well. NWHCs, but not ordinary negations, express negation so that the absolute polarity items do not change their value. Also, the use of NWHCs is more restricted than that of propositional negation words: NWHCs cannot be used in embedded positions. In sum, we have good reasons to analyze Mandarin NWHCs as potential devices conveying metalinguistic negation.

It has to be noted, that outer *zenme* questions share some of these properties with NWHQs. They need to be licensed in discourse, that is, they are reactions to some previous utterance or (non-verbal) event. Outer *zenme* questions can negate implicatures and they fail to license NPIs. However, as for the speaker's attitude is concerned, these questions can remain neutral, that is, they can express a causal question without a denial reading, as it was noted in the previous section.

4   In search of the source of causal and denial readings

In this section, the third research question is addressed, which is related to outer *zenme* questions, namely to the conditions of the two 'outer' interpretations. Contrast 1 and Contrast 2 will serve as a basis for that.

4.1   The causal reading of *zenme* questions

4.1.1   A factivity analysis of causal-*how*

So far, what has been observed about NWHCs and denial-*zenme* questions is that they seem to share the same position in syntax and they both convey a negative attitude on the part of the speaker, though in somewhat different ways. Both express an objection

in Martins' sense, but at the same time, NWHCs are more likely to convey propositional negation than denial-*zenme* questions.

In what follows, the question related to Contrast 1 will be addressed. The broader question to be treated in this section is this: How does a causal interpretation arise in a case like in Contrast 1? We have seen in section 2.2.1 that there are many kinds of delimiters that are reliable predictors of a causal interpretation. However, as it was shown already in Tsai (1999), none of them is present in Contrast 1: in such a case, the difference between an inner and an outer reading arises because of the presence of an aspect marker. The aspect marker is not a delimiter though, because its presence itself cannot exclude a manner reading.

The phenomenon represented by Contrast 1, repeated here for convenience, might be connected to the presupposition-related properties of causal-*how* questions, which play a central role in the analysis of Fitzpatrick (2005) and Conroy (2006).

(80)   **Contrast 1**: With a perfective marker, only a causal reading is available

    a. Akiu *zěnme* qù Táiběi?   [Mandarin]
       Akiu how   go Taipei
       'How (by what means) will Akiu go to Taipei?'

    b. Akiu *zěnme* qù le Táiběi?
       Akiu how   go PFV Taipei
       'How come Akiu went to Taipei?'

They base their account on the observation that *how come* in English presupposes the truth of its complement stronger than any other wh-question, including *why*.

Fitzpatrick (2005) uses some linguistic evidence to support his claim that *how come* is a factive wh-phrase, the presupposition of which is like the one of definites and factive predicates. Namely, he builds on Collins's (1991) observation on rhetorical and multiple questions, and on facts about negative polarity item licensing. Rhetorical questions cannot host *how come* because the presupposition of the sentence radical is in conflict with the rhetorical reading that suggests the opposite of the sentence radical. (81b) is suggested by (81a), but not by (81c), because it suggests (81d).

(81)   a. Why would John leave?

    b. John would not leave.

    c. How come John would leave?

    d. John would leave.

Fitzpatrick explains these facts by a factive operator C_{FACT} which creates a presupposition that its complement (the sentence radical) is true. The presupposition of the truth of the complement makes the proposition expressed by the sentence radical veridical. A sentence containing an expression p is veridical, if it entails the truth of p, while non-veridicality "captures a state of unknown (or as yet undefined) truth value" (Giannakidou 2011). Thus, the availability of NPIs in (82a) means that the non-veridical context created by the wh-word is not 'spoiled' by such a presupposition of truth, while in (82b), the factivity operator creates a veridical context in which NPIs (*ever*, *anything*) cannot appear (Giannakidou 2011; 2013).

(82)   a. Why did John say anything?

         b. *How come John ever said anything?
           (Fitzpatrick 2005, p. 140)

So Fitzpatrick claims that C_{FACT} creates a factive island, any movement out of which gives rise to ungrammaticality. This, according to him, would explain the syntactic phenomena of *how come* observed by Collins. *How come* cannot have wide scope from an embedded clause the same way other wh-words can (cf. 30), because *how come* cannot move out to take wide scope because of C_{FACT}. *How come* cannot interact with quantifiers the way other wh-words can (cf. 31), because the quantifier cannot move out of the factive island to a position where it could take scope over *how come.*

Conroy (2006) (who adopts and extends the analysis of Fitzpatrick) explains the unavailability of *how come* in tenseless clauses (cf. 32) by the factive operator as well: it is not tenselessness but the negative bias of the clause that explains the incompatibility with *how come* along with a factive operator. According to Anikó Lipták (p.c.), the unacceptability of tenseless clauses can also be attributed to the fact that they cannot have a truth value, without which their truth cannot be presupposed.

Conroy reports a further contrast between *how come* and other wh-words: *how come* cannot be used in suggestions of the form of a question. The content of the suggestion is non-veridical, thus its truth cannot be presupposed.

(83)   a. Why don't we go out tonight?

         b. #How come we don't go out tonight?
           (Conroy 2006, p. 6)

Both Fitzpatrick and Conroy put *how come* high in the structure, and they account for the non-wh-like behavior of it by the factivity operator.

Recall that Tsai stated by Contrast 1 that adding the perfective marker *le* results in a causal reading and excludes any inner reading of *zenme*. How does the factive operator relate to the perfective aspect marker *le*?

On the one hand, *le* appears in the complement of factive predicates, too. Fitzpatrick compared the presuppositional character of the complement of *how come* to factive predicates. Consider the complements of the factive predicate *zhidao* 'know' in (84).

(84) a. */#Wǒ zhīdǎo Akiu qù Táiběi.   [Mandarin]
          I   know   Akiu go Taipei
          Lit.: 'I know that Akiu goes to Taipei.'

      b. Wǒ zhīdǎo Akiu {yào   / huì} qù Táiběi.
          I   know   Akiu {want / can} go Taipei
          'I know that Akiu wants/can go to Taipei.'

      c. Wǒ zhīdǎo Akiu qù le   Táiběi.
          I   know   Akiu go PFV Taipei
          'I know that Akiu went to Taipei.'

Having modals or the perfective marker *le* in the complement of the factive predicate turn the sentence grammatical[10]. Modals are delimiters between inner and outer readings of *zenme*, as it was noted, so their presence in the complement of factive predicates is not surprising. Since factive predicates and causal-*zenme* questions behave alike in this respect, this parallel can serve as a support for assuming a factivity operator in Chinese causal questions[11].

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[10]Native speakers accepted (84a) only if either *Akiu* or *Taibei* is stressed, but without stressing them, the complement is not acceptable.

[11]Ochi (2015) uses Tsai's (2008) example sentences in (1) to show that in Chinese, the factivity operator does not create an island, because it is possible for subject Q(uantifier) Phrases to move above causal-*zenme* (which is the equivalent of *how come*).

(1) a. Zěnme měigèrén huì dài   yì běn shū?   [Mandarin]
         how   everyone will bring one CL book
         'How come everyone will bring one book?'
     b. Měigèrén zěnme huì dài   yì běn shū?
         everyone how   will bring one CL book
         'How come everyone will bring one book?'
         (Tsai 2008, p. 98)

Ochi argues the following way: *why the hell* in English is believed to be merged into Spec,IntP just like *how come*. It is not factive, yet it behaves similarly to *how come* with respect to subject movement. *Why the hell* does not allow QP subjects to move across it, yet it is not factive, so according to Ochi, the ban on movement cannot be attributed to Fitzpatrick's factive island. Ochi uses these arguments to justify his account on the diverse merging sites of *why*.

On the other hand, Sybesma (1999) analyzes *le* in a way that is in line with the factivity analysis of causal-*zenme* questions. Sybesma proposes that the *le* that occurs after verbs can have various functions and can be interpreted in different ways depending on the object of the verb. The common property that each token of (post-verbal) *le* has, however, is that in one way or another, they mark the realization of the event denoted by the verb. *Le* either marks the completion of the event or it "freezes" the action, which means that the action was started, it became a fact, and a resulting state ensued from it. Realizing the event in question is compatible with factivity: it is plausible to assume that *le* is the morpheme that satisfies C_{FACT} in signaling the realization of the event in the sentence radical.

In sum, both the similar pattern of the complements of factivity verbs and the factive-like analysis of *le* proposed by Sybesma support the existence of a factive operator in causal-*zenme* questions. As far as the causal reading of *zenme* is concerned, actuality entailments and forked modality will be introduced in the following point.

4.1.2 Actuality entailments

Contrast 1, according to Lisa Cheng (p.c.) might be related to a special kind of entailment that is called *actuality entailment* (AE) by Bhatt (1999) and Hacquard (2009) and *actuality implication* by Pinón (2003; 2011). Briefly, the phenomenon can be described as follows: when a predicate with certain kinds of modals is marked for perfective aspect (in languages that differentiate perfective and imperfective aspect morphologically), such an entailment arises and the modal meaning vanishes.

(85) a. Yesterday, John was able to eat five apples in an hour. (Past episodic)

      b. In those days, John was able to eat five apples in an hour. (Past generic)
        (Bhatt 1999, p. 74)

In English, the simple past of the modal (*could*) and the ability predicate (*was able to*) can appear in both perfective and imperfective contexts, therefore, Bhatt uses sentential adverbials to mark the difference between contexts. Bhatt claims that (85a) is only true if John actually performed the event described by it, while no such requirement seems to be valid for (85b). Hacquard, who extends Bhatt's account of ability modals to all root modals (which also comprise deontic and goal-oriented modals) proves the same for French perfective-imperfective minimal pairs:

However, I believe that Fitzpatrick's factivity analysis can still hold; the fact that *why the hell* does not let QP subjects move above it does not necessarily entail that there cannot be a factivity operator with *how come*.

(86) a. Jane pouvait   traverser le lac à la nage,   [French]
          Jane can-PST.IMPF.3sg cross   the lake by the swim

          mais elle ne le fit   jamais.
          but   she not it do.PST.PFV.3sg never

      b. Jane put   traverser le lac à la nage, #mais elle ne le
          Jane can.PST.PFV.3sg cross   the lake by the swim, but   she not it
          fit   pas.
          do.PST.PFV.3sg not

          'Jane could (was able to) swim across the lake, but she never did.'

          (Hacquard 2009, p. 280)

Here I will not introduce the theories proposed by Bhatt and Hacquard in detail, only some relevant aspects of them. Bhatt constructed his account only for ability modals, represented by ABLE, which has an implicative reading (like *managed to*), and ABLE in the scope of a generic operator Gen, which is present in sentences like (85b). Piñón's critique of Bhatt is that sentences like (85b) do not have to be generalizations of implicative event predicates. Thus, (85b) holds even if John never actually revealed his apple-eating ability by performing it even once. Hacquard (2009), proposes that actuality entailments arise due to different scopal relations between the modal and Aspect. If Aspect takes scope over the root modal, it forces an actuality reading, while if the modal scopes over the aspect (which can only be the case if the modal is an epistemic one), modality remains part of the meaning. Importantly, both Bhatt and Hacquard consider actuality entailments uncancellable, which proves that they belong to the semantics of the expression.

In the following, I summarize Cheng and Sybesma's proposal to solve Contrast 1 along with some challenges it faces.

In Mandarin, *le* marks perfective aspect, without which a bare predicate must be interpreted generically (Li & Thompson 1989). When combined with a modal, actuality entailments should arise, and, according to Cheng and Sybesma[12], it is the case in (87).

(87) Akiu zěnme huì qù le   Táiběi?   [Mandarin]
      Akiu how   can go PFV Taipei
      'How come Akiu could go to Taipei?'

There are sentences though which have an actuality entailment, yet they do not contain modals.

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[12]I refer here to what Lisa Cheng and Rint Sybesma presented in their course at Leiden University: Chinese Syntax and Semantics in the spring semester of academic year 2014/15.
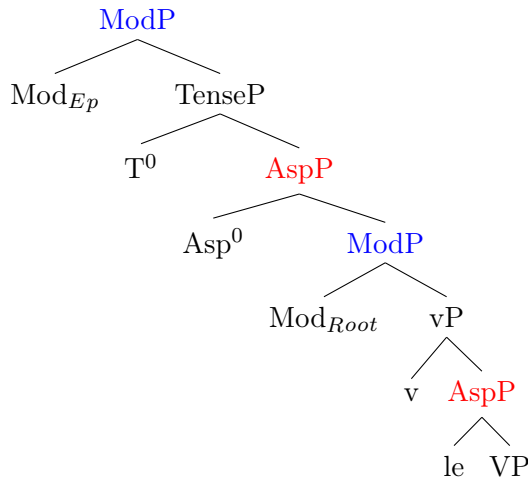
(88) Akiu zěnme qù le Táiběi? [Mandarin]
    Akiu how   go PFV Taipei
    'How come Akiu went to Taipei?'

To account for the AE in (88), Cheng and Sybesma propose that in such sentences, there are implicit modals that are obligatorily triggered by the perfective marker *le*. Specifically, they refer to an earlier observation on a similar phenomenon described in Cheng & Sybesma (2003; 2004). In Cantonese, there is a root modal, *-dak-* which is embedded into the complex predicate with which it forms a single unit.

(89) Keoi lo -dak- hei li   seung syu. [Cantonese]
    he   take -DAK- up this box   book
    'S/he can lift this box of books.'
    (Cheng & Sybesma 2003, p. 13)

It is exceptional in Cantonese for modals to occur in a post-verbal position, so the authors suggest that it must be related to the higher projection of root modals. To solve the problem of having AEs without modals, Cheng and Sybesma apply this solution. In Mandarin, the perfective aspect marker *le* is always post-verbal, which cannot be accommodated in the tree suggested by Cinque (1999). They suppose therefore following. Two projections of Aspect are needed: a post-verbal one that hosts *le* and another one in its 'canonical' position, below TenseP. The presence of *le* in the lower AspP "activizes" the higher AspP projection, the two are always related. Next, two ModalPs are needed: a lower one for root modals below the higher AspectP, and one for epistemic modals that is placed higher than both AspPs. Using implicit root modals in such a structure could account for AEs even in sentences where there are no overt modals.

(90) "Forked modality"

```
                    ModP
                   /    \
              Mod_Ep    TenseP
                       /      \
                     T⁰       AspP
                             /    \
                          Asp⁰    ModP
                                 /    \
                           Mod_Root   vP
                                     /  \
                                    v   AspP
                                       /    \
                                      le    VP
```

This way, actuality entailments arise both with overt and with implicit root modals, and the fact that epistemic modals do not give rise to AEs (91) is also accounted for. Given that epistemic modals are higher than any of the AspPs, it can never be in their scope, hence AEs do not arise.

(91) Tā zěnme kěnéng qù le   Táiběi?   [Mandarin]
      he how   possible go PFV Taipei
      'How is it possible that he went to Taipei? (I just saw him.)'

AEs might be the source of the causal reading of *zenme* questions if we assume that the TP in a causal/denial-*zenme* question is a phase. Phases are Spell-Outs of partial structures during the derivation, thus a phase must be interpretable and pronounceable. When TP is merged to the higher AspP, it becomes a proposition that can get a truth value, hence the TP is a phase.

As Cheng and Sybesma suggest, the perfective aspect marker *le* triggers a higher AspP that "activizes it". When it combines with TP, a phase is created to which the Phase Impenetrability Condition (PIC) applies (Chomsky 2004). Due to the PIC, once a phase is formed, nothing can move out of it, hence there is no way to interpret outer *zenme* as an inner one.

(92) Phase Impenetrability Condition
      In a phase α with a head H, the domain of H is not accessible to operations
      outside α, only H and its edge are accessible to such operations.

The fact that stative predicates are well-formed with outer *zenme*, as Tsai (2008) proved it (cf. 42b), suggests that outer *zenme* quantifies over a property that applies to

both eventualities and situations. Every event and situation has a cause, therefore it is plausible to assume that the causal reading of outer *zenme* is due to the unavailability of any event-modifying (i.e. inner) readings of *zenme*.

There are some problematic issues in an account based on AEs, however. Firstly, testing actuality entailments with native speakers gave some unexpected results. According to their judgments, (93a) does not necessarily entail that Akiu went to Taipei, as we would expect. Also, the acceptability of (93a) degrades when *le* is added, and (93b) is unacceptable with *le*. The fact that (93b) is acceptable without *le* proves that there is no actuality entailment in the first clause.

(93)   a.   {Zuótiān   / qù nián}, Akiu kěyǐ qù Táiběi.   [Mandarin]
            {yesterday / last year} Akiu can go Taipei
            'Yesterday/last year, Akiu was able to go to Taipei.'

       b.   {Zuótiān   / qù nián}, Akiu kěyǐ qù *(le) Táiběi, kěshì méi yǒu qù.
            {yesterday / last year} Akiu can go (PFV) Taipei but   not have go
            'Yesterday/last year, he was able to go to Taipei, but he did not go.'

In these cases, a root modal was used, *keyi*, which, similarly to *hui*, has an ability modal reading (both have other readings besides the ability one). Any account based on AEs should explain why AEs do not arise here.

Also, (94) was judged acceptable and having AEs by native speakers both with and without *le*, but it was considered natural only without it.

(94)   Nǐ   zěnme kěyǐ duì wǒ zuò (le)   zhè jiàn shì?   [Mandarin]
       you how   can to I   do (PFV) this CL   matter
       'How could you do this to me?'

Even if (94) is accommodated into an AE-based account, Contrast 1 can still not be fully explained by it, as there are other aspect markers that give rise to outer *zenme* readings, as noted by Tsai (1999). This does not mean a problem for an account based on AEs, but if we are to account for Contrast 1 solely by AEs, these sentences should be accounted for in another way.

(95)   a.   Akiu zěnme zài   shuìjiào?   [Mandarin]
            Akiu how   PRG sleep
            'Why is Akiu sleeping?'

b. Akiu zěnme chuān zhe   tuōxié?
Akiu how   wear   DUR slipper
'Why is Akiu wearing slippers?'
(Tsai 1999, p. 10)

What is more, the status of AEs has been questioned as well. Piñón argues that
AEs are not even necessarily entailments because they are not uncancelable. He suggests
therefore the term *actuality implications*. In Piñón (2009, 2011), pragmatic reasoning is
offered to solve the puzzle. Piñón has shown (citing Mari and Martin's example) in (96),
that actuality entailments are not uncancellable which made him commit to the view
that actuality implications, as he calls them, are a pragmatic phenomenon.

(96)   Notre nouveau robot <u>a</u> même <u>pu</u> repasser les chemises à un   [French]
        stade bien précis de son développement. Mais on a supprimé
        cette fonction (qui n'a jamais été testée) pour des raisons
        de rentabilité.
        'Our new robot could even iron shirts at a particular stage
        of its developement. But we suppressed this function
        (which was never tested) for reasons of cost.'
        (Piñón 2011, p. 3)

In (96), the ability modal *pouvoir* appears in passé composé (underlined), which is a
perfective in the past tense (which, according to Hacquard (2009), originally expressed
present perfect but now is used to express past perfective as well), yet one does not have
to assume that the robot had ever used its ironing ability. (Piñón's claim about the lack
of AEs was corroborated by a native speaker of French.) Also, he argues that in a strange
world where abilities come and go, it would be possible to say (86a). This implies that
the actuality entailment depends on world knowledge and so, it is more appropriate to
call it an implication.

Lastly, it should be noted that even though forked modality does not contradict the
"one feature one head" principle because modality is forked to host two different kinds of
modals, but having two AspPs does contradict it.

In this section, the puzzle of Contrast 1 was looked at. Fitzpatrick's factivity-based
analysis of causal *how* questions shed light on a parallel between factive predicates and
causal *zenme* questions, which is supported by the way Sybesma analyzed *le*. The com-
plements of both the factive operator and factive predicates show a similar pattern: the
bare predicate in the complement is not acceptable. Factivity thus might be an option
to consider in future research. If a TP with a root modal and *le* in it forms a phase, it

can explain why the causal reading is the only available one for *zenme*. Some problems were pointed out with AEs, the most important of which being that AEs alone cannot account for the full range of sentences belonging to Contrast 1, because it is not perfective markers alone that can give rise to a causal reading.

4.2 The role of modality in the denial reading

In what follows, the problem of Contrast 2 will be addressed: What is the source of the denial reading in some causal *zenme* questions? I will point to the fact that in Mandarin causal questions, the presence of the modal seems to correlate with a denial reading which is corroborated by Hungarian denial-*how* questions. I suggest that modality plays an important role in the denial reading of outer *how* questions.

4.2.1 Causal and denial-*how* questions in Hungarian

Just as Chinese outer *zenme*'s can be translated into English by two different words, *how* or *how come*, Hungarian has two counterparts for it, too: *hogy* 'how' that can be both an inner and an outer 'how', and *hogyhogy* which is the counterpart English *how come*. In the case of Hungarian, the label 'outer' does not apply in the same way as it does for Chinese (suggesting the position of the question words), however, it will be used for the Hungarian counterparts of Chinese outer *zenme*'s. There is one study that treats *hogyhogy* 'how come'-type causal questions in Hungarian, but denial-*how* has not yet received even this much attention (as far as I know). In this subsection, I will argue that Hungarian 'outer' *how* questions come in two forms: as *hogyhogy* questions and as *hogy* questions that need to have a modal in them. It will be shown by some syntactic tests that denial-*hogy* is an outer question word, not identical to the inner *hogy*. Denial- or outer *hogy* is the most likely to convey the speaker's denial, however, only when the predicate has a potential morpheme on it. Without the modal component, this question can only get a 'low' interpretation.

Hogyhogy. *Hogyhogy*[13] 'how come' as a wh-element has a controversial status among the parts of speech. Lipták (2001), treats wh-items as variables lacking inherent quantificational force just as Cheng (1991; 1994) treats Chinese wh-elements, on the ground that Hungarian wh-elements and pronouns are morphologically related. She does not

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[13]Molnár (2010) provides the etymology of *hogyhogy*. Literally, it can be glossed as 'how that' (just as Portuguese *como que* 'how come'), in which the former *hogy* means 'how' while the latter is a complementizer, glossed as 'that' in English. In Hungarian, both morphemes happen to have the form *hogy*.

list *hogyhogy* among wh-elements however, because it lacks a variable reading - there is no morphologically related variant of it that could serve as a wh-indefinite, meaning 'somehow'.

Besides the description provided by Kálmán (2001), Cecília Molnár (2010) is the only one who thoroughly examines both the formal and functional characteristics of Hungarian *hogyhogy* 'how come'. Hungarian wh-elements are fronted, and so does *hogyhogy*, but it does not occupy the usual position of wh-words. Hungarian verbal modifiers (VM) are supposed to follow the verb in wh-questions (É. Kiss 2002), but it is not the case in (98).

(97) a. Mikor indul-t-atok   el Leiden-be?   [Hungarian]
         when depart-PST-2pl VM Leiden-ILL
         'When did you depart to Leiden?'

      b. *Mikor el-indul-t-atok   Leidenbe?
         when   VM-depart-PST-2pl Leiden-ILL
         Intended: 'When did you depart to Leiden?'

(98) a. *Hogyhogy indul-t-atok   el Leidenbe?
         how come   depart-PST-2pl VM Leiden-ILL
         Intended: 'How come you depart-PST-2pl to Leiden?'

      b. Hogyhogy el-indul-t-atok   Leidenbe?
         how come VM-depart-PST-2pl Leiden-ILL
         'How come you departed to Leiden?'

Molnár (2010) observed that *hogyhogy* shows many of the characteristics of *how come* that Collins observed. Accordingly, *hogyhogy* cannot appear in multiple questions with coordinated wh-words, nor in multiple questions yielding a pair-list reading. Changing the order of the wh-elements does not affect grammaticality in neither of the cases.

(99) a. Mikor és   hol   találkoz-t-atok?   [Hungarian]
         When and where meet-PST-2pl?
         'When and where did you meet?'

      b. *Hogyhogy és   hol   találkoz-t-atok?
         how come   and where meet-PST-2pl
         Lit.: '*How come and where did you meet?'

(100) a. Ki   mikor játsz-ott?
         Who when play-PST.3sg
         'Who played when?'

b. *Ki   hogyhogy játsz-ott?
   Who how come play-PST.3sg
   Lit.: '*Who played how come?'

Also, *hogyhogy* 'how come' cannot have matrix scope from an embedded position, neither can it interact with quantifiers scopally.

Denial-*hogy*.   Besides *hogyhogy* questions, Hungarian can also use *hogy* 'how' in a causal/denial-*how* question, which is closest (if not identical) both in meaning and in function to Chinese denial-*zenme* questions.

(101)   Hogy te-het-t-ed   ez-t   vel-e?   [Hungarian]
        how   do-POT-PST-2sg this-ACC with-3sg
        'How could you do this to him?'

Based on (102), denial-*hogy* behaves similarly to *hogyhogy*: even though (102) that has coordinated wh-elements in it is well-formed, there is no causal or denial reading available in it.

(102)   Hogy és   mikor ve-het-t-él   ilyen drága   autó-t?   [Hungarian]
        how   and when buy-POT-PST-2sg so   expensive car-ACC
        'How and when could you buy such an expensive car?'

Multiple questions that yield a pair-list as an answer cannot host denial-*hogy*, and they cannot interfere with QPs either. It is the presence of the modal that makes *hogy* in (103) a denial-*hogy*.

(103)   a. *{Hogy / hogyhogy} ve-het-t-él   meg mikor ilyen   [Hungarian]
           {how   / how come} buy-POT-PST-2sg VM   when so

           drága   autó-t?
           expensive car-ACC

           Lit.: 'How could you buy when such an expensive car?'

        b. ?Mindenki hogy ve-het-ett   ilyen drága   autó-t?
           everyone   how buy-POT-PST.3sg so   expensive car-ACC
           'How could everyone buy such an expensive car?' (only wide scope reading)

In Hungarian, both manner-*how* and denial-*how* can translate as *hogy*. There is a longer form (*hogyan*) though, which does not exclude a denial reading, but it is definitely the shorter form that is preferred for an 'outer' *how* reading.

(104) a. Hogy ve-het-t-él   ilyen drága   autó-t?   [Hungarian]
           how buy-POT-PST-2sg so   expensive car-ACC
           'How could you buy such an expensive car?' (denial)

       b. Hogyan ve-het-t-él   ilyen drága   autó-t?
           how   buy-POT-PST-2sg so   expensive car-ACC
           'What made it possible for you to buy such an expensive car?'
           (manner or causal reading)

       c. Hogy(an) ve-tt-él   ilyen drága   autó-t?
           how   buy-PST-2sg so   expensive car-ACC
           'How did you buy such an expensive car?' (manner or causal reading)

Also, the denial-*hogy* question in (104a) and *hogyhogy* questions are similar in that they cannot be used out of the blue, that is, without something (a previous utterance or a contextually relevant proposition) to which they can be a reaction and in that neither of them can appear in multiple questions. (Recall that this is one of the characteristics of metalinguistic negation.)

However, denial-*hogy* behaves as any other (inner) wh-word when it comes to syntax: the verbal modifier follows the verb, so it must occupy the focus position, just as the 'ordinary' wh-elements in Hungarian (É. Kiss 2002).

(105) a. *Hogy meg-ve-het-t-él   ilyen drága   autó-t?   [Hungarian]
           how VM-buy-POT-PST-2sg so   expensive car-ACC

       b. Hogy ve-het-t-él   meg egy ilyen drága   autó-t?
           how buy-POT-PST-2sg VM a   so   expensive car-ACC
           Intended: 'How could you buy such an expensive car?'

In this single respect, denial-*hogy* does not pattern with the causal question word *hogyhogy*, which cannot occupy this position. Thus, although denial-*hogy* has one important property that suggests that it is an inner question word, there are more properties that suggest that it is an outer one (properties that also characterize *hogyhogy*). I will assume therefore, that *hogy* is an outer question word.

Now, outer *hogy* needs a modal to yield an outer reading and also for conveying denial. Without the potential (ability) modal morpheme -*hAt*, it cannot be interpreted so. There is thus an important contrast between a question with *hogy* with and without a modal. With a modal, the causal reading is suppressed by the denial reading, at least, it becomes a very unlikely candidate for asking reasons. Modals cannot cause such a contrast in *hogyhogy* 'how come' questions, nor in manner questions with *hogyan*.

(106) a. Hogyhogy ve-tt-él   egy ilyen drága   autó-t?   [Hungarian]
          how   buy-PST-2sg a   so   expensive car-ACC

       'How come you bought such an expensive car?' (causal reading)

    b. Hogyhogy ve-het-t-él   egy ilyen drága   autó-t?
          how   buy-POT-PST-2sg a   so   expensive car-ACC

       'How come you could buy such an expensive car?' (causal reading)

In the counterparts of (104) with *hogyhogy* in (106), the causal reading is no less available than the denial reading, it is thus a more felicitous candidate for asking reasons. Importantly, adding the potential morpheme does not make (106b) more likely to convey denial. The presence of the modal is thus a unique requirement of outer *hogy* to yield both an outer and a denial reading.

The aim of presenting Hungarian causal and denial-*how* questions was to draw a parallel between denial-*hogy* and denial-*zenme*. Even though based on its syntactic properties, it is not straightforward that denial-*hogy* is an outer wh-element (because unlike *hogyhogy*, it occupies the focus position which prevents verbal modifiers to appear pre-verbally), in many other relevant ways, it patterns with causal *hogyhogy*, which suggests that they both are outer question words. A causal-*hogy* question with a potential morpheme in it gives rise to a denial reading that is hardly cancelable (if cancelable at all). If such a question appeared without the ability modal in it, it would also cease to be a causal question; in this case, only 'lower' interpretations would be available. The way a denial reading depends on modality in Hungarian, where the two outer *how*'s are distinguished even morphologically, can support the idea that in Chinese as well, where these outer *zenme*'s are not distinguished this way, the denial reading is dependent on modality.

4.2.2   The NPI-like behavior of denial-*zenme*

In Chinese, as I argued, the presence of a modal makes a denial reading dominant, just like in Hungarian. In this section, I aim to account for this by referring to quantification over possible worlds and to NPIs, inspired by the way den Dikken and Giannakidou (2002) analyzed *wh-the-hell* constructions.

The *wh-the-hell* construction, which is an aggressively non-D-linked expression, is analyzed as a polarity item (PI) by den Dikken & Giannakidou (2002). It corresponds at least to how they define polarity items in (107).

(107)   A linguistic expression α is a polarity item iff:
       a. The distribution of α is limited by sensitivity to some semantic property β of

the context of appearance; and

b. β is (non)veridicality, or a subproperty thereof: $\beta \in \{$veridicality, nonveridicality, modality, intensionality, extensionality, episodicity, downward entailingness$\}$
(den Dikken & Giannakidou 2002, p. 37)

Modality is one of the subproperties of non-veridicality, and this is what links polarity items to the present discussion of denial-*how* questions.

According to den Dikken and Giannakidou, a sentence with a modal and *who-the-hell* as in (108b) conveys that no one would buy that book, which they call a *negative rhetorical reading.* (108a) can have the same reading even without the aggressively non-D-linked morpheme *the-hell*, but there is still a canonical reading available ('who is the one that would possibly buy that book?'). With *wh-the-hell*, however, the canonical reading vanishes and the only reading available is the one in which the speaker expresses a negative attitude, suggesting that no one would buy that book.

(108)   a. Who would buy that book?
             (both canonical and denial reading available)
         b. Who the hell would buy that book?
             (only denial reading available)

In the presence of modals, even weak (or broad) PIs like *any* lean towards a negative answer, therefore, the authors suggest that the *wh-the-hell* construction should be a PI itself.

Den Dikken and Giannakidou explain the ability of utterances in (108) to convey a certain negative attitude on the part of the speaker by the fact that the modal extends the domains over which the wh-element normally quantifies. That is, in (108b), the domain of persons that *who* should range over (the modal base, marked by K), now extends beyond the contextually relevant set of people, because the modal introduces all possible worlds, which contains all subsets of the set of all people.

The canonical reading and negative attitude reading conveyed by (108a) would be the following:

(109)   a. Canonical reading of (108a)
             $\forall w \in K \ [P(x)(w) \rightarrow Q(x)(w)]$, for all possible values of x
             where x = the variable introduced by *who*,
             P = the property denoted by the wh-phrase
             Q = the property denoted by the VP

b. Negative rhetorical reading of (108a) and of (108b)

$\forall w \in K [P(x)(w) \rightarrow \neg Q(x)(w)]$, for all possible values of x

The outcome is that "no one would buy that book". Since every possible world is involved, there is universal quantification: the outcome is thus even stronger: "no one" is understood as "no one in the whole world" – it is the strength of this universally quantified expression having a negated predicate in it that is responsible for the strong negative rhetorical reading.

Now, if we consider *how*-questions with modals, which have the denial reading, what we can observe is that the presence of *the-hell* is not needed for it to become available, nor is it needed to cancel the canonical reading: the canonical reading is not available "by default" in (110a) and (111a).

(110)   a. How can you be so rude?

b. How on earth can you be so rude?

(111)   a. Hogy lehetsz   ilyen udvariatlan?   [Hungarian]
how   be-POT-2sg so   rude
'How can you be so rude?'

b. Hogy a   fenébe lehetsz   ilyen udvariatlan?
how   the hell-ILL be-POT-2sg so   rude
'How on earth can you be so rude?'

The Chinese counterpart of *the-hell*, the marker of aggressively non-D-linked expressions is *daodi*, that can be glossed as 'after all' or 'to the bottom', which contributes the same meaning component to the sentences in (112) as *a fenébe* 'in the hell' or *on earth* did in (110) and (111).

(112)   a. Nǐ zěnme kěyǐ zhème wúlǐ?   [Mandarin]
you how   can this   rude
'How can you be so rude?'

b. Nǐ dàodǐ   zěnme kěyǐ zhème wúlǐ?
you after all how   can so   rude
'How can you be so rude?'

c. Nǐ zěnme kěyǐ duì wǒ zuò zhè jiàn shì?
you how   can to I do this CL matter
'How can you do this to me?'

d. Nǐ dàodǐ   zěnme kěyǐ duì wǒ zuò zhè jiàn shì?
   you after all how   can to I   do this CL matter
   'How on earth can you do this to me?'

The judgments of the consultants about (112) are in line with the observations about English and Hungarian utterances above: All sentences in (81) have a denial reading.

The semantics of the examples of *how*-questions without aggressively non-D-linked expressions, that is (110a), (111a) and (112a), should be constructed similarly to (109a), the semantic representation of the canonical reading of *how*-sentences. And the semantic representation of *how*-questions with *the-hell*, that is (110b), (111b) and (112b), similarly to (109b). However, the question word in this case is *how*, therefore it ranges over causes (so the property variable is now changed to C).

(113) Canonical reading of (110a), (111a) and (112a)
       $\forall w \in K$ $[C(x)(w) \rightarrow Q(x)(w)]$, for all possible values of x
       where x = the variable introduced by *how*,
       C = the property (a cause) denoted by the *wh*-phrase, and
       Q = the property denoted by the VP

(114) Negative rhetorical reading of (110b), (111b) and (112b)
       $\forall w \in K$ $[C(x)(w) \rightarrow \neg C(x)(w)]$, for all possible values of x

Den Dikken and Giannakidou (2002) argue that *wh-the-hell* is a negative polarity item that is sensitive to a non-veridical context. Modals can create such a context. Accordingly, a question with a modal and the question word *who* can be interpreted in two ways, with a canonical and a negative rhetorical reading, but the same question with *who-the-hell* does not allow the canonical reading, only the negative rhetorical one. Surprisingly, *how*-questions that have modals in them do not allow for a canonical reading, even without the NPI *the-hell*.

The behavior of *how* is thus unexpected, given that its semantic representation should allow for a canonical reading, see (109). In order to exclude the canonical reading and only allow for the negative rhetorical reading, the property denoted by the VP (Q in the formulas) should equal to a formula in which Q is negated, which is the case in formulas containing NPIs. What we can see here is that *zenme* in denial-*zenme* questions behaves exactly like a *wh-the-hell* expression, which is a negative polarity item. And NPIs, in the presence of a modal, are able to convey the strong denial associated to them. One can think of denial-*how*, denial-*hogy* and denial-*zenme* as if they had an implicit *the-hell*

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component which is sensitive to non-veridicality and becomes available only in a non-veridical context. This means that their "*the-hell*" component enables them to create and convey a denial reading when they are triggered by the modal, which happens to be the ability modal. Given that the presence of a question morpheme itself is not enough to trigger such a negative rhetorical reading, denial-*how*'s must be "strong" or narrow polarity items[14].

In this final section, I have argued for the NPI-status of denial-*zenme*. I have showed that because just like in Hungarian, the presence of a modal is a prerequisite of a dominant denial reading of Chinese outer *zenme*-questions that convey a denial, its meaning including the denial reading can be captured by treating them as NPIs. The availability of a denial reading is tied to a Q operator and the presence of a modal, both being able to create non-veridical contexts.

In this proposal, however, there are many potential problems. Giannakidou (2011; 2013) warns that the licensing contexts and even the strength of NPIs may vary cross-linguistically. Therefore, it might not be enough to simply justify Mandarin data based on the counterparts of its NPIs in other languages. Also, while the misuse of some NPIs results in "truly ungrammatical" sentences, the misuse of others does not – this suggests that the set of NPIs is not homogeneous even within the same language. These observations cannot be left out of such an account.

In sum, the third research question can be answered as follows: for an outer interpretation of questions with *zenme*, there must be either aspect or a delimiter such as a modal present. If the predicate in a *zenme* question is marked for aspect, it guarantees an outer reading, namely a causal one. What causes this is unknown, however, it is possible that with perfective aspect, factivity and actuality entailments play a role in it. Such question words, which can be glossed as *how come* in English and *hogyhogy* in Hungarian, can also convey the speaker's denial, but their causal reading is not suppressed by it. However, the denial reading becomes dominant, as I suggested, in the presence of a modal. Denial-*zenme* and its counterparts in English and Hungarian can therefore be analyzed as strong NPIs, the same way as *wh-the-hell* expressions.

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[14]Den Dikken and Giannakidou use the metaphor of strength to place PIs on a scale based on the kinds of contexts they can appear in. They call *any* 'weak', (which Giannakidou (2011) later calls 'broad'), for example, because it does not strongly suggest a negative answer, therefore, it is allowed in such "innocent" contexts as constituent questions.

5 Conclusion

In the present thesis, two non-canonical question types in Mandarin were looked at: negative wh-constructions and causal/denial-*zenme* 'how' questions. Their syntactic distribution suggests that they share the same position in syntax. Given that conveying the denial of the speaker can be part of their (pragmatic) meaning, a projection hosting pragmatic meaning was proposed to host them, an Attitude Phrase, following Huang & Ochi (2004).

Secondly, Nwhcs, which convey both the speaker's denial and negation, were compared to 'ordinary' negation. The conclusion of this comparison was that nwhcs can be analyzed as metalinguistic negation. Many properties of metalinguistic negation apply to denial-*zenme* questions as well, with the only difference that the latter, contrarily to nwhcs, are not likely to convey propositional negation.

Thirdly, there are some syntactic prerequisites for questions with *zenme* to have an outer reading: either the predicate of the sentence radical has to be marked for aspect or there must be a delimiter in it, such as a modal. Delimiters between inner and outer readings of *zenme*, have to follow *zenme* in order to have an outer interpretation. The presence of modals seems to be a prerequisite for a denial reading, which was supported by facts in Hungarian. Hungarian has two equivalents for Chinese outer *zenme*: *hogyhogy* 'how come' and "*hogy*+modal". The latter can only be interpreted as an outer question word with a modal. The correlation between the presence of modals and the denial reading led to an NPI-analysis of denial-*zenme*.

Acknowledgements

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