Deriving ATB from Box System[*]

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1. Introduction

Since Ross (1967), the Across-The-Board (ATB) phenomenon has been extensively discussed in the literature. One of the interesting properties of ATB *wh*-questions is that there is an argument/adjunct asymmetry with respect to the availability of identity and non-identity readings (Munn 1992, 1999). For example, the *wh*-argument *which boy* in (1) allows only an identity reading like (1a), while the *wh*-adjunct *where* in (2) allows not only an identity reading like (2a), but also a non-identity reading like (2b):[1]

(1) <u>Which boy</u> did John meet *e* and Mary like *e*?

    a. John met <u>Bill</u> and Mary liked <u>Bill</u>.

    b. #John met <u>Bill</u> and Mary liked <u>Frank</u>.

(2) <u>Where</u> did Mary vacation *e* and Bill decide to live *e*?

    a. Mary vacationed <u>in Paris</u> and Bill (also) decided to live <u>in Paris</u>.

    b. Mary vacationed <u>in Paris</u> and Bill decided to live <u>in Toronto</u>. (Munn 1999: 421)

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[1] There are speakers who find a non-identity reading possible in *wh*-argument ATB questions such as (1) and (6). In this paper, following Chomsky (2019: 1:00:45-), we will assume in the *wh*-argument ATB question that the identity reading, not the non-identity reading, is the interpretation derived from ATB movement, and will not discuss other factors other than the ATB interpretation (see also the discussion around (70)-(76) below).

The purpose of this study is to identify the factors behind the availability of identity/non-identity readings, and to explain these factors in terms of a framework recently developed by Chomsky (2023), called *Box System*.   In Section 2, on the basis of novel data from Japanese, we propose that an identity reading is allowed only with *wh*-elements which are θ- and Case-marked.   We point out that previous approaches to ATB *wh*-questions would have difficulty explaining our empirical findings.   In Section 3, while the box system entails that θ-marking plays a crucial role in boxing of a *wh*-element, we propose that not only θ-marking but also Case marking contributes to boxing of a *wh*-element.   We argue that the possible readings of ATB *wh*-questions follow as a natural consequence of the box system, along with an independently motivated ellipsis operation.   In Section 4, we briefly consider some implications of our analysis and conclude the discussion.

Section 2. Novel ATB Data from Japanese

Section 2.1. The key factors of the ATB Interpretation

Let us first confirm that the argument/adjunct asymmetry in ATB *wh*-questions really exists. With the English example in (2), we have seen that the *wh*-adjunct *where* allows both the identity and non-identity readings.   The same fact is illustrated by (3, 4) (Munn 1999: 421):

(3) <u>How</u> tired did Bill look *e* and Mary seem *e*?
   a. Bill looked <u>exhausted</u> and Mary also looked <u>exhausted</u>.
   b. Bill looked <u>exhausted</u> and Mary looked <u>OK</u>.

(4) <u>Why</u> did Bill leave *e* and Fred arrive *e*?
   a. Bill left <u>because John arrived</u> and Fred arrived <u>because he arrived</u>.
   b. Bill left <u>because Fred arrived</u> and Fred arrived <u>because he had a meeting</u>.

(3) is an ATB *wh*-question of the *wh*-adjunct *how*, and (4) is an ATB *wh*-question of the *wh*-adjunct *why*.   In both cases, not only identity readings like (3a, 4a), but also non-identity readings like (3b, 4b) are possible.   The *wh*-adjunct ATB questions have no reading restriction.

On the other hand, the possible reading of the *wh*-argument ATB question is restricted. As shown by the English example in (1), the *wh*-argument *which boy* allows only the identity reading.   One might say that the restriction is due to pragmatic factors.   But the following conversation between A and B indicates that the availability is not affected by pragmatic factors:

(5) A: Every student read a different book for class today.

    B: <u>Which book</u> did Mary read and John read?

    A: What?   Wait, I just said they all read <u>DIFFERENT books</u>.

In the first utterance, A is forcing a non-identity reading, and afterward B is asking an ATB *wh*-question of the *wh*-argument *which book*. If the *wh*-argument ATB question allowed a non-identity reading, then A would give an appropriate answer to B's question. But A doesn't do so, but rather is puzzled by such a question. This suggests that pragmatic factors do not affect the unavailability of the non-identity reading of a *wh*-argument ATB question.

Turing now to Japanese ATB questions, the argument/adjunct asymmetry with the availability of identity/non-identity readings is also observed in Japanese, as shown by (6, 7):

(6) <u>Dono hon-o</u>   John-wa tosyokan-kara *e* kari,   Bill-wa syoten-de *e* katta no?

    which book-acc J.-top   library-from   borrow, B.-top bookstore-at bought Q

    'Which book did John borrow from the library and Bill buy at the bookstore?'

    a. John-wa … <u>*The Great Gatsby*-o</u>   kari,   Bill-mo … <u>*The Great Gatsby*-o</u>   katta.

        J.-top   *The Great Gatsby*-acc borrow, B.-also   *The Great Gatsby*-acc bought

        'John borrowed <u>*The Great Gatsby*</u> … and Bill bought it (=<u>*The Great Gatsby*</u>) …, too.'

    b. #John-wa … <u>*The Great Gatsby*-o</u>   kari,   Bill-wa … <u>*The Years*-o</u>   katta.

        J.-top   *The Great Gatsby*-acc borrow, B.-top   *The Years*-acc bought

        'John borrowed <u>*The Great Gatsby*</u> … and Bill bought <u>*The Years*</u> ….'

(7) <u>Dono mati-de</u> John-wa Bill-ga *e* kyuuka-o tori, Mary-ga taisyoku-go *e* sugosita to itta no?

    which city-at J.-top B.-nom vacation-acc take, M.-nom retirement-after spent that said Q

    'In which city did John say that Bill vacationed and Mary spent after retirement?'

    a. … Bill-ga <u>Pari-de</u> kyuuka-o   tori,   Mary-mo … <u>Pari-de</u> sugosita …

         B.-nom Paris-in vacation-acc take, M.-also   Paris-in spent

      'John said that Bill vacationed <u>in Paris</u> and Mary spent <u>in Paris</u> after retirement, too.'

    b. … Bill-ga <u>Pari-de</u> kyuuka-o   tori,   Mary-ga … <u>Sooru-de</u> sugosita …

         B.-nom Paris-in vacation-acc take, M.-nom   Seoul-in spent

      'John said that Bill vacationed <u>in Paris</u> and Mary spent <u>in Seoul</u> after retirement.'

(6) is an ATB *wh*-question of the *wh*-argument *dono hon-o* 'which book,' and (7) is an ATB *wh*-question of the *wh*-adjunct *dono mati-de* 'in which city.' In the *wh*-argument ATB question (6), only an identity reading like (6a) is possible but an non-identity reading is not.

But in the *wh*-adjunct ATB question (7), not only an identity reading like (7a) but also a non-identity reading like (7b) is possible.   This fact indicates that the argument/adjunct asymmetry with the ATB interpretation exists in Japanese too.   The mismatch conversation between A and B in (8) also shows that the non-availability of the non-identity reading of a *wh*-argument ATB *wh*-question is not subject to pragmatic factors in Japanese either:

(8) A: Kyoo-no   kokugo-no   zyugyo-de minna   sorezore tigau   hon-o
        today-gen Japanese-gen class-at   everyone   each   different book-acc
        roodoku   sita   yo.
        reading-aloud   did   Par
        'Everyone each read a different book for Japanese class today.'
    B: <u>Dono hon-o</u>   John-wa   tosyokan-kara kari,   (sosite)
        which book-Acc John-Top   library-from   borrow,   (and)
        Bill-wa   syoten-de   katta   no?
        Bill-Top   bookstore-at bought   Q
        'Which book did John borrow from the library and Bill buy at the bookstore?'
    A: Minna   sorezore <u>tigau   hon-o</u>   roodoku   sita to   itta yo-ne.
        everyone each   different book-Acc reading-aloud did   that said Par-Par
        'I just said everyone each read DIFFERENT books.'

    It should be noted that *wh*-adjunct ATB questions have both identity and non-identity readings whether *wh*-adjuncts are high adjuncts or low adjuncts.   Following Koizumi (1993), we assume that tense/modal adverbs and their *wh*-counterparts such as *nan nen-ni* 'in what year' in (9), *dore kurai* 'how long' in (10), *dooiu riyuu-de* 'for what reason' and *naze* 'why' in (11) are high adjuncts, which appear outside VP.   As in (9-11), they allow both identity and non-identity readings:

(9) <u>Nan nen-ni</u>   John-wa   Bill-ga   *e* kyuuka-o   tori,   Mary-ga   *e* taishoku sita
    what year-in   John-Top   Bill-Nom   vacation-Acc took, Mary-Nom   retirement-did
    to   itta no
    that said Q?
    'In what year did John say that Bill took a vacation and Mary retired?'
    a. … Bill-ga   <u>2023 nen-ni</u> kyuuka-o   tori,   Mary-mo <u>2023 nen-ni</u> taishoku sita…
            B.-Nom 2023-in   vacation-Acc take, M.-also   2023-in   retirement-did
        'John said that Bill vacationed <u>in 2023</u> and Mary retired <u>in 2023</u>, too.'

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b. … Bill-ga <u>2023 nen-ni</u> kyuuka-o   tori, Mary-ga <u>2019 nen-ni</u> taishoku sita…

      B.-Nom 2023-in   vacation-Acc take, M.-also 2019-in   retirement-did

   'John said that Bill vacationed <u>in 2023</u> and Mary retired <u>in 2019</u>.'

(10) <u>Dore kurai</u> John-wa Bill-ga kyuuka-o   tori, Mary-ga ryokou-shita to   itta no?

how long   J.-Top   B.-Nom vacation-Acc took, M.-Nom traveled   that said Q?

'How long did John say that Bill took a vacation and Mary traveled?'

  a. … Bill-ga <u>1 shuukan</u>   kyuuka-o   tori, Mary-mo <u>1 shuukan</u> ryokou-shita…

      B.-Nom 1 week   vacation-Acc take, M.-also 1 week   traveled

   'John said that Bill took a vacation <u>for one week</u> and Mary traveled <u>for one week</u>, too.'

  b. … Bill-ga <u>1 shuukan</u>   kyuuka-o   tori, Mary-ga <u>2 shuukan</u> ryokou-shita…

      B.-Nom 1 week   vacation-Acc take, M.-Nom 2 weeks   traveled

   'John said that Bill took a vacation <u>for one week</u> and Mary traveled <u>for two weeks</u>.'

(11) <u>Dooiu riyuu-de/naze</u> John-wa Bill-ga *e* kyuuka-o   tori, Mary-ga *e*

for what reason/why J.-Top   B.-Nom   vacation-Acc took, M.-Nom

taisyoku sita   to   itta no?

retirement- did that said Q?

'For what reason/Why did John say that Bill took a vacation and Mary retired?'

  a. … Bill-ga   <u>[ikuji-no tame-ni]</u> kyuuka-otori,   Mary-mo <u>[ikuji-no tame-ni]</u>

      B.-Nom for childcare   vacation-Acc take, M.-also   for childcare

      taisyoku sita...

      retirement-did

   'John said that Bill took a vacation <u>for childcare</u> and Mary retired <u>for childcare</u>, too.'

  b. … Bill-ga   <u>[ikuji-no tame-ni]</u> kyuuka-otori,   Mary-wa <u>[kaigo-notame-ni]</u>

      B.-Nom for childcare   vacation-Acc take, M.-Top   for nursing care

      taisyoku sita...

      retirement-did

   'John said that Bill took a vacation <u>for childcare</u> and Mary retired <u>for nursing care</u>.'

On the other hand, locative phrases and their *wh*-counterparts such as *dono machi-e/ni* 'to which city' in (12) when used with verbs of motion are examples of low adjuncts.   In this case too, both identity and non-identity readings are allowed as in (12):

(12) <u>Dono machi-e/ni</u> John-wa   Bill-ga   funin-si,   Mary-ga   ijuu-sita

  which city-to   John-Top Bill-Nom appointment-did, Mary-Nom emigration-did

  to   itta no?

  that said Q?

  'To which city did John say that Bill went for a new post and Mary emigrated?'

  a. … Bill-ga <u>New York</u>-ni funin-si,   Mary-mo <u>New York</u>-ni ijuu-sita …

    B.-Nom New York-to appointment-did, M.-also   New York-to emigration-did

   'John said that Bill went to <u>New York</u> for a new post and Mary emigrated to <u>New York</u>, too'

  b. … Bill-ga <u>New York</u>-ni funin-si,   Mary-wa <u>Pari</u>-ni   ijuu-sita …

    B.-Nom New York-to apointment-did, M.-Top   Paris-to   emigration-did

   'John said that Bill went to <u>New York</u> for a new post and Mary emigrated to <u>Paris</u>.'

The following examples in (13)-(16) further corroborate the argument/adjunct asymmetry with the ATB interpretation in Japanese.   Note that (13) and (14), and (15) and (16), respectively, are near-minimal pairs:

(13) <u>Dono ie-ni</u>   John-wa Bill-ga   *e* hon-o   okuri, Mary-ga   *e*

  which house-to J.-Top   B.-Nom   book-Acc   send,   M.-Nom

  tegami-o   yūsō shita   to   itta   no?

  letter-Acc   mailed   that said   Q

  'To which house did John say Bill sent a book, and Mary sent a letter?'

  a. … Bill-ga   <u>Smith-no ie-ni/e</u>   hon-o   okuri,

    B.Nom   the Smiths's house-to   book-Acc   send,

    Mary-mo   <u>Smith-no ie-ni/e</u>   tegami-o   yūsō shita…

    M.-also   the Smiths's house-to   letter-ACC   mailed

   'John said that Bill sent a book <u>to the Smiths' house</u> and Mary also sent a letter <u>to the Smiths' house</u>.'

  b. #… Bill-ga   <u>Smith-no ie-ni/e</u>   hon-o   okuri,

    B.Nom   the Smiths's house-to   book-Acc   send,

    Mary-wa   <u>Johnson-no ie-ni/e</u>   tegami-o   yūsō shita …

    M.-Top   the Smiths's house-to   letter-ACC mailed

   'John said that Bill sent a book <u>to the Smiths' house</u> and Mary also sent a letter <u>to the Johnsons' house</u>.'

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(14) <u>Dono kuni-ni</u>   John-wa   Bill-ga   kyūka-de   *e*   itte,

which country-to   J.-Top   B.-Nom   vacation-on   went,

Mary-ga   taishoku-go ni   *e*   ijuu-shita   to   itta   no?

M.-Nom   retirement-after   moved   that   said   Q

'To which country did John say Bill went on vacation and Mary moved after retirement?'

    a. … Bill-ga   kyuuka-de   <u>Italia-ni/e</u>   itte,   Mary-mo   taishoku-go ni   <u>Italia-ni/e</u>

        B.-nom   vacation-on   Italy-to   went,   M.-also   retirement-after   Italy-to

    ijuu-shita…

    moved

    'John said that Bill went <u>to Italy</u> on vacation and Mary moved <u>to Italy</u> after retiring.'

    b. … Bill-ga   kyuuka-de   <u>Italia-ni/e</u>   itte,   Mary-wa   taishoku-go ni   <u>Peru-ni/e</u>

        B.-nom   vacation-on   Italy-to   went,   M.-Top   retirement-after   Peru-to

    ijuu-shita…

    moved

    'John said that Bill went <u>to Italy</u> on vacation and Mary moved <u>to Peru</u> after retiring.'

(15) <u>Dono heya-ni</u>   John-wa   Bill-ga   *e*   hon-o   oki-wasure,

which room-in   J.-Top   B.-Nom   book-Acc   forget to put,

Mary-ga   *e*   pen-o   modoshi-wasureta   to   itta   no?

M.-Nom   pen-Acc   forget to return   that   said   Q

'In which room did John say Bill forgot to put a book, and Mary forgot to return a pen?'

    a. … Bill-ga   <u>toshoshitsu-ni</u>   hon-o   oki-wasure,   Mary-mo   <u>toshoshitsu-ni</u>

        B.Nom   library-in   book-Acc   forget-put,   M.-also   library-in

        pen-o   oki-wasureta…

        pen-Acc   forget-put

    'John said that Bill forgot to put a book <u>in the library</u> and Mary also forgot to put a pen <u>in the library</u>.'

    b. #… Bill-ga   <u>toshoshitsu-ni</u>   hon-o   oki-wasure,   Mary-wa   <u>rika-shitsu-ni</u>

        B.Nom   library-in   book-Acc   forget-put,   M.-Top   science room-in

        pen-o   oki-wasureta…

        pen-Acc   forget-put

    'John said that Bill forgot to put a book <u>in the library</u> and Mary also forgot to put a pen <u>in the science room</u>.'

(16) <u>Dono heya-de</u>   John-wa   Bill-ga   *e*   hon-o   yomi,

     which room-in   J.-Top   B.-Nom   book-Acc   read,

     Mary-wa   *e*   shōsetsu-o   kaita to itta no?

     M.-Top   novel-Acc   wrote that said Q

     'In which room did John say Bill read a book, and Mary wrote a novel?'

    a.   … Bill-ga   <u>toshoshitsu-de</u> hon-o   yomi, Mary-mo <u>toshoshitsu-de</u>

          B.Nom   library-in   book-Acc read, M.-also   library-in

          shōsetsu-o   kaita…

          novel -Acc   wrote

      'John said that Bill read a book <u>in the library</u> and Mary also wrote a novel <u>in the library</u>.'

    b.   … Bill-ga   <u>toshoshitsu-de</u> hon-o   yomi, Mary-wa <u>rika-shitsu-de</u>

          B.Nom   library-in   book-Acc read, M.-also   science room-in

          shōsetsu-o   kaita…

          novel -Acc   wrote

      'John said that Bill read a book <u>in the library</u> and Mary also wrote a novel <u>in the science room</u>.'

In (13) and (14), the *wh*-phrases are followed by the adposition *-ni* corresponding to the English preposition *to*, but in (13), the *wh*-phrase is used as an argument of the transitive verbs, while in (14), it is used as an adjunct of the intransitive verbs. In (15) and (16), the *wh*-phrases are followed by the adpositions *-ni/de* corresponding to the English preposition *in*, but in (15), the *wh*-phrase is used as an argument of the transitive verbs, while in (16), it is used as an adjunct of the intransitive verbs. In the *wh*-argument ATB questions (13) and (15), only identity readings like (13a) and (15a) are possible but non-identity readings are not. But in the *wh*-adjunct ATB questions (14) and (16), not only identity readings like (14a) and (16a) but also non-identity readings like (14b) and (16b) are possible. These facts also indicate that the argument/adjunct asymmetry with the ATB interpretation exists in Japanese.

    Given that the argument/adjunct asymmetry is observed in Japanese as well as English, without being affected by pragmatic factors, it is plausible to claim that the asymmetry is not an accidental property, but rather a significant property reflecting some core syntactic factors. What would be the factors behind it, then?

    Noticing that *which boy* in (1), *dono hon-o* 'which book' in (6), *dono ie-ni* 'to which house' in (13), and *dono heya-ni* 'in which room' in (15) that allow only the identity readings are θ-marked *wh*-elements, while *where* in (2), *how* in (3), *why* in (4), *dono machi-de* 'in which city'

in (7), *nan nen-ni* 'in what year' in (9), *dore kurai* 'how long' in (10), *dooiu riyuu-de* 'for what reason' and *naze* 'why' in (11), *dono machi-e/ni* 'to which city' in (12), *dono kuni-ni* 'to which country' in (14), and *dono heya-de* 'in which room' in (16) that allow both the identity and non-identity readings are non-θ-marked *wh*-elements, one might say that the key factor that determines the possible readings is whether *wh*-elements are θ-marked or not. If this generalization is on the right track, a non-identity reading should not be possible in an ATB *wh*-question of a θ-marked *wh*-element. But examples like (17) illustrate that this observation is not correct:

(17) (kinoo-no kenka-nituite) <u>Nan-to</u>   John-wa *e* sinziteite, Mary-wa *e* omoikondeiru no
    (yesterday-gen fight-about)what-that J.-top   believe,   M.-top   thinks   Q
    '(About a fight that happened yesterday) What is it that John believes and Mary thinks?'
    a. John-wa [Bill-ga   tataita to] sinziteite, Mary-mo [Bill-ga tataita to] omoikondeiru.
        J.-top   Bill-nom hit   that believe, M.-also   Bill-nom hit that thinks
        'John believes <u>that Bill hit</u> and Mary also thinks <u>that Bill hit</u>.'
    b. John-wa [Bill-ga   tataita to] sinziteite, Mary-wa [Tim-ga tataita to] omoikondeiru.
        J.-top   Bill-nom hit   that believe, M.-top   Tim-nom hit   that thinks
        'John believes <u>that Bill hit</u> and Mary thinks <u>that Tim hit</u>.'

(17) is an ATB *wh*-question of the θ-marked clausal *wh*-argument *nan-to* 'what-that.' Nevertheless, not only an identity reading (17a) but also a non-identity reading (17b) is allowed, contrary to the expectation. Hence, we cannot attribute the key factor determining the possible readings of ATB *wh*-questions only to a θ-marking.

    Notice here that *to* 'that'-clause and *nan-to* 'what-that' in (17) can never be Case-marked, as exemplified by the unacceptability of (18a,b):

(18) a. *Bill-ga   tataita **to-ga/o/ni** …
        Bill-Nom   hit   that-Nom/Acc/Dat
        '… that Bill hit'
    b. *nan-**to**-ga/o/ni
        what-that-Nom/Acc/Dat
        'what-that'

From what we have seen so far, *wh*-elements that allow only the identity readings like *which boy* in (1), *dono hon-o* 'which book' in (6), *dono ie-ni* 'to which house', and *dono heya-ni* 'in

which room' are Case-marked *wh*-elements, while those that allow both the identity and non-identity readings like *where* in (2), *how* in (3), *why* in (4), *dono machi-de* 'in which city' in (7), *nan nen-ni* 'in what year' in (9), *dore kurai* 'how long' in (10), *dooiu riyuu-de* 'for what reason' and *naze* 'why' in (11), *dono machi-e/ni* 'to which city' in (12), *dono kuni-ni* 'to which country' in (14), *dono heya-de* 'in which room' in (16), and *nan-to* 'what-that' in (17) are non-Case-marked *wh*-elements.   One might claim that the key factor that determines the possible readings is whether *wh*-elements are Case-marked or not.   If this generalization is on the right track, a non-identity reading should not be possible in an ATB *wh*-question of a Case-marked *wh*-element.   But ATB examples using Case-marked *wh*-adjunct *nani-o*, which means *why*, show that this observation is not correct either.   In (19a, b), the Case-marked *wh*-element *nani-o* has the same meaning as the *wh*-adjunct *naze* 'why' (Kurajufi 1996, 1997):[2]

(19) a. John-wa **nani-o**   sawai-dei-ru   no?
         John-Top **what-Acc** make-noise-prog-pres Q
         'Why is John making a noise?'
     b. John-wa **naze**   sawai-dei-ru   no?
         John-Top **why**   make-noise-prog-pres Q
         'Why is John making a noise?'

In the ATB *wh*-question (20), Case-marked *wh*-adjunct *nani-o* '*why*' is used.   Although *wh*-adjunct *nani-o* 'why' is Case-marked, it allows both the identity reading (20a) and the non-identity reading (20b):

(20) <u>Nani-o</u>   John-wa *e* sawagi, Mary-wa *e* yorokondeiru no?
     what-acc J.-top   fuss   M.-top   be.pleased   Q
     'Why is John fussing and Mary happy?'
     a. John-wa [inu-o kau node]   sawagi, Mary-mo [inu-o kau node] yorokondeiru.
         J.-top   dog-acc have because fuss,   M-also   dog-o have because be.pleased
         'John is fussing <u>because he has a dog</u> and Mary is also happy <u>because she has a dog</u>.'

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[2] Kurafuji (1997) argues that accusative *wh*-adjuncts have a structural Case.   Assuming this, one might wonder how *-o* (accusative Case) is assigned by the intransitive verb *sawagu* 'make a noise' to *nani* 'what' meaning *why*.   However, Nakao and Obata (2009) argue that accusative *wh*-adjuncts have an inherent Case, not a structural Case.   Here, we tentatively assume the latter approach to accusative *wh*-adjuncts, and will not discuss specific mechanisms for Case assignment in Japanese.

b. John-wa [inu-o   kau node]   sawagi, Mary-wa [dekakeru node]   yorokondeiru.

   J.-top   dog-acc buy because fuss,   M-top   come.out   because be.pleased

   'John is fussing <u>because he has a dog</u> and Mary is happy <u>because she goes out</u>.'

Therefore, we cannot attribute the key factor determining the possible readings of ATB *wh*-questions solely to Case-marking, either.

      What we have observed so far is summarized in Table 1:

Table 1.

Examples	*wh*-types	θ	Case	Identity	Non-identity
English (1)	*which boy*	+	+	✔	#
English (2)	*where*	-	-	✔	✔
English (3)	*how*	-	-	✔	✔
English (4)	*why*	-	-	✔	✔
Japanese (6)	*dono hon-o* 'which book'	+	+	✔	#
Japanese (7)	*dono mati-de* 'in which city'	-	-	✔	✔
Japanese (9)	*nan nen-ni* 'in what year'	-	-	✔	✔
Japanese (10)	*dore kurai* 'how long'	-	-	✔	✔
Japanese (11)	*dooiu riyuu-de 'for what reason'* *naze* 'why'	-	-	✔	✔
Japanese (12)	*dono machi-e/ni* 'to which city'	-	-	✔	✔
Japanese (13)	*dono ie-ni* 'to which house'	+	+	✔	#
Japanese (14)	*dono kuni-ni* 'to which country'	-	-	✔	✔
Japanese (15)	*dono heya-ni* 'in which room'	+	+	✔	#
Japanese (16)	*dono heya-de* 'in which room'	-	-	✔	✔
Japanese (17)	*nan-to* 'what-that'	+	-	✔	✔
Japanese (20)	*nani-o* 'what' meaning *why*	-	+	✔	✔

These facts suggest that both θ-marking and Case-marking, rather than either only θ-marking or Case-marking, play a key role in determining the possible readings of ATB *wh*-questions. We therefore propose the following descriptive generalization as an account for the facts summarized in Table 1:

(21) Descriptive Generalization about the ATB Interpretation

An ATB *wh*-question only allows an identity reading when the *wh*-element is both θ- and Case-marked.

This generalization correctly captures the fact that it is examples like (1, 6, 13, 15), but not others, that only allow the identity readings. It should be noted here that if we assumed either θ-marking or Case-marking alone to be the key factor determining the possible readings, we could not deal with examples like (17, 20) appropriately. Hence, we can conclude from the above observation that an ATB *wh*-question only allows an identity reading when the *wh*-element is θ- and Case-marked.[3]

The next question to ask is why a generalization like (21) holds. Before answering this, we would like to point out in the following sub-section that previous approaches to ATB *wh*-questions would have difficulty explaining the above empirical findings.

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[3] It is worth noting that there are other cases where Case-marking and the availability of an identity reading correlate with each other. See the control constructions in Russian in (i) (Landau 2013: 162-163).

(i) a. Exhaustive control
My   predpočli [PRO   sobrat'sja vse/??vsem   v šest'].
we.NOM   preferred   PRO.NOM to.gather   all.NOM/??DAT   at six
'We preferred to all gather at six.'
   b. Partial control
Predsedatel' predpočel [PRO   sobrat'sja vsem/*vse   v šest'].
Chair.NOM   preferred   PRO.DAT   to.gather   all.DAT/*NOM   at six
'The chair preferred to all gather at six.'

Landau (2008, 2013) claims that PRO has Case, which is invisible but revealed on agreeing predicative elements like floating quantifiers. (ia), where PRO is assigned Nominative Case, illustrates control by a plural subject. The dominant reading of (ia) is an exhaustive reading, though the embedded predicate *sobrat'sja* 'gather' is collective. In (ib), where PRO is assigned Dative Case, the singular subject partially controls PRO. In other words, Nominative PRO is required to have an identity reading with a controller whereas Dative PRO is required to have a non-identity reading with a controller. Assuming that obligatory control is implemented as a Agree relation between a matrix functional head and PRO, Landau argues that exhaustive control like (ia) forces Nominative transmission from a controller to PRO in terms of direct PRO control from a matrix functional head, whereas partial control like (ib) forces independent Dative Case assignment to PRO due to indirect PRO control mediated by the embedded C. See Landau (2008, 2013) for the details.

Section 2.2. Problems with previous approaches

There are several approaches to ATB *wh*-questions.   In the following, we take up only the major approaches and quicky go over how they derive the sentence (1) (for a nice summary of empirical arguments that motivate each analysis as well as potential problems they may have, see Hein and Murphy 2020, in particular).

The first approach is *parallel movement approach* (Ross 1967; Williams 1978; Blümel 2017), according to which (1) is derived as in (22) (henceforth, movement/IM is indicated by a solid line):
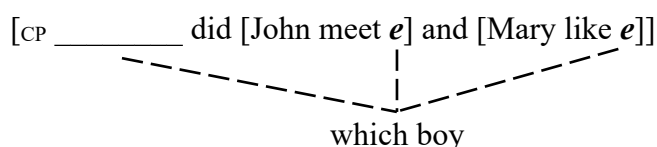
(22) *Parallel movement approach*

    [$_{CP}$ which boy did [John meet *e*] and [Mary like *e*]]
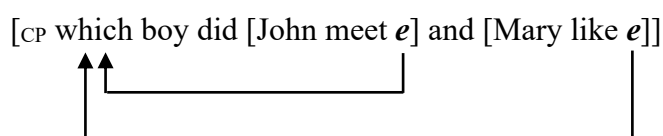
In (22), *which boy* undergoes *wh*-movement from both conjuncts in parallel, and each of the gaps are related to that *wh*-movement.

The second approach is *multidominance approach* (Citko 2005, 2011), according to which (1) is derived as in (23):

(23) *Multidominance approach*

    [$_{CP}$ _____ did [John meet *e*] and [Mary like *e*]]

                       which boy

In (23), *which boy* is simultaneously associated with its derived SPEC-CP position and the gaps in each conjunct by multidominance (as indicated with a long dashed line).   Although these two approaches differ in the derivational processes, they are the same in that the gaps in each conjunct are directly related to the *wh*-element in SPEC-CP in the first conjunct.   Hence, we call these approaches *symmetrical approaches*.

The third approach is *parasitic gap approach* (Munn 1999), according to which (1) is derived as in (24):

(24) *Parasitic gap approach*

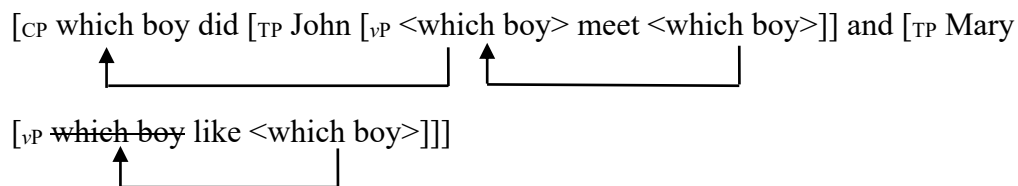   [$_{CP}$ which boy did [John meet *e*] and [*Op* Mary like *e*]]
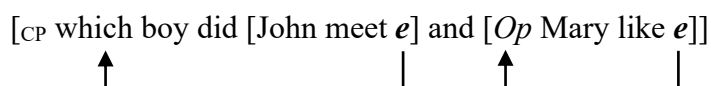
In (24), *which boy* undergoes *wh*-movement from the first conjunct, and in the second conjunct, null operator undergoes empty operator movement deriving a parasitic gap (Chomsky 1981). The fourth approach is *sideward movement approach* (Hornstein and Nunes 2002), according to which (1) is derived as in (25):

(25) *Sideward movement approach*

    [$_{CP}$ which boy did [John meet *e*] and [Mary like *e*]]
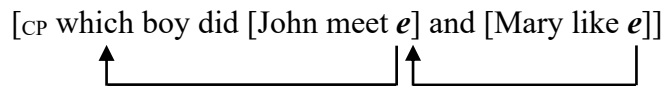
In (25), *which boy* first undergoes sideward movement from the object position of *like*, which is built in a workspace, to the object position of *meet*, which is also built in the workspace, and then undergoes *wh*-movement from the first conjunct.　　The fifth approach is *ellipsis approach*, according to which (1) is derived as in (26):

(26) *Ellipsis approach (I)*

    [$_{CP}$ which boy did [$_{TP}$ John [$_{vP}$ <which boy> meet <which boy>]] and [$_{TP}$ Mary

    [$_{vP}$ ~~which boy~~ like <which boy>]]]

In (26), *which boy* undergoes successive cyclic *wh*-movement in each conjunct.　　The copies of *which boy* in the *v*P-edge and the object position of *meet* of the first conjunct and the one in the object position of *like* in the second conjunct undergo PF deletion of non-top copies.　　The copy in the *v*P-edge of the second conjunct undergoes ellipsis (Salzmann 2012a, b).　　The sixth approach is also *ellipsis approach*, according to which (1) is derived as in (27):

(27) *Ellipsis approach (II)*

    [$_{CP}$ which boy did [John meet ~~which boy~~] and [Mary like *e*]]
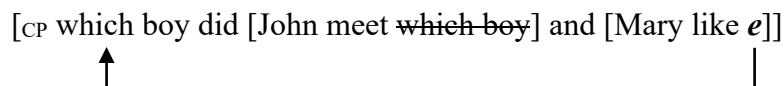
In (27), *which boy* undergoes *wh*-movement from the second conjunct, and the gap in the first conjunct is derived by ellipsis of *which boy* (Ha 2008, Salzmann 2012a, b).　　These four approaches also differ in the derivational processes, but they are the same in that only one of the gaps in either conjunct is directly related to the *wh*-element in SPEC-CP in the first conjunct. Hence, we call these approaches *asymmetrical approaches*.

What is important for our present purposes is that neither the symmetrical approaches nor the asymmetrical approaches can straightforwardly account for the above empirical findings of the availability of identity and non-identity readings (see Table 1 and (21)). Specifically, the problem with the symmetrical approaches is that it is not clear how to analyze the non-identity readings, since the gaps in each conjunct are related to the same single *wh*-element. Given that a denotation of the non-identity reading of (1b), for example, is like *for which x, x a person, John met x and for which y, y a person, Mary liked y*, the gap in each conjunct should be linked to a different *wh*-operator that occupies SPEC-CP in each conjunct, where it takes scope. Hence a challenge for the symmetrical approaches would be how to derive the non-identity readings. On the other hand, the problem with the asymmetrical approaches is that it is not clear how to analyze the identity readings, since only one of the gaps in either conjunct is related to the single *wh*-element. Given that a denotation of the identity reading of (1a), for example, is like *for which x, x a person, John met x and Mary liked x*, the gaps in each conjunct should be linked to the same *wh*-operator that occupies SPEC-CP in the first conjunct, where it takes scope. Therefore, a challenge for the asymmetrical approaches is how to derive the identity readings.

To overcome these problems, it would be, of course possible, to devise mechanisms. But in order to do so, it would first be necessary to verify whether such mechanisms are formulable. Particularly in the highly restricted minimalist framework of Chomsky (2021, 2023), in which an explanation of linguistic phenomena is considered to be "genuine explanation" only if it is achieved by relying solely on third-factor principles such as computational efficiency, it is claimed that parallel movement, sideward movement, multidominance, *etc*., are not formulable. According to Chomsky, since these "extensions of Merge" violate *Minimal Yield*, one of the conditions that the core syntactic structure-building operation *Merge* should satisfy, they are eliminated from the system as unformulable operations (see Goto and Ishii 2023 for relevant discussion). Moreover, even if they are formulable, it would also be necessary to answer the question of why they are available only for the ATB phenomenon, not others. Otherwise, any mechanism devised only for ATB will be regarded as an *ad hoc* stipulation. Whatever the possible solutions may be, given that there have been no previous studies, to the best of our knowledge, that characterize the possible readings of ATB *wh*-questions in terms of the properties such as θ-role and Case-feature, the facts we pointed out and the generalization we made will be a serious challenge to any approach to ATB *wh*-questions.

In the following, we explain the above empirical findings in terms of the most recent framework of Chomsky (2023), called *Box System*. In sub-section 3.1, we briefly review his box analysis of *wh*-movement. In sub-section 3.2, we propose that not only θ-marking but

also Case-marking contributes to boxing of a *wh*-element.　We show that the possible readings of ATB *wh*-questions follow as a natural consequence of the box system, along with an independently motivated ellipsis operation.

Section 3. Box Analysis of ATB

Section 3.1. Box System

Assuming that I-language is a system of thought, Chomsky (2021, 2023) argues that there are two categories of thought relevant to language structure and use, the θ-based propositional system and the discourse/information-related clausal system.　This property is called *Duality of Semantics*.　Given that the primary syntactic structure-building operation is Merge, Chomsky argues that *External Merge* (EM) provides θ-structures (*i.e.*, the propositional system) and *Internal Merge* (IM) is associated with discourse/information-related functions (*i.e.*, the clausal system).　Putting aside phase-internal raising like raising to the Spec of I and object raising, EM and IM correspond with A- and A'-systems.　Chomsky claims that there is evidence such as a ban on improper movement that the A- and A'-systems must be segregated not to interact with each other.

To implement segregation of A- and A'-systems, Chomsky (2023) proposes that IM creates an element that has no further interactions with the EM-structure:

(28) Segregation by IM

"IM creates an element that has no further interactions with the EM-generated structures that constitute the propositional domain or with operations that apply there."

(Chomsky 2023: 8)

According to Chomsky, such an element (that has no further interactions with the EM-structure) is created by applying IM to the phase edge and putting it in a "box."　It is assumed that the boxed element is separate from the ongoing derivation, immune to θ-marking, and inaccessible to Merge (although its terms are accessible to other operations such as Agree, Labeling, Anaphora at later phases):

(29) Boxing by IM

"we can think of the element E that is IM-ed to the phase edge as being put in a box, separate from the ongoing derivation D." (Chomsky 2023: 8)

In the box system, therefore, movement of a *wh*-element in the narrow syntax virtually terminates, once it is IM-ed to the "lowest phase" edge.   This makes a significant departure from the traditional approach to the overt *wh*-movement phenomenon in languages like English. Traditionally it has been assumed that *wh*-movement of a *wh*-element takes place phase-by-phase to the SPEC of C with a Q-feature (C_Q).   But in the box system, such a successive-cyclic *wh*-movement no longer exists.   This, in effect, means that in a *wh*-question, IM never fills SPEC-CP, an A'-position, with a *wh-syntactic object* (SO).   Instead, "instructions" for *wh*-scope interpretation at the Conceptual-Intentional (CI) interface and *wh*-spell-out under Externalization at the Sensory-Motor (SM) interface are provided by another operation other than IM.

In the box system, Chomsky suggests that instructions are provided by an operation called "access."   Thus, in a *wh*-question, C_Q accesses a boxed *wh*-element for instructions.   Given that instructions are, in fact, provided to the interfaces in the form of *features*, his suggestion implies that C_Q that initiates access obtains relevant *feature instructions* of the boxed element for interpretation at the interfaces.   For the interfaces to interpret a *wh*-question appropriately, C_Q would contain at least formal features like a Q-feature for Labeling, semantic features for *wh*-scope interpretation, and so on.

With these in mind, let us consider how a simple *wh*-question is derived in the box system, taking a concrete example in (30):

(30) What did you buy?

First, EM merges the verb *buy* and the *wh*-object *what*, deriving the VP structure in (31) (where a label is assigned to the structure just for exposition):

(31) {$_{VP}$ buy, what}

By the VP structure, a θ-role is assigned to *what*.   Then, EM merges the VP structure and the phase head *v**, deriving the *v**P structure in (32), where we ignore the object shift to SPEC-VP for <φ-φ> labeling suggested in Chomsky (2013, 2015); see Section 4 for relevant discussion:

(32) {$_{v*P}$ *v**, {$_{VP}$ buy, what}}

By the *v**P structure, a θ-role is assigned to the subject (Chomsky 2023: 9) (in what follows, we ignore the derivation of the subject, for ease of exposition).   Here, if IM merges *what* to

17

the v*P phase edge, *what* is put in a "box," separate from the ongoing derivation. As noted above, Duality of Semantics imposes segregation of EM and IM, and hence IM cannot interact with the theta-structure created by EM. So, in (33), *what*, IM-ed to the v*P phase edge, is put in a "box," not to interact with the EM-structure:

(33) {$_{v*P}$ [what], {$_{v*P}$ v*, {$_{VP}$ buy, what}}}

The boxed *what* does not undergo movement any further, since the boxed element is inaccessible to Merge. As the derivation proceeds, the phase head C_Q is introduced, as shown in (34):

(34) {$_{CP}$ C_Q … {$_{v*P}$ [what], {$_{v*P}$ v*, {$_{VP}$ buy, what}}}}

Here C_Q accesses the boxed *what* for instructions and get features relevant for interpretation at the interfaces (henceforth, access is indicated by a dotted line). In (35) below, the C_Q with relevant feature instructions of *what* is indicated by "what$_3$," where the subscript numerals are assigned just for expository purposes (henceforth, feature instructions are indicated in this way):

(35) {$_{CP}$ C_Q-"what$_3$" … {$_{v*P}$ [what$_2$], {$_{v*P}$ v*, {$_{VP}$ buy, what$_1$}}}}

With the C_Q getting feature instructions of "what$_3$" through access to the boxed *what*, *what* can take scope in the matrix SPEC-CP. It is important to remember that *what* can never appear in the matrix SPEC-CP in such a form of SO as IM generates. Again, since the boxed element is inaccessible to Merge, what exists around the C_Q in (35) is only the relevant features of *what*, not an SO of *what*.

To derive (30) from (35), under Externalization, while the phonological features of "what$_3$" are spelled-out at SPEC-CP, the two copies of *what*, *i.e.*, *what$_1$* at the object position of *buy* and *what$_2$* at the phase edge position of *v$*$*, must be deleted. For copy and deletion, Chomsky (2021, 2023) argues that "structurally identical" elements that are in a "c-command configuration" ("cc-configuration") are interpreted as identical copies at the CI interface, while the lower copies of identical elements are deleted at the SM interface by the universal economy-based rule under Externalization. Thus in (35), since *what$_{3\sim1}$* are in a cc-configuration,

what$_{3,2,1}$ are interpreted as identical copies at the CI interface, and the lower copies *what*$_{2\sim1}$ are deleted at the SM interface, as shown in (36) (henceforth, spell-out is indicated by boldface and deletion by strikethrough):

(36) {$_{CP}$ C$_Q$-"**what$_3$**" ... {$_{v*P}$ ~~what$_2$~~, {$_{v*P}$ v*, {$_{VP}$ **buy**, ~~what$_1$~~}}}}

In this way, the box system derives a *wh*-question without assuming successive cyclic *wh*-movement/IM.

Of course, there remain many unresolved issues in the box system (for example, under what conditions are boxing and access possible?   How can other *wh*-elements such as *wh*-subject be analyzed?   How should SPEC-INFL be accommodated?, *etc*.).   However, we find it to be worthwhile to pursue the box system further and explore its consequences, because the box theory not only presents a simple and elegant account for Duality of Semantics, one of "Language-Specific Conditions" that any theory of language has to satisfy, but also can solve empirical problems with Labeling, improper movement/copying, and so on, in a fundamental way (see Chomsky 2023 for details).

Thus, in this paper, we adopt the box theory.   Before we proceed to the analysis of the empirical facts, in the following sub-section, we will point out that boxing is closely related to θ-marking, or more generally, Θ-Theory, which essentially states that an argument cannot receive more than one θ-role.   We will then elaborate the box theory by examining the behavior of non-θ-marked *wh*-elements, which Chomsky (2023) does not deal with:

(37) Θ-Theory
    An argument cannot receive more than one θ-role.

Section 3.2. An Elaboration
In the box system, Chomsky (2023) proposes that Merge should follow the guiding principles that he calls "Principle [S]" and "Principle [T]":
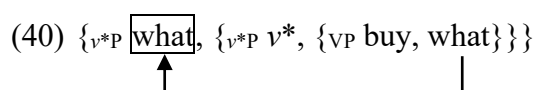
(38) Principle [S]
    "The computational structure of language should adhere as closely as possible to SMT."
    (Chomsky 2023: 3)

(39) Principle [T]

"All relations and structure-building operations (SBO) are thought-related, with semantic properties interpreted at CI." (Chomsky 2023: 5)

In effect, Principle [S] requires that Merge should be binary, and Principle [T] that Merge should be θ-related.   Regarding Principle [T], Chomsky (personal communication) says: "The phrase 'semantic property' can be understood to cover both receiving and assigning theta role, and also the secondary semantic properties of surface subject (and its VP counterpart)." Under Principles [S] and [T], therefore, EM selects X and Y from the workspace (WS) and/or the lexicon (LEX), and forms a θ-structure {X, Y}, where one member assigns a θ-role and the other member receives that θ-role.   IM selects one member, say X, in WS and a term Y of X, and then forms a binary structure {X, Y}, where the term Y must be θ-marked.

    With these in mind, let us return to the derivation of (33), where boxing by IM takes place. The relevant derivation is repeated in (40):

(40) {$_{v*\text{P}}$ $\boxed{\text{what}}$, {$_{v*\text{P}}$ v^*, {$_{\text{VP}}$ buy, what}}}

Here, *what*, a term of *v**P, undergoes IM to SPEC-*v**P, where it is put in a box.   Under a strict interpretation of Principle [T], *what* must be θ-marked before it is selected by IM.   As noted above, the object θ-role is assigned by the VP structure.   *What* is θ-marked by the verb *buy*, "eligible" for IM.   What is crucial to recall here is that the *v**P phase edge also counts as a θ-position for the external argument.   If *what* were not boxed in the *v**P phase edge, it would be susceptible to the θ-marking, unless barred by stipulation.   The resultant structure would violate Θ-Theory, since it would receive two θ-roles by the VP structure and the *v**P structure. Hence, for the θ-marked *what* not to violate θ-Theory, it must be immune to the θ-marking by being boxed by IM in the *v**P phase edge.

    This indicates that θ-marking of a *wh*-element is closely related to the necessity of its boxing.   Actually, in Chomsky's box analysis of *wh*-movement, since object argument *wh*-elements are θ-marked by the VP structure, they are obligatorily boxed in the *v**P phase edge, a θ-position, not to be assigned more than one θ-roles.   We call such *wh*-elements *wh*[+θ]-elements.   This consideration naturally leads us to expect that boxing is unnecessary for adjunct *wh*-elements, since they are not θ-marked.   We call such *wh*-elements *wh*[-θ]-elements.   We argue that the box theory has the following implication for boxing of a *wh*-element:

(41) Boxing of a *Wh*-element

　　When a *wh*-element is IM-ed to a phase edge, the *wh*-element is boxed if it is a *wh*[+θ]-element, whereas it is not boxed if it is an *wh*[-θ]-element.

Note that in the case of a *wh*[-θ]-element, even if it is not boxed in the *v**P phase edge, a θ-position, Θ-Theory would not be violated, since the element is never θ-marked.

　　Under the strict interpretation of Principle [T], one may wonder how *wh*[-θ]-elements like *wh*-adjuncts are accessible to Merge.　On this matter, Chomsky (personal communication) suggests: "Principle T is loose enough so that adjuncts could be included: taking modification to be within the broader category of extended theta roles, including predication."　Following Chomsky's suggestion, we include *wh*[-θ]-elements as elements eligible for Merge. Although he leaves open how boxing is related to *wh*[-θ]-elements, we claim in this paper that *wh*[-θ]-elements are eligible for Merge but not boxed, as stated in (41).

　　Even if Principle [T] is allowed to include *wh*[-θ]-elements, the above implication raises a question how *wh*[-θ]-elements are licensed.　It is relevant to recall here that a *wh*[+θ]-element is licensed through access from C_Q to a boxed *wh*-element.　If boxing is a necessary condition for access, this means that we cannot appeal to access to license unboxed *wh*[-θ]-elements. Therefore, we argue that an unboxed *wh*[-θ]-element is licensed by moving it to SPEC of C_Q by IM, as traditionally assumed in overt *wh*-movement:

(42) Licensing of a *Wh*-element[4]

　　A *wh*[+θ]-element is licensed through access from C_Q whereas a *wh*[-θ]-element is licensed through IM to the Spec of C_Q.

It follows that while a *wh*[+θ]-element ceases to be accessible to Merge once it is IM-ed to a phase edge, a *wh*[-θ]-element continues to be accessible to Merge.

　　In the next section, in terms of this elaborated theory of the box system, we attempt to provide a "genuine explanation" for the above empirical findings (Table 1 and (21)).

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[4] The approach is reminiscent of unselective binding of Tsai (1994).　According to this, *in-situ wh*-arguments can be licensed by unselective binding without moving to SPEC-CP, while *in-situ wh*-adjuncts do not have this option, and must move to SPEC-CP to be licensed.　Note that the applicability of unselective binding relies on the notion of *nominality*, *i.e.*, Case.

Section 3.3. Proposal and analysis

As just noted, θ-marking plays an important role in the box theory.　Based on the descriptive generalization on the interpretations of ATB *wh*-questions (21), we propose that not only θ-marking but also Case-marking should contribute to boxing of a *wh*[+θ]-element. Specifically, we propose (43):

(43) Obligatoriness/Optionality of Boxing of a *Wh*[+θ]-element

When a *wh*[+θ]-element is IM-ed to a phase edge, the *wh*[+θ]-element is boxed obligatorily if it is Case-marked, whereas it is boxed optionally if it is not Case-marked.

This proposal leaves intact Chomsky's box analysis of *wh*-movement, as the only *wh*-element he deals with is a Case-marked *wh*[+θ]-element.　This proposal also leaves intact non-boxing of a *wh*[-θ]-element, since a *wh*[-θ]-element is not boxed irrespectively of whether it is Case-marked or not.　There remains the important question of why [±Case] affects boxing of a *wh*[+θ]-element, to which we return in the final section and suggest a possible direction toward a solution.

Before turning to an analysis of ATB *wh*-questions, let us briefly discuss coordination.　As for coordination, we assume with Chomsky (2023) that what is combined is determined by the freely available operation *FormSet* (FS), which can form order-free multi-membered sets, and we do not commit ourselves to any specific formalization here (for relevant discussion on FS, see Chomsky 2021, 2023; Goto and Ishii 2022).　Given FS, an ATB *wh*-question can have (at least) two possible derivations, depending on what categories are coordinated.　Below we present an analysis under *v**P-coordination and CP-coordination, but our analysis holds under TP-coordination, too.

Now, let us first consider how our proposal can account for the reading facts of the ATB *wh*-questions in (1, 6, 13, 15) (repeated here as (44, 45, 46, 47) respectively) that allow only the identity readings:

(44) <u>Which boy</u> did John meet *e* and Mary like *e*?
  a.　John met <u>Bill</u> and Mary liked <u>Bill</u>.
  b. #John met <u>Bill</u> and Mary liked <u>Frank</u>.

(45) <u>Dono hon-o</u>　　John-wa　tosyokan-kara *e* kari,　Bill-wa syoten-de　*e* katta　no?
  which book-acc　J.-top　library-from　　borrow,　B.-top　bookstore-at　bought Q
  'Which book did John borrow from the library and Bill buy at the bookstore?'

a. John-wa … *The Great Gatsby*-o   kari,   Bill-mo … *The Great Gatsby*-o   katta.

   J.-top   *The Great Gatsby*-acc borrow, B.-also   *The Great Gatsby*-acc bought

   'John borrowed *The Great Gatsby* … and Bill bought it (=*The Great Gatsby*) …, too.'

b. #John-wa … *The Great Gatsby*-o   kari,   Bill-wa … *The Years*-o   katta.

   J.-top   *The Great Gatsby*-acc borrow, B.-top   *The Years*-acc bought

   'John borrowed *The Great Gatsby* … and Bill bought *The Years* ….'

(46) <u>Dono ie-ni</u>   John-wa Bill-ga *e* hon-o   okuri, Mary-ga   *e*

which house-to   J.-Top   B.-Nom   book-Acc   send,   M.-Nom

tegami-o   yūsō shita   to   itta   no?

letter-Acc   mailed   that   said   Q

'To which house did John say Bill sent a book, and Mary sent a letter?'

a. … Bill-ga   <u>Smith-no ie-ni/*e*</u>   hon-o   okuri,

   B.Nom   the Smiths's house-to   book-Acc   send,

   Mary-mo   <u>Smith-no ie-ni/*e*</u>   tegami-o   yūsō shita…

   M.-also   the Smiths's house-to   letter-ACC mailed

  'John said that Bill sent a book <u>to the Smiths' house</u> and Mary also sent a letter <u>to the Smiths' house</u>.'

b. #… Bill-ga   <u>Smith-no ie-ni/*e*</u>   hon-o   okuri,

   B.Nom   the Smiths's house-to   book-Acc   send,

   Mary-wa   <u>Johnson-no ie-ni/*e*</u>   tegami-o   yūsō shita …

   M.-Top   the Smiths's house-to   letter-ACC mailed

  'John said that Bill sent a book <u>to the Smiths' house</u> and Mary also sent a letter <u>to the Johnsons' house</u>.'

(47) <u>Dono heya-ni</u>   John-wa Bill-ga *e* hon-o   oki-wasure,

which room-in   J.-Top   B.-Nom   book-Acc   forget to put,

Mary-ga *e* pen-o   modoshi-wasureta to   itta   no?

M.-Nom   pen-Acc   forget to return   that   said   Q

'In which room did John say Bill forgot to put a book, and Mary forgot to return a pen?'

a. … Bill-ga   <u>toshoshitsu-ni</u> hon-o   oki-wasure, Mary-mo   <u>toshoshitsu-ni</u>

   B.Nom   library-in   book-Acc forget-put,   M.-also   library-in
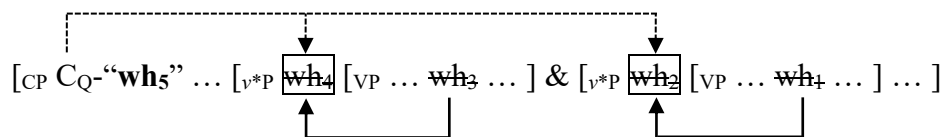
   pen-o   oki-wasureta…

   pen-Acc forget-put

> 'John said that Bill forgot to put a book <u>in the library</u> and Mary also forgot to put a pen <u>in the library</u>.'

    b. #… Bill-ga   <u>toshoshitsu-ni</u>   hon-o   oki-wasure, Mary-wa <u>rika-shitsu-ni</u>

        B.Nom   library-in   book-Acc forget-put, M.-Top   science room-in

        pen-o   oki-wasureta…

        pen-Acc forget-put

> 'John said that Bill forgot to put a book <u>in the library</u> and Mary also forgot to put a pen <u>in the science room</u>.'

According to (43), Case-marked *wh*[+θ]-elements, such as *which book* in (44), *dono hon-o* 'which book-acc' in (45), *dono ie-ni/e* 'to which house' in (46), and *dono heya-ni* 'in which room' in (47) are obligatorily boxed. The derivation under *v**P-coordination is schematically represented as follows:

(48) Derivation of an ATB *wh*[+θ, +Case]-question under *v**P-coordination

$$[_{CP} \; C_Q\text{-“}\mathbf{wh_5}\text{”} \ldots [_{v*P} \; \boxed{\cancel{wh_4}} \; [_{VP} \ldots \cancel{wh_3} \ldots] \; \& \; [_{v*P} \; \boxed{\cancel{wh_2}} \; [_{VP} \ldots \cancel{wh_1} \ldots] \ldots]$$

                                      (deriving the identity reading facts in (44, 45, 46, 47))

In (48), wh_1 and wh_3 are introduced by EM in each conjunct and assigned a θ-role by each VP structure. Since they are Case-marked *wh*[+θ]-elements, they are obligatorily boxed by IM to SPEC-*v**P of each conjunct, as indicated by wh_2 and wh_4. In *v**P-coordination, C_Q is introduced at the matrix position in the first conjunct and accesses the boxed wh_2 and wh_4 for instructions. The C_Q with relevant feature instructions is indicated by "wh$_5$." Given feature instructions of "wh$_5$," $wh_{5,4,3}$ and $wh_{5,2,1}$ are in a cc-configuration. Consequently, $wh_{5,4,3,2,1}$ are all interpreted as identical copies at the CI interface, and the lower copies $wh_{4\sim1}$ are deleted at the SM interface.

    Thus, the identity reading facts of the ATB *wh*-questions in (44, 45, 46, 47) follow from this derivation. Note that from the derivation (48), there is no way to derive an ATB *wh*-question with a non-identical reading.

    On the other hand, the derivation under CP-coordination is schematically represented as follows:

(49) Derivation of an ATB $wh[+\theta, +Case]$-question under CP-coordination

$$[_{CP} \, C_Q\text{-``}\mathbf{wh_6}\text{''} \, \ldots \, [_{v*P} \, \cancel{wh_5} \, [_{VP} \, \ldots \, \cancel{wh_4} \, \ldots ]]] \, \& \, [_{CP} \, C_Q\text{-``}\mathbf{wh_3}\text{''} \, \ldots \, [_{v*P} \, \cancel{wh_2} \, [_{VP} \, \ldots \, \cancel{wh_1} \, \ldots]]]$$

For the same reason as (48), wh_1 and wh_4 in (49) are obligatorily put in a box by IM to SPEC-$v*$P of each conjunct, as indicated by wh_2 and wh_5.   (49) differs from (48) in that CPs are coordinated in (49), and therefore C_Q is introduced at the matrix position in each conjunct. The C_Q in the second conjunct accesses the boxed wh_2, and the C_Q in the first conjunct accesses the boxed wh_5, getting features relevant for interpretation at the interfaces, respectively.   The C_Q in the second conjunct with relevant feature instructions is indicated by "wh_3," and the C_Q in the first conjunct with relevant feature instructions is indicated by "wh_6."   Given the feature instructions of "wh_6" and "wh_3," $wh_{6,5,4}$ and $wh_{3,2,1}$ are in a cc-configuration.   Consequently, $wh_{6,5,4}$ and $wh_{3,2,1}$ are each interpreted as identical copies at the CI interface, and their lower copies $wh_{5\sim4}$ and $wh_{2\sim1}$ are deleted at the SM interface.

What is crucial here is that since the chain of $wh_{6,5,4}$, *i.e.*, $<wh_6, wh_5, wh_4>$, and the chain of $wh_{3,2,1}$, *i.e.*, $<wh_3, wh_2, wh_1>$, are not in a cc-configuration, they are not interpreted as identical copies, nor can deletion be applied to "wh_6" and "wh_3."   Hence, in this case, "wh_6" and "wh_3" are spelled-out in the matrix SPEC-CP in each conjunct.   This derives non-ATB *wh*-questions with a non-identity reading like (50):

(50) **Which boy** did John meet and **which boy** did Mary like?

Hence, whether it be $v*$P-coordination or CP-coordination, there is no way to derive an ATB *wh*-question with a non-identical reading, when the Case-marked $wh[+\theta]$-elements are involved.

Let us next consider how our proposal can account for the reading facts of the ATB *wh*-questions in (2, 3, 4, 7, 9, 10, 11, 12, 14, 16, 20) (repeated here as (51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61) respectively) that allow both identity and non-identity readings:

(51) <u>Where</u> did Mary vacation *e* and Bill decide to live *e*?
    a. Mary vacationed <u>in Paris</u> and Bill (also) decided to live <u>in Paris</u>.
    b. Mary vacationed <u>in Paris</u> and Bill decided to live <u>in Toronto</u>. (Munn 1999: 421)

(52) <u>How</u> tired did Bill look *e* and Mary seem *e*?

    a. Bill looked <u>exhausted</u> and Mary also looked <u>exhausted</u>.

    b. Bill looked <u>exhausted</u> and Mary looked <u>OK</u>.

(53) <u>Why</u> did Bill leave *e* and Fred arrive *e*?

    a. Bill left <u>because John arrived</u> and Fred arrived <u>because he arrived</u>.

    b. Bill left <u>because Fred arrived</u> and Fred arrived <u>because he had a meeting</u>.

(54) <u>Dono mati-de</u> John-wa Bill-ga *e* kyuuka-o tori, Mary-ga taisyoku-go *e* sugosita to itta no?

which city-at J.-top B.-nom vacation-acc take, M.-nom retirement-after spent that said Q

'In which city did John say that Bill vacationed and Mary spent after retirement?'

    a. … Bill-ga <u>Pari-de</u> kyuuka-o   tori,   Mary-mo … <u>Pari-de</u> sugosita …

          B.-nom Paris-in vacation-acc take,   M.-also   Paris-in spent

      'John said that Bill vacationed <u>in Paris</u> and Mary spent <u>in Paris</u> after retirement, too.'

    b. … Bill-ga <u>Pari-de</u> kyuuka-o   tori,   Mary-ga … <u>Sooru-de</u> sugosita …

          B.-nom Paris-in vacation-acc take, M.-nom   Seoul-in   spent

      'John said that Bill vacationed <u>in Paris</u> and Mary spent <u>in Seoul</u> after retirement.'

(55) <u>Nan nen-ni</u>   John-wa   Bill-ga   *e* kyuuka-o   tori, Mary-ga   *e* taishoku sita

what year-in   John-Top   Bill-Nom   vacation-Acc took, Mary-Nom   retirement-did

to   itta   no

that said Q?

'In what year did John say that Bill took a vacation and Mary retired?'

    a. … Bill-ga <u>2023 nen-ni</u> kyuuka-o   tori, Mary-mo <u>2023 nen-ni</u> taishoku sita…

          B.-Nom 2023-in   vacation-Acc take, M.-also 2023-in   retirement-did

      'John said that Bill vacationed <u>in 2023</u> and Mary retired <u>in 2023</u>, too.'

    b. … Bill-ga <u>2023 nen-ni</u> kyuuka-o   tori, Mary-ga <u>2019 nen-ni</u> taishoku sita…

          B.-Nom 2023-in   vacation-Acc take, M.-also 2019-in   retirement-did

      'John said that Bill vacationed <u>in 2023</u> and Mary retired <u>in 2019</u>.'

(56) <u>Dore kurai</u> John-wa Bill-ga kyuuka-o   tori, Mary-ga ryokou-shita to   itta   no?

how long   J.-Top   B.-Nom vacation-Acc took, M.-Nom traveled   that said Q?

'How long did John say that Bill took a vacation and Mary traveled?'

    a. … Bill-ga <u>1 shuukan</u> kyuuka-o   tori, Mary-mo <u>1 shuukan</u> ryokou-shita…

          B.-Nom 1 week   vacation-Acc take, M.-also   1 week   traveled

'John said that Bill took a vacation <u>for one week</u> and Mary traveled <u>for one week</u>, too.'

    b. … Bill-ga <u>1 shuukan</u> kyuuka-o   tori, Mary-ga <u>2 shuukan</u> ryokou-shita…

        B.-Nom 1 week   vacation-Acc take, M.-Nom 2 weeks   traveled

        'John said that Bill took a vacation <u>for one week</u> and Mary traveled <u>for two weeks</u>.'

(57) <u>Dooiu riyuu-de/naze</u> John-wa Bill-ga *e* kyuuka-o   tori, Mary-ga *e*

     for what reason/why J.-Top   B.-Nom   vacation-Acc took, M.-Nom

     taisyoku sita   to   itta no?

     retirement- did that said Q?

     'For what reason/Why did John say that Bill took a vacation and Mary retired?'

    a. … Bill-ga   <u>[ikuji-no tame-ni]</u> kyuuka-otori,   Mary-mo <u>[ikuji-no tame-ni]</u>

        B.-Nom for childcare   vacation-Acc take, M.-also   for childcare

        taisyoku sita...

        retirement-did

        'John said that Bill took a vacation <u>for childcare</u> and Mary retired <u>for childcare</u>, too.'

    b. … Bill-ga   <u>[ikuji-no tame-ni]</u> kyuuka-otori,   Mary-wa <u>[kaigo-notame-ni]</u>

        B.-Nom for childcare   vacation-Acc take, M.-Top   for nursing care

        taisyoku sita...

        retirement-did

        'John said that Bill took a vacation <u>for childcare</u> and Mary retired <u>for nursing care</u>.'

(58) <u>Dono machi-e/ni</u> John-wa Bill-ga   funin-si,   Mary-ga   ijuu-sita

     which city-to   John-Top Bill-Nom appointment-did, Mary-Nom emigration-did

     to   itta no?

     that said Q?

     'To which city did John say that Bill went for a new post and Mary emigrated?'

    a. … Bill-ga <u>New York</u>-ni funin-si,   Mary-mo <u>New York</u>-ni ijuu-sita …

        B.-Nom New York-to appointment-did, M.-also New York-to emigration-did

      'John said that Bill went to <u>New York</u> for a new post and Mary emigrated to <u>New York</u>, too'

    b. … Bill-ga <u>New York</u>-ni funin-si,   Mary-wa <u>Pari</u>-ni   ijuu-sita …

        B.-Nom New York-to apointment-did, M.-Top   Paris-to emigration-did

      'John said that Bill went to <u>New York</u> for a new post and Mary emigrated to <u>Paris</u>.'

(59) <u>Dono kuni-ni</u>   John-wa   Bill-ga   kyūka-de   *e*   itte,

which country-to J.-Top   B.-Nom   vacation-on   went,

Mary-ga   taishoku-go ni   *e*   ijuu-shita to   itta no?

M.-Nom   retirement-after   moved   that   said Q

'To which country did John say Bill went on vacation and Mary moved after retirement?'

    a. … Bill-ga kyuuka-de <u>Italia-ni/e</u> itte,   Mary-mo taishoku-go ni   <u>Italia-ni/e</u>

            B.-nom vacation-on Italy-to   went, M.-also   retirement-after Italy-to

      ijuu-shita…

      moved

      'John said that Bill went <u>to Italy</u> on vacation and Mary moved <u>to Italy</u> after retiring.'

    b. … Bill-ga kyuuka-de <u>Italia-ni/e</u> itte,   Mary-wa taishoku-go ni   <u>Peru-ni/e</u>

            B.-nom vacation-on Italy-to   went, M.-Top   retirement-after Peru-to

      ijuu-shita…

      moved

      'John said that Bill went <u>to Italy</u> on vacation and Mary moved <u>to Peru</u> after retiring.'

(60) <u>Dono heya-de</u>   John-wa   Bill-ga   *e*   hon-o   yomi,

which room-in   J.-Top   B.-Nom   book-Acc   read,

Mary-wa   *e*   shōsetsu-o   kaita to   itta no?

M.-Top   novel-Acc   wrote that said Q

'In which room did John say Bill read a book, and Mary wrote a novel?'

    a. … Bill-ga   <u>toshoshitsu-de</u> hon-o   yomi, Mary-mo   <u>toshoshitsu-de</u>

            B.Nom   library-in   book-Acc   read, M.-also   library-in

            shōsetsu-o   kaita…

            novel -Acc   wrote

      'John said that Bill read a book <u>in the library</u> and Mary also wrote a novel <u>in the library</u>.'

    b. … Bill-ga   <u>toshoshitsu-de</u> hon-o   yomi, Mary-wa   <u>rika-shitsu-de</u>

            B.Nom   library-in   book-Acc   read, M.-also   science room-in

            shōsetsu-o   kaita…

            novel -Acc   wrote

      'John said that Bill read a book <u>in the library</u> and Mary also wrote a novel <u>in the science room</u>.'

(61) <u>Nani-o</u>   John-wa *e* sawagi, Mary-wa *e* yorokondeiru no?

what-acc J.-top   fuss   M.-top   be.pleased   Q

'Why is John fussing and Mary happy?'

   a. John-wa [inu-o kau node]   sawagi, Mary-mo [inu-o kau node] yorokondeiru.

      J.-top   dog-acc have because fuss,   M-also dog-o have because be.pleased

      'John is fussing <u>because he has a dog</u> and Mary is also happy <u>because she has a dog</u>.'

   b. John-wa [inu-o   kau node]   sawagi, Mary-wa [dekakeru node]   yorokondeiru.

      J.-top   dog-acc buy because fuss,   M-top   come.out because be.pleased

      'John is fussing <u>because he has a dog</u> and Mary is happy <u>because she goes out</u>.'

According to (43), *wh*[-θ]-elements, such as *where* in (51), *how* in (52), *why* in (53), *dono machi-de* 'in which city' in (54), *nan nen-ni* 'in what year' in (55), *dore kurai* 'how long' in (56), *dooiu riyuu-de* 'for what reason' and *naze* 'why' in (57), and *dono machi-e/ni* 'to which city' in (58), *dono kuni-ni/e* 'to which county' in (59), and *dono heya-de* 'in which room' in (60), and *nani-o* 'what-acc' in (61), are not boxed whether they are Case-marked or not. An ATB *wh*[-θ]-question has two possible derivations, depending on what categories are coordinated. The derivation under *v**P-coordination is schematically represented as follows:

(62) Derivation of an ATB *wh*[-θ]-question under *v**P-coordination

$[_{CP}$ **wh$_5$** $[_{CQ}$ $[_{v*P}$ ~~wh$_4$~~ $[_{VP}$ … ~~wh$_3$~~ … $]]$ & $[_{v*P}$ ~~wh$_2$~~ $[_{VP}$ … ~~wh$_1$~~ … $]]$ … $]$
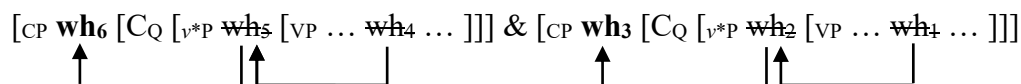
(deriving the identity reading facts in (51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61))

In (62), although *wh$_1$* and *wh$_3$* are not assigned any θ-role, they are introduced by EM in each conjunct for modification, which is within the broader category of extended theta roles (see personal communication with Chomsky above). Under the standard assumption that *wh*-movement takes place phase-by-phase (cf. the Phase-Impenetrability Condition, PIC), *wh$_1$* and *wh$_3$* are IM-ed to SPEC-*v**P of each conjunct, as indicated by *wh$_2$* and *wh$_4$*. In *v**P-coordination, C$_Q$ is introduced at the matrix position in the first conjunct, and its SPEC is filled with the Syntactic Object (SO) *wh$_5$* by IM of either *wh$_2$* or *wh$_4$*. Given the SO *wh$_5$*, *wh$_{5,4,3}$* and *wh$_{5,2,1}$* are in a cc-configuration. Consequently, *wh$_{5,4,3,2,1}$* are all interpreted as identical copies at the CI interface, and the lower copies *wh$_{4\sim1}$* are deleted at the SM interface.

    Thus, the identity reading facts of the ATB *wh*[-θ]-questions like (51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61) follow from this derivation. Note that from the derivation (62), there is no way to derive an ATB *wh*[-θ]-question with a non-identity reading.

On the other hand, the derivation of an ATB $wh[-\theta]$-question under CP-coordination is schematically represented as follows:

(63) Derivation of an ATB $wh[-\theta]$-question under CP-coordination

    $[_{CP}$ **wh$_6$** $[_{CQ}$ $[_{v*P}$ ~~wh$_5$~~ $[_{VP}$ … ~~wh$_4$~~ … $]]]$ & $[_{CP}$ **wh$_3$** $[_{CQ}$ $[_{v*P}$ ~~wh$_2$~~ $[_{VP}$ … ~~wh$_1$~~ … $]]]$

For the same reason as (62), wh_1 and wh_4 in (63) are not put in a box in each conjunct, as indicated by wh_2 and wh_5. Just like the difference between (48) and (49) we noted above, (63) differs from (62) in that CPs are coordinated in (63), and therefore, C_Q is introduced at the matrix position in each conjunct. The SPEC of C_Q in the second conjunct is filled with the SO wh_3, and the SPEC of C_Q in the first conjunct is filled with the SO wh_6. Given the SOs of wh_6 and wh_3, $wh_{6,5,4}$ and $wh_{3,2,1}$ are in a cc-configuration. Consequently, $wh_{6,5,4}$ and $wh_{3,2,1}$ are each interpreted as identical copies at the CI interface, and the lower copies $wh_{5\sim4}$ and $wh_{2\sim1}$ are deleted at the SM interface.

What is essential here is that, as in the case of (49), since the chain of $wh_{6,5,4}$, i.e., $<wh_6, wh_5, wh_4>$, and the chain of $wh_{3,2,1}$, i.e., $<wh_3, wh_2, wh_1>$, are not in a cc-configuration, they are not interpreted as identical copies, nor can deletion be applied to wh_6 and wh_3. Thus in this case, too, wh_6 and wh_3 are spelled-out in the matrix SPEC-CP in each conjunct. This derives non-ATB wh-questions with a non-identity reading like (64) (cf. (50)):

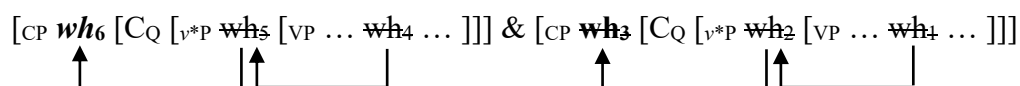(64) **Where** did Mary vacation and **where** did Bill decide to live?

Essentially following Salzmann (2012a, b), we argue that $where$ in the second conjunct (and more precisely, did, too) undergoes $ellipsis$ to derive the ATB wh-question from (64). But to make this analysis works, we need to ensure that ellipsis of a wh-element can only apply to (63), but, crucially, not to (49). Otherwise, the device that could be convenient to derive (63) would be allowed to apply to (49) as well, and then an ATB wh-question of a Case-marked $wh[+\theta]$-element that allows a non-identical reading would be derived, contrary to fact. Here, it is important to notice that the C_Q areas of the derivations in (49) and (63) are composed differently. While the C_Qs of (49) consist of $feature\ instructions$ obtained through access ("wh$_6$" and "wh$_3$"), those of (63) consist of $the\ SOs$ generated by IM (wh_6 and wh_3). This makes a significant difference with respect to the applicability of $ellipsis$. In the box system, it is assumed that the lower copies identical with the higher element composed of features can undergo deletion if they are in a cc-configuration (see the discussion around (36)). Although

such a cc-configuration condition is not imposed on ellipsis, ellipsis can only apply to *identical SOs* generated by Merge.   As illustrated by cases of sluicing, gapping, and VP ellipsis in (65a-c), the SOs generated by Merge in the second conjuncts, *i.e.*, *he ordered*, *ordered*, and *like spaghetti*, can be elided, although they are not in a cc-configuration with their identical counterparts marked by italics in the first conjunct:

(65) a. *He ordered* something, but I don't know what ~~he ordered~~. (sluicing)

   b. John *ordered* pizza, and Mary ~~ordered~~ spaghetti. (gapping)

   c. John may *like spaghetti*, and Mary may ~~like spaghetti~~, too. (VP ellipsis)

This consideration allows us to proceed the derivation (64) further as in (66):

(66) Derivation of an ATB *wh*[-θ]-question under CP-coordination with ellipsis

   $[_{CP}$ ***wh$_6$*** $[_{C_Q}$ $[_{v*P}$ ~~wh$_5$~~ $[_{VP}$ … ~~wh$_4$~~ … $]]]$ & $[_{CP}$ ***wh$_3$*** $[_{C_Q}$ $[_{v*P}$ ~~wh$_2$~~ $[_{VP}$ … ~~wh$_1$~~ … $]]]$

   (deriving the non-identity reading facts in (51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61))

In (66), since *wh$_3$* in the second conjunct and *wh$_6$* in the first conjunct are identical SOs, *wh$_3$* can undergo ellipsis, without being constrained by a cc-configuration.   Thus, given ellipsis that can elide SOs that are not in a cc-configuration, an ATB *wh*[-θ]-question with a non-identity reading can be derived by applying ellipsis to the identical SO in the second conjunct (as in *where did Mary vacation and ~~where~~ did Bill decide to live?*).[5]

   Let us finally consider how our proposal can account for the reading facts of the ATB *wh*-questions in (17) (repeated here as (67)) that allow both identity and non-identity readings:

(67) (kinoo-no kenka-nituite) <u>Nan-to</u>   John-wa *e* sinziteite, Mary-wa *e* omoikondeiru no

   (yesterday-gen fight-about)what-that J.-top   believe,   M.-top   thinks   Q

   '(About a fight that happened yesterday) What is it that John believes and Mary thinks?'

   a. John-wa <u>[Bill-ga   tataita to]</u> sinziteite, Mary-mo <u>[Bill-ga tataita to]</u> omoikondeiru.

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[5] One might wonder why feature instructions of "wh$_6$" and "wh$_3$" in (49) cannot be elided "after" externalization takes place, as in (66).   However, in the theory of derivational ellipsis (see Merchant 2001, Aelbrecht 2010, Goto 2013, Takahashi 2020, among others), which we will adopt, it is not possible that ellipsis applies "after" externalization because elliptic constituents are marked as such as early as in the syntactic component.   In passing, in the correct surface form of *where did Mary vacation and ~~where did~~ Bill decide to live?*, the auxiliary element *did* must also be elided, to which we return below.

J.-top   Bill-nom hit   that believe,   M.-also   Bill-nom hit that thinks

'John believes <u>that Bill hit</u> and Mary also thinks <u>that Bill hit</u>.'

    b. John-wa [Bill-ga   tataita to] sinziteite, Mary-wa [Tim-ga tataita to] omoikondeiru.

        J.-top   Bill-nom hit   that believe, M.-top Tim-nom hit that thinks

        'John believes <u>that Bill hit </u>and Mary thinks that Tim hit.'

According to (43), non-Case-marked *wh*[+θ]-elements like *nan-to* 'what-that' in (67) may or may not be boxed.   When *nan-to* 'what-that' is boxed, its derivation proceeds in the same way as the derivation (48, 49) of an ATB Cased-marked *wh*[+θ]-question.   On the other hand, when *nan-to* 'what-that' is not boxed, its derivations proceed just like those of an ATB *wh*[-θ]-question as shown in (62, 63).   While its identity reading fact follows from derivations (48, 62), its non-identity reading fact from derivation (66).

    In this way, the above empirical findings (Table 1 and (21)) are explained as a natural consequence of the box system, along with the independently motivated ellipsis operation.

    Here, one might say that, as shown in (66), if it is allowed to delete a *wh*-element that is not in a cc-configuration with its identical counterpart in the antecedent clause, then an example like (68B) should be acceptable:

(68) A. *Dare ga*   Taiwan e   itta-ka   shitte imasu-ka.

        who-Nom   Taiwan-to   went-Q know-Prog-Q

        'Do you know who went to Taiwan?'

    B. Iie. Demo, *(dare ga)   Oranda e   itta-ka   nara, wakarimasu.

        No. But   who-Nom   Netherlands-to went-Q if   know

        'No. But, if it's about who went to the Netherlands, I understand.' (Saito 2014: 9)[6]

In (68B), the interrogative *wh*-phrase *dare-ga* 'who-NOM', which is not in a cc-configuration with its identical counterpart in the antecedent clause in (68A), is deleted.   If a *wh*-element can be deleted without cc-configuration, then (68B) should be acceptable, contrary to fact.   So, one may say that deleting the interrogative *wh*-phrase is not allowed in general, and the unacceptability of (68B) is a counterexample to our deletion analysis of ATB questions in (66). However, we point out that the generalization that a *wh*-phrase cannot be deleted is too strong. As in (68B.'), deletion of a *wh*-phrase is allowed if the Q-particle *-ka* is also deleted:

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[6] See also Sakamoto (2019) for relevant discussion.

(68) B.' Iie. Demo, Oranda e   nara, wakarimasu.

　　　 No. But   Netherlands-to if,   know

　　　 (Lit.) No. But, if it's to the Netherlands, I understand.'

So, we argue that it is in principle be possible to delete the interrogative *wh*-phrase, and claim that if we apply deletion to the interrogative *wh*-phrase that is not in a cc-configuration with its identical counterpart in the antecedent clause, both the interrogative *wh*-phrase and the C_Q-head must be deleted, as shown in (68B.').　　This also explains why the auxiliary *did* of the second conjunct in ATB *wh*-questions like (51), which is in C_Q-head, must delete along with the *wh*-phrase:

(69) Where did Mary vacation and ~~where did~~ Bill decide to live? (= (51))

　　　So far, we have only considered the cases in which the *wh*-phrase in an ATB question is singular and only the identity reading is allowed (see (44, 45, 46, 47)).　　What about when the *wh*-phrase in an ATB question is plural?　　As in (70), when the *wh*-phrase in an ATB question is plural, both identity and non-identity readings are allowed even when the *wh*-phrase is an argument:[7]

(70) <u>Which books</u> did you read *e* and he not read *e*?

We suggest that examples like (70) are not ATB *wh*-questions but apparent ATB *wh*-questions which are derived from distributed coordination constructions like (71) by putting the two singular *wh*-phrases into one plural *wh*-phrase (see Bošković 2022: 1):

(71) Which book$_i$ and which magazine$_j$ did [John buy t_i] and [Bill read t_j] respectively?

　　　Apparent ATB *wh*-questions are also observed in Japanese.　　(72) is an example of distributed coordination constructions pointed out in Boskovic (to appear, his (64)):

(72) Niku-to   sake-o   sorezore   Taroo-ga   tabe-te   Hanako-ga   nonda.

　　　 meat-and sake-Acc respectively Taro-Nom eat-and   Hanako-Nom drank

---

[7] We owe this observation to Daniel Seely (personal communication).

'Meat and sake, Taro ate and Hanako drank respectively.'

(73) shows that distributed coordination constructions are also possible with *wh*-phrases:

(73) Dono okasi-to   dono nomimono-o   sorezore   Taroo-ga   tabe-te
     which sweets-and   which drink-Acc   respectively Taro-Nom   eat-and
     Hanako-ga   nonda   no?
     Hanako-Nom   drank   Q
     'Which sweets and which drink did Taro eat and Hanako have, respectively?'

Given the context in italics, (74) looks like an *wh*-argument ATB question with a non-identity reading:

(74) (*Context: Every day, a teacher and a counselor each have a meeting about grades with*
     one boy student and one girl student, respectively.)
     Kinoo-wa   <u>dare-to</u>   (sorezore)   sensei-wa   kare-zisin-no   seiseki   nituite
     yesterday-Top   who-with   (respectively)   teacher-Top   himself-Gen   grades   about
     mendan site,   kaunseraa-wa   kanozyo-zisin-no   seiseki nitsuite   mendan-sita   no?
     interviewed,   counselor-Top   herself-Gen   grades about   interviewed   Q
     'Yesterday, with whom (respectively) did the teacher have a meeting about his own grades
     and the counselor about her own grades?'

Notice that in (74), *kare-zisin* 'himself' and *kanozyo-zisin* 'herself', which are clause-bound reflexives, are each bound by its antecedent within the conjunct.   We suggest that (74) is not an ATB *wh*-question but an apparent ATB *wh*-question which is derived from distributed coordination constructions like (75) by putting the two singular *wh*-phrases into one plural *wh*-phrase:

(75) Kinoo-wa   dono dansi seito-to   dono josi seito-to   (sorezore)
     yesterday-Top   which boy student-and   which girl student-with   (respectively)
     sensei-wa   kare-zisin-no   seiseki nituite   mendan-site,
     teacher-Top   himself-Gen   grades about   interviewed,
     kaunseraa-wa   kanozyo-zisin-no   seiseki nitsuite   mendan-sita   no?
     counselor-Top   herself-Gen   grades about   interviewed   Q

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'Yesterday, with which boy student and which girl student (respectively) did the teacher have a meeting about his own grades and the counselor about her own grades?'

(76) shows that the non-identity reading seems to be difficult to obtain when *dono seito* "which student" is used: at least there is a contrast with *dare-to* "who-with" in (74):

(76) ??Kinoo-wa   <u>dono seito</u>-to   (sorezore)   sensei-wa   kare-zisin-no
       yesterday-Top which student-with (respectively) teacher-Top himself-Gen
       seiseki nituite   mendan-site,   kaunseraa-wa kanozyo-zisin-no   seiseki nituite
       grades about   interviewed,   counselor-Top herself-Gen   grades about
       mendan-sita no?
       interviewed   Q
       'Yesterday, with which student (respectively) did the teacher have a meeting about his own grades and the counselor about her own grades?'

This indicates that ATB *wh*-questions with *dono~* "which~" cannot be derived from distributed coordination constructions, but rather, they are pure ATB *wh*-questions. We leave detailed discussions of this issue for further research.[8]

Section 3.4. An implication for improper movement

Our proposal (43) provides a new approach to the fact that long-distance scrambling to a sentence-medial position is prohibited in Japanese (Saito 1985); consider (77b):

(77) a. John-ga   minna-ni [CP Mary-ga   sono hon-o   mottei-ru to] it-ta.
       John-nom all-to   Mary-nom   that book-acc have-pres that say-past

---

[8] Daniel Seely (personal communication) points out that when the *wh*-phrase in an ATB question is singular as in (i), both identity and non-identity readings are allowed even when the *wh*-phrase is an argument (although a non-identity reading seems to be harder to get):

(i) Who do you like *e*, but he hates *e*?

Here it is important to notice that the form of *who* is singular, but in terms of meaning, it can have both singular and plural meanings. Given the above argument that an ATB *wh*-question of a *wh*-phrase with a plural meaning is not a pure ATB *wh*-question, (i) might also be analyzed as an apparent ATB *wh*-question which is derived from a distributed coordination construction by putting two singular *who* into one *who* with a plural meaning. We leave the details for future work and consider only pure ATB questions in this paper, using D-linked which-type wh clauses, which are less likely to produce an A reading.
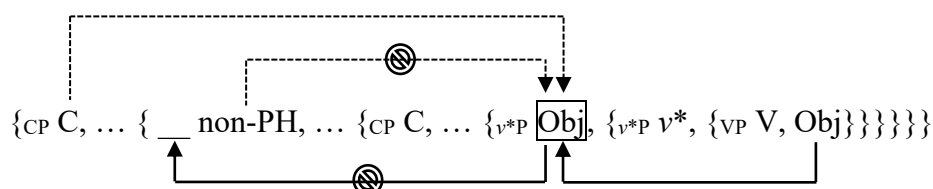
'John said to all [that Mary has that book].'

b. ??John-ga **sono hon-o$_i$** minna-ni [$_{CP}$ Mary-ga t_i mottei-ru to] it-ta.

John-nom that book-acc all-to Mary-nom have-pres that say-past

'(Lit.) John, that book, said to all [that Mary has t_i].'

(77b) is derived from (77a) via long-distance scrambling of the embedded object *sono hon-o* 'that book' to a sentence-medial position, and the sentence is marginal. Saito (1985) observes that the sentence-medial position in question is an A-position, arguing that the marginality is due to *improper movement* that bans A'-movement followed by A-movement (*A→A'→A). Under the improper movement approach, the marginality of (77b) is accounted for as follows: *sono hon-o* 'that book-acc' first moves from the object position of *motteiru* 'have', *i.e.*, an A-position to the Spec of C in the embedded clause, *i.e.*, an A'-position, and then to an A-position in the matrix clause, and hence the sentence is ruled out.

We can develop a new analysis of (77b) in the box system. According to our proposal (43), since Case-marked [+θ]-elements such as *sono hon-o* 'that book-acc' are obligatorily boxed, it can no longer undergo IM. The relevant part of the derivation of (77b) is given in (78) (where Obj = *sono hon-o* 'that book-acc'; V = *motteiru* 'have'):

(78) Box analysis of (77b) (order irrelevant)

$$\{_{CP} \text{ C}, \ldots \{ \underline{\quad} \text{ non-PH}, \ldots \{_{CP} \text{ C}, \ldots \{_{v*P} \boxed{\text{Obj}}, \{_{v*P} v^*, \{_{VP} \text{ V, Obj}\}\}\}\}\}\}$$

Here *sono hon-o* 'that book-acc' (the Case-marked Obj[+θ]) is boxed by IM to the embedded SPEC-v^*P. Since the boxed element is inaccessible to Merge, Obj cannot undergo IM to the relevant A-position in the matrix clause, which is provided by a non-phase head (non-PH). Note that the boxed Obj cannot be externalized in an A-position by access from a non-PH. In the box system, it is only a phase head that provides an A'-position that can access to a boxed element for instructions (see Section 3.1). So in the box system, there is no way to derive (77b); neither IM nor access can apply to the boxed Obj to derive the sentence. Therefore (77b) can be excluded without recourse to the notion of improper movement. Note in passing that in (79) below, the embedded object *sono hon-o* 'that book-acc' undergoes long-distance scrambling to the initial position of the sentence, and the sentence is acceptable. This can be

accommodated, given that the phase head C in the matrix clause can access the boxed Obj for externalization, as depicted in (78):

(79) ***Sono hon-o*_i** John-ga   minna-ni [_{CP} Mary-ga   *t*_i   mottei-ru to] it-ta.

that book-acc John-nom all-to   Mary-nom   have-pres that say-past

'(Lit.) That book_i, John said to all [that Mary has *t*_i].'

What should be noted here is that our box analysis of (77b) can lead to a prediction that is not available in the analysis based on the notion of improper movement.   According to (43), since non-Case-marked [+θ]-elements like *to* 'that'-clause may or may not be boxed, it should be predicted that long-distance scrambling of *to* 'that'-clause to a sentence medial position is possible under the option of unboxing.   Remarkably, this prediction seems to be borne out; consider (80b):

(80) a. John-ga   minna-ni [_{CP} Mary-ga   [kare-ga   muzai   da to]

John-nom   all-to   Mary-nom   he-nom   innocent is that

omoikondei-ru   to]   say-past

believe-pres   that it-ta.

'John said to all [that Mary believes [that he is innocent]].'

b. John-ga   **[kare-ga   muzai   da   to]** minna-ni [_{CP} Mary-ga   *t*_i

John-nom   he-nom   innocent is   that all-to   Mary-nom

omoikondei-ru   to]   say-past

believe-pres   that it-ta.

'(Liy.) John, [that he is innocent], said to all [that Mary believes *t*_i].'

(80b) is derived from (80a) via long-distance scrambling of the *to* 'that'-clause to a sentence-medial position.   In our judgement, there is a contrast between (77b) and (80b); (80b) is more acceptable than (77b).   This fact is surprising under the improper movement analysis, according to which, (80b) should be marginal, on a par with (77b), contrary to fact.   Under our box analysis, however, it is not surprising anymore.   The acceptability of (80b) can be accounted for as follows: since the *to* 'that'-clause *[kare-ga muzai da to]* 'that he is innocent' may not be boxed, it can undergo IM.   The relevant part of the derivation of (80b) is given in (81) (where CP = *kare-ga muzai da to* ' that he is innocent'; V = *omoikondei-ru* 'believe-pres'):

(81) Box analysis of (80b) (order irrelevant)

$\{_{CP}$ C, … $\{$ ___ non-PH, … $\{_{CP}$ C, … $\{_{v*P}$ CP, $\{_{v*P}$ $v*$, $\{_{VP}$ V, CP$\}\}\}\}\}\}$
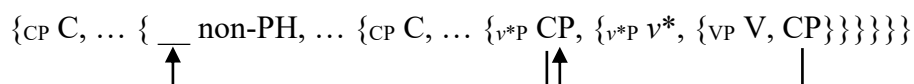
Here *kare-ga muzai da to* ' that he is innocent' (the non-Case-marked CP[+θ]) is not boxed by IM to the embedded SPEC-*v**P.   Since the unboxed element is accessible to Merge, CP can undergo IM to the relevant A-position in the matrix clause.   If CP undergoes further IM to the matrix SPEC-CP via the matrix SPEC-*v**P under the Phase-Impenetrability Condition (PIC) that requires that IM must apply phase-by-phase, then the acceptable sentence in (82) is derived:

(82) **[kare-ga muzai da to]** John-ga t_i minna-ni $[_{CP}$ Mary-ga t_i

he-nom   innocent is   that John-nom   all-to   Mary-nom

omoikondei-ru   to]   say-past

believe-pres   that   it-ta.

'(Liy.) [that he is innocent]$_i$, John said to all [that Mary believes t_i].'

The important thing is that although the contrast between (77b) and (80b) cannot be accounted for under the improper movement analysis, it can be accounted for under the box system that incorporates the proposal (43).   Thus, the contrast provides evidence for the proposal (43).

Section 4. Concluding Remarks

In this paper we have examined the English and Japanese ATB *wh*-questions in detail.   On the basis of novel data from Japanese, we have proposed that *wh*-elements, which are θ- and Case-marked, allow only an identity reading.   Pointing out that the major approaches to ATB *wh*-questions would have difficulty explaining our empirical findings, we have provided a "genuine explanation" for them in terms of the box system in Chomsky (2023).   Elaborating Chomsky's box system, we have argued that a *wh*[+θ]-element is boxed by IM to a phase edge and licensed through access by C$_Q$, while a *wh*[-θ]-element is not boxed and licensed through IM to the Spec of C$_Q$.   We have proposed that not only θ-marking but also Case-marking contributes to boxing of a *wh*-element.   More specifically, we have claimed that boxing is obligatory for Case-marked *wh*[+θ]-elements, but optional for non-Case-marked *wh*[+θ]-elements.   Under this proposal, we have argued that the reading facts of the ATB *wh*-questions are explained as a natural consequence of the box system, along with the independently motivated ellipsis operation, which can apply to identical SOs, without being

constrained by a cc-configuration.   We have also shown that Case-marked [+θ]-elements and non-Case-marked [+θ]-elements behave differently with respect to the possibility of long-distance scrambling to a sentence medial position, suggesting that the contrast, which cannot be accounted for under the improper movement analysis, lends further support for our proposal.

Before concluding this paper, we would like to go back to the remaining question: why [±Case] affects boxing of wh[+θ].   A scenario we are currently envisioning as a possible solution to this problem is the following.   Chomsky (2023: 8, fn. 17) argues that SPEC-VP, not SPEC-v*P, can be a θ-position for the external argument (cf. (32)).   It then follows that a wh[+θ]-element must be boxed in SPEC-VP.   If it were not boxed there, Θ-Theory would be violated, since the wh-element would receive two θ-roles, *i.e.*, one assigned by V at the object position and the other assigned by the V + Complement structure at SPEC-VP.   A question remains, however, as to why a boxed element does not raise a labeling problem.   Chomsky (personal communication) suggests that this question might be resolved by assuming that "a boxed element is inaccessible to labeling."   However, this is clearly an *ad hoc* stipulation. Suppose instead that a boxed element is accessible to labeling.   Then, when a wh[+θ]-element is boxed by IM in SPEC-VP, <φ, φ> labeling takes place because SPEC-VP is a position for <φ, φ> labeling (see Chomsky 2013, 2015); there is no labeling problem without stipulating that "a boxed element is inaccessible to labeling."   Suppose that Case is related to φ-agreement, or more relevantly, <φ, φ> labeling, that takes place at SPEC-VP.   If a Case-marked boxed element, which is responsible for <φ, φ> labeling, underwent further IM from SPEC-VP, then it would "de-label" <φ, φ>, resulting in a violation of Labeling Theory.   It then follows that a Case-marked wh[+θ]-element must stay at SPEC-VP by being put in a box by IM, so as not to undergo further IM, as required by the box system.   When a non-Case-marked wh[+θ]-element, which has nothing to do with <φ, φ> labeling, undergoes IM to SPEC-VP, it may not be boxed, thereby being subject to further IM.

Under this scenario, what would happen in the case of non-Case-marked [+θ]-elements, which may or may not be boxed?   We suggest that when boxing takes place, it is boxed by IM in SPEC-VP, a θ-position, being inaccessible to further Merge, but when boxing does not take place, it is IM-ed to SPEC-v*P, a non-θ-position under the current scenario, being accessible to further IM.   Given that VP is a phase here, one might wonder how IM under consideration can observe the Phase-Impenetrability Condition (PIC) that requires that IM must apply phase-by-phase.   In this case, we assume that the relevant phase is not VP, but v*P.   This assumption is plausible, given that phasehood of the v*-V area originates in v*, and its inheritance to V is coupled with φ-feature-inheritance (see Chomsky 2015).   If Case is related to φ-agreement, and phasehood-inheritance is linked with φ-feature-inheritance, then

it follows that when a non-Case-marked [+θ]-element is involved, neither φ-feature-inheritance nor phasehood-inheritance is unnecessary, so therefore, phasehood stays in $v*$.   Thus, even if a non-Case-marked [+θ]-element undergoes IM to SPEC-$v*$P without stopping by SPEC-VP, no PIC violation occurs.

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