Even-NPIs in Dharamsala Tibetan

Michael Yoshitaka ERLEWINE and Hadas KOTEK
mitcho@nus.edu.sg, hadas.kotek@mcgill.ca
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In this paper we investigate two series of Negative Polarity Items (NPIs) in Dharamsala Tibetan: one series uses the numeral 'one' with an EVEN particle, with an optional nominal domain. The other series combines a *wh*-word with the same EVEN particle, and may appear with or without the numeral 'one.' We discuss the relation of these NPIs to indefinite expressions in Dharamsala Tibetan, and document their syntactic licensing conditions. We show that NPIs are licensed in the scope of a clause-mate negation and in questions, but not in other downward-entailing environments.

We then present a compositional semantics for these two types of NPIs which explains their negative-polarity dependency, based on Lahiri's (1998) analysis of similar constructions in Hindi. Our analysis for *wh*-EVEN NPIs takes advantage of the Hamblin (1973) denotation of *wh*-words as sets of alternatives and the fact that EVEN introduces two presuppositions—an additive one and a scalar one. Allowing the additive component of EVEN to scope independently of the scalar part, the additive part of EVEN is used to generate an indefinite out of the *wh*-word. The scalar component will be used to ensure that EVEN-NPIs can only be used in downward entailing contexts.

1.   Introduction

This paper studies a dialect of the Tibetan language spoken in Dharamsala, India, which we will refer to as *Dharamsala Tibetan* (DT). Dharamsala is the home of the Tibetan government in exile and the largest Tibetan diaspora community in the world. DT is similar but distinct from the better-studied Lhasa dialect. Unless otherwise cited, the data discussed in this paper comes from our own elicitations with ANONYMIZED, who grew up in Dharamsala. A practical orthography is used here.

In the first half of the paper, we describe two series of Negative Polarity Items (NPIs) in DT: one series uses the numeral 'one' with an EVEN particle, with an optional nominal domain. An example of this type of NPI is shown in (1):

(1)   **ONE-EVEN NPIs:**
        (Lopchuk) *chi-ye*   lep-**ma**-song.
        student   one-EVEN arrive-NEG-PRFV
        'No {student/one} arrived.'

The other series combines a *wh*-word with the same EVEN particle, and may appear with or without the numeral 'one.' This is exemplified in (2).

(2)   ***Who*-EVEN NPI = *anyone*, with and without 'one':**
        Su-(chi)-ye   lep-**ma**-song.
        who-(one)-EVEN arrive-NEG-PRFV
        'No one arrived.'

We describe the licensing conditions of these NPIs. They must appear in a subset of the downward entailing contexts that English *any* NPIs may appear in—with a clause-mate negation or in a question.

In the second half of the paper, we develop a compositional analysis of these EVEN-NPIs. We follow the work of Lee & Horn (1994) and Lahiri (1998) in analyzing an NPI as a scalar EVEN particle associating with an indefinite or numeral 'one.' Our analysis for the *wh*-EVEN NPI series is, to our knowledge, the first compositional analysis of these NPIs. The analysis assumes that the two presuppositional meaning components of EVEN—the additive and scalar parts—can scope independently of one another at LF. The additive component is first used to generate an indefinite from the *wh*-word ranging over its Hamblin alternatives. The scalar component then ensures that EVEN-NPIs can only be used in downward entailing contexts. The scope-taking of these components is clause-bound, explaining the clause-mate condition on negation.

2.   Dharamsala Tibetan

We begin with a brief overview of the main features of *Dharamsala Tibetan* (DT) that will be relevant for our discussion, including basic clause structure, negation, and question formation.

Like other varieties of Tibetan, DT is a head-final language with default SOV word order. Examples (3) and (4) below illustrate canonical transitive and intransitive clauses. Arguments can be reordered through optional scrambling.

(3)   **Transitive clause: SOV with ergative marking**
        Tashi-ki   nyee momo see-song.
        Tashi-ERG 1sg.GEN   dumpling eat-PRFV
        'Tashi ate my dumpling.'
(4)   **Intransitive clause:**
        Tashi lep-song.
        Tashi arrive-PRFV
        'Tashi arrived.'

The transitive subject in (3) is marked by the ergative marker *-(k)i*, whereas the object 'my dumplings' in (3) and the intransitive subject in (4) are unmarked. Like in many other Tibeto-Burman languages, transitive subjects do not always bear this ergative marker, with its distribution affected by factors such as aspect, agentivity, and information structure. Some intransitive subjects can also bear this marker; see DeLancey (2011) for an overview. A useful generalization is that ergative marking is obligatory in Dharamsala Tibetan in perfective clauses with the affix *-song*, as in examples (3–4) above (ANONYMIZED).

Tibetan famously has a series of postverbal markers that encode evidentiality along with tense and aspect. The marker -*song* is one such marker, encoding direct evidence status in addition to perfective aspect, but we will gloss this simply as PRFV here. See Garrett (2001) and references therein for discussion. Many of the examples in this paper will use this marker -*song*.

DT has multiple negation forms, depending on the tense/aspect and evidential features of the verbal complex. Three examples, *ma*, *min*, and *me* are shown in (5–7) below.[1] For our purposes in this paper, there are no differences between these different negative forms. Negation is always expressed on the verb. There are, for example, no negative quantifiers on nominals.

(5) a. Tashi lep-song.   b. Tashi lep-**ma**-song.
         Tashi arrive-PRFV   Tashi arrive-NEG-PRFV
         'Tashi arrived.'   'Tashi hasn't arrived.'
(6) a. Ko nii khu-duk.   b. Ko nii khu-**min**-duk.
         3sg sleep LV-EVID   3sg sleep LV-NEG-EVID
         'He is sleeping.'   'He is not sleeping.'
(7) a. Nga nii khu-yu.   b. Nga nii khu-**me**.
         1sg sleep LV-EVID   1sg sleep LV-NEG
         'I am sleeping.'   'I am not sleeping.'

As much of this paper will focus on NPIs formed using *wh*-words, we will now take a brief look at *wh*-question formation in DT. DT is a *wh*-in-situ language. Examples of transitive subject and object questions are given in (8) and (9) below. Both of these questions are in canonical SOV word order, with the appropriate argument replaced with a *wh*-word (*su* 'who' or *khare* 'what') in place. The addition of a question particle -*pe* to the verbal complex is optional but preferred. Note that in example (8), the subject *wh*-word *su* still takes the ergative marker -*(k)i*.

(8) *Su*-i   tep-di   lok-song-pe?
     who-ERG book-DEM read-PRFV-Q
     'Who read this book?'
(9) Tenzen-ki   *khare* lok-song-pe?
     Tenzen-ERG what   read-PRFV-Q
     'What did Tenzen read?'

Additional *wh*-words in DT are given in (10). We will see later that all of these *wh*-words participate in the construction of NPI forms.

(10) ***Wh*-words in Dharamsala Tibetan:**
      a. who   *su*
      b. whose / who.ERG *suu* or *su-i*
      c. what   *khare*
      d. where   *kawa*
      e. when   *khatu*
      f. which   *kangki*

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[1] The predicate 'sleep' in (6–7) takes a light verb, glossed as LV.

3. NPIs, indefinites, and *even* in DT

We now turn to the formation of NPIs in Dharamsala Tibetan. We will see that there are two basic strategies for the formation of an NPI, both involving the use of the particle *-(y)e/yang* meaning 'even/also.' In section 3.1 we take a look at the basic use of *-(y)e/yang* as a focus-sensitive particle before turning to its use to form NPIs. Section 3.2 presents NPIs formed with the numeral 'one' and EVEN, which we call "ONE-EVEN NPIs." Section 3.3 will then present NPIs formed with *wh*-words and EVEN, which we call "*wh*-EVEN NPIs." Finally, in section 3.4 we report on the distribution of these NPIs in DT.

3.1. The particle *-ye/yang*

We begin with a brief look at the particle *-ye/yang*, which will play an important role in the formation of NPIs in the following sections. For ease of exposition, we will consistently gloss this particle EVEN.

Consider first the use of *-ye* in example (11). The second clause in (11) requires that someone else who is not a student also came, and is therefore very natural given the context in (11). This second clause, *Lopchuk-ye lep-song*, is judged as infelicitous when uttered out of the blue. The meaning of *-ye* here is of an *additive* particle, corresponding to English *also* or *too*.

(11)   ***-ye/yang* is an additive particle:**
        Gegen   lep-song.   Lopchuk-**ye** lep-song.
        teacher arrive-PRFV   student-EVEN arrive-PRFV
        'Teachers arrived. [Students]$_F$ also arrived.'

Additive particles such as English *also* are focus-sensitive, and we therefore indicate *students* as focus-marked, or *F-marked*, in the English translation, in order to express the desired meaning.[2] This English translation contrasts with *Students also [came]$_F$* with pitch accent on *came*. Such a sentence requires that the students do something else other than come, and is therefore incongruent with a context such as the one in (11). In Tibetan, the focused constituent must be (a part of) the constituent *-ye/yang* is adjoined to, so this ambiguity does not arise. This dependence of the semantics of additives on focus will be explained briefly below and will also become important later in our proposal.

The same particle may be realized as *-ye* or *-yang*, in some cases determined by the preceding context and in other cases in free variation. For example, consider the examples in (12) below. The name Tenzen has two forms, *Tenzen* and *Tenzi*; the latter is used, for example, with the ergative case marker *-(k)i*, resulting in the ergative *Tenzii*. When *-ye/yang* is adjoined to Tenzen, there is optionality in the form used, correlating with the realization of the name Tenzen. Examples (12a) and (12b) express the same meaning.

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[2] Focus is reflected prosodically by a pitch accent on (a subpart of) the F-marked constituent (Jackendoff 1972, Selkirk 1984, a.o.). In the particular case of the English translation for (11), however, pitch accent may be on *also* instead; see Krifka (1998).

(12) **Allomorphy of -*ye/yang*:**
    a.   Tenzen-**yang** lep-song.
         Tenzen-EVEN arrive-PRFV
         '[Tenzen]$_F$ also arrived.'
    b.   Tenzi-**ye**   lep-song.
         Tenzen-EVEN arrive-PRFV
         '[Tenzen]$_F$ also arrived.'

If -*ye/yang* attaches to an ergative argument, it appears outside of the ergative case marker -*ki*, as in example (13), or the two fuse into the form -*ki-ye* > -*ke*. The opposite order with -*ye/yang* inside the case marker, such as -*ye-ki*, is ungrammatical.

(13) **-*ye/yang* must come after the ergative marker:**
    Tenzen-ki-**ye/yang** tep-di   lok-song.   ***-ye/yang**-ki
    Tenzen-ERG-EVEN   book-DEM read-PRFV   -EVEN-ERG
    '[Tenzen]$_F$ also read this book.'

The examples we have seen thus far are compatible with the view that this particle -*ye/yang* we gloss as EVEN is in fact simply an additive particle and better glossed ALSO. The semantics of *also* asserts that the proposition in its scope—the prejacent—is true and additionally introduces a presupposition that another, alternative proposition is also true. This set of alternative propositions depends on the position of focus: informally, they are constructed by replacing the focus-marked (F-marked) position with other, relevant alternatives (Jackendoff 1972, Rooth 1985, a.o.).

Even has a different but related semantics. *Even* also makes reference to this set of alternatives modulated by focus and introduces a presupposition that the prejacent proposition is *less likely* than the alternatives under consideration. We call this the *scalar* meaning of *even*. In addition, it has been claimed that *even* introduces an *additive* inference as well, equivalent to the meaning introduced by *also* (Horn, 1969). Since Karttunen & Karttunen (1977) and Karttunen & Peters (1979), a common view has been that *even* introduces these two meanings, both an additive and scalar requirement, but the presence of *even*'s additive meaning has been debated—see Wagner (2013) for recent discussion.

The examples that we have seen thus far all clearly have an additive requirement, but not a clear scalar requirement. That is, for example, in example (11), there does not seem to be a requirement that the proposition "that students came" be less likely than "that teachers came" in order to felicitously use -*ye*. Nonetheless, we will now show that examples can be constructed where EVEN has an unambiguous scalar use and, in fact, does not enforce its additive meaning. The relevant example is (14):

(14) **-*ye/yang* has a scalar use:**
    Context: Tenzen has done many things to advance her career.
    (Tenzen-ki) sinzi-nyamto-**ye/yang** changsa   gyap-pare.
    Tenzen-ERG president-with-EVEN   marriage LV-EVID
    'Tenzen even married [the President]$_F$.'

The use of *-ye* in example (14) is licensed because marrying the President is an unlikely thing to do. It is important to note here that (14) is compatible with a scenario in which Tenzen has never been married before. Thus *-ye* here is unambiguously a scalar particle, and does not have an additive meaning.[3] Cross-linguistically, the use of a single morpheme to express both scalar and additive meanings is common, with each inference active in some contexts but not others. We will leave open for further study the distribution of these inferences of *-ye/yang* in Dharamsala Tibetan.

3.2.   ONE-EVEN NPIs

With this background on the morphology and semantics of *-ye/yang* in place, we now turn to NPIs in DT. The first class of NPIs we will study are built of the numeral 'one' *chi(k)* together with *-ye/yang*, which we will call "ONE-EVEN NPIs." Two basic examples are given in (15) below. The NPIs here are italicized and their licensers are bolded.

(15)   **ONE-EVEN NPIs:**
    a.   Lopchuk *chi-ye*   lep-**ma**-song.
         student   one-EVEN arrive-NEG-PRFV
         'No student arrived.'
    b.   Nye   tep *chi-ye*   lok-**me**.
         1sg.ERG book one-EVEN read-NEG
         'I didn't read any book.'

This *chi-ye* NPI form normally follows a nominal domain ('student' and 'book' above), but this is not required. Example (16) below presents a conversational context where the relevant domain, eggs, is made clear through A's question. B's use of the bare *chi-ye* 'one-EVEN' NPI is then felicitous, meaning that there are no eggs.

(16)   **ONE-EVEN NPI without an overt domain:**
    A: Konga duk-pe?
         egg   EVID-Q
         'Are there eggs?'

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[3] *-ye/yang* could also attach directly to *sinzi* 'president' in (14), inside the postposition *-nyamto* 'with,' but then the additive requirement is strongly enforced:

(i)   (Tenzen-ki) sinzi-**ye/yang**-nyamto changsa gyap-pare.
    Tenzen-ERG president-EVEN-with   marriage LV-EVID
    'Tenzen married even [the President]F.' ⤳ Tenzen married someone else as well.

Interestingly, a parallel contrast is observed between the English translation in (14) using an adverb *even* and the translation in (i) with *even* adjoined directly to the focused constituent. The higher, adverb *even* in (14) has only a scalar inference, not requiring that Tenzen be married before, whereas the lower, constituent-marking *even* in (i) enforces the additive inference, that Tenzen has married someone else as well. See Wagner (2013) for discussion and an approach to this contrast in English.

B: *Chi-ye* **mǐn**-duk.
    one-EVEN NEG-EVID
    'There are none.' (= no eggs)

In addition to being licensed by negation, these NPIs can be used in questions, as in (17), just as English NPIs such as *any* can (17). The licensing conditions of NPIs in DT will be discussed in more detail in section 3.4.

(17) **NPI licensed in a question:**
       Ku tep *chi-ye*   lok-duk-**pe**?
       3sg book one-EVEN read-EVID-Q
       'Did he read any book?'

It is very often the case that 'one' *chi(k)* is adjacent to EVEN *-ye*, as in the examples above, but this is not required. For example, for an ergative-marked subject, the ergative marker *-ki* will intervene between 'one' and EVEN, as in example (18) below.

(18) **'One' and EVEN can be separated by ERG:**
       Lopchuk *chi-ki-ye*   tep-di   lok-**min**-duk.
       student   one-ERG-EVEN book-DEM read-NEG-EVID
       'No student read the book.'

The word order in (18) is what we would independently expect, given that the EVEN particle necessarily follows the ergative marker *-ki* (13) and case markers and postpositions must follow numerals. Examples such as (18) make it clear that the NPI in question is made up of the numeral 'one' *chi(k)* and the EVEN particle *-ye/yang*, rather than a single, unanalyzable lexical item *chiye*.

The use of both the numeral 'one' and the EVEN particle is essential for constructing this NPI. Without the numeral 'one,' a nominal followed by *-ye/yang* will simply be interpreted with the regular 'even/also' semantics, discussed in the previous section, and is not an NPI. Consider example (19) below; *-ye* here introduces the additive presupposition that Tenzen has read something else as well.

(19) ***-ye/yang* without 'one' is simply 'also/even':**
       Tenzen-ki   tep-di-*ye*   lok-song.
       Tenzen-ERG book-DEM-EVEN read-PRFV
       'Tenzen also read [this book]_F.'

In contrast, the ONE-EVEN NPI described here does not require that another, alternative individual or category also hold of the predicate; for example, example (18) above does not introduce a requirement that no teacher read the book, either.

Without the EVEN particle, the numeral 'one' *chi(k)* is interpreted as an indefinite and is also not an NPI. Consider the examples in (20) below. (20a) shows the basic use of *chik* to form an indefinite, in this case 'a person.' In (20b), we take such a *chik* indefinite and combine it with

negation. It's important to note here that (20b) expresses a specific indefinite meaning, where one student did not show up, despite our expectations. It does not mean the same as the *chi-ye* NPI with negation as in (20a) above.

(20) **Indefinites with 'one' *chik*:**
    a.   Mi   *chik* yong-khi-re.
         person one come-PROG-EVID
         'Someone is coming.'
    b.   Lopchuk *chik* lep-**ma**-song.
         student   one arrive-NEG-PRFV
         'One student didn't arrive.' (≠ 'No student arrived.' (15a))

Finally, we note that there is also a use of *chi-ye*, which is not as an NPI, and instead is the regular EVEN particle adjoined to an indefinite with 'one.' An example of this use is given in (21) below.

(21) **A non-NPI use of 'one EVEN':**
    Lopchuk chik lep-song.   [[Gegen]$_F$ chik]=*ye* lep-song.
    student   one arrive-PRFV   teacher   one-EVEN arrive-PRFV
    'A student arrived. A [teacher]$_F$ also arrived.'

However, this use can be distinguished from the NPI use of ONE-EVEN which we study here. The use of *-ye* in the second clause of (21) requires that an individual of another, contrasting category has also arrived; in (21) this is satisfied by the first clause. No such requirement regarding individuals in contrasting nominal domains is introduced by ONE-EVEN NPIs. The difference between these two meanings for 'one EVEN' will be explained in our analysis in section 4.

3.3. *Wh*-EVEN NPIs

We will now turn to the second family of NPIs in DT, which are built using *wh*-words together with the EVEN particle *-ye/yang*. *Wh*-words are often used cross-linguistically not only to form questions but also to form a range of quantificational expressions, including NPIs. In an early study of quantificational uses of *wh*-words in Japanese, Kuroda (1965) proposed the term "indeterminate" to highlight the idea that *wh*-items can be used for a variety of quantificational purposes, beyond question formation.

Our first example of a *wh*-EVEN NPI is given in (22) below. Note that both the variant *su-ye* 'who-EVEN' and *su-chi-ye* 'who-one-EVEN' are grammatical, but the form *su-chi-ye* is preferred.

(22) ***Who*-EVEN NPI = *anyone*, with and without 'one':**
    Su-(chi)-ye   lep-**ma**-song.
    who-(one)-EVEN arrive-NEG-PRFV
    'No one arrived.'

The addition of EVEN to form an NPI applies to all of the *wh*-words mentioned in section 2, summarized in (10), although there are some minor idiosyncracies related to particular forms. In this section we will present examples of each type and then present some observations which will later inform our analysis of these NPI forms involving *wh*-indeterminates.

We begin with 'what' *khare*. In example (23) below we observe two forms, the productive *khare-yang* combination and the form *khee*, which are both interpreted as the NPI 'anything.' We hypothesize that *khee* underlyingly derives from the combination *khare-ye > khee*. The shorter form, *khee*, is preferred in colloquial speech.

(23)   ***What*-EVEN NPI = *anything*:**
    a.   Nye   *khare-yang* se-**me**.
          1sg.ERG what-EVEN eat-NEG
          'I didn't eat anything.'
    b.   Nye   *khee*   se-**me**.
          1sg.ERG anything eat-NEG
          'I didn't eat anything.'

Examples based on *khatu* 'when,' *kawa* 'where,' and *kangki* 'which' are given below, forming NPIs meaning *at any time*, *anywhere*, *any of…*, respectively.

(24)   ***When*-EVEN NPI = *at any time*:**
    Nga *khatu-ye*   nye-khi-**me**.
    1sg when-EVEN sleep-PROG-NEG
    'I never sleep.' or 'I don't sleep at any time.'
(25)   ***Where*-EVEN NPI = *anywhere*:**
    Nga *kawa-chi-ye*   ching-**me**.
    1sg where-one-EVEN go-NEG
    'I didn't go anywhere.'
(26)   ***Which*-EVEN NPI = *any of…*:**
    Kuu tep-*kangki-ye*   lok-**min**-duk.
    3sg book-which-EVEN read-NEG-EVID
    'He didn't read any of the books.'

Just as in our discussion of ONE-EVEN NPIs in the previous section, we can show that *wh-chi-ye* NPIs indeed involve the numeral 'one' *chi(k)* followed by the EVEN particle *-ye*. This evidence comes from 'who' *su* with ergative or genitive marking, which often results in the form *suu*. Recall that the numeral 'one' must precede case markers but EVEN must follow. Therefore, when *chi(k)* and *-ye/yang* are both used, *suu* is split into 'who' *su* and the regular ergative/genitive marker *-ki*, which must intervene:[4]

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[4] NPI formation based on ergative/genitive 'who' does not require this addition of 'one' *chi(k)*, in which case the form *suu* comprising both 'who' and the case marker will simply be followed by the EVEN particle *-ye*:

(27)   **'One' and EVEN can be separated by ERG/GEN:**
    a.   Kyarang *su-chi-k-e*   thong-song-**pe**?[5]
          2sg   who-one-ERG-EVEN see-PRFV-Q
          'Did anyone see you?'
    b.   *Su-chi-k-e*   gegen   lep-**ma**-song.
          who-one-GEN-EVEN teacher arrive-NEG-PRFV
          'No one's teacher arrived.'

Although we seen that other material can intervene between the *wh*-word (and numeral 'one') and the EVEN particle *-ye/yang*, EVEN must still be very local to the *wh*-word. For example, the EVEN particle in example (27b) above cannot be placed at the end of the entire DP, following 'teacher':

(28)   **EVEN particle cannot attach further away:**
    * [*Su-chi-ki*   gegen]=*ye/yang* lep-**ma**-song.
      [who-one-GEN teacher]=EVEN   arrive-NEG-PRFV
      Intended: 'No one's teacher arrived.' (=27b)

3.4.   NPI licensing

With this basic description of the two families of NPIs in DT in place, we now investigate their distribution. As we have seen, these NPIs must be in the presence of a licensing negation or question. The examples in (29) below clearly show this dependence on a licensor, using the NPI *khee* 'anything.' Recall that *khee* is a short form for the *wh*-EVEN NPI *khare-ye* 'what-EVEN.'

(29)   **NPIs require a licensing negation or question:**
    a. * Nye   *khee*   see-yin.
        1sg.ERG anything eat-EVID
    b. Nye   *khee*   see-**me**.
        1sg.ERG anything eat-NEG
        'I didn't eat anything.'
    c. Kyarang-ki *khee*   see-**pe**?
        2sg-ERG   anything eat-Q
        'Did you eat anything?'
        * 'What did you eat?'

(i)   Tep-kanghi *suu-ye*   lok-**ma**-song-pe?
       book-which who.ERG-EVEN read-NEG-PRFV-Q
       'Which book did no one read?'

[5] Note that the NPI here is licensed by the question, rather than by negation, as we also saw in example (17) above. The question particle is bolded here. The licensing environments for NPIs in DT will be discussed in more detail in section 3.4.

NPIs in subject position are also licensed by a clause-mate negation, as we have seen in examples above, unlike in English (e.g. *Anyone didn't see me.*) A single licenser can also license multiple NPIs simultaneously, as we see in example (30):

(30)   **Multiple NPIs can be licensed simultaneously:**
        Su-chi-k-e   *khee*   se-**ma**-song.
        who-one-ERG-EVEN anything eat-NEG-PRFV
        'No one ate anything.'

NPIs in many languages, including the English NPI *any*, are licensed in a range of *downward-entailing* environments (Ladusaw, 1979) including the antecedent of conditionals. We see in example (31) below that this is not the case in DT. Example (31a) presents a baseline conditional example and (31b) is the test case with a ONE-EVEN NPI.

(31)   **NPIs not licensed in conditional clause:**
        a.   [Tenzen chang tung-nga], ra-si-khi-duk.
              Tenzen beer drink-if   drunk-become-PROG-EVID
              'If Tenzen drinks beer, she gets drunk.'
        b. * [Tenzen chang *chi-ye*   tung-nga], ra-si-khi-duk.
              Tenzen beer one-EVEN drink-if   drunk-become-PROG-EVID
              Intended: 'If Tenzen drinks any beer, she gets drunk.'

Being in the presence—or more formally, the scope—of negation is also insufficient to license NPIs. A licensing negation must be in the same clause as the NPI. This requirement is illustrated in (32–33) below. The (a) examples are baselines with an NPI licensed by a local negation within an embedded clause and the (b) examples show a grammatical use of matrix negation. The (c) examples are the test cases, illustrating the unavailability of non-local NPI licensing. Such non-local licensing is grammatical in English, as seen in the intended English translations.

(32)   **Licensing negation must be in the same clause:**
        a.   Tashi-ki   [Tenzen chang *chi-ye*   tung-**ma**-song]   lap-song.
              Tashi-ERG [Tenzen beer   one-EVEN drink-NEG-PRFV] say-PRFV
              'Tashi said [Tenzen didn't drink any beer].'

        b.   Tashi-ki   [Tenzen-ki   chik tung-song] lap-**ma**-song.
              Tashi-ERG [Tenzen-ERG one   drink-PRFV] say-NEG-PRFV
              'Tashi didn't say [Tenzen drank something].'
        c. * Tashi-ki   [Tenzen chang *chi-ye*   tung-song] lap-**ma**-song.
              Tashi-ERG [Tenzen beer   one-EVEN drink-PRFV] say-NEG-PRFV
              Intended: 'Tashi didn't say [Tenzen drank any beer].'
(33)   a.   Tashi-ki   [Tenzen *khee*   se-yu-**ma**-re]   sam-duk.
              Tashi-ERG [Tenzen anything eat-EVID-NEG-EVID] think-EVID
              'Tashi thinks [Tenzen didn't eat anything].'
        b.   Tashi-ki   [Tenzen-ki   momo se-re]   sam-**min**-duk.
              Tashi-ERG [Tenzen-ERG dumpling eat-EVID] think-NEG-EVID
              'Tashi doesn't think [Tenzen are dumplings].'

c. * Tashi-ki [Tenzen *khee* se-re] sam-**min**-duk.
Tashi-ERG [Tenzen anything eat-EVID] think-NEG-EVID
Intended: 'Tashi doesn't think [Tenzen ate anything].'

Such a *clause-mate condition* on NPI licensing is famous in Japanese NPIs (Muraki 1978, Kato 1985, a.o.). Example (34) below illustrates this with the Japanese *wh*-EVEN NPI *nani-mo* 'what-EVEN,' patterned after the DT example (33) above.

(34) **The clause-mate condition in Japanese:**
    a. Tashi-wa [Tenzen-ga *nani-mo* tabe-**nak**-atta to] omo-tteiru.
       Tashi-TOP [Tenzen-NOM what-EVEN eat-NEG-PAST COMP] think-PROG
       'Tashi thinks [Tenzen didn't eat anything].'
    b. Tashi-wa [Tenzen-ga gyoza-o tabe-ta to] omo-ttei-**nai**.
       Tashi-TOP [Tenzen-NOM dumpling-ACC eat-PAST COMP] think-PROG-NEG
       'Tashi doesn't think [Tenzen ate dumplings].'
    c. * Tashi-wa [Tenzen-ga *nani-mo* tabe-ta to] omo-ttei-**nai**.
       Tashi-TOP [Tenzen-NOM what-EVEN eat-PAST COMP] think-PROG-NEG
       Intended: 'Tashi doesn't think [Tenzen ate anything].'

Furthermore, we observe that DT NPIs act as *interveners* for the interpretation of interrogative *wh*-phrases, as described by Beck & Kim (1997, 2006).[6] Consider the contrast observed in the Korean data in (35) below. In example (35a), the subject NPI *amuto* 'anyone,' licensed by negation, precedes the object *wh*-phrase 'what.' This question, intended to mean 'What did no one buy?' is judged as ungrammatical. Scrambling the object to precede the intervening NPI as in (35b), however, results in a grammatical question.

(35) **Korean NPIs disrupt interrogative *wh* interpretation (Beck & Kim 1997):**
    a. * ***Amuto*** *muôs*-ûl sa-chi **anh**-ass-ni?
       anyone what-ACC buy-CHI NEG-do-PAST-Q
    b. *Muôs*-ûli ***amuto*** *t* sa-chi **anh**-ass-ni?
       what-ACC anyone buy-CHI NEG-do-PAST-Q
       'What did no one buy?'

Note that the NPI here, *amuto*, includes the focus-sensitive particle *-to* with 'even/also' semantics, akin to the NPIs we study here in DT. The generalization developed in Kim (2002) and Beck (2006) is that NPIs—as well as a range of other focus-sensitive elements—cannot intervene between the interrogative *wh*-word and the interpreting complementizer at the edge of the clause.

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[6] The term "intervention effect" has also been used to describe a requirement where scope-bearing operators are not allowed to intervene between NPIs and their licensers, also called the "Immediate Scope Constraint" of Linebarger (1980). The intervention we discuss here, between in-situ *wh*-words and C, is arguably a different phenomenon.

We present parallel intervention contrasts in (36) below. In (36a), the ergative subject NPI *su-chi-ki-ye* 'anyone' precedes the *wh*-phrase 'which book,' leading to ungrammaticality. Once the interrogative *wh*-phrase is scrambled past the NPI (36b), however, the question becomes grammatical.

(36) **DT NPIs disrupt interrogative *wh* interpretation:**
    a. * ***Su-chi-ki-ye***   tep-*kangki*   lok-**ma**-song-pe?
        who-one-ERG-EVEN book-which read-NEG-PRFV-Q
    b. Tep-*kangki* ***su-chi-ki-ye***   *t* lok-**ma**-song-pe?
        book-which who-one-ERG-EVEN   read-NEG-PRFV-Q
        'Which book did no one read?'

To summarize, we observe both syntactic and semantic licensing conditions on EVEN-NPIs. A semantic condition is that EVEN-NPIs must occur in a downward-entailing environment, and more specifically either c-commanded by negation or in a question. In addition, we observe a syntactic *clause-mate* condition: negation must occur in the same clause as the NPI.

Finally, we note that *wh*-EVEN may also be used to form free choice items. One example of this use is shown in (37).

(37) Di *su-ye*   che-tup-khi-re
      this who-EVEN do-able-PROG-EVID
      'Anyone is able to do this.'

The use of *wh*-EVEN as both NPIs and free choice items is also observed in other languages; see for example Bangla facts discussed in Ramchand (1996, 1997). In this paper we will concentrate on the NPI use of *wh*-EVEN in DT and its distribution and leave further investigation of these free choice item uses for future work.

4.   Proposal

In this section we develop a compositional semantics for the two series of EVEN-NPIs in DT. We begin by discussing the additive and scalar semantics of EVEN. We then present our analysis, building on the idea that EVEN associating with an indefinite or numeral 'one' forms an NPI (Lee & Horn, 1994; Lahiri 1998). For our novel analysis of *wh*-EVEN NPIs, it will be important that *wh*-words denote sets of alternatives (Hamblin, 1973; a.o.) and that EVEN introduces both additive and scalar inferences. We show how this proposal accounts for the semantic as well as syntactic conditions on EVEN-NPIs.

4.1.   The semantics of *even*

Operators like *even* are called *focus-sensitive* as their interpretation relies on another constituent in the clause being focused. In English, focus is realized prosodically, and its placement has profound effects on the interpretation of focus-sensitive operators. This can be seen in the contrast between (38a–b) (example based on Beaver and Clark, 2008).

(38)   **The interpretation of *even* depends on *focus* in the sentence**
      a.   David **even** wears a BOW TIE when teaching.
      b.   David **even** wears a bow tie when TEACHING.

The semantic contribution of focus in examples such as (38) can be thought of as introducing *alternatives* to the focused constituent into the semantic computation. Focus on "bow tie" in (38a) conjures up other potential alternatives to what David might be wearing, such as "shirt" or "cowboy hat." In contrast, focus on "teaching" in (38b) conjures up alternative times when David might be wearing a bow tie, such as when "swimming" or "grocery shopping." The precise membership of these sets of alternatives is determined through the current discourse context. Following Jackendoff (1972), we assume that the syntactic representation includes an abstract F-mark on "bow tie" in (38a) and on "teaching" in (38b). Each of these local alternatives then corresponds to an *alternative proposition* at the scope of the focus-sensitive operator. Note that the set of alternatives always includes the stated value, which we call the *prejacent*.

(39)   **Interpreting (38a):**
      a.   <u>LF for (38a):</u> EVEN(David wears a [bow tie]$_F$ when teaching)[7]
      b.   <u>Focused (F-marked) constituent:</u> bow tie
      c.   <u>Alternatives to focused constituent:</u> bow tie, shirt, cowboy hat,…
      d.   <u>Prejacent proposition:</u> David wears a bow tie when teaching
      e.   <u>Alternative propositions:</u>
          David wears a bow tie when teaching,
          David wears a shirt when teaching,
          David wears a cowboy hat when teaching,…

As noted above in section 3.1, *even* introduces two presuppositions, which we call the *additive* and *scalar* presuppositions (Karttunen & Karttunen, 1977; Karttunen & Peters, 1979; among others; based on Horn, 1969). The additive presupposition states that one of the non-prejacent alternatives is true. This additive meaning is shared with other English focus-sensitive particles such as *also* and *too*. The scalar presupposition states that the prejacent is less likely or more noteworthy than all the other alternatives. The content of these presuppositions for example (38a) above, based on the ingredients computed in (39) above, is as follows:

(40)   **The presuppositions of *even* in (38a):**
      a.   <u>Additive:</u> David wears a shirt when teaching OR David wears a cowboy hat when teaching…
      b.   <u>Scalar:</u> David is less likely to wear a bow tie than other things when teaching.

Both of these components of the semantics of *even* will become important in our analysis below. Note that the introduction of these two presuppositions is the sole contribution of *even*; in particular, *even* does not modify the truth-conditions of the prejacent proposition in its complement (Horn, 1969). Therefore the at-issue content of (38a) is that "David wears a bow tie," and the same is true of (38b) as well.

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[7] To simplify this illustration, the subject will be represented here in the scope of EVEN.

Let us now present a formalization of this interpretation process. Our approach here follows the common Alternative Semantics model of Rooth (1985), using notation from Rooth (1992). Alternative Semantics is a *bidimensional* theory of semantics, where any syntactic node can be evaluated for an *ordinary semantic value*, using the denotation function $[\![\cdot]\!]^o$, and a *focus-semantic value*, using the denotation function $[\![\cdot]\!]^f$. The focus-semantic value is the set of relevant alternative denotations, as determined by the placement of focus. For the compositional interpretation of ordinary semantic values, see for example Heim & Kratzer (1998). Focus-semantic values are likewise computed compositionally: for a terminal node X, $[\![X]\!]^f$ = the set of relevant alternative denotations to X if X is F-marked, and $[\![X]\!]^f = \{[\![X]\!]^o\}$ otherwise; for non-terminal nodes, the rule in (F4) is used:

(41)   **Point-wise composition:**
$[\![[\beta\ \gamma]]\!]^f = \{b \circ g \mid b \in [\![\beta]\!]^f, g \in [\![\gamma]\!]^f\}$
where $\circ$ is the appropriate composition rule, based on the types of b and g

The additive and scalar presuppositions of *even* can then be formalized as in (42) and (43). Note that for both ADD and SCAL, their complement α must be of propositional type.

(42)   **The additive part of *even*:**
ADD(α) ⤳ $\exists\ \varphi \in [\![\alpha]\!]^f \setminus [\![\alpha]\!]^o$ (φ true)

(43)   **The scalar part of *even*:**
SCAL(α) ⤳ $\forall\varphi \in [\![\alpha]\!]^f \setminus [\![\alpha]\!]^o$ ($[\![\alpha]\!]^o <_{\text{likely}} \varphi$)

English *even* is commonly thought of as a single morpheme that has the semantics of the combination of these two meanings, ADD and SCAL.[8] In section 3.1 we showed that the DT -*ye/yang* can introduce both additive and scalar meanings as well, and therefore we assume that DT -*ye/yang* also has both of these parts in its meaning.

Finally, we make one observation regarding the meaning of ADD in (42) above: ADD introduces an *existential* presupposition, that at least one member in a set of alternatives is true. This existential quality of ADD will play a crucial role in our analysis *wh*-EVEN NPIs in section 4.3.

4.2.   ONE-EVEN NPIs

We now present our account for the compositional syntax/semantics of ONE-EVEN NPIs in DT, based on the analysis of Hindi ONE-EVEN NPIs in Lahiri (1998) and the similar insight of Lee & Horn (1994). An example of a ONE-EVEN NPI is repeated here in (44):

(44)   **ONE-EVEN NPI:**
Lopchuk   *chi-ye*   lep-**ma**-song.
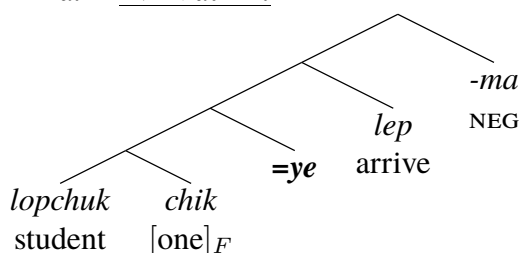student   one-EVEN   arrive-NEG-PRFV
'No student arrived.' (=15a)

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[8] But see Wagner (2013) and references therein for discussion of whether English *even* always introduces both meanings or not.

Recall that NPIs in DT must be licensed by a clause-mate negation or by a question operator. The task at hand is to derive this behavior from the independent semantics of the ingredients present in the sentence—the numeral 'one' and the focus-sensitive particle EVEN *-ye/yang*. The core intuition from Lee & Horn (1994) and Lahiri (1998) is that SCAL *forms an NPI when it associates with an indefinite*.[9]
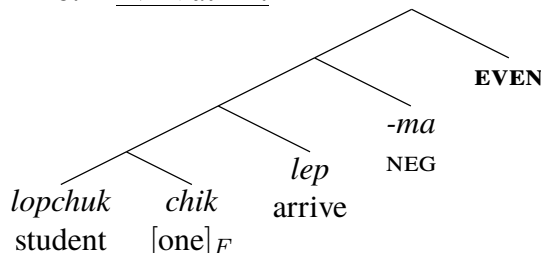
We will demonstrate this approach concretely for the ONE-EVEN NPI in example (44) above, with and without the licensing negation. We follow Lahiri (1998)—in turn, based on Karttunen & Peters (1979)—in interpreting EVEN in a position distinct from its surface position. This is necessary for the semantics of EVEN; recall that the additive and scalar parts of EVEN operate on a syntactic object of propositional type and its focus-alternatives (see (42) and (43), above), even though on the surface it is adjoined to a nominal. The positions of EVEN in (44) at PF and LF are illustrated in (45):[10]

(45)   **Positions of EVEN:**
   a.   EVEN at PF: b.   EVEN at LF:

   lopchuk   *chik*   **=ye**   *lep* arrive   *-ma* NEG
   student   [one]$_F$ EVEN

   lopchuk   *chik*   *lep* arrive   *-ma* NEG   **EVEN**
   student   [one]$_F$

This mismatch between PF and LF could be resolved through covert movement of EVEN, where EVEN is base-generated as a clitic on the DP. This would lead to the transparent PF representation in (45a). EVEN would then separate from the DP and adjoin higher on the clausal spine at LF, resulting in (45b).[11] Alternatively, we could think of the pronounced *-ye/yang* morpheme at PF (45a) as the result of agreement with an abstract EVEN operator higher on the clausal spine (45b), which is unpronounced (cf Lee, 2004).

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[9] See also Heim (1984) for an approach to English minimizer NPIs which uses an implicit *even* and Krifka (1994, 1995) for an approach to NPIs very similar to that presented here, but using a dedicated EmphAssert operator in place of *even*. See discussion in Lahiri (1998) comparing his approach to these precursors as well as Chierchia (2013) for more recent discussion and extensions.
See also Giannakidou & Yoon (to appear), who challenge the view that *even*-words in NPIs necessarily introduce their standard scalar semantics, based on extensive discussion of Greek and Korean EVEN-NPIs. Here we will leave open how EVEN-NPIs in DT behave with respect to their diagnostics for scalarity.

[10] The contribution of tense will not be modeled here.

[11] This is the approach in Lahiri (1998), who describes it as moving EVEN "at LF by an operation resembling QR (it is *like* QR, but not the same as it, because the moved phrases in this case are not NPs, but more like determiners)" (p. 82). See footnotes 126 and 127 in Erlewine (2014) for some discussion and background on this movement operation.

The characterization of how the PF and LF representations in (45) are related derivationally will not affect our core proposal. For our purposes, we will simply propose that the pronounced position of *-ye/yang* and the LF position of EVEN must be *within the same clause*. If covert movement is involved, then, this covert movement of EVEN cannot cross finite clause boundaries, as is common for covert movement such as QR (May, 1985; a.o.). If an agreement relation is involved, it is this agreement operation that must be limited to the local clause.

We now turn to the interpretation of the LF structure in (45b). Because the structure in (45b)—based on the original example in (44)—includes a clause-mate negation, we predict that the NPI will be grammatical in this example, and the whole structure will mean 'no student arrived.' We assume with Lahiri (1998) that the numeral predicate 'one' is true of anything with at least one atomic part, intuitively meaning "at least one" rather than "exactly one." This 'one' is F-marked and introduces the alternatives denoting "at least two," "at least three," etc. Ordinary and focus-semantic values are built up compositionally, as illustrated in (46–47):

(46) a. $[\![$ [[student [one]$_F$] arrive] $]\!]^o$ = that at least one student arrives
      b. $[\![$ [[student [one]$_F$] arrive] $]\!]^f$ = {that at least one student arrives,
                                                            that at least two students arrive,
                                                            that at least three students arrive,…}
(47) a. $[\![$ [[[student [one]$_F$] arrive] NEG] $]\!]^o$ = NEG(that at least one student arrives)
                                                = that no student arrives
      b. $[\![$ [[[student [one]$_F$] arrive] NEG] $]\!]^f$ = {NEG(that at least one student arrives),
                                                            NEG(that at least two students arrive),
                                                            NEG(that at least three s.'s arrive),…}
                                                = {that no student arrives,
                                                    that less than two students arrive,
                                                    that less than three students arrive,…}

Finally, we compute the contribution of EVEN in (45b). Recall that EVEN does not affect the truth-conditions of its complement, so the at-issue content of (45b) is the proposition "that no student arrives," passed up from the ordinary semantic value in (47a). Here we will illustrate only the scalar part of EVEN, SCAL, which derives the NPI distribution. Let α below refer to the complement of EVEN, with ordinary and focus-semantic values in (47) above.

(48) **The scalar presupposition of EVEN in (45b), using SCAL (43):**
      $\forall \varphi \in [\![\alpha]\!]^f \setminus [\![\alpha]\!]^o$ ($[\![\alpha]\!]^o <_{likely} \varphi$)
      = $\forall \varphi \in$ {that less than two students arrive,
              that less than three students arrive,…} ((that no student arrives) $<_{likely} \varphi$)
      = ((that no student arrives) $<_{likely}$ (that less than two students arrive)) AND
        ((that no student arrives) $<_{likely}$ (that less than three students arrive))…

Consider the content of this presupposition. The proposition "that no student arrives" must be less likely than "that less than two students arrive," etc. Notice that "that no student arrives" asymmetrically entails "that less than N students arrive" for all values of N > 1. Therefore this scalar inference will always hold. The LF in (45b) for example (44) is therefore grammatical. The NPI is licensed.

This logic above will hold for other downward-entailing operators. For licensing to go through, however, it is necessary for EVEN to scope over the downward-entailing operator at LF. This explains the inability of DT EVEN-NPIs to be licensed in conditional clauses, as we saw in section 3.4 above: for the NPI to be licensed by the conditional clause, a downward-entailing environment, EVEN would have to scope out of the conditional, and therefore outside of the clause where EVEN is pronounced, violating the clause-mate requirement on the position of EVEN at LF. EVEN-NPIs are also licensed in questions in DT; see section 9 of Lahiri (1998) as well as Guerzoni (2004) for discussion of NPI licensing in questions.

It is important in this derivation above that the numeral 'one' is F-marked and is the source of the alternatives that EVEN associates with. If instead, the nominal 'student' is focused, we yield the predicted interpretation of EVEN associating with 'student,' in contrast to other categories, such as 'teacher.' This use is illustrated in example (49) below. Notice that the combination of 'one' and *-ye/yang* EVEN here is not an NPI; the NPI behavior is dependent on EVEN associating with the numeral 'one.'[12]

(49) ***Even* associating across 'one'; not an NPI:**
      Gegen chik lep-song.   [[Lopchuk]$_F$ chik]=*ye*   lep-song.
      teacher one   come-PRFV   student   one=EVEN come-PRFV
      'A/one teacher came. A/one [student]$_F$ even came.'

Now consider the computation of example (44) without the licensing negation. We again interpret EVEN at a higher position with propositional type at LF. This configuration is illustrated in (50):

(50) **Example LF for ONE-EVEN NPI without a licensor:**
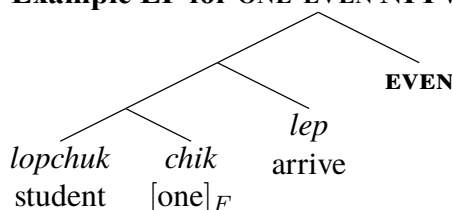
We'll refer to the complement of EVEN here as α. The ordinary and focus-semantic values for α are as in (46a–b). The scalar part of EVEN introduces the following presupposition:

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[12] Although 'one' *chik* in these ONE-EVEN NPIs must be F-marked for this analysis, there need not be a clear pitch accent on the numeral 'one.' However, we note that many factors go into the determination of the exact phonetic realization of abstract F-marking. In this case, the presence of a focus-sensitive operator on 'student one' together with the lack of narrow focus on the nominal domain 'student'—which would have instead led to an interpretation as in (49)—may be sufficient to indicate that 'one' bears F-marking without a pitch accent.

(51)   **The scalar presupposition of EVEN in (50), using SCAL (43):**
$\forall \varphi \in [\![\alpha]\!]^f \setminus [\![\alpha]\!]^o ([\![\alpha]\!]^o <_{likely} \varphi)$
$= \forall \varphi \in$ {that at least two students arrive,
            that at least three students arrive,…}
        ((that at least one student arrives) $<_{likely} \varphi$)
$=$ ((that at least one student arrives) $<_{likely}$ (that at least two students arrive)) AND
    ((that at least one student arrives) $<_{likely}$ (that at least three students arrive))…

Notice that the proposition "that at least one student arrive" is asymmetrically entailed by "that at least N students arrive" for all values of N > 1. Therefore all of the claims of relative likelihood in (51) will necessarily be false. The scalar presupposition introduced by SCAL in (50) is a contradiction and cannot be satisfied, leading to the unacceptability of the structure in (50). More generally, the same result will obtain in any configuration without a downward-entailing operator between EVEN and the focused numeral 'one' at LF. In this way, the combination of the scalar part of EVEN associating with a weak indefinite—here the numeral 'one'—derives the polarity-sensitivity of EVEN-NPIs.

4.3.   *Wh*-EVEN NPIs

We now turn to the semantics of *wh*-EVEN NPIs. Our analysis will follow the same basic logic of Lee & Horn (1994) and Lahiri (1998), making the scalar part of EVEN (SCAL) associate with a weak indefinite. The question, though, is what the source of the indefinite in *wh*-EVEN NPIs is. *Wh*-EVEN NPIs in DT can include the numeral 'one' *chik*, but unlike in ONE-EVEN NPIs, it is not required. To solve this problem, we present a novel proposal for constructing an indefinite using the additive part of EVEN (ADD) together with a standard semantics for *wh*-words based on Hamblin (1973).

Hamblin (1973) proposed that *wh*-words denote sets of alternatives, corresponding to possible (short) answers to the question. Consider the *wh*-question in (52):

(52)   ***Wh*-question:**
    Su   lep-song(-pe)?
    who arrive-PRFV-Q
    'Who arrived?'

The *wh*-word *su* 'who' will denote the set of animate individuals, who are possible answers to the question. Here we will present a modern extension to Hamblin (1973) couched within Rooth's bidimensional Alternative Semantics framework, presented in work such as Ramchand (1996) and Beck (2006). In this framework, the Hamblin set of alternatives will be the focus-semantic value of *su* 'who.' The ordinary semantic value of *wh*-words is undefined.

(53)   **The semantics of *su* 'who':**
    a. $[\![su]\!]^o$ undefined
    b. $[\![su]\!]^f = $ {Tenzen, Tashi, Migmar,…}

Composing with the rest of the structure, we yield the following denotations at the TP level:

(54)   **The semantics of TP in (52):**
    a. $[\![$ TP $]\!]^o$ undefined
    b. $[\![$ TP $]\!]^f$ = {that Tenzen arrives, that Tashi arrives, that Migmar arrives,…}

Each focus-alternative of *su* in (53b) yields a corresponding proposition at the TP level in (54b), which corresponds to a possible full answer to the question. The ordinary semantic value is still undefined, because complex expressions that include undefined material are themselves undefined. The question operator, optionally spelled out as *-pe*, then takes this focus-semantic value in (54b) and returns it as the ordinary value of the question (Shimoyama, 2001; Beck & Kim, 2006; Kotek, 2014).

Wh-words can also be used to form quantificational expressions in many languages, with the great quantificational versatility of *wh*-words leading to their moniker as "indeterminates" (Kuroda, 1965). A now standard approach to such *wh*-quantification is to allow certain operators to quantify over the sets of alternatives introduced by *wh*-words (Ramchand, 1996, 1997; Hagstrom, 1998; Shimoyama, 1999, 2001; Kratzer & Shimoyama, 2002; a.o.). This often involves designated operators that apply to syntactic objects that have a non-singleton focus-semantic value but lack an ordinary semantic value, picking out exactly those structures including *wh*-words whose alternatives have not yet been quantified over, e.g. (54).

Familiar focus-sensitive operators may also be able to quantify over alternatives introduced by *wh*-words, but this possibility is limited by the fact that no ordinary semantic value (prejacent) is specified. For example, our definitions for ADD and SCAL, repeated below, make reference to both the ordinary and focus-semantic values of their complement, $[\![\alpha]\!]^o$ and $[\![\alpha]\!]^f$. However, notice that these formulations differ in their dependence on the ordinary semantic value: ADD simply removes $[\![\alpha]\!]^o$ from the set of alternatives it quantifies over, whereas the content of SCAL's presupposition is a series of likelihood orderings between $[\![\alpha]\!]^o$ and its alternatives. Without a defined ordinary value, SCAL will not result in a meaningful result, whereas ADD could simply quantify over all alternatives in $[\![\alpha]\!]^f$.

(55)   **The additive part of *even*:** (=42)
    ADD(α) ⤳ $\exists\, \varphi \in [\![\alpha]\!]^f \setminus [\![\alpha]\!]^o$ (φ true)
(56)   **The scalar part of *even*:** (=43)
    SCAL(α) ⤳ $\forall \varphi \in [\![\alpha]\!]^f \setminus [\![\alpha]\!]^o$ ($[\![\alpha]\!]^o <_{likely} \varphi$)
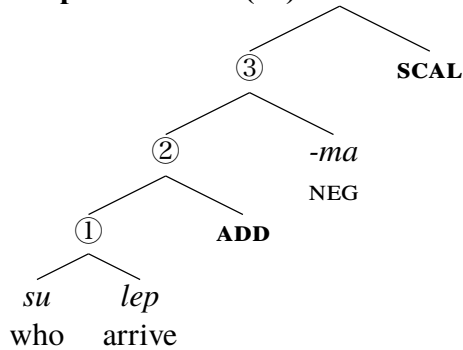
We propose to use the additive part of EVEN, ADD, to existentially quantify over the *wh*-alternatives and construct an indefinite. With this indefinite in place, its association with the scalar inference SCAL will form an NPI, in the same way as we saw above with ONE-EVEN NPIs. We demonstrate this approach with example (57) below:

(57)   ***Wh*-EVEN NPI:**
    Su-yang   lep-**ma**-song.
    who-EVEN arrive-NEG-PRFV
    'No one arrived.'

Following the analysis of ONE-EVEN NPIs, we will again interpret EVEN at a higher position at LF. We again assume that there is a derivational relationship of movement or agreement between its PF and LF positions, explaining the clause-mate requirement. But here, we will split EVEN into its two parts, ADD and SCAL, and allow these two meanings to scope at different positions at LF. ADD will take scope below the licensing operator—here negation—and SCAL will take scope above it. Again, the contribution of tense will not be illustrated here.

(58) **Proposed LF for (57):**

```
                  ③          SCAL
              ②      -ma
                     NEG
          ①      ADD
        su   lep
        who  arrive
```

Let us illustrate how this structure is interpreted. At ①, we have a focus-semantic value of a set of propositions, with no ordinary semantic value (59). Applying ADD, we yield the existential closure of the alternatives as the resulting presupposition, in (60). Notice that in the first step of (60), because the ordinary value of ① is undefined, nothing is removed from the set of alternatives quantified over.

(59) a. $[\![①]\!]^o$ undefined
      b. $[\![①]\!]^f$ = {that Tenzen arrives, that Tashi arrives, that Migmar arrives,…}

(60) ADD(①) ⤳ $\exists \varphi \in [\![①]\!]^f \setminus [\![①]\!]^o$ (φ true)

        = $\exists \varphi \in [\![①]\!]^f$ (φ true)
        = that Tenzen arrives OR Tashi arrives OR Migmar arrives …
        = $\exists x \, . \, x$ arrives

This existential in (60) is the source of the indefinite that will make our NPI analysis work. One issue, however, is that the ordinary semantic value at this point is still undefined. Here we propose to apply a version of Local Accommodation (Heim, 1983) to take the newly introduced presupposition of ADD (60) and use it as the ordinary semantic value at ②. We further assume that the focus-semantic values here are simply passed up to the mother node. This results in the following denotations at ②:

(61) a. $[\![②]\!]^o$ = $\exists x \, . \, x$ arrives = that someone arrives
      c. $[\![②]\!]^f$ = {that Tenzen arrives, that Tashi arrives, that Migmar arrives,…}

In the next step, negation simply applies point-wise, resulting in the following denotations. Notice that the ordinary semantic value, $[\![③]\!]^o$ already encodes the desired truth-conditions for the example as a whole.

(62)   a. $[\![③]\!]^o$ = NEG($\exists x$. x arrives) = that no one arrives
       b. $[\![③]\!]^f$ = {that Tenzen doesn't arrive, that Tashi doesn't arrive,
   that Migmar doesn't arrive,…}

Finally, SCAL yields the following presupposition:

(63)   **The presupposition of SCAL in (57/58):**
       $\forall \varphi \in [\![③]\!]^f \setminus [\![③]\!]^o$ ($[\![③]\!]^o <_{\text{likely}} \varphi$)
       = $\forall \varphi \in$ {that Tenzen doesn't arrive, that Tashi doesn't arrive,
                  that Migmar doesn't arrive,…}
              ((that no one arrives) $<_{\text{likely}} \varphi$)
       = ((that no one arrives) $<_{\text{likely}}$ (that Tenzen doesn't arrive)) AND
         ((that no one arrives) $<_{\text{likely}}$ (that Tashi doesn't arrive)) AND
         ((that no one arrives) $<_{\text{likely}}$ (that Migmar doesn't arrive))…

Notice that "that no one arrives" asymmetrically entails "that X doesn't arrive," for any individual X. The presupposition introduced by SCAL here will always be trivially satisfied. This same result will obtain as long as the same basic configuration as in (58) is established at LF: ADD scopes below a downward-entailing operator and SCAL takes scope above it.

Let us next consider what would happen if there were no downward-entailing operator in this structure. The LF representation we assume will still involve interpretation of ADD and SCAL higher in the clause, as in (64) below.

(64)   **Example LF for *wh*-EVEN NPI without a licensor:**

```
              ②            SCAL
            /    \
          ①      ADD
        /    \
      su      lep
      who    arrive
```
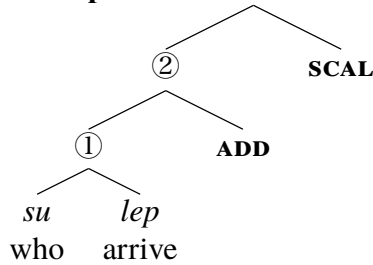
Nodes ① and ② are the same as in (58) above, so we can go directly to the interpretation of SCAL, given the denotations in (61) above:

(65)   **The presupposition of SCAL in (64):**
       $\forall \varphi \in [\![②]\!]^f \setminus [\![②]\!]^o$ ($[\![②]\!]^o <_{\text{likely}} \varphi$)
       = $\forall \varphi \in$ {that Tenzen arrives, that Tashi arrives, that Migmar arrives,…}
              ((that someone arrives) $<_{\text{likely}} \varphi$)
       = ((that someone arrives) $<_{\text{likely}}$ (that Tenzen arrives)) AND
         ((that someone arrives) $<_{\text{likely}}$ (that Tashi arrives)) AND
         ((that someone arrives) $<_{\text{likely}}$ (that Migmar arrives))…

Notice that the proposition "that someone arrives" is asymmetrically entailed by "that X arrives" for all individuals X. The likelihood orderings in (65) will thus never be true and this presupposition introduced in (64) will never be satisfied. This contrast explains *wh*-EVEN's dependence on an appropriate downward-entailing operator, following the basic logic developed by Lee & Horn (1994) and Lahiri (1998).

4.4.   Previous approaches to *wh*-EVEN NPIs

In this section we will briefly compare our analysis of *wh*-EVEN NPIs in DT to two previous approaches in the literature. Recall the general approach to NPIs developed by Lee & Horn (1994) and Lahiri (1998) and adopted here: that NPIs involve the scalar part of *even* associating with an indefinite. The question in the case of *wh*-EVEN NPIs is where the indefinite comes from.

In some languages, this is simply not a puzzle. In Korean, bare *wh*-words are ambiguous between interrogative and indefinite interpretations, the latter exemplified in (66a) below. Choi (2007) uses this *wh*-indefinite directly as the basis for a productive series of *wh*-EVEN NPIs. There is no process specific to the *wh*-EVEN NPIs which builds the indefinite.

(66)   **Korean has bare *wh*-indefinites and *wh*-EVEN NPIs (Choi, 2007: p. 24):**
    a.   Bare *wh*-indefinite: b.   *Wh*-EVEN NPI:
          Nwukwu oasse.   *Nwukwu-to* **an**   oasse.
          who   came   who-EVEN NEG came
          'Someone came.'   'No one came.'

In contrast, bare *wh*-words in DT do not have an indefinite use and must instead introduce a question (67). The simple analysis of Choi (2007) therefore cannot be straightforwardly applied to DT.

(67)   **Bare *wh*-words in DT cannot be indefinites:**
        Su   lep-song(-pe)
        who come-PRFV-Q
        'Who came?'
        * 'Someone came.'

Next we discuss Ramchand's (1996, 1997) pioneering discussion of *wh*-EVEN NPIs in Bangla. Like in DT, Bangla productively forms NPIs through the combination of *wh*-words and the particle *-o*, which appears independently in the language as an 'also/even' particle with both additive and scalar uses. An example is given in (68) below:

(68)   **Bangla *wh*-EVEN NPI (Ramchand, 1996: p. 4):**
        Tara   *kotha-o*   jay   **na**.
        they.NOM   where-EVEN go.PRES   NEG
        'They don't go anywhere.'

Ramchand analyzes *-o* in these NPIs as a "scope marker," indicating the projection of alternatives by the *wh*-word. She argues that it is synchronically distinct from the homophonous

'even/also' particle in the language (Ramchand, 1996: section 5.3). The alternatives introduced are then closed under a disjunction operation, equivalent to existential closure. However, this disjunction operation is not introduced compositionally. Ramchand (1996: p. 25) explains as follows:

> "I am claiming here that the 'disjunction' employed in the representation above, is a result of the notion of alternativity itself and is not contributed by any additional linguistic particle. In other words, a sentence which contains a phrase which only has a focus semantic value is equivalent to one which contains a narrow scope disjunction of possibilities."

In contrast, our proposal uses the additive part of the 'even/also' particle, ADD, to compositionally derive this indefinite from the semantics of the *wh*-word. We believe this compositional specificity is a unique and welcome aspect of our analysis. We will leave the extension of our approach to *wh*-EVEN NPIs in other languages for future work.

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