Presuppositional Compositionality with Japanese *mo*

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1. Introduction

This paper discusses the interpretation of Japanese sentences containing a numeral quantifier and the focus particle *mo*. A numeral quantifier (NQ) is a combination of a numeral and a classifier, i.e. the form [Num CL]; *mo* functioning as a focus particle is similar in meaning to English *even*.[1] When *mo* co-occurs with an NQ in a Japanese sentence, there are at least three different possible syntactic structures, and the scalar presuppositional effect differs depending on the structure. This is an interesting phenomenon since the pragmatic effect seems to be directly affected by syntax. In this paper, I will describe the relevant data and give an account as to how the pragmatic interpretation is derived for each case. Here we see how presupposition obeys syntax, and thus my claim will be that the presupposition of *mo* is computed in accordance with the syntactic structure. This indirectly supports Chierchia's (2004) claim that scalar implicature computation is part of function compositional process of sentence interpretation.

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[1] A sentence with Japanese *mo* can be semantically interpreted in various ways depending on the co-occurring elements in the sentence. In the literature, we can find discussions of at least the following four distinct uses:

(i) Universal quantifier *mo*, co-occurs with an indeterminate (e.g. Shimoyama 2006)
　　dono hito-mo　hashitta.
　　which person-MO ran
　　'Everyone ran.'

(ii) *Mo* as part of neg-oriented item, co-occurs with an indeterminate (e.g. Watanabe 2004)
　　dare-mo hashira-na-katta.
　　who-MO run-NEG-PAST
　　'Nobody ran.'

(iii) *Mo* as part of 'minimizer' neg-oriented item (e.g. Kato 1985)
　　hito-ri-mo hashira-na-katta.
　　1-CL-MO　run-NEG-PAST
　　'Not one person ran.'

(iv) Additive *mo* (e.g. Shudo 2002)
　　Taro-mo hashit-ta.
　　Taro-MO run-PAST
　　'Taro also ran.'

I assume that *mo* in these four cases is quantificational and semantically substantial (Kobuchi-Philip 2008), unlike the presuppositional *mo* which is more pragmatic. I discuss this distinction in section 5.2.

2. Three Syntactic Structures

When the particle *mo* co-occurs with an NQ in a Japanese sentence, there are at least three possible syntactic structures, as shown in (1)-(3):

(1) Floated NQ-*mo*
      gakusei-ga   [*20-nin-mo* hashit-ta].
      student NOM   20 CL MO run   PAST
      'As many as 20 students ran.'

(2) Discontinuous NQ-*mo*
      [*20-nin*-no gakusei]-*mo* hashit-ta.
       20 CL GEN student   MO run PAST
      'The 20 students also ran.' (#'As many as 20 students ran.')

(3) DP-internal NQ-*mo*
      [*20-nin-mo*-no gakusei]-ga hashit-ta.
       20 CL MO GEN student NOM ran PAST
      'As many as 20 students ran.'

In (1), the NQ *20-nin* is directly postposed by *mo* and the combined constituent *20-nin-mo* occupies a position left-adjacent to the predicate *hashitta* 'ran'. I will call this the 'floated NQ-*mo*' construction since here NQ-*mo* occupies the same position as a floated NQ, as exemplified in (4). I assume that floated NQ-*mo* belongs to the verbal domain, just as do other floated NQ (see, e.g. Kobuchi-Philip 2007):

(4) Floated NQ
      gakusei-ga   [*20-nin* hashit-ta].
      student NOM   20 CL run   PAST
      '20 students ran.'

The case in (2) I will call the 'discontinuous NQ-*mo*' construction, since the NQ is immediately followed by the case marker *no* and an NP, forming a nominal constituent, and then *mo* is attached to this constituent.[2]

Finally, in (3), an NQ and *mo* are directly combined with each other, just like (1); however, in (3) the combination NQ-*mo* is followed by a case marker *no* and an NP, forming a nominal constituent, and this entire phrase occupies an argument position, as it is followed by the nominative case marker *ga*.

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[2] The GEN element *no* in (2) is probably a copula rather than genitive case marker (Kuno 1973). For simplicity I gloss it as GEN since its exact identity is irrelevant for the present discussion.

3. Interpretations

Turning to the meanings of the sentences in (1)-(3), we first observe that, when the co-occurring NQ has focus stress, NQ-*mo* triggers scalar presupposition, just like English *even* (Karttunen and Peters 1979).

First, consider the floated NQ-*mo* sentence in an affirmative and a negative context. Here and throughout the paper boldface indicates focus stress:

(5)   a. affirmative context
           gakusei-ga   [***20-nin-mo*** hashit-ta].
           student NOM   20 CL MO run   PAST
           'As many as 20 students ran.'   (high)
        b. negative context
           gakusei-ga   [***20-nin-mo*** hashira-na-katta].
           student NOM   20 CL MO run   NEG PAST
           'As many as 20 students didn't run.'   (high)
           'Not even 20 students ran.'   (low)

In the affirmative context in (5a), the sentence truth-conditionally means '20 students ran', i.e. it has the same semantic interpretation as (4), which lacks *mo*. However, with *mo*, the sentence carries extra information about the speaker's expectation; it signals that the number associated with focus, namely twenty (students who ran) is greater than what the speaker would expect. Let us call this the 'high reading'. This reading is approximately expressed by the English expression 'as many as n'.

On the other hand, in the negative context in (5b), the sentence is ambiguous. It yields a high reading, i.e. the students who did not run were twenty in number and this is more than what the speaker would expect. In addition to this high reading, however, the sentence also may have a 'low reading'. In this case, the students who ran was less than twenty, and this is less than what the speaker would expect. (5b) is completely ambiguous between these distinct readings, while (5a) only has the high reading.

Next consider discontinuous NQ-*mo* in an affirmative and a negative context:

(6)   a. affirmative context
           [***20-nin*-no gakusei**]-*mo* hashit-ta.
            20 CL GEN student   MO run PAST
           'The 20 students also ran.'   ('also' reading)
           #'As many as 20 students ran.'   (#high)

    b. negative context
      [***20-nin***-no gakusei]-*mo* hashira-na-katta.
       20 CL GEN student   MO run   NEG PAST
      'The 20 students also didn't run.'   ('also' reading)
      #'As many as 20 students didn't run.'   (#high)
      'Not even 20 students ran.'   (low)

In the affirmative context in (6a), the high reading is not available, despite the presence of the NQ and *mo*. This sentence is not ungrammatical, however, since it does yield an interpretation with an 'also' reading of *mo*. But this reading is also available without focus stress, i.e. it does not invoke a scalar presupposition.

Turning to the negative context in (6b), we find that once again the high reading is impossible. In contrast, a low reading is perfectly acceptable. In addition, (6b) can have the 'also' reading of *mo* found with (6a). However, for (6b) as for (6a), the 'also' reading does not require focus stress and does not give rise to a scalar presupposition with respect to the NQ.[3] Thus, I will not discuss this reading in the remainder of the paper.

Finally, consider DP-internal NQ-*mo* in an affirmative and a negative context:

(7)   a. affirmative context
       [***20-nin***-*mo*-no gakusei]-ga   hashit-ta.
        20 CL MO GEN student   NOM ran   PAST
       'As many as 20 students ran.'   (high)
    b. negative context
       [***20-nin***-*mo*-no gakusei]-ga   hashira-na-katta.
        20 CL MO GEN student   NOM ran   NEG PAST
       'As many as 20 students didn't run.'   (high)
       #'Not even 20 students ran.'   (#low)

In the affirmative context in (7a), the sentence yields a high reading, just like (5a). On the other hand, in the negative context in (7b), the sentence turns out not to be ambiguous, unlike (5b); only a high reading is possible here.

The rather complicated set of data with respect to (5)-(7) above is summarized in the table in (8). The three NQ-*mo* constructions are listed on the left. In an affirmative and a negative context for each construction, the possibility of the high and the low readings is indicated by either √ (possible) or # (impossible):

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   [3] When the NQ in (6a,b) has focus stress, it yields a reading in which the particular set of twenty students is contrasted with some other contextually relevant set, e.g. '(These thirty students ran and) these twenty students also ran'.

(8) Data summary

	Construction	Context	High	Low	Description
i	Floated NQ-*mo*	aff.	√	#	high only
ii		neg.	√	√	ambiguous
iii	Discontinuous NQ-*mo*	aff.	#	#	no reading
iv		neg.	#	√	low only
v	DP-internal NQ-*mo*	aff.	√	#	high only
vi		neg.	√	#	high only

There are all together six different syntactic environments, as indicated by roman numerals. For most of these six cases the possible scalar presuppositional interpretations are distinct, as indicated in the rightmost columns. Floated NQ-*mo* only has a high reading in an affirmative context, but is ambiguous in a negative context. Discontinuous NQ-*mo* has no scalar presuppositional reading in an affirmative context and only a low reading in a negative context. Finally, DP-internal NQ-*mo* only has a high reading, but both in affirmative and negative contexts.

The idea that scalar presupposition may be regulated by syntax seems far-fetched. How, one wonders, could pragmatics depends on syntactic structure? However, the observations summarized in (8) suggest that syntax must somehow affect scalar presupposition in the case of NQ-*mo*.

4. Deriving the Interpretations

In this section I will give an account for the data in (8). Specifically, the question is how a high or a low reading obtains or does not obtain in each of the six cases. I will explain the derivation of the readings in the three sub-sections below, one for each construction.

4.1. Floated NQ-mo

Let us begin with the case (i) in (8); the floated NQ-*mo* sentence in an affirmative context. This was represented by the sentence (5a):

(5)   a. affirmative context
            gakusei-ga   [***20-nin***-*mo* hashit-ta].
            student NOM   20 CL MO run   PAST
            'As many as 20 students ran.'   (high)

The first question is why *mo* should give rise to a high reading in the first place. First, consider the following set of data:

(9)   a.   Even **John** ran.
       b.   **John**-mo hashit-ta.
             John MO run PAST
             'Even John ran.'

In the English sentence (9a), it is widely assumed, since Karttunen and Peters (1979), that *even* triggers a likelihood scale and the presupposition that the focused element *John* is placed low on the scale. That is, the sentence signals that the speaker considers John to be one of the least likely people to run. Exactly the same occurs with the Japanese counter-part in (9b).[4] Thus, *mo* functions as a scalar presupposition trigger, just like English *even*. Likewise, when *mo* is associated with an NQ, as in (5a), the focused element, in this case NQ *20-nin*, is placed low on the likelihood scale. More specifically, the speaker considers the number 20 to be less likely as the number of students who ran. However, this immediately raises a question as to why "less-likelihood" manifests itself here as the 'as many as 20' reading, rather than, say, an 'as little as 20' reading.

Nakanishi (2007) suggests that this less-likelihood is based on logical entailment. With respect to (5a), if it is true that twenty students ran, it is logically true that nineteen students ran. Because the set of situations in which twenty students ran is a subset of the set of situations in which nineteen students ran, the former is less frequent than the latter, and hence is perceived as less likely. The generalization is captured by the conditional in (10):

(10)   p is less likely than q if p entails q.   (Lahiri 1998, Chierchia 2004)

Due to the entailment relation, 'less likely' means a higher number when numbers are concerned. Formally, this can be represented as follows:

(11) $\lambda w \exists x [|x|=n \wedge student(x) \wedge ran(x,w)] \subseteq$
        $\lambda w \exists x [|x|<n \wedge student(x) \wedge ran(x,w)]$

(12) $\exists w \exists x [|x|=n \wedge student(x) \wedge ran(x,w)] <_{likelihood}$
        $\exists w \exists x [|x|<n \wedge student(x) \wedge ran(x,w)]$

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[4] Of course, English *even* and Japanese *mo* are not exactly parallel syntactically. English *even* is a word, while Japanese *mo* is a bound morpheme. *Even* can simply be added to a sentence as shown in (i). The same can be said for *mo* when it is associated with an adjunct, as illustrated in (iii); however, *mo* generally substitutes for an otherwise obligatory case marker when it is associated with an argument, as shown in (ii):
   (i)   John ran.   →   Even **John** ran.
   (ii)   John-ga   hashitta.   →   **John**-mo hashitta.
          John NOM ran   John MO ran
          'John ran.'   'Even John ran.'
   (iii) Mary-wa John-ni denwashita.   →   Mary-wa **John**-ni-mo denwashita.
          Mary TOP John to called   Mary TOP John to MO called
          'Mary called John.'   'Mary called even to John.'

In this way, the less-likelihood of *mo* can be seen to yield the 'as many as n' reading of the numeral, such that (5a) yields a high reading. NQ-*mo* generally yields an 'as many as n' reading in the default case.

Next, consider the negative case (ii) in (8), which was represented in (5b):

(5)   b. negative context
           gakusei-ga   [***20-nin**-mo* hashira-na-katta].
           student NOM   20 CL MO run   NEG PAST
           'As many as 20 students didn't run.'   (high)
           'Not even 20 students ran.'   (low)

Here the sentence yields the high reading we have just discussed, but in addition, it yields a low reading as well. With English *even*, it is well-known that the likelihood scale is inverted in a negative context, as shown in (13):

(13)   a.   Even **John** ran.
        b.   Even **John** didn't run.

In (13b), John is considered a person likely to run, while in (13a) he is considered a person unlikely to run. Karttunen and Peters (1979) account for this inversion of the likelihood scale in terms of scope. Given this analysis, one might hypothesize that (5b) should have only a low reading, contrary to the fact. However, note that NQ-*mo* in (5b) is an adverbial element, just like an ordinary floated NQ. An adverbial element is an adjunct and thus its position is more flexible than an argument (Hasegawa 1993). Given this flexibility, the ambiguity of (5b) can be explained in terms of scope, as Nakanishi (2007) also shows. In the interpretations of (5b) there are two alternative possible scope relations between NQ-*mo* and negation, as indicated in (14):

(14)   High reading: 20-mo > not
        Low reading: not > 20-mo

In fact, this two-way ambiguity exists even for an ordinary floated NQ sentence without *mo*, as shown in (15):

(15)   Floated NQ, negative sentence
        gakusei-ga,   *20-nin* hashira-na-katta.
        student NOM   20 CL   run   NEG PAST
        'There are 20 students who didn't run.'   (20 > not)
        'It is not the case that 20 students ran.'   (not > 20)

Since it is independently necessary to assume two possible scope relations between an NQ and NEG for a sentence such as (15), exactly in the same mechanism accounts for the two possible scope relations observed in (14). The ambiguity in question, possibly a syntactic ambiguity at LF, is summarized in (16):

(16)   gakusei-ga   [*20-nin-mo* hashira-na-katta].
          student NOM   20 CL MO run   NEG PAST
     a.   students   [20-mo [run not]]
     b.   students   [not [20-mo [run]]]

In this way, we can account for the ambiguity of (5b), between a high reading 'as many as 20 students didn't run' and a low reading 'not even 20 students ran'.

Having explained the ambiguity of floated NQ-*mo* in an affirmative context, let us now consider a curious generalization about all three NQ-*mo* constructions. Consider again the table in (8); note that a low reading does not obtain in an affirmative context for any of the three constructions. This is because the default reading of NQ-*mo* is a high reading, and a low reading arises only as an inverse scope reading with respect to negation. For this reason, a low reading can not possibly be licensed in an affirmative context.

4.2. *Discontinuous NQ*-mo

Next, let us consider the case (iii) in (8), which was represented in (6a):

(6)   a. affirmative context
            [*20-nin*-no gakusei]-*mo* hashit-ta.
              20 CL GEN student   MO run PAST
            #'As many as 20 students ran.'   (#high)

The peculiar fact here is that a high reading, a default reading with an NQ and *mo*, does not obtain in this sentence, despite the presence of the two lexical elements in an affirmative context.

In order to see what is going on here, we have to pay attention to the fact that what *mo* attaches to, namely [*20-nin*-no gakusei] '20 students', is a DP. This is apparent from the fact that *mo* can be replaced with a case marker, e.g. nominative *ga*. [NQ-*no* NP] is a full-fledged DP. Here, I assume the presence of a null determiner, following Kobuchi-Philip (2006).[5] Specifically, I assume there is a null indefinite 'a' here. Thus, '20 students' is really interpreted as 'a sum of 20 students'. Since *mo* 'as many as' is attached to this DP, it has the scope over the entire DP, as follows:

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[5] Briefly, the motivation for this 'null determiner hypothesis' is that, technically, a sentence with a bare NP or an NP associated with an NQ cannot formally be calculated to yield a truth value at the end of the function composition. In addition, assuming what is equivalent to English *a* or *the*, together with the plurality theory by Link (1983) and Landman (2000), the ambiguity with respect to indefiniteness/definiteness and singularity/plurality of the noun in a sentence such as (i) can be accounted for without any stipulation:
(i)   gakusei -ga   hashitta.
      student NOM ran
      'A student ran.' or 'Some students ran.' or 'The student ran.' or 'The students ran.'

(17)   a.   [[(a) ***20-nin***-no   gakusei]_{DP} –*mo*]
                    20 CL GEN student   MO
        b.   [as many as [_{DP} a sum of 20 students]_{DP}]_{MoP}

However, note that (17b) is illogical in meaning, because 'as many as' requires a high number, and being a singular, 'a' cannot satisfy this requirement. Therefore, no matter how high the numeral actually is, it systematically produces a contradictory statement. This is why the high reading is impossible.

    Next, consider the same construction in a negative context; the case (iv) in (8), which was represented in (6b):

(6)   b. negative context
            [***20-nin***-no gakusei]-*mo* hashira-na-katta.
             20 CL GEN student   MO run   NEG PAST
            #'As many as 20 students didn't run.'   (#high)
            'Not even 20 students ran.'   (low)

Here again, a high reading does not obtain; however, a low reading does. The reason that a high reading does not obtain is due to exactly the same cause as the case above. Note that the contradiction arose the minute the DP, which is singular, combined with *mo*, which required a high number. Thus, the presence of negation in the position somewhere lower in the structure has no effect. The situation can be roughly represented as follows:[6]

(18)   a.   [[(a) ***20-nin***-no gakusei]-*mo*] [hashira-na-katta].
                    20 CL GEN student   MO   run   NEG PAST
        b.   [[as many as [a sum of 20 students]]_{MoP} [didn't run]]

    An interesting interaction occurs, however, when the negation takes scope over the MoP, generating a low reading. Compare (19) with (18b):

(19)   [[[even [a sum of 20 students]]_{MoP} run] not]

Here, because negation takes scope over it, MoP can have a coherent meaning, yielding for (18a) the interpretation 'Not even a sum of 20 students ran.' Unlike 'as many as', 'not even' goes together perfectly well with the singularity of 'a' set of twenty students. Thus, wide scope negation saves the low reading. As a result, in this structure, only the low reading arises.

4.3. DP-Internal NQ-mo

Finally, let us consider the third construction; first in the affirmative context, the case (v) in (8), which was represented in (7a):

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    [6] I assume that what I label MoP (Mo Phrase: the phrase headed by *mo*), [DP-*mo*] in (18), is syntactically an adjunct in general, rather than an argument.

(7) a. affirmative context
  [***20-nin**-mo*-no gakusei]-ga hashit-ta.
    20 CL MO GEN student NOM ran PAST
  'As many as 20 students ran.' (high)

Here the sentence yields a high reading, just like the first construction in an affirmative context. This is predicted, because [NQ-*mo*] yields a high reading (an 'as many as n' reading) in the default, as we saw in the first construction. However, unlike the first construction, this time [NQ-*mo*] is embedded inside a DP rather than a VP. With the null determiner hypothesis we assumed above, then, the DP structure would be as follows:

(20) [a sum of [[as many as 20]$_{MoP}$ students]$_{NP}$]$_{DP}$

As can be seen in (20), 'as many as' directly combines with NQ, forming a MoP. This MoP combines with an NP, forming a larger NP, and this is what combines with the null determiner.

Now consider this DP in the negative context; case (vi) in (8), which was represented by (7b):

(7) b. negative context
  [***20-nin**-mo*-no gakusei]-ga hashira-na-katta.
    20 CL MO GEN student NOM ran NEG PAST
  'As many as 20 students didn't run.' (high)
  #'Not even 20 students ran.' (#low)

Here, the sentence yields a high reading but not a low reading. The exact syntactic position of the negative morpheme is under debate among Japanese linguists; however, no matter where it may be, it will definitely be outside of the DP. Japanese has no analog of English [no NP]. Thus, even if negation takes scope over the DP, it ends up yielding a high reading as follows:

(21) It is not the case that a sum of as many as 20 students run.

Since *mo* is embedded inside a DP, there is no possibility of an interaction between *mo* and the negation; the determiner blocks that interaction. Thus, the high reading of *mo* cannot possibly occur with negation. As a result, in this structure, only the high reading is possible.

5. Summary and a Note on Quantificational *mo*

5.1. Summary

In this paper, I have shown that NQ-*mo* yields a high reading in the default case, and that negation affects presupposition if syntax allows it to. Specifically, we

saw some cases where determiner *a* blocks the high reading (iii and iv) and a case where determiner *a* preserves the high reading (vi). This means that the scalar presupposition of Japanese *mo* does not penetrate a syntactic constituent, and thus, the conclusion is that scalar presupposition is locally computed in parallel with function composition. This, then, indirectly supports Chierchia's claim that scalar implicature computation is part of function compositional process of a sentence interpretation.

5.2. *Presuppositional and Quantificational* mo

As a last note, I would like to suggest that the presuppositional *mo* we discussed in this paper is distinct from the other *mo* in footnote 1, which yields the interpretation of universal quantification, negative polarity item, and additive.

     To start with, the *mo* we discussed in this paper is a focus particle; the one that involves focus stress on the associated NQ, as in (22b). Compare this with an ordinary floating NQ sentence in (22a):

(22)   a.   gakusei-ga   20-nin hashitta.
             student NOM 20 CL ran
             'Twenty students ran.'
      b.   gakusei-ga **20-nin**-mo hashitta.
             student NOM 20 CL   MO ran
             'As many as twenty students ran.'

The only meaning added to (22a) by *mo* in (22b) is reference to the speaker's expectation; there is no truth-conditional difference between (22a) and (22b). Clearly, *mo* in (22b) is purely a pragmatic element, without formal semantic content.

     On the other hand, *mo* I mentioned in footnote 1, repeated here as (23), seems to be semantically quite substantial:

(23)   a.   Universal quantifier *mo*, co-occurring with an indeterminate
             dono   hito-mo   hashitta.
             which person-MO ran
             'Everyone ran.'
      b.   *Mo* as part of neg-oriented item, co-occurring with an indeterminate[7]
             dare-mo hashira-na-katta.
             who-MO run-NEG-PAST
             'Nobody ran.'

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[7] In the literature *dare-mo* (LHH) and *nani-mo* (LHH) with a rising tone are often referred to as NPIs. However, part of the definition of an NPI generally assumed in the literature (e.g. Horn 1989) is that the NPI be under the scope of negation. This is a point of controversy with respect to the Japanese lexical items above (e.g. Kataoka 2006). In order to stay theory-neutral, I will use the term 'neg-oriented' here.

     c.   *Mo* as part of 'minimizer' neg-oriented item
         hito-ri-mo hashira-na-katta.
         1-CL-MO   run-NEG-PAST
         'Not one person ran.'

     d.   Additive *mo*
         Taro-mo hashit-ta.
         Taro-MO run-PAST
         'Taro also ran.'

In these sentences, *mo* does make a truth conditional contribution, especially with respect to quantification. Thus, we might call the former *mo* the 'presuppositional' *mo* and the latter 'quantificational' *mo*.

     The distinction between presuppositional and quantificational *mo* can also be supported by the prosodic facts. Consider the prosodic features of (23b) and (23c) as indicated in (24a) and (24b), respectively:

(24)   a.   dare-mo ... NEG
           LH H
       b.   hito-ri-mo ... NEG
           LH H H

Here, H (high pitch) is assigned for *mo*. When uttered in this manner, the indeterminate pronoun *dare* 'who' and the NQ *hitori* '1-CL' do not carry focus stress, and they yield only the quantificational reading as part of NPI. An interesting fact is that, at least with a minimizer construction such as (23c), the NQ could carry focus stress, as shown in (25):

(25)   hito-ri-mo . . . POS/NEG
       LH L L

Here, L (low pitch) is assigned for *mo*. When uttered in this manner, the NQ does carry stress, and *mo* is interpreted as presuppositional *mo*. As the reader can see, the presence of focus stress can be acoustically detected by the L or H pitch assignment on *mo* itself: If it has L assignment, its associate carries focus stress, while if it has H assignment, its associate does not carry focus stress. Consider the following set of three sentences (the relevant prosodic information is provided above each):

(26)   Presuppositional *mo* (With focus stress on NQ)
      a.   L   HLL L ←
         John-wa shukudai -o **ip-peegi**-mo yatta.
         John TOP homework ACC 1 page MO did
         'John has done as much as one page of his homework.' (high)

b.   L   HLL L ←
John-wa shukudai   -o **ip-peegi**-mo yatteinai.
John TOP homework ACC 1   page MO do-not
'John has not done as much as [one page] of his homework.' (high)
'John has not done even [one page] of his homework.' (low)

(27)   Quantificational *mo* (No focus stress on NQ)
                                     L   HHH H ←
John-wa shukudai   -o   ip-peeji-mo yatteinai.
John TOP homework ACC 1   page MO do-not
'John has not done a (any) page of his homework.'

In (26a-b), *mo* has L assignment and its associate, the NQ, carries focus stress, yielding a presuppositional reading (a high reading in the affirmative context 26a and a high or a low reading in the negative context 26b). On the other hand, in (27), *mo* has H assignment and the NQ does not carry focus stress, yielding a quantificational reading. Note that the interpretation of the low reading of (26b) and that of (27) seem very similar, describing the same truth conditional fact. However, the two interpretations are definitely distinct from each other in terms of the presence/absence of the presupposition. Thus, presuppositional *mo* and quantificational *mo* are distinct from each other and the prosodic feature of a sentence essentially determines the interpretation of the sentence.

In relation to this, consider the following set of sentences with a slightly different minimizer construction:

(28)   a.   John-wa **shukudai   ip-peegi** (-mo) yatte-inai.
            John TOP homework 1 CL   MO do   not
            'John has not done even [a single page of his homework].'
       b.   sora-ni-wa **kumo hito-tsu** (-mo) mie-nai.
            sky in TOP cloud 1   CL   MO see-not
            'Not even [one piece of cloud] can be seen in the sky.'

This construction is distinct from (26-27) in the sense that the NQ forms a constituent with the preceding NP. Although *mo* is optional in this construction, no matter whether it is present or absent, the focus stress is on the entire phrase *shukudai ip-peeji* 'homework 1-CL', or *kumo hito-tsu* 'cloud 1-CL', rather than just the NQ, and the sentence is interpreted with a presuppositional reading.[8] Note that the interpretation of (28) is quite different from the low reading of (26b), since the sentence in (28a) signals that the speaker considers that 'doing one page of homework', rather than, say, 'cleaning his room' is a minimum chore to do, yet John has not done even that, in fact he has not done anything. This differs from the low reading of (26b) since there only the NQ 'one page' carries focus stress,

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[8] This *mo* can be replaced with some other focus particles such as *sura* and *sae*. In either case, the particle here is optional at least on the surface. The reason for this optionality remains to be investigated.

as one can see that the scope of *even* is only for the NQ itself, as indicated in its English translation.

In this last subsection, I have suggested that the presuppositional *mo* and the quantificational *mo* are distinct from each other, and prosodic information differentiates them.

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