Scale structures in discourse: Discourse-pragmatic properties of Japanese comparative expressions

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Abstract. The Japanese *sore-yori* 'lit. than it' and *nani-yori* 'lit. than what' have a pragmatic use (in addition to semantic use), and their pragmatic functions are highly discourse-sensitive. In terms of scalarity, the pragmatic *sore-yori* is non-endpoint-oriented in that it conventionally implicates that *U* in *sore-yori*(*U*) is preferable to the previous utterance. In contrast, the pragmatic *nani-yori* is endpoint-oriented in that it conventionally implicates that *U* in *nani-yori*(*U*) is preferable to any alternative utterance. In this paper I argue (i) that these two types of scalar meanings at the level of conventional implicaure (CI) are derived compositionally by the single *yori* 'than', and (ii) that various kinds of discourse-pragmatic functions of *sore-yori* and *nani-yori*―such as "topic shifting" in *sore-yori*, and "priority listing" and "additive reinforcing" in *nani-yori*―automatically arise from the interaction between the expression's scale structures (endpoint vs. non-endpoint scales) and Grice's conversational maxims (relevance, manner). This paper shows that scale structures play a crucial role in managing the direction of discourse and that there is a rich interaction between CIs and general conversational maxims in pragmatic comparative expressions.

Keywords. scale structures; endpoint vs. non-end point scales; discourse; pragmatic comparative expressions; conventional implicatures; Gricean maxims

1. Introduction. In this paper, I will investigate the discourse-dependent pragmatic properties of the Japanese comparative expressions *sore-yori* 'lit. than it' and *nani-yori* 'lit. than what' and consider how scalarity and comparison are utilized in discourse structure.

The Japanese comparative expressions *sore-yori* and *nani-yori* can be used at the level of semantics, as shown in the following:

(1)   Hanako-no   keeki-wa sore-yori-(mo) ookii.
       Hanako-GEN cake-TOP it-than-MO   big
       'Hanako's cake is bigger than it/that.'
(2)   Kenkoo-ga   nani-yori-mo   taisetsu-da.
       Health-NOM what-than-MO important-PRED
       'Health is more important than anything.'

In (1), the sentence with *sore-yori* compares Hanako's cake with a contextually determined thing (possibly another cake) and denotes that the former is larger than the latter at the level of semantics. In (2), the sentence with *nani-yori* compares health with contextually related

alternatives (e.g., money, time, position) and semantically denotes that the former is more important than any alternative.[1]

However, *sore-yori-*(*mo*) and *nani-yori-*(*mo*) can also be used as an utterance modifier at the pragmatic level, as well:

(3) Sore-yori-(mo) syukudai   owa-tta?
     It-than-MO   homework finish-PAST
     '*Sore yori-mo*, did you finish your homework?'
(4) Nani-yori-(mo) Shizuoka-wa ondan-da.
     What-than-MO Shizuoka-wa warm-PRED
     'More than anything, Shizuoka is warm.'

In (3), *sore-yori-mo* compares a previous utterance (which is referred to by *sore*) and the at-issue utterance and denotes that the latter is more important. In (4), *nani-yori-mo* signals that the at-issue is the most important among possible alternatives concerning Shizuoka.[2]

The interesting aspect about the pragmatic use of *sore-yori* and *nani-yori* is that their pragmatic functions are highly discourse-dependent. For example, in (5B), *sore-yori* seems to shift the topic of the conversation (Kawabata 2002) or the discourse goal:[3]

(5) (Example of the pragmatic *sore-yori* (topic shifting))
     A: Sensei   osoi-ne?
        Teacher late-confirm.Q
        'The teacher is late, isn't she?'
     B: Sore-yori(-mo) kinoo-no   tesuto saiaku-da-tta.
        It-than-MO   yesterday-GEN test   terrible-PRED-PAST
        '*Sore-yori-mo*, yesterday's exam was terrible.'

However, in (6B), *sore-yori* is not used for shifting the goal or topic of the conversation, but rather it is used for comparing the previous utterance with the given utterance under the same goal (a question under discussion (QUD)(Roberts 1996)):

(6) (Context of denial in goal-internal comparison)
     Question: What kind of person is Taro?
     A: Taro-wa   atama-ga   ii-desu.
        Taro-TOP head-NOM good-PRED.HON
        'Taro is smart.'
     B: Iya, sore-yori-(mo) mazu Taro-wa   yasashii hito-desu.
        No that-than-MO   first Taro-TOP kind   person-PRED.HON
        'No, *sore-yori-mo*, first, Taro is a kind person.'

The discourse-pragmatic function of the pragmatic *nani-yori* is also discourse-dependent;

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[1] Note that *mo* in (1) is completely optional; however, for many native speakers, *mo* is necessary in (2). As we will discuss later, *mo* in a pure comparative sentence (without a wh-phrase) does not have a concrete meaning, whereas *mo* in a comparison with the indeterminate pronoun *nani* 'what' has a universal meaning.

[2] Note that unlike the semantic *nani-yori*, *mo* in the pragmatic *nani-yori* is optional. I will explain the difference between the semantic *nani-yori-mo* and the pragmatic *nani-yori-mo* in terms of compositionality.

3 In this paper, I use the term "goal" in the sense of Roberts' (1996) notion of "discourse goal," which is the aim to address particular questions in the conversation (i.e., the question under discussion (QUD)). Roberts' notion of discourse goals is different from Vanderveken's (2013) notion of linguistic goals. Vanderveken (2013) proposed the notion of "linguistic goal" based on the idea of speech act or direction of fit.

however, its discourse dependency is quite different from that of the pragmatic *sore-yori-mo*. As the following examples show, *nani-yori* can be placed at either the beginning or end of a sequence of utterances, and each use has a different pragmatic effect:

(7)   (Example of the pragmatic *nani-yori* (priority listing))
        A: What are the good points of Shizuoka?
        B: Nani-yori-(mo) Shizuoka-wa   ondan-desu.
           What-than-MO Shizuoka-TOP warm-PRED.HON
           Soreni tabemono-mo oishii-desu.   Kootuu-no   ben-mo
           And   food-also   good-PRED.HON. Transportation-GEN convenience-also
           ii-desu.
           good-PRED.HON
           'More than anything, Shizuoka is warm. Furthermore, food is good. Also, it is easy to access.'

(8)   (Example of the pragmatic *nani-yori* (additive reinforcing))
        A: What are the good points of Shizuoka?
        B: Soodesune. Shizuoka-wa   koutuu-no   ben-ga   ii-desu.
           Let's see   Shizuoka-TOP transportation-GEN convenience-NOM good-PRED.HON
           Tabemono-mo oishii-desu.   Soshite nani-yori-mo Shizuoka-wa
           Food-also   good-PRED.HON And   what-than   Shizuoka-TOP
           ondan-desu.
           warm-PRED.HON
           'Let's see. Shizuoka is easy to access. The food is also good. And more than anything, Shizuoka is warm.'

In (7), *nani-yori* has the function of priority listing: it behaves like "first of all." On the other hand, *nani-yori* in (8) is additive reinforcing, as it conveys the most important information at the end of the discourse sequence. In terms of the directionality of the flow of information, *nani-yori* in (7) uses a top-down strategy, whereas *nani-yori* in (8) uses a bottom-up strategy.

However, the following questions require further clarification: Why do *sore-yori-(mo)* and *nani-yori-(mo)* have these pragmatic functions? Where do the discourse-pragmatic functions of *sore-yori-(mo)* (goal-shifting/non-goal shifting) and the discourse-pragmatic function of *nani-yori-(mo)* (i.e., priority listing and additive reinforcing) come from? Can we analyze the meaning of *sore-yori* and *nani-yori* in a systematic fashion?

In this paper, I will argue that the scale structural properties of the pragmatic *sore-yori-mo* and *nani-yori-mo* play an important role in explaining their distinctive pragmatic functions. The pragmatic *sore-yori* is non-endpoint-oriented, as in (9a), in that it conventionally implicates that *U* in *sore-yori*(*U*) is preferable to the previous utterance. In contrast, the pragmatic *nani-yori* is endpoint-oriented, as in (9b), in that it conventionally implicates that *U* in *nani-yori*(*U*) is preferable to any alternative utterance ("|" stands for a standard of comparison):

(9) a. Non-maximum endpoint scale

        [------------|----------•---->
                        Target

    b. Maximum endpoint scale

        [---|---|---|---|---|---|---|---•
                        Target

In this paper I will argue (i) that two types of CI scalar meanings are derived compositionally by a single *yori* 'than' and the elements *yori* attaches to; and (ii) that various kinds of discourse-pragmatic functions of *sore-yori* and *nani-yori*—such as "topic shifting" in *sore-yori*, and "priority listing" and "additive reinforcing" in *nani-yori*—automatically arise from the interaction between the expression's scale-structures (i.e., (9a) and (9b)) and Grice's (1975) conversational maxims (relevance, manner). This paper shows that there are systematic scale structures in the pragmatic dimension and that they are utilized for various pragmatic strategies in a flexible way by interacting with general pragmatic principles.

2. The Japanese *sore-yori*-(*mo*) 'than it.' Let us first investigate the meaning and use of *sore-yori*-(*mo*). We will first look at the interpretation of the semantic *sore-yori*-(*mo*) and then consider the meaning and function of the pragmatic *sore-yori*-(*mo*).

2.1. THE MEANING OF THE SEMANTIC SORE-YORI-(MO). Let us consider the meaning of semantic *sore-yori*-(*mo*) based on (10):

(10)　Hanako-no　keeki-wa　sore-yori-(mo) ookii.
　　　 Hanako-GEN cake-TOP that-than-MO　big
　　　 'Hanako's cake is bigger than that.'

Sore-yori-(*mo*) in (10) is semantic in that its meaning is part of the truth condition of the given proposition. This is supported by the fact that the denial *sore-wa uso-da* 'No, that's false' can target the comparative meaning in (10). I assume that in Japanese comparative, the standard marker *yori* encodes a comparative meaning (Kennedy 2007; Hayashishita 2009; Sawada 2013):

(11)　$[[\text{yori}]] = \lambda x \lambda g \, \lambda y.\max\{d' \mid g(d')(y)\} > \max\{d'' \mid g(d'')(x)\}$

As for the meaning of a gradable predicate, I assume that gradable predicates represent relations between individuals and degrees (e.g., Klein 1991; Kennedy and McNally 2005).

(12)　$[[\text{ookii}]] = \lambda d \lambda x.\text{big}(x) = d$

Note that as I have briefly explained in the introduction, the particle *mo* is meaningless in *sore-yori*-(*mo*) and it does not affect the meaning of a sentence. The following figure shows the logical structure of (10):

(13)
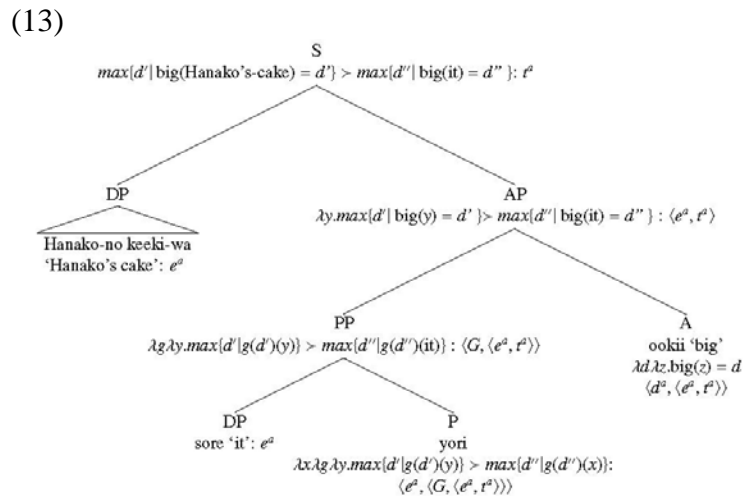
2.2. THE MEANING OF THE PRAGMATIC SORE-YORI-(MO). Now, let us start investigating the meaning and use of the pragmatic *sore-yori*-(*mo*). As we observed in Introduction, the pragmatic

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sore-yori-(*mo*) has goal-shifting and non-goal shifting uses. In the lexical level, I argue that both goal-internal and goal-shifting uses of *sore-yori* have the same CI; that is, "the at-issue utterance is more important than the previous utterance":

(14)   (Example of the pragmatic *sore-yori-*(*mo*) (non-topic shifting))
       Question: What kind of tennis player is Taro?
       A: Taro-wa   foaa-ga   umai-desu.
          Taro-TOP forehand-NOM good-PRED.HON
          'Taro is good at his forehand stroke.'
       B: Iya, sore-yori-(mo) (mazu) Taro-wa   saabu-ga   sugo-sugi-desu.
          No that-than-MO   first   Taro-TOP service-NOM great-too-PRED.HON
          At-issue: No, Taro is extremely great at his serve.
          CI: My utterance is more important than your utterance.

(15)   (Example of the pragmatic *sore-yori-*(*mo*) (topic shifting))
       A: Sensei   osoi-ne?
          Teacher late-confirm.Q
          'The teacher is late, isn't she?'
       B: Sore-yori-(mo) kinoo-no   tesuto saiaku-da-tta.
          It-than-MO   yesterday-GEN test   terrible-PRED-PAST
          At-issue: Yesterday's exam was terrible.
          CI: My utterance is more important than your utterance.

In the Gricean theory of meaning, CIs are considered as part of the meaning of words, yet these meanings are not part of "what is said" (e.g., Grice 1975; Potts 2005, Potts 2007; McCready 2010; Gutzmann 2015; Horn 2013; Sawada 2010, 2018). Furthermore, CIs have the semantic property of speaker-orientedness (by default) (Potts 2005, Potts 2007).

The pragmatic *sore-yori-mo* satisfies these criteria. First, the pragmatic use of *sore-yori-mo* is invariably speaker-oriented. Second, its meaning is logically and dimensionally independent of "what is said." This is supported by the fact that the meaning triggered by the pragmatic *sore-yori* cannot be challenged by the utterance "Not, that's not true."

(16)   Iya sore-wa   uso-da.
       No that-TOP false-PRED
       'No, that's false.'

Unlike semantic *sore-yori-*(*mo*), the denial cannot target the comparative meaning triggered by the pragmatic *sore-yori* in (14B) and (15B). It can only target the at-issue part of the B's utterance. Furthermore, the fact that the meaning triggered by *sore-yori* cannot be within the semantic scope of logical operators (such as past tense in (15B)) also supports that the pragmatic/discourse use of *sore-yori* is independent of "what is said."

Now, let us consider how the meaning of pragmatic *sore-yori-*(*mo*) is interpreted. First, I assume that there is another *yori* 'than' for a speech act modifier:

(17)   [[yori$_{PRAG}$]]: $\langle a^a, \langle a^a, t^s \rangle \rangle$
       $= \lambda U \lambda U'.$ max$\{d' \mid$ important$(U') = d'\} >$ max$\{d'' \mid$ important$(U) = d''\}$

The non-superscript *a* is the type for speech act; *U* and *U'* are the variables for type *a*; superscript *a* stands for the at-issue type; and superscript *s* stands for the shunting type. The pragmatic use of *yori* compares two utterances (speech acts) as its arguments and conventionally

implicates that the maximum degree to which the second utterance is important is greater than the maximum degree to which the first utterance is important.[4] Notice that in the pragmatic *sore-yori-mo*, the measure function "important" is built in the lexicon. No explicit gradable predicate is combined with *yori*. The pragmatic *yori* then combines with *sore*, which refers to a previous utterance:

(18) [[sore]]: $a^a = U_{PRE}$ (U_{PRE} stands for the previous utterance)

Sore and *yori* are then combined via the shunting operation (McCready 2010; Gutzmann 2012):
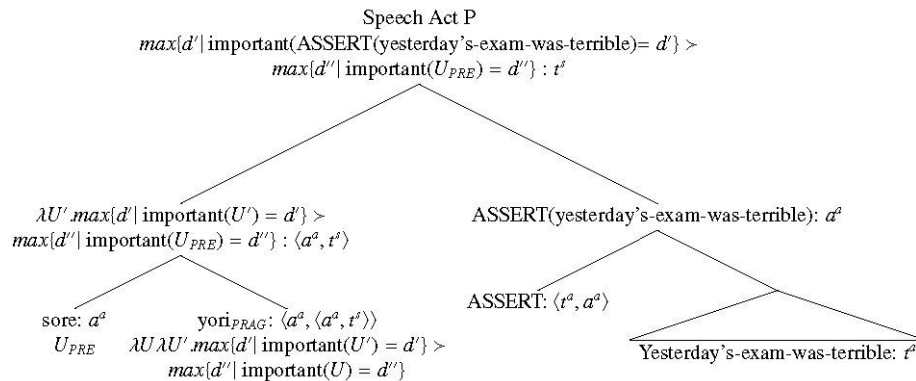
(19) The shunting application (McCready 2010)

$$\alpha(\beta) : \tau^s$$
$$\alpha : \langle \sigma^a, \tau^s \rangle \quad \beta : \sigma^a$$

(20) [[yori]]([[sore]]): $\langle a^a, t^s \rangle$
$$= \lambda U'. \max\{d' \mid \text{important}(U') = d'\} > \max\{d'' \mid \text{important}(U_{PRE}) = d''\}$$

The superscript *a* stands for the at-issue type, and the superscript *s* stands for the shunting type. The shunting type *s* is utilized for the interpretation of a special kind of CI content. The rule says that an α of type $\langle \sigma^a, \tau^s \rangle$ takes β of type σ^a and returns τ^s. Note that this rule is specific to certain CI meanings, namely, resource-sensitive CI. The rule is different from Potts's (2005) CI function application, which is resource-insensitive. *Sore-yori* then combines with a main utterance. As for the semantic representation of a speech act, following Stenius (1967) and Krifka (2001), I will assume the following type system. (22) shows the logical structure of (15B):

(21) a. Basic types: *e* entities, *t* truth values, *p* (=*st*) propositions, *a* speech acts.
      b. A speech act operator is a function from the type of sentence radical it selects to type *a*.
      c. The variables for type $a = \{U, U', U'', ...\}$

(22)

Speech Act P

$\max\{d' \mid \text{important}(\text{ASSERT}(\text{yesterday's-exam-was-terrible}) = d'\} >$
$\max\{d'' \mid \text{important}(U_{PRE}) = d''\} : t^s$

$\lambda U'.\max\{d' \mid \text{important}(U') = d'\} >$
$\max\{d'' \mid \text{important}(U_{PRE}) = d''\} : \langle a^a, t^s \rangle$

ASSERT(yesterday's-exam-was-terrible): a^a

ASSERT: $\langle t^a, a^a \rangle$

sore: a^a
U_{PRE}

yori$_{PRAG}$: $\langle a^a, \langle a^a, t^s \rangle \rangle$
$\lambda U \lambda U'.\max\{d' \mid \text{important}(U') = d'\} >$
$\max\{d'' \mid \text{important}(U) = d''\}$

Yesterday's-exam-was-terrible: t^a

One problem with this analysis is that the at-issue speech act (i.e., question) is not represented at the root level even though it is performed. I propose that the following interpretive rule applies to the embedded speech act:

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[4] Note that pragmatic *sore-yori* is different from the metalinguistic comparative *to iu-yori-mo* in (i)(Sawada 2014):
(i) Taro-wa   sensei-to   iu-yori-mo   gakusha-da
    Taro-TOP teacher-that say-than-MO scholar-PRED
    'Taro is more a scholar than a teacher.'

(23) Projection of a speech act: Interpret "$F(U)$: t^s" as

U: a^a

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$F(U)$: t^s

In the case of *sore-yori*, F corresponds to *sore-yori-mo*. By applying this rule to the root in (22), in the end, we get the following two-dimensional meanings:

(24)   QUEST(you-finish-your-homework): a^a

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max{d' | important(QUEST(you-finish-your-homework) = d' > max{d"| important(U_{PRE}) = d"}: t^s

2.3. DERIVING THE PRAGMATIC FUNCTIONS OF THE PRAGMATIC SORE-YORI-(MO). The question is how to distinguish between goal-shifting and goal-internal comparisons. I argue that the distinction between goal-shifting comparison and goal-internal comparison is determined by Grice's maxim of relevance; namely, it is determined by the extent to which U in *sore-yori(U)* is relevant to the "current" Question Under Discussion (QUD)(e.g., Roberts 1996). If the given utterance (the utterance associated with *sore-yori*) is less relevant to the current QUD, the comparison by *sore-yori* is interpreted as more goal shifting. For example, *sore-yori-(mo)* in (14) is interpreted as goal internal because the at-issue utterance is relevant to the current QUD (What kind of tennis player is Taro?). On the other hand, *sore-yori-(mo)* in (15) is interpreted as goal shifting because the given utterance is not directly related to the current QUD (The teacher is late, isn't she?). I would like to assume that *sore-yori-mo* in (15) is implicitly answering to a new QUD "What do you want to say?"

Note that goal-internal and goal-shifting comparison can be a continuum. The following example illustrates a goal-shifting comparison, but it is also pragmatically connected to the previous utterance (which itself is a QUD):

(25)   A: Ima-kara   tenisu si-nai?
          Now-from tennis do-NEG
          'Can't we play tennis now?'
       B: (Sore-yori-(mo)) syukudai-wa   owa-tta-no?
          It-than-MO   homework-TOP finish-PAST-Q
          '*Sore-yori-mo*, did you finish your homework?'

Here, B is asking a new question (i.e., introducing a new QUD), so it is natural to consider that the utterance is a goal-shifting comparison. Although B is introducing a new QUD, B's utterance is relevant to A's utterance (the QUD). Whether A can play tennis or not depends on whether A has finished his/her homework. The idea that B's question is relevant to A's utterance is supported by the fact that the utterance sounds natural even if we delete *sore-yori-mo*. This fact supports the idea that the distinction between goal-internal and goal-shifting comparisons is purely a matter of pragmatics.

3. The Japanese *nani-yori-mo*. Let us now turn our attention to *nani-yori-mo*.

3.1 THE MEANING OF THE SEMANTIC NANI-YORI-MO. Before considering the interpretive mechanism of the pragmatic *nani-yori-(mo)*, let us first examine the meaning of the semantic

nani-yori-mo based on the following example:[5]

(26)   Tennis-wa   nani-yori-mo   tanoshii.
       Tennis-TOP   what-than-MO   fun
       'Tennis is more fun than anything.'

The semantic *nani-yori-mo* uses the same lexical item *yori* as the semantic *sore-yori-mo*:

(27)   [[yori]] = {$\lambda x \lambda g \lambda y.\max\{d' \mid g(d')(y)\} > \max\{d'' \mid g(d'')(x)\}$}

What is different from the semantic *sore-yori-mo* is that the semantic *nani-yori-mo* combines with the indeterminate pronoun *nani*, which denotes a set of alternative individuals:

(28)   [[nani]] = {$x \mid x \in$ thing $\wedge C(x)$}

A contextual operator *C* ensures that *nani* 'what' only introduces contextually relevant alternatives. In analyzing the meaning of *nani-yori*, I use Hamblin's 1973 semantics for Japanese indeterminate pronouns (Kratzer and Shimoyama 2002; Shimoyama 2006) where *nani* combines with *yori* via pointwise application:

(29)   Pointwise Functional Application (Kratzer and Shimoyama 2002):

If α is a branching node with daughters β and γ, and $[[\beta]] \subseteq D_\sigma$ and $[[\gamma]] \subseteq D_{\langle \sigma, \tau \rangle}$, then $[[\alpha]] = \{a \in D_\tau : \exists b \exists c [b \in [[\beta]] \wedge c \in [[\gamma]] \wedge a = c(b)]\}$

If we apply this functional application to *nani-yori* in the individual reading, we can derive the following meaning (Note that *yori* in (27) is a singleton set):

(30)   The interpretation of *nani-yori* via pointwise function application
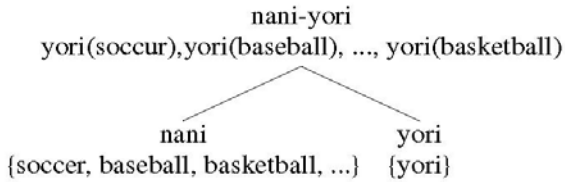
Note that the alternatives expand until they meet the universal operator *mo*, which selects them:

(31)   [[mo]] = {$\lambda P \lambda g \, \lambda y. \forall x [x \in$ thing $\rightarrow P(g)(y)]$}

Thus, if *mo* is combined with *nani-yori*, we get the following meaning:

(32)   [[mo]]([[nani-yori]]) =
       {$\lambda g \lambda z. \forall x [x \in$ thing $\rightarrow \max(g)(z) > \max(g)(x)] \mid x \in$ thing $\wedge C(x)$ }

Nani-yori-mo is then combined with the gradable predicate *tanishii* 'fun', which denotes a singleton set:

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[5] Unlike *sore-yori-mo*, for many native speakers, *mo* is necessary in the semantic *nani-yori-mo*. Furthermore, note that various kinds of indeterminate pronouns can be used for the semantic comparison:
(i) Hanako-wa   dare-yori-??(mo) yasashii.
     Hanako-TOP   who-than-MO   kind
     'Hanako is more kind than anyone.'
(ii) Tokyo-wa   nihon-no   doko-yori-??(mo) benri-da.
     Tokyo-TOP   Japan-GEN   where-than-MO   convenient-PRED
     'Tokyo is more convenient than anywhere in Japan.'

(33) $[[\text{tanoshii}]] = \{\lambda d\lambda x.\text{fun}(x) = d\}$

The following figure shows the logical structure of (26):

(34)
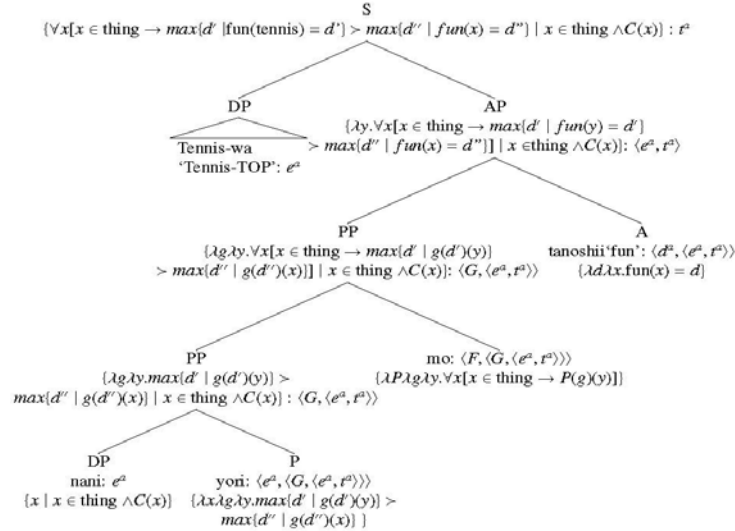
3.2. THE MEANING OF THE PRAGMATIC NANI-YORI-(MO). Let us now turn our attention to the pragmatic *nani-yori-*(*mo*). Similar to the case of the pragmatic *sore-yori-*(*mo*), the pragmatic *nani-yori* is a CI-triggering expression. The pragmatic *nani-yori-*(*mo*) conventionally implicates that the at-issue utterance is more important than any alternative utterance:

(35) Nani-yori-mo Shizuoka-wa atatakai.
      What-than-MO Shizuoka-TOP warm
      'More than anything, Shizuoka is warm.'

The idea that it is independent from "what is said" is supported by the fact that the denial cannot target the meaning of noteworthy comparison. For example, if we say "no, that's not true" after the noteworthy comparative utterance, the denial can only target the at-issue part of the utterance (i.e., Tokyo is safe):

(36) Iya, sore-wa uso-desu.
      No   that-TOP false-PRED.HON
      'No, that's false.' (Tokyo is not safe.)

Note that in the case of the semantic *nani-yori-mo*, a denial can target the comparative meaning.

Let us now consider how the meaning of the pragmatic *nani-yori-*(*mo*) is computed. I argue that the meaning of the pragmatic *nani-yori-*(*mo*) can be derived based on the same lexical item *yori* in the pragmatic *nani-yori-mo*:

(37) $[[\text{yori}_{\text{PRAG}}]] = \{\lambda U\lambda U'\ \max\{d' \mid \text{important}(U') = d'\} > \max\{d'' \mid \text{important}(U) = d''\}\}$

The superlative meaning of the pragmatic *nani-yori-mo* is derived by the meaning of *nani* and the universal particle *mo*. As for *nani*, I assume that it denotes a set of speech act:

(38) $[[\text{nani}]] = \{U \mid U \in \text{speech act} \wedge C(U)\}$

Then, the pragmatic *nani-yori* is combined with *mo*, which selects all the alternatives created by *nani* in (38):

(39) [[mo]]: $\langle\langle a^a, t^s\rangle, \langle a^a, t^s\rangle\rangle = \{\lambda O\lambda U'. \forall U[U\in\text{speech act} \rightarrow O(U')]\}$

The CI meaning in (39) is then combined with the main part of the utterance, the speech act. The following figure shows the logical structure of (35):

(40) The logical structure of the sentence with the pragmatic *nani-yori-(mo)*
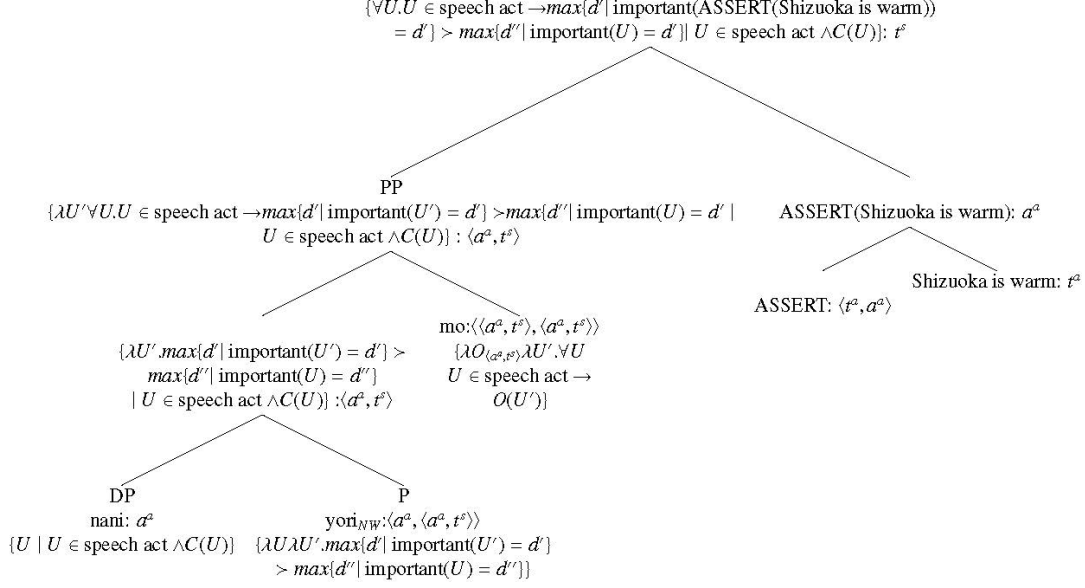
As in the case of the pragmatic *sore-yori-mo*, the argument of *nani-yori* (i.e., the at-issue speech act) is projected to the root level via the "projection of a speech act":

(41) $\{\text{ASSERT(Shizuoka is warm)}\}: a^a$

                            •

$\{\forall U.\ U\in\text{speech act} \rightarrow \max\{d' \mid \text{important(ASSERT(Shizuoka is warm))} = d'\} > \max\{d'' \mid \text{important}(U) = d''\}\mid U \in \text{speech act} \wedge C(U)\}: t^s$

    One puzzling point is that unlike the semantic *nani-yori-(mo)*, *mo* is optional in the case of the pragmatic *nani-yori-(mo)*. I would like to consider that *mo* is optional in the pragmatic *nani-yori-mo*, because the indeterminate pronoun *nani* 'what' is the only possible indeterminate pronoun that can be used at the CI level (*nani* is a speech act, but other indeterminate pronouns are not). In the case of the pragmatic *nani-yori-mo*, *mo* takes a CI-triggering expression to trigger a CI meaning, but this semantic operation is computationally redundant if we consider that *mo* always take *nani-yori* as its argument. There is a possibility that the pragmatic *nani-yori-mo* has been conventionalized, and as a result, *mo* can be dropped in the pragmatic use.

3.3. DERIVING THE PRAGMATIC FUNCTIONS OF THE PRAGMATIC NANI-YORI-MO. Let us now consider the discourse-dependent pragmatic functions of *nani-yori-mo*. As we have observed earlier, *nani-yori* can be placed at the beginning of a discourse sequence, which creates a "priority listing" effect (i.e., the top-down strategy), or it can be placed at the end of a discourse sequence, which creates an "additive reinforcing" effect (i.e., the bottom-up strategy):

(42) Top-down strategy (priority listing)
      A:Tokyo-no ii tokoro-tte   nan-desu-ka?
        Tokyo-GEN good point-TE what-PRED.POL-Q
        'What is a good point of Tokyo?'

B: Soo-desu-nee. Nani-yori-mo Tokyo-wa   anzen-desu.
   Let's see   what-than-MO Tokyo-TOP safe-PRED.POL
   Soreni benri-mo   ii-desu.
   Also   convenience-also good-PRED.HON
   'Let's see. More than anything, Tokyo is safe. Furthermore, Tokyo is convenient.'

(43)   Bottom-up strategy (additive reinforcing)
   A: Tokyo-no   ii   tokoro-tte nan-desu-ka?
          Tokyo-GEN good point-TE   what-PRED.POL-Q
          'What are the good points of Tokyo?'
       B: Soo-desu-ne. Tokyo-wa   benri-ga   ii-si   nigiyaka-desu.
          Let's see   Tokyo-TOP convenience-NOM good-and lively-PRED.HON
          Sosite nani-yori-mo, Tokyo-wa   anzen-desu.
          And   what-than-MO Tokyo-TOP safe-PRED.POL
          'Let's see. Tokyo is convenient, and it is lively. And more than anything, Tokyo is
   safe.'

I propose that the functions of "priority listing" and "additive reinforcing" naturally arise by obeying the Grice's maxim of manner: Be orderly. Because of the maxim of manner, the only possibility to place the most important information in order is to signal it at either the beginning or the end of a discourse sequence. This means that the maximum endpoint of the importance scale is mapped onto the edge of a temporal scale of a discourse, that is, the beginning or the end.

4. Relationship between *sore-yori-*(*mo*) and *nani-yori-*(*mo*). In sections 2 and 3, we discussed the meaning and use of the pragmatic *sore-yori-*(*mo*) and *nani-yori-*(*mo*) and considered how their pragmatic functions are pragmatically derived. The theoretical implication we get from our analysis is that the discourse-dependent pragmatic functions of *sore-yori* and *nani-yori* are restricted by their scale structures (which is represented at the CI level.)

(44)   a. Non-maximum endpoint scale

          [------------|----------●---->
                            Target
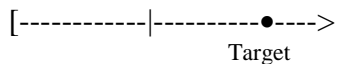
       b. Maximum endpoint scale
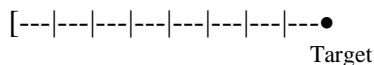
          [---|---|---|---|---|---|---|---●
                               Target
       ("|" stands for a standard of comparison.)

That is, scalar structures are the input for deriving pragmatic functions. This predicts that *sore-yori-*(*mo*) and *nani-yori-*(*mo*) cannot trigger the same pragmatic effects because the inputs are different; thus, this prediction is supported. As the following example shows, the pragmatic *nani-yori*, but not the pragmatic *sore-yori*, is awkward in the context of goal shifting:

(45)   (Context of goal shifting))
       A: Sensei   osoi-ne?
          Teacher late-confirm.Q
          'The teacher is late, isn't she?'
       B: {Sore-yori(-mo)/# nani-yori(-mo)} kinoo-no   tesuto saiaku-da-tta.
          It-than-MO   / what-than-MO yesterday-GEN test   terrible-PRED-PAST
          '{*Sore-yori-mo*/#*nani-yoi-mo*}, yesterday's exam was terrible.'

The pragmatic *nani-yori*(*-mo*) is inappropriate for goal shifting because *nani* 'what' is indefinite, and it cannot refer to a previous utterance. It just conventionally implicates that the at-issue utterance is the most important among other possible utterances.

By contrast, *sore-yori*-(*mo*), but not *nani-yori*-(*mo*), cannot trigger a function of priority listing nor can it have a function of additive reinforcing because these functions require a scale that has multiple standards:

(46) (Context of priority listing)
A: What are the good points of Shizuoka?
B: {Nani-yori(-mo) /# Sore-yori(-mo)} Shizuoka-wa   ondan-desu.   Soreni
    What-than-MO / It-than-MO   Shizuoka-TOP warm-PRED.HON also
    tabemono-mo oishii-desu.   Kootuu-no   ben-mo   yoi-
    food-also   good-PRED.HON. Transportation-GEN convenience-also good-
    desu.
    PRED.HON
    'More than anything, Shizuoka is warm. Furthermore, food is good. Also, it is easy to access.'

(47) (Context of additive reinforcing)
A: What are the good points of Shizuoka?
B: Soodesune. Shizuoka-wa   koutuu-no   ben-ga   ii-desu.
   Let's see   Shizuoka-TOP transportation-GEN convenience-NOM good-PRED.HON
   Tabemono-mo oishii-desu.   Soshite {nani-yori-(mo)/# sore-yori-(mo)}
   Food-also   good-PRED.HON And   what-than-MO/   it-than-MO
   Shizuoka-wa   ondan-desu.
   Shizuoka-TOP warm-PRED.HON
   'Let's see. Shizuoka is easy to access. The food is also good. And more than anything, Shizuoka is warm.'

Note that in the following conversation, both sore-yori and *nani-yori*-(*mo*) can naturally be used:

(48) (Context of denial in goal-internal comparison) [Question: What kind of person is Taro?]
A: Taro-wa   atama-ga   ii-desu.
   Taro-TOP head-NOM good-PRED.HON
   'Taro is smart.'
B: Iya, {sore-yori(-mo)/nani-yori-(mo)} mazu Taro-wa   yasashii hito-desu.
   No that-than-MO   what-than-MO first Taro-TOP kind   person-PRED.HON
   'No, *sore-yori-mo*/*nani-yori-mo*, first, Taro is a kind person.'

In this context, speaker B is denying A's utterance based on the goal-internal comparison. In this case, the use of *nani-yori*-(*mo*) is appropriate. Note, however, that the negative response marker *iya* 'no' is obligatory in the case of *nani-yori*-(*mo*). *Nani-yori*-(*mo*) is not referring to the previous utterance, but *iya* signals a negative response to the previous utterance.

Interestingly, both *nani-yori*-(*mo*) and *sore-yori*-(*mo*) can co-occur in the same sentence; however, there is an asymmetry in the ordering in that *sore-yori*-(*mo*) has to come first:

(49) (Context of denial in goal-internal comparison) [Question: What kind of person is Taro?]
A: Taro-wa   atama-ga   ii-desu.
   Taro-TOP head-NOM good-PRED.HON
   'Taro is smart.'

B:Iya, {sore-yori(-mo) nani-yori-(mo)/#nani-yori-mo   sore-yori-mo} Taro-wa
　No　that-than-MO　what-than-MO　what-than-MO it-than-MO　Taro-TOP
　yasashii hito-desu.
　kind　　person-PRED.HON
　'No, *sore-yori-mo/nani-yori-mo*, first, Taro is a kind person.

This seems to be explained based on information updating. In order to refer to the previous utterance, we need to first use *sore-yori*. If we first introduce *nani-yori-mo*, then it will compare every alternative, thus it is meaningless to refer to one specific utterance after a universal comparison.

5. Comparison to English pragmatic comparative expressions. We have considered the meanings and uses of the two kinds of comparative expressions in Japanese. Finally, let us briefly consider cross-linguistic variation of pragmatic comparative expressions by comparing Japanese and English data. Similar to Japanese, English also has pragmatic comparative expressions such as *more than that* and *more than anything*. The former can serve as an utterance modifier as in (50):

(50)　I felt happy. More than that, I felt relieved.

However, unlike *sore-yori*, it cannot be used in the context of rejecting a previous utterance:

(51)　A: What kind of person is Hanako?
　　　B: Hanako is smart.
　　　C: No, {??more than that/rather than that}, Hanako is a kind person.

Furthermore, the English *more than that* does not have the goal-shifting function:

(52)　(Context of goal-shifting comparison)
　　　A: Can't we play tennis?
　　　B: {# More than that/rather than that/instead of that} did you finish your homework?

In this context, the expressions such as *instead of that* or *rather than that* are more natural.
　　　However, as for English *more than anything*, it seems that its meaning and function are the same as those of the Japanese pragmatic *nani-yori-mo*. As the following examples show, *more than anything* has both "priority listing" and "additive reinforcing" functions:

(53)　Example of *more than anything* (top-down strategy)
　　　More than anything she is a Personal Achiever, where she scores unusually high. She is also very high as a Real Manager and as an Expert Idea Generator.
　　　(https://books.google.co.jp/books?isbn=1881052826)

(54)　Example of *more than anything* (bottom-up strategy)
　　　I want to show the U.S. Ski Team how I can ski, I want to show the country how I can ski, and more than anything, I want to show the diabetes community what's possible. I really did not want to have a blood-sugar episode on the biggest stage. I wanted this to be "You can do anything with this disease'—and I still totally believe that—but there are setbacks along the way. I got one more chance.
　　　(http://sportsillustrated.cnn.com/2010/olympics/2010/writers/david_epstein/02/23/freeman .diabetes/index.html)

How can we explain the similarities and differences between English and Japanese pragmatic comparatives? I would like to claim that the English standard markers *more than* and Japanese

yori in their pragmatic use have different meanings in the former, but not the latter, which has an additional additive component in that the standard of comparison satisfies a contextual standard of importance (I tentatively assume that the additive component is a presupposition):[6]

(55)   a. English: [[more than$_{PRAG}$]] =
           $\lambda U\lambda U'$: $\exists d[d \geq$ STAND $\wedge$ important$(U) = d]$. max$\{d' \mid$ important$(U') = d'\} >$ max$\{d'' \mid$ important$(U) = d'' \}$ (where U and U' are relevant to a goal of conversation)
       b. Japanese: [[yori$_{PRAG}$]] =
           $\lambda U \lambda U'$. max$\{d' \mid$ important$(U') = d'\} >$ max$\{d'' \mid$ important$(U) = d''\}$

However, essentially, when *yori* and *more than* are used in endpoint-oriented comparatives, their difference is neutralized. Both *more than anything* and *nani-yori-mo* denote that the given utterance is the most important among other alternatives; thus, they have the same superlative CI meaning and the same pragmatic functions (although there is a difference between them in the scalar value of alternatives.)

5. Conclusion
This paper investigated the discourse-pragmatic uses of Japanese comparative expressions *sore-yori-(mo)* and *nani-yori-(mo)* and considered their discourse-dependent pragmatic functions. I argued that the pragmatic *sore-yori-(mo)* is non-endpoint-oriented in that it conventionally implicates that the given utterance is more important than the previous utterance, whereas the pragmatic *nani-yori-(mo)* is endpoint-oriented in that it compares the given speech act with every contextually relevant alternative utterance. I then argued that the discourse pragmatic effects of each pragmatic comparative expression (such as topic shifting in *sore-yori-(mo)* and priority listing or additive reinforcing in *nani-yori*) automatically arise from the interaction between their scale structures (which are represented at the level of conventional implicature (CI)) and general pragmatic principles). This paper clarified that scale structures are utilized for various pragmatic purposes, and that scale structures play a crucial role in managing the direction of discourse. Furthermore, this paper also suggests that there is a rich interaction between CIs and general conversational maxims in natural language; therefore, it is important to examine both kinds of implicatures at the same time to understand fully the rule of CI expressions. In the future, I would like to investigate the mechanism of mapping from scale structure and discourse structure more theoretically and consider whether there can be pragmatic functions other than the discussed pragmatic functions in the pragmatic *sore-yori-(mo)* and *nani-yori-(mo)*.

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[6] It seems that it is not a coincidence that the pragmatic *more than that* has an additive component. As Thomas (2010) and Greenberg (2010) have observed, the English *more* has both comparative and additive (incremental) use. For example, in the additive (incremental) reading (i), the second sentence asserts that there are two beers in the fridge and presupposes that there are/were some other beers:
(i) There were five beers on the kitchen table. There are two more in the fridge. (Thomas 2010)
It seems that the pragmatic *more than that* is similar to the additive/incremental *more* in that it is adding additional information to the previous utterance.

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