On the Licensing of Understating NPIs: Manipulating the domain of degrees for Japanese *a(n)mari* and *sonnani* *

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Abstract Negative Polarity Items (NPIs) often has an effect of strengthening the statement. However, there are also NPIs that contribute to make a weaker claim such as *all that* (Israel 1996, 2006; van Rooy 2003). I analyze two kinds of such NPIs, namely the degree modifier *a(n)mari* and *sonnani* in Japanese, which roughly translate as 'very/much' and '(all) that'. In doing so, two points are considered: first, since the NPIs in question are a degree modifier, I would like to adopt a degree-based semantics and combine it with the idea of domain widening proposed for determiner NPIs such as *any*. In particular, building on a version of Chierchia (2006)'s framework, I consider domain widening in terms of domains of degrees. Second, to capture the nature of understatement, I refer to the notion of quality-based strengthening, rather than informativity/entailment-based strengthening (Israel 2006; Krifka 1995; van Rooy 2003).

Keywords: NPIs, degree modifiers, understatement, Japanese

1   Introduction

One of the most prominent characteristics of Negative Polarity Items (NPIs) is that they make the claim stronger and more informative, e.g. *If you move, I'll shoot you* vs. *If you budge an inch, I'll shoot you* (Kadmon & Landman 1993). In their analysis of *any*, Kadmon & Landman (1993) argue that it is the strengthening condition, in addition to domain widening, that determines the distribution of the NPI *any* and its meaning. However, not all NPIs share this characteristic. Some NPIs contribute to make a weaker claim, or understatement, such as *all that* as in *John is*(n't) all that tall* (Israel 1996, 2006; van Rooy 2003). By saying *John isn't all that tall* (he could be slightly taller than the standard or less), one is making a weaker claim than *John isn't tall* (less tall than the standard), as the former is entailed by the latter. If strengthening as well as widening is the key to understand the distribution of NPIs, then the question is whether the same holds for such understating NPIs.

In this paper, I analyze two adverbs in Japanese, *a(n)mari* and *sonnani*, both understating NPIs, that roughly translate as 'very/much' and '(all) that' respectively. The aim of analysis is two-fold. First, since the NPIs in question are a degree modifier, I would like to adopt a degree-based semantics and apply it to the domain widening analysis proposed to account for determiner NPIs like *any*. Particularly, I consider domain widening in terms of domain of degrees and build my analysis on a version of the framework by Chierchia (2006). Second, I explore the notion of strength, not only in terms of entailment-based strength, but also in terms of other pragmatic factor that affects the preference over alternatives. The key notion I refer to is quality rather than quantity of the information conveyed by the sentence, or relevance of the utterance (Krifka 1995; van Rooy 2003).

Section 2 presents data that shows *a(n)mari*'s unique distribution in contrast with *sonnani* and *all that*. Section 3 gives a brief review of the domain widening and strengthening approach and how it is implemented in Chierchia (2006). My analysis is presented in section 4, followed by a discussion and concluding remarks in 5.

2 An Observation: The distribution of *a(n)mari* and *sonnani*

2.1 Basic Patterns

I show a small paradigm with respect to the distribution of *a(n)mari* and *sonnani*. They are similar in that they both are degree modifiers and negative polarity understaters. However, they do not share the same licensing environments.[1]

As the contrast in 1-2 shows, adverbs *a(n)mari* and *sonnani* are polarity sensitive.[2] Both of them are ungrammatical in a simple affirmative sentence. In this sense, they are similar to English *all that* as in *It is*(n't)* **all that** *hot today.*

(1) Kyoo-wa   {*a(n)mari/*sonnani} atsui.
     Today-TOP {*a(n)mari/sonnani*}   hot

     Intended: 'It's very/all that hot today.'

(2) Kyoo-wa   {a(n)mari/sonnani} atsuku-**nai**.
     Today-TOP {*a(n)mari/sonnani*} hot-**not**

     'It isn't very/all that hot today.'

However, they behave differently in case of the following environments: 'because' adverbial clauses and questions. In adverbial 'because' clauses, *a(n)mari* is acceptable but *sonnani* is not.

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1 For other licensing environments that is not discussed here, see Matsui (to appear).

2 Abbreviations: ACC=Accusative Marker, CL=Classifier, GEN=Genitive Marker, NOM=Nominative Marker, NPST=Non-Past, Q=Question Marker, TOP=Topic Marker

(3)   Heya-ga   {a(n)mari/*sonnani} atsukatta-**kara**   eakon-o   tsuketa.
        Room-NOM {*a(n)mari/sonnani*}   hot.PAST-because A/C-ACC turned.on

        'I turned on the air conditioner, because the room was very/all that hot.'

A *because*-clause by itself is not a common possible NPI licenser, e.g. **Mary is upset because John ate <u>any</u> potatoes.* This raises a question with respect to the generalization of NPI licensing contexts. There have been several hypotheses to capture the property shared among various NPI licensing contexts, e.g. downward entailingness (Ladusaw 1980; von Fintel 1999), and non-veridicality (Giannakidou 1998, 2002). However, since 'because' clauses are factive, it does not seem non-veridicality would help. Furthermore, it does not seem to be a downward entailing (DE) context either.

To determine whether it is DE or not, we can follow the format below (von Fintel 1999).

(4)   A function $f_{\langle \sigma, \tau \rangle}$ is downward entailing iff for all x, y of type σ such that x entails ($\Rightarrow$) y: $P(y) \Rightarrow P(x)$.

Supposing that x = 'sparrow' and y = 'bird', x entails y. The environment 'I didn't see a ....' is DE because the entailment holds as in 5a. On the other hand, the environment 'I saw a ...' is not DE as in 6. The availability of *any* nicely corresponds to the DE-ness: it may appear in DE environments.

(5)   a. I didn't see a <u>bird</u>. $\Rightarrow$ I didn't see a <u>sparrow</u>.

        b. I didn't see **any** bird.

(6)   a. I saw a <u>bird</u>. $\nRightarrow$ I saw a <u>sparrow</u>.

        b. *I saw **any** bird.

According to the above scheme, 'because'-clauses are not DE.[3]

(7)   a. My cat got excited because she saw a <u>bird</u>.
                 $\nRightarrow$ My cat got excited because she saw a <u>sparrow</u>.

        b. *My cat got excited because she saw **any** bird.

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3 There might be a way to determine that 'because'-clauses are a kind of DE by adopting a presupposition incorporated version of DE, i.e. Strawson DE, depending on what we assume for the presupposition for *because*.

(1)   A function $f_{\langle \sigma, \tau \rangle}$ is downward entailing iff for all x, y of type σ such that x entails ($\Rightarrow$) y <u>and $f(x)$ is defined</u>: $P(y) \Rightarrow P(x)$.   (von Fintel 1999)

However, judging *because* clauses as SDE would be problematic too, since it would predict 7b to be grammatical.

This raises a question if DE-ness is an accurate characterization of NPI licensing contexts. What property of *a(n)mari* and what licensing mechanism derives this unique distributional pattern?

In questions, *sonnani* (and *all that*), but not *a(n)mari*, is acceptable.

(8)   Soto-wa   {*a(n)mari/sonnani} atsui-**no?**
        Outside-TOP {*a(n)mari*/sonnani} hot-Q

        'Is it very/all that hot outside?'

However, one thing to note is that the question 8 with *sonnani* (and *all that*) is acceptable only if the degree of hotness is mentioned earlier in the discourse and the speaker is referring to that degree, feeling suspicious if it is actually hot to that degree. For example, someone complained about the temperature, saying that it is too hot, but if you do not think it is THAT hot, the sentence 8 with *sonnani* is perfectly natural to utter (cf. *Is it <u>really</u> all that hot?*). *A(n)mari*, on the other hand, cannot be used in this way, and the sentence 8 is just ungrammatical.

So here is an empirical puzzle: what explains the fact that the two seemingly similar degree modifiers, which are both NPI understaters, show different licensing patterns with respect to 'because' clauses and questions? Moreover, how should we account for the polarity sensitivity of understating degree modifiers in the first place?

2.2   Additional Etymological Notes

Here are some additional facts about the two adverbs before I start my analysis. While they are both degree modifying adverbs, they have different lexical origins. Specifically, I would like to point out that *a(n)mari* has an intensifying or excessive meaning, and that *sonnani* may function as a degree anaphor.

Anmari is a derived form of *amari*, which is related to the verb *amaru* 'to exceed', 'to exist too much'.[4]

(9)   Jikan-ga   <u>amatta.</u>
        Time-NOM left.PAST

        'There's some (extra) time <u>left</u>.'

In its nominalized form, it functions as a suffix on measure phrases to mean '-plus'.

(10)   Sanjuu-nin-<u>amari</u>-no-hito-ga   kita.
        Thirty-CL$_{people}$-*amari*-GEN-people-NOM come.PAST

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4 The derived form *anmari* is rather colloquial and may be more emphatic (Nakamura 2010). Most of the times they are inter-changable, but in some cases, setting aside the register difference, *anmari* is preferred to *amari*, suggesting that they are not exactly equivalent. I do think that they should be lexically different, but I treat them equally at the moment.

'Thirty-<u>plus</u> people came.'

If it is in the form of *amari-**ni(-mo)***, it loses the NPI property (that is, it does not require negation for licensing) and means 'extremely' or 'way too'.

(11) <u>Amari-**ni(-mo)**</u> nedan-ga   takai.
      Amari-ni-mo   price-NOM high

      '(It) is way too expensive.'

(12) <u>Amari-**ni(-mo)**</u> omoshiroku-nai.
      Amari-ni-mo   interesting-not.NPST

      '(It) is way too uninteresting.' (NOT: '(It) is not way too interesting.')

For *anmari* (but not for *amari*), there is a usage of attaching it to the copula and mean 'to be too much' (with some negative connotation).

(13) Sore-wa   {anmari-da/*amari-da}.
      That-TOP {*anmari*-COP/*amari*-COP}

      'That is too much!!' ('That's unfair/unreasonable/etc.!!')

On the other hand, *sonnani* consists of *sonna* (an adnominal anaphoric or deictic 'that/such') and *ni* (an adverb forming particle/suffix).

(14) <u>Sonna</u>-hito-o   mita.
      Such-person-ACC see.PAST

      'I saw <u>such</u> a person.'

From a cross-linguistic perspective, it is not surprising to see a connection between degree anaphora/deictics and intensifying/hedging meaning, e.g. Umbach & Ebert (2009). *Sonnani* probably is one of such cases. However, unlike *so* or *such*, *sonnani* cannot be simply a degree anaphor. If it was, then *sonnani* in the following use in 15 should be acceptable. (Suppose that Person A, who is in Osaka, is speaking on the phone with Person B, who is in a different city.)

(15) a. A: Kyoo Oosaka-wa   monosugoku atsui.   Sanjuunana-do
            Today Osaka-TOPIC extremely   hot.NPST Thirty-seven-degrees

         aru   yo.
         exist.NPST SFP

         'It's extremely hot in Osaka today. It's 37 degrees (celsius).'

      b. B: Hee. Demo kocchi-mo {*<u>sonnani</u>/sore-gurai} atsui   yo.
            Oh. But here-also {*sonnani*/that-about}   hot.NPST SFP.

         'Oh. But it is THAT hot here too.'

Even though it has derived from the anaphoric expression and may still has that property, it seems to have some additional property that makes it polarity sensitive. In this paper, I will not be accounting for these facts shown in 9-15 in detail in my analysis below, but I take into account the fact that *a(n)mari* does mean excessiveness and that *sonnani* is essentially a degree anaphor (that refers to a salient degree in the discourse or in the speaker's mind).

3   Previous studies: Domain widening & strengthening

3.1   Domain widening and strengthening: Kadmon & Landman (1993)

According to Kadmon & Landman (1993), the determiner *any* is essentially an indefinite determiner with additional conditions 16b-c.

(16)   The meaning of *any NP*:

   a. Basic meaning: same as the indefinite (*a*) *NP*

   b. Widening: *Any* widens the interpretation of the common noun phrase along a contextual dimension (kinds, amount,...).

   c. Strengthening: The domain widened statement must entail the narrower one.

The combination of the two conditions explains the polarity sensitivity of *any potatoes* in the following way. From 16b, the interpretation of *potatoes* is widened with *any*. Suppose that the widened domain include not only the default cooking potatoes but also non-cooking potatoes (potatoes$_{cooking} \subset$ potatoes$_{wide}$). According to 16c, the statement must be stronger with the NPI. Under negation, the strengthening condition is met: By saying that you do not have potatoes, cooking or non-cooking, that entails that you do not have cooking potatoes either (I don't have potatoes$_{wide} \Rightarrow$ I don't have potatoes$_{cooking}$). However, without negation, the entailment doesn't hold: having some kind of potatoes, which could be cooking or non-cooking, does not entail having cooking potatoes. (I have potatoes$_{wide} \nRightarrow$ I have potatoes$_{cooking}$)

   The ungrammaticality of **I have any potatoes* is explained in terms of the failure of satisfying the strengthening condition. In other words, it is this pragmatic preference, i.e. 'say something semantically stronger and more informative', that makes the sentence ungrammatical (not infelicitous). There is a general question with respect to how this pragmatic condition interact with syntax and semantics of expressions that contains an NPI. At what point should widening be calculated into the meaning? At what point should the strengthening condition is checked whether it is satisfied? And how are these information encoded in the lexical item *any* and other NPIs?

3.2 The pragmatic enrichment operator: Chierchia (2006)

To overcome the general problem mentioned above, i.e. how to mediate the pragmatic notions such as strengthening and ungrammaticality of unlicensed NPIs, I follow the idea by Chierchia (2006). According to Chierchia, NPIs like *any* have an uninterpretable strong feature $[+\sigma]$, which activates alternatives in some way similar to focus (Rooth 1985). As an uninterpretable feature, it must be checked by an appropriate interpretable operator σ (via agreement). This σ operator takes care of pragmatic enrichment when interpreted.[5]

(17)

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              IP
            /    \
          σ       IP
                /    \
          I saw any[+σ] boy
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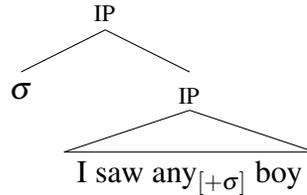
At the stage of semantic interpretation, first, a constituent that contains $[+\sigma]$ denotes a set of alternatives via ALT function.[6]

(18) a. $[\![\text{any}_{[+\sigma]}]\!] = \lambda P \lambda Q \lambda w[\exists w' \exists x \in D_{w'}[P_{w'}(x) \wedge Q_w(x)]]$

  b. . $\text{ALT}([\![\text{any}_{[+\sigma]}]\!]) =$
    $\{ \ \lambda P \lambda Q \lambda w[\exists w' \exists x \in D'_{w'}[P_{w'}(x) \wedge Q_w(x)] : D' \subseteq D \wedge D' \text{ is large} \ \}$
    Where D is the largest domain of all the possible individuals (e.g. $D = \{a,b,c\}$) and D' a smaller but not the smallest sub-domains (e.g. $D' = \{\{a,b\}, \{b,c\}, \{a,c\}\}$)

Then there is the operator σ, which enriches the statement pragmatically. One way it is interpreted is shown in 19 as E_C. It is sensitive to the alternative set generated by ALT, and not only it denotes the proposition p but also compares p with the alternatives and ranks p the strongest (the least likely) among all other alternatives.

(19) $E_C(p) = p \wedge \forall q \in C[p$ is stronger (hence less likely) than $q]$, where C = ALT

This is actually not the only way σ gets interpreted. In fact, Chierchia (2006) proposes two more different types of enrichment operation, i.e. O and O^-, that accounts for scalar implicatures and antiexhaustivity respectively. The choice among these is said to be determined by the nature of alternatives.

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5 In a sense similar to Assert operator in Krifka (1995).

6 To be precise, *any* in 18b is a 'fictional' *any*, as it only accounts for the NPI *any* and not the Free Choice (FC) use of *any*.

So, syntactically, the strong meaning operator σ licenses the uninterpretable feature $[+\sigma]$ that *any* carries. Semantically/pragmatically, this operator is responsible for the strengthening condition. It takes a proposition *p* and adds the *even*-like meaning to make sure that what is said (*p*) is the strongest (the least likely) of all other possible alternatives generated via ALT.

For example, the sentence **I saw any student*, whose syntactic structure is in 20a, is interpreted as in 20b. 20c shows the alternative set. The E operator now takes the original proposition and all other alternatives, compares them in terms of semantic strength (informativity), and makes sure that the original one is the strongest of all. Without negation, the condition is not satisfied and the sentence turns out to be ungrammatical.

(20) *I saw any student.

    a. σ [I saw any$_{[+\sigma]}$ student]

    b. $E_C(\exists w'\exists x \in D_{w'}[student_{w'}(x) \wedge saw_w(I,x)])$

    c. $\left\{ \ \exists w'\exists x \in D'_{w'}[student_{w'}(x) \wedge saw_w(I,x)] : \ D' \subseteq D \wedge D' \text{ is large} \ \right\}$

    d. $\exists w'\exists x \in D_{w'}[student_{w'}(x) \wedge saw_w(I,x)]$ is stronger than
                 $\exists w'\exists x \in D'_{w'}[student_{w'}(x) \wedge saw_w(I,x)]$

With negation, the stronger-than relation holds and the sentence is grammatical.

(21) I didn't see any student.

    a. $\sigma\neg$ [I saw any$_{[+\sigma]}$ student]

    b. $E_C(\neg\exists w'\exists x \in D_{w'}[student_{w'}(x) \wedge saw_w(I,x)])$

    c. $\left\{ \ \neg\exists w'\exists x \in D'_{w'}[student_{w'}(x) \wedge saw_w(I,x)] : D' \subseteq D \wedge D' \text{ is large} \ \right\}$

    d. $\neg\exists w'\exists x \in D_{w'}[student_{w'}(x) \wedge saw_w(I,x)]$ is stronger than
                 $\neg\exists w'\exists x \in D'_{w'}[student_{w'}(x) \wedge saw_w(I,x)]$

Here, the σ operator is taking scope over negation. If it was the other way around, then it produces the same unreasonable implicature seen in 20d. As Chierchia notes, it is assumed that at the point when the σ operator is interpreted, it "freezes" or "locks in" the implicature.

This approach maintains the original widening and strengthening view (Kadmon & Landman 1993; Krifka 1995; Lahiri 1998): NPIs trigger alternatives, and the domain-widened expression is checked against the alternatives. Alternatives are computed by an alternative deriving interpretation function (similar to Rooth (1985)'s alternative semantics for focus). The σ operator is adjoined to IPs (at a clausal level). Thus, the pragmatic computation (implicatures) can be factored in a recursive, compositional manner (not just when an utterance is completed).

3.3   Customizing the system

The next thing we need to consider is how to extend this to the case of *a(n)mari* and *sonnani*. There are two things to be considered: kinds of domain to be manipulated, and the notion of strength. First, in case of the determiner *any*, the relevant domain under discussion was the domain of individuals. What domains should we consider for degree modifiers like *a(n)mari*? Assuming a degree-based semantics for gradable predicates, I suggest that it is the domain of degrees. In fact, the idea of manipulating the domain of degrees is not new. For example, Morzycki (To appear) implements such an idea to account for the meaning of extreme degree modifiers such as *downright* and *flat-out*. Although those degree modifiers are not NPIs, as he notes, we can think of those modifiers as something that only contributes to some kind of domain manipulation but not to strengthening (at least not having the same pragmatic effect).[7]

Second, as already pointed out in section 1, what becomes crucial in analyzing understating NPIs like *all that*, *a(n)mari* and *sonnani* is that they do not actually strengthen the claim like *any* or *at all* do, but rather weaken the claim. In terms of Chierchia's system, the part that needs an adjustment is the interpretation of the σ operator that is associated with NPIs. So far, the only interpretation of σ in case of NPI licensing is E in 19, which accounts for the entailment/informativity-based strengthening.

However, as van Rooy (2003) points out, the existence of understating NPIs "is a threat to any approach that tries to explain the acceptability of NPIs under negation in terms of a notion of strength. Indeed, if strength should always be measured in terms of informativity, [understating NPIs] are clear counterexamples to the proposed analysis". This is precisely true, and is directly relevant to the issue of *a(n)mari*. Instead of informativity, van Rooy (2003) adopts the notion of relevance for the measurement of strength. The idea is that, depending on how the speaker wants to reach a goal of the conversation, a less informative claim could be more relevant than more informative ones as it avoids the speaker to make a commitment to the utterance. In fact, domain widening itself does not always have to be tied up with the informativity-based strengthening. For example, in their analysis of the determiner *irgendein* in German, Kratzer & Shimoyama (2002) assume that "...domain widening might serve any of the following reasons: (a) strengthening of the claim, (b) avoiding a false claim, (c) avoiding a false exhaustivity inference". Assuming that understaters have a domain widening function, it could be the case that its reason is to avoid a false claim or something similar related to quality of the

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7 Morzycki (To appear) uses the term 'domain expansion' to keep it distinct from 'domain widening' in the sense of Kadmon & Landman (1993). In fact, the way domain widening occurs in his analysis is not equivalent to the one I am implementing.

claim.

In the next section, I will propose my analysis building on Chierchia's framework with some adjustments as needed, particularly with respect to kinds of domain and the notion of strength.

4 Analysis: the NPI *a(n)mari* and *sonnani*

In section 4.1 I first outline my idea using the basic cases, i.e. the simple affirmative and negative sentence with the two adverbs, and show how their grammaticality can be accounted for. Section 4.2 and 4.3 deals with 'because' clauses and questions respectively.

4.1 The basic cases

I propose that the semantics of both *a(n)mari* and *sonnani* are essentially the same as that of intensifiers such as 'very'. However, unlike 'very' or other degree modifiers, they behave as NPIs, because (i) they are alternative-sensitive elements, and (ii) they associate with a particular operator that compares the statement in terms of pragmatic relevance in contrast with the alternatives. Furthermore, I suggest that the difference between *a(n)mari* and *sonnani* comes from their different ways of generating alternatives and the way the operator works.

Following Chierchia's idea, let us start by assuming that *a(n)mari* has an un-interpretable strong feature $[+\sigma]$, which calls for a corresponding operator σ, the pragmatic enrichment operator. 22a shows the basic meaning, which is very much like that of the degree modifier 'very' as in Kennedy & McNally (2005). It takes a gradable predicate G of type $\langle d, et \rangle$, and provides a degree that exceeds the standard degree of G-ness by some significant amount ($>_!$). I further assume that the standard is determined relative to the domain of degrees (i.e. it depends on the domain whether it can be considered G or not).[8] The result of applying the ALT function is in 22b. Here, I assume D is the set of all possible degrees salient on the scale available in the present context, and D' as the subset of D.[9] $max(D') < max(D)$ ensures that the largest domain D in fact includes the greatest degree possible on the scale that is not available in any other smaller domain D'.

(22) a. $[\![\text{a(n)mari}_D]\!] = \lambda G_{\langle d,et \rangle} \lambda x [\exists d \in D[G(d)(e) \wedge d >_! Stnd(G)(D)]]$

  b. $\text{ALT}([\![\text{a(n)mari}_D]\!]) = \left\{ \begin{array}{c} \lambda G_{\langle d,et \rangle} \lambda x [\exists d' \in D'[G(d')(e) \wedge d' >_! Stnd(G)(D')] : \\ D' \subset D \wedge max(D') < max(D) \end{array} \right\}$

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8 In a sense, this functions like a contextually determined comparison class in Kennedy & McNally (2005).

9 In this respect, I am departing from the domain 'expansion' proposed in Morzycki (To appear), where $D' \supset D$.

As Chierchia notes, syntactically, the operator appear as σ, and its interpretation actually depends on the semantic nature of the alternatives. Here, I suggest that the pragmatic enrichment happens slightly differently from the way it happened in the earlier case of *any*.

(23) $M_C(p) = p \wedge \forall q \in C[p$ is less refutable (hence modest) than $q]$, where C = ALT

Similar to the σ operator, it is sensitive to the alternative set, and it compares the proposition p with the alternatives and ranks p the least refutable, least controversial claim that requires less evidence. In this way, the claim will be 'stronger' in terms of quality.

Sonnani also has the σ feature and it is alternative-sensitive.

(24) a. $[\![\text{sonnani}_D]\!] = \lambda G_{\langle d,et\rangle}\lambda x[\exists d \in D[d >_! Stnd(G)(D) \wedge G(d)(e)]]$

b. $\text{ALT}([\![\text{sonnani}_D]\!]) = \left\{ \begin{array}{l} \lambda G_{\langle d,et\rangle}\lambda x[\exists d' \in D'\text{-}D[d' >_! Stnd(G)(D') \wedge G(d')(e)] : \\ D \subset D' \wedge max(D) < max(D') \end{array} \right\}$

However, unlike the domain D' provided in $a(n)mari$, the alternative domain D' in *sonnani* is the one that contains the original one D whose maximal degree exceeds the one of D. Accordingly, the interpretation of σ operator differs from the one in 23 for $a(n)mari$. I tentatively adopt the version of E in 19, repeated below.

(25) $E_C(p) = p \wedge \forall q \in C[p$ is stronger (hence, less likely) than $q]$, where C = ALT

Let us see how the two work with the data presented earlier in section 2. First, take the the affirmative case as in 26, which is ungrammatical.[10]

(26) a. *A(n)mari atsui.
       A(n)mari hot.NPST

       Intended: '(It) is very hot.'

       b. σ [a(n)mari$_{[+\sigma]}$ hot]

       c. $M_C(\exists d \in D[hot(d) \wedge d >_! Stnd(hot)(D)])$

       d. $\{\ \exists d' \in D'[hot(d) \wedge Stnd(hot)(D')] : D' \subset D \wedge max(D') < max(D)\ \}$

       e. $\exists d \in D[hot(d) \wedge d >_! Stnd(hot)(D)]$ is less refutable than $\exists d' \in D'[hot(d') \wedge d' >_! Stnd(hot)(D')]$

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10 I am ignoring the expletive 'it' (which is invisible in Japanese) and the time expression 'today'. I could assume that the gradable predicate that is modified by $a(n)mari$ is of type $\langle d,t\rangle$, and that there is an implicit argument (something like 'the weather') that fills the argument position (λx) of 'hot'.

In the above example, it basically means what it is intended to be, i.e. 'it's very hot'. However, because there is the σ operator (whose existence is induced by the strong $[+\sigma]$ feature on $a(n)mari$), there is a comparison made between the original proposition and the alternatives with respect to the quality of the claim. What is said in 26e is that, the claim 'it is very$_D$ hot' is weaker than all other alternatives 'it is very$_{D'}$ hot'. Suppose that the maximal degree of the largest domain D is 100 degrees Fahrenheit. Having 100 degrees on top of the scale, let us suppose that, in order to be said it is significantly hot, it must be above 90 degrees. Whereas for the smaller domain D', whose maximum degree is less hot than that of D (say, 90 degrees), in order to be said it is significantly hot, let us say that it must be above 80 degrees. In this way, the standard degree of 'very hot' is lower in D' than D. Therefore, the comparison is between 'it is very$_D$ hot' (there exists a degree above 90 degrees) versus 'it is very$_{D'}$ hot' (there exists a degree above 80 degrees). In terms of entailment, the former entails the latter, hence it is stronger. But here, the strength is measured differently, i.e. the weaker the better. So the condition in 26e is not met, hence it is ungrammatical.

With *sonnani*, the ungrammaticality is explained in a slightly different way.

(27)   a. *<u>Sonnani</u> atsui.
           Sonnani   hot.NPST

        '(It) is all that hot.'

        b. σ [sonnani$_{[+\sigma]}$ hot]

        c. $E_C(\exists d \in D[d >_! Stnd(hot)(D) \wedge hot(d)])$

        d. $\{ \ \exists d' \in D'\text{-}D[d' >_! Stnd(hot)(D') \wedge hot(d')] : D \subset D' \wedge max(D) < max(D') \ \}$

        e. $\exists d \in D[d >_! Stnd(hot)(D) \wedge hot(d)]$ is stronger (less likely) than $\exists d' \in D'[d' >_! Stnd(hot)(D') \wedge hot(d')]$

The sentence again basically means that it is hot to some significant degree. Since *sonnani* is alternative-sensitive, it generates the alternatives via ALT. Unlike $a(n)mari$, the alternative domain D' is larger than the original D and its maximal degree exceeds that of D. Thus, when the σ operator takes the proposition and compare it to the alternatives, the stronger-than relation does not hold: 'it is that$_D$ hot' (say, above 80 degrees) is LESS stronger than 'it is that$_{D'}$ hot' (above 90 degrees), as the former is entailed by the latter.

When there is a negation, the situation is reversed for both $a(n)mari$ and *sonnani*.

(28)   a. <u>A(n)mari</u> atsuku-**nai**.
           A(n)mari hot-**not**.NPST

        '(It) isn't very hot.'

        b. $\sigma\neg$ [a(n)mari$_{[+\sigma]}$ hot]

12

c. $M_C(\neg\exists d \in D[hot(d) \wedge d >_! Stnd(hot)(D)])$

d. $\{\ \neg\exists d' \in D'[hot(d) \wedge Stnd(hot)(D')] : D' \subset D \wedge max(D') < max(D)\ \}$

e. $\neg\exists d \in D[hot(d) \wedge d >_! Stnd(hot)(D)]$ is less refutable than
$\qquad \neg\exists d' \in D'[hot(d') \wedge d' >_! Stnd(hot)(D')]$

(29)   a. <u>Sonnani</u> atsuku-**nai**.
     Sonnani hot-**not**.NPST

   '(It) isn't all that hot.'

   b. $\sigma\neg\,[\ a(n)mari_{[+\sigma]}\ hot]$

   c. $E_C(\neg\exists d \in D[d >_! Stnd(hot)(D) \wedge hot(d)])$

   d. $\{\ \neg\exists d' \in D'\text{-}D[d' >_! Stnd(hot)(D') \wedge hot(d')] : D \subset D' \wedge max(D) < max(D')\ \}$

   e. $\neg\exists d \in D[d >_! Stnd(hot)(D) \wedge hot(d)]$ is stronger (less likely) than
   $\qquad \neg\exists d' \in D'[d' >_! Stnd(hot)(D') \wedge hot(d')]$

Contrary to the situation in 26, it is indeed the case that 'it is not very$_D$ hot' (there is no degree above 90 degrees) is weaker than 'it is not very$_{D'}$ hot' (there is no degree above 80). Hence, the condition in 28e is met and it is grammatical. Likewise, contrary to 27, the stronger-than relation holds in 29. 'It is not that$_D$ hot' (no degree above 80) entails 'it is not that$_{D'}$ hot' (no degree above 90). The stronger-than relation holds and it is grammatical.

It is shown that the two NPI adverbs, even though they are both understaters, are licensed differently, i.e. the content of the alternatives and the operator that ensures the pragmatic status of the statement with respect to the alternatives. One motivation behind this –making a distinction between the licensing mechanism of *a(n)mari* and that of *sonnani*– is that they do behave differently after all, particularly in 'because' clauses and questions.

4.2 'Because' clauses

Let us remind ourselves that in 'because' clauses, *a(n)mari* is acceptable but *sonnani* is not.

(30)   {A(n)mari/*Sonnani} atsukatta-**kara**   eakon-o   tsuketa.
     {A(n)*mari*/Sonnani}   hot.PAST-because A/C-ACC turned.on

   'I turned on the air conditioner, because it was very/that hot.'

   First, the curious case of *a(n)mari* being licensed in 'because' clauses can be explained in the same way as the basic cases above with one assumption about the syntactic position of the operator.

(31)   a. $\sigma\,[\,[\ a(n)mari_{[+\sigma]}\ hot\ ]$-because turned on AC $]$

b. $M_{\rm C} \left(\text{CAUSE}(\exists d \in D[d >_! Stnd(hot)(D) \wedge hot(d)])(turn\text{-}on(AC)) \right)$

c. 'I turned of the AC because it was very hot$_D$' is less refutable than 'I turned of the AC because it was very hot$_{D'}$'

Assume that the hotter it is, the more likely people are to turn on the air conditioner. The claim that your turning on the air conditioner is caused by extreme hotness (above 90 degrees) is then more likely and less refutable than the claim that regular hotness (above 80 degrees) causing you to turn on the air conditioner. The intuition is that, in order to say 'P, because Q', one has a certain belief about the relation between P and Q. If one has a strong belief such as 'whenever Q, P' or 'P iff Q', the person would be confident in saying 'P, because Q' and be confident in his/her own reasoning. It might be important to have the assumption 'the hotter it is, the more likely (less refutable, less controversial) for people to turn on the air conditioner' in order to calculate what is more likely and less refutable.

This explanation only holds if we assume that the operator is attached to the top most IP as in 31b. If the operator is attached directly to the adverbial clause, then the implicature that gets locked in would be the same unreasonable one as in 26. Therefore, we want the operator to wait until the whole sentence is built. Since we are not assuming any syntactic movement to ensure the feature checking of *a(n)mari*'s $_{[+\sigma]}$ feature and the operator, there would not be a serious problem for this kind of long-distant dependency. I think it is worth noting that it is indeed generally necessary to have this kind of long-distance dependency between the alternative evoking expression and the operator that operates on it. An example comes from wh-expressions. In Japanese, it is known that there is no island phenomena observed in cases where complex noun phrases or adjunct clauses are involved.

(32) [**Dono**-hon-o   yonda]-kodomo-ga   kore-o   kaki-mashita **ka**?
     Which-book-ACC read.PAST–child-NOM this-ACC write-PAST   Q

     'Which book x, a child who read x wrote this?'

(33) [**Dono**-hon-o   yonda]-kara   nemuku-natta   **no**?
     Which-book-ACC read.PAST-because sleepy-become.PAST Q

     'Which book x, you became sleepy because you read x?'

Movement of the wh-phrases out of those embedded clauses to the matrix clause (where the question operator exists) will result in syntactic island violations. However, according to Shimoyama (2006), these cases raise no such problem if we adopt a non-movement account for wh-phrases and operators. The key idea is that wh-phrases in Japanese stay in-situ and denote sets of alternatives. Within the framework of Hamblin's semantics for questions (Hamblin 1973), the alternatives keep expanding until it meets a relevant operator (in this case, the question operator). The

situation is also the same when the wh-expression is that of degrees *dono-gurai* 'how much' (lit. 'which about').

(34) [**Donogurai** atsukatta]-kara   eakon-o tsuketa   no?
      How-much   hot.PAST-because A/C-ACC turn.on.PAST Q

      'What degree d, did you turn on the air conditioner because it was d-hot?'

Long distance dependency between alternative sensitive expressions and operators is thus observable not only in case of NPI licensing but also in case of wh-expressions.

　Turning to the case of *sonnani*, the situation is slightly unclear. To see the problem, assume the following structure, where the operator is taking scope over everything else just as it was in 31.

(35) a. σ [[sonnani$_{[+\sigma]}$ hot]-because turned on AC]

      b. $E_C \left(\text{CAUSE}(\exists d \in D[d >_! Stnd(hot)(D) \land hot(d)])(turn\text{-}on(AC)) \right)$

      c. 'I turned of the AC because it was that$_D$ hot' is stronger (hence, less likely) than 'I turned of the AC because it was that$_{D'}$ hot'

Because of the nature of alternatives derived from *sonnani*, it predicts that the stronger-than relation to hold: the claim that the regular hotness (above 80 degrees) causing me to turn on the AC does entail that the extreme hotness (above 90 degrees) causing me to do so, i.e. the former is stronger than the latter. However, since sentence is actually unacceptable, this is not what we want.

　One speculative idea is to assume that the $[+\sigma]$ feature on *sonnani* somehow must be checked somewhat more locally, e.g. within the adverbial clause.

(36) a. $[[\sigma$ [sonnani$_{[+\sigma]}$ hot]-because] turned on AC]

      b. $\text{CAUSE}\left(E_C(\exists d \in D[d >_! Stnd_{hot} \land hot(d)] \right) \left(turn\text{-}on(AC) \right)$

      c. 'It was very hot$_D$' is stronger than 'it was very hot$_{D'}$'

Because of the position of the operator, the implicature that gets locked in is 36c, which is false, and hence ungrammatical. However, with this kind of explanation it remains unclear why the long distance dependency does not hold for *sonnani*, but it does for *a(n)mari*. At the moment, I leave this question open for future research.

4.3 Questions

Another problem is why *a(n)mari* is licensed by questions but *sonnani* is not.

(37) {*A(n)mari/Sonnani} atsui-**no?**
      {*A(n)mari/Sonnani}   hot-Q

      'Is it very/all that hot?'

Before explaining why, we first need to consider why NPIs like *any* are licensed at all under questions to begin with. Since NPIs in questions are not investigated in Chierchia (2006), I mainly refer to the idea by Krifka (1990, 1995); van Rooy (2003). According to them, the use of NPIs in questions, either in rhetorical or information-seeking questions, has an effect of increasing the average informativity of its answers, i.e. maximization of utility of the question. In rhetorical questions, where the speaker is expecting the negative answer, the use of NPIs has an effect of lowering the threshold for the positive answer to show that s/he is certain that the answer would be negative. In information seeking questions, where there is no such speaker's bias, the use of NPIs has an effect of "constructing the question in such a way that every suggested answer would roughly yield the same amount of information increase" (Krifka 1995: p. 253). To yield the same amount of information increase, the speaker should not be asking a too specific question, because there is a higher risk of not getting any information. [11] By using an NPI, i.e. having a lexical item that contributes to domain widening, the speaker will be asking a more general, less risky question.

Assuming that σ operator can also take questions, it then ranks the question with the original domain as the best question (the most general and least risky) among all other alternative questions with different domains of degrees. As for *a(n)mari*, the question with the original domain ('is it very$_D$ hot?') is contrasted with the alternative questions ('is it very$_{D'}$ hot?'), i.e. 'Is there a degree d of hotness that is considerably significantly hot with respect to the domain D?' vs. 'Is there a degree d' of hotness that is considerably significantly hot with respect to the domain D'?' where $D' \subset D \wedge max(D') < max(D)$. It turns out that the former is a more specific, risky question than the latter (cf. 'Is it very very hot?' vs. 'Is it very hot?'), and thus the pragmatic condition for questions is not met.

As for *sonnani* on the other hand, because of the nature of alternatives, the situation is reversed. The comparison is between the question with the original domain ('is it that$_D$ hot?') and the alternative questions ('is it that$_{D'}$ hot?'), where $D \subset D' \wedge max(D) < max(D')$. Here, the former is more general and less riskier than the latter. Thus, the pragmatic condition is met.

In sum, the reason why the two adverbs behave differently in questions is (i) because the content of alternatives in *a(n)mari* and that of *sonnani* are different, and (ii) because the pragmatic enrichment operator in this case chooses the best kind of question with respect to usefulness or utility of the question.

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11 For example, in a guessing game example as Krifka mentions, where you want to ask less questions as possible, starting by asking 'did you get seven of diamonds?' to a person who drew a card is more riskier and less economical, than asking 'did you get diamonds?', which is more general and has higher probability of an yes-answer.

5 Concluding remark

In this paper, I explored the semantics and pragmatics of understating NPIs in light of alternatives and strength, in particular, two degree modifiers, *a(n)mari* and *sonnani* in Japanese. Following the domain widening and strengthening approach for NPIs such as *any* (Kadmon & Landman 1993; Krifka 1995) and building on a version of Chierchia (2006)'s framework, I extended the idea to the case where it involves manipulation of the domain of degrees. In order to account for the notion of understatement or attenuation, which is a crucial part of the meaning of expressions like *a(n)mari*, I adopted the idea by van Rooy (2003), and analyzed the meaning of understatement as quality strengthening rather than an entailment-based strengthening. In this way, the analysis presented here explores the possibility of extending the original widening and strengthening approach in two ways: one is to extend that to domains of degrees, and the other is to recapture the notion of strength in terms of quality.

Besides the most problematic case of *sonnani* in 'because' clauses, which the present analysis could not fully cover, there are further broader questions. Are there any other NPIs, in other languages and in other syntactic categories, that functions as understaters that refer to the notion of quality-based strengthening? If so, do they also occur in 'because' clauses and resists appearing in questions like *a(n)mari*? What does this contrast between *a(n)mari* and *sonnani* tells us about diversity of understating NPIs? These inquiries call for further investigation of understating NPIs across languages and their variations.

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