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Author(s)	Ihara, Shun
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What do superlative modifiers encode and do not, *at least*?*

Shun Ihara

1. Introduction

A challenge for the semantic and pragmatic analysis of the superlative modifier *at least* is how to account for ignorance implications about exact quantity.

(1) A: How many people came to the party?
B: At least 10 people came.
⇝ the speaker (= B) is not sure whether 10 or more people came.

The ignorance implications with superlative modifiers is sensitive to how the numeral interacts with modals and other operators (e.g. Geurts & Nouwen 2007, Büring 2008, Nouwen 2010, Rawlins 2013, Schwarz 2013, Rett 2014). However, the focus of many of these studies is almost limited to *at least* (and *at most*) in English; the meaning of superlative modifiers in other languages has not been paid much attention in the literature so far.

This paper, by focusing on the Japanese *sukunakutomo* 'at least,' offers a new approach to expressions that encode the superlative meaning. Specifically, I propose a compositional semantics of *sukunakutomo*, which would shed new light on the variation of how the meaning of superlative modifiers is derived.

The rest of this paper is organized as follows. In Section 2, I briefly summarize the previous approaches to superlative modifiers and point out their limitations. Section 3 introduces the semantic ingredients of the components of *sukunakutomo*, which are crucial for my analysis, and then illustrates how the entire meaning is derived. Given the proposal, Section 4 attempts to give an explanation to the problematic data. Section 5 is the conclusion with some implication for this study.

2. Previous approaches

In this section, I summarize the previous approaches to superlative modifiers, pointing out their potential problems.

Geurts & Nouwen (2007), in one of the first comprehensive analyses of the current phenomenon, effectively build the interpretation of *at least* into the truth conditional semantics of the superlative modifiers, arguing that superlative modifiers like *at least* have an epistemic component. Based on Krifka (1999), they give *at least* an explicitly modal meaning, as shown in (2). [1]

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[1] In Geurts & Nouwen (2007), the necessity operator is posited mainly in order to feed a process of modal concord. The need of such a process, however, has been questioned in Büring (2008) and Nouwen (2010). Geurts & Nouwen also motivate the necessity operator with a symmetry argument referring to *at least*'s

(2) $[\![\text{ At least 10 people came }]\!]^w = \Box_{epi}[\,\textbf{came}_w(\text{10-}\textit{people})\,] \wedge \Diamond_{epi}[\,\textbf{came}_w(n\text{-}\textit{people} : n > 10)\,]$

(i.e. It is certain that 10 people came, and it is possible that more than 10 people came.)

What is crucial in (2) is that the ignorance meaning of *at least* is encoded at the level of semantics, rather than of pragmatics.

Let me first suppose that *sukunakutomo* has the same semantics as *at least* in (2). As Geurts & Nouwen (2007: 554–555) themselves admit, this line of analysis fails to account for conditionalized and negated examples like (3) and (4). Note that (4a) is the case where an ordinary negation (i.e. a negation with *nai* 'not') is used, and (4b) is the one in which a sentential negation expression (i.e. *wake-de-wa-nai* 'it is not the case that') embeds *sukunakutomo*; the latter case is an example which shows that the sentence that a negation strictly has a higher scope than *sukunakutomo* induces the same interpretation as the ordinary negation case in (4a).

(3) *Sukunakutomo* san-hai biiru-o nonde-tara, Hanako-wa yottei-ta.
at.least 3-CL beer-ACC drink-if.then, H-TOP get.drunk-PAST would
'If Hanako had at least three beers, she would have been drunk.'

(4) a. Hanako-wa biiru-o *sukunakutomo* san-hai(-wa) nom-anakat-ta.
H-TOP beer-ACC at.least 3-CL(-TOP) drink-NEG-PAST
'Hanako didn't have at least three beers.'

b. Hanako-wa biiru-o *sukunakutomo* san-hai non-da wake-de-wa-nai.
H-TOP beer-ACC at.least 3-CL drink-PAST case-COP-TOP-NEG
'It is not the case that Hanako had at least three beers.'

The reading that Geurts & Nouwen's theory predicts for (3) is "if it *must* be the case that Hanako had three beers and it *may* be that she had more than three, then she would have been drunk," which is not what the sentence means; the modal meaning should not be embedded under the *if*-clause. Moreover, what the sentences in (4) say is simply "it is the case that Hanako had drunk beer, and the amount was *at most* two beers." However, there is no way the modal analysis will capture this *at-most*-reading. In brief, their modal analysis sometimes fails to produce the right interpretations when superlative modifiers occur in embedded positions.

Subsequent research after Geurts & Nouwen has taken a different strategy, aiming to derive the meaning of superlative modifiers from independent pragmatic principles, assuming a minimal semantics for them (Büring 2008, Cummins & Katsos 2010, Nouwen 2010, Schwarz 2013, Rett 2014). This section introduces Büring's (2008) account in which *at least* is interpreted as a disjunction operator over scalar alternatives. According to his analysis, a sentence with *sukunakutomo* is interpreted as (5).

(5) $[\![\text{ At least 10 people came }]\!]^w$

$= [\,[\![\,\textbf{came}_w(\text{10-}\textit{people})\,]\!] - \bigcup \textsc{above}(\textbf{came}_w(\text{10-}\textit{people}))\,] \vee \bigcup \textsc{above}(\textbf{came}_w(\text{10-}\textit{people}))\,]$,

where $\textsc{above}(q)$ is a set of scalar alternatives that are strictly higher than the meaning of q.

negative partner *at most*, but Japanese *sukunakutomo* lacks such a partner. I will return to discuss this issue in Section 5.

In this analysis, all modal aspects of the meaning of *sukunakutomo* are derived via pragmatic implicatures as follows: in (5), *sukunakutomo*(p) literally means '[EXACTLY(p)] or [ABOVE(p)]'; this conveys that (i) the speaker is certain that 10 people came, and (ii) she is not certain about whether exactly 10 people came or more than 10 people came.

The theory based on uncertainty implicatures generated from disjunctions can correctly capture the data which are problematic in Geurts & Nouwen. First, the reading of the conditional example in (3) that Büring's theory predicts is "if Hanako had exactly 3-beers or she had more than 3-beers, then Hanako would have been drunk," which seems to be on the right track. The meaning of the negated examples in (5) predicted by the current theory is (6).

(6) $\neg\Big[\,[\,\mathbf{drink}_w(\mathbf{h}, 3\text{-}beer)\,] \vee [\,\mathbf{drink}_w(\mathbf{h}, n\text{-}beer : n > 3)\,]\,\Big]$
$= \neg\,\mathbf{drink}_w(\mathbf{h}, 3\text{-}beer) \;\wedge\; \neg\,\mathbf{drink}_w(\mathbf{h}, n\text{-}beer : n > 3)$

What (6) says is that "it is not the case that Hanako had exactly three beers, and it is not the case that she had more than three beers," which implicates the situation where Hanako had *at most* two beers. This, again, successfully captures what (5) means. However, Büring's theory is problematic in a context where the speaker has perfect knowledge about the truth of alternatives.[2] Consider the case below.

(7) (The speaker knows that Mary didn't win a gold medal.)

a. Mary-wa *sukunakutomo* ginmedaru-o tot-ta.
M-TOP at.least silver.medal-ACC get-PAST
'Mary at least won a silver medal (which is less preferable than a gold medal).'

b.#Mary-wa ginmedaru-o tot-ta ka, aruiwa kinmedaru-o tot-ta ka da.
M-TOP silver.medal-ACC get-PAST or either gold.medal-ACC get-PAST or COP
'Either 'Mary won a silver medal' or 'Mary won a gold medal."

c.#Mary-wa ginmedaru-ijoo-o tot-ta.
M-TOP silver.medal-more.than.or.equal.to-ACC get-PAST
'Mary won more than or equal to a silver medal.'

The sentence with *sukunakutomo* in (7a) is perfectly fine, while the one with the phonologically overt disjunction (i.e. *ka*) in (7b) and the one with the overt 'greater-than-or-equal-to' expression (i.e. *ijoo*) in (7c) are infelicitous. This contrast is undesirable for the disjunctive approach, because if a sentence with *sukunakutomo* is interpreted as a disjunction, the sentences in (7b,c) (which directly correspond to the literal meaning of (7a) should be unobjectionable, contrary to the fact that they are not.[3]

[2] *Sukunakutomo* in this context is akin to what Nakanishi & Rullman (2009) calls the *concessive at least*).

[3] If a context is such that the speaker does not know whether Mary won a gold medal, the sentences in (7b,c) become fine, which indicates that the factor that makes (7b,c) infelicitous is the context in (7):

(i) (The speaker does not know whether Mary won a gold medal, but knows that she at least won a medal.)

a. Mary-wa *sukunakutomo* ginmedaru-o tot-ta.
M-TOP at.least silver.medal-ACC get-PAST
'Mary at least won a silver medal (which is less preferable than a gold medal).'

Given the discussion so far, we can conclude that the semantic meaning of *sukunakutomo* is neither modals nor disjunctions.

3. Proposal

I argue that *sukunakutomo* is neither modals nor disjunctions, but rather a concessive conditional with a flexible degree scale. I propose a compositional semantics which derives the meaning of *sukunakutomo*:

(8) *sukunakutomo* 'at least'
= *sukunai* (LITTLE) + *to* (CONDITIONAL) + *mo* (EVEN)

This section discusses how the interpretation of *sukunakutomo* is derived in a compositional way. Let me begin with the semantic ingredients of each component above. I will then attempt to derive the compositional meaning by putting the meanings of the components all together.

3.1. Ingredients

The lexical semantics of *sukunai* 'a little/few' is defined as (9). [4]

(9) $[\![sukunai]\!]^{w,c} = [\![few/little]\!]^{w,c}$
$= \lambda I_{\langle d,t \rangle}.\textsc{max}_d(I) = \mathbf{d}_{\Delta}$ (cf. Solt 2009)

Here, I is a variable that ranges over scalar intervals, $\mathbf{d}_{\Delta}$ is a significantly small value relative to the context c, and MAX is a maximality operator. [5] A simple example is given in (10).

(10) *Taro-ga nom-u biiru(-no ryoo)-wa sukunai.*
'The amount of beer that Taro drink is small.'

a. $[\![(10)]\!]^{w,c}$
$= \lambda w.\textsc{max}_d(\exists x.[beer(x) \wedge \mathbf{drink}_w(\mathbf{t}, x) \wedge \mu_{amount}(x) = d]) = \mathbf{d}_{\Delta}$

b. Intuitively: the maximal amount of beer that Taro drinks is significantly small value.

For the meaning of *-to*, I assume that it is a conditional marker which introduces the meaning of *if...,(then)* (Akatsuka 1992). As in (11), *-to* takes two propositions as an antecedent part and a consequent part.

b. Mary-wa ginmedaru-o tot-ta ka, aruiwa kinmedaru-o tot-ta ka da.
M-TOP silver.medal-ACC get-PAST or either gold.medal-ACC get-PAST or COP
'Either 'Mary won a silver medal' or 'Mary won a gold medal.''

c. Mary-wa ginmedaru-ijoo-o tot-ta.
M-TOP silver.medal-more.than.or.equal.to-ACC get-PAST
'Mary won more than or equal to a silver medal.'

[4] Various compositional implementations are possible (e.g. Solt 2009, Wellwood 2014).

[5] I assume in (10) that *sukunai* takes the lambda-abstracted proposition (cf. Solt 2009):

(i) $[\![\text{Taro drinks is } n\text{-amount of beer}]\!]^{w,c}$
$= \lambda w.\exists x.[beer(x) \wedge \mathbf{drink}_w(\mathbf{t}, x) \wedge \mu_{amount}(x) = d]$
$= \lambda d.\lambda w.\exists x.[beer(x) \wedge \mathbf{drink}_w(\mathbf{t}, x) \wedge \mu_{amount}(x) = d]$ (λ-Abstraction over d)

(11) $\textsc{to}_{if}(\psi)(\phi) \rightsquigarrow \textsc{nec}_w[\psi][\phi]$,

where NEC is a covert necessity operator (which is interpreted as an epistemic *must*) (Kratzer 1986).

a. *Izakaya-no biiru-ga puremoru-da to$_{if}$, kibun-ga sagaru.*

'If the beer in the bar is Premium Malts, I feel depressed.'

b. $\textsc{to}_{if}(\llbracket$ the beer in the bar is Premium Malts $\rrbracket)(\llbracket$ I feel depressed $\rrbracket)$

$\rightsquigarrow$ '**Necessarily**, if the beer in the bar is Premium Malts, I feel depressed.'

$\rightsquigarrow$ '**It must be the case**, given that the beer in the bar is Premium Malts, I feel depressed.'

Finally, following Nakanishi (2004) among many others, *mo* is assumed to be interpreted as *even*, which ranks the alternatives by correlating them with a graded property which is salient in the context (Gianakidou 2007, Rullman 2007).

(12) $\llbracket mo_{even} \rrbracket^{w,c} = \lambda w.\lambda p.p(w)$

presupposes that: $\forall q \in \mathcal{A}lt_p[\, q \neq p \rightarrow p \prec_c q\,]$,

where $\prec_c$ means 'less than' with respect to the contextual scale and $\mathcal{A}lt$ is an alternative set.

(13) *Taro-mo$_{even}$ ki-ta.*

'Even Taro came.'

$\rightsquigarrow$ It is unlikely that Taro came.

a. $\llbracket mo_{even}\,(p : \text{Taro came})\,\rrbracket^{w,c}$

$= \lambda w.\,\mathbf{came}_w(\mathbf{t}) \wedge \partial\,[\,\forall q \in \mathcal{A}lt_p[\, q \neq p \rightarrow p \prec_{likely} q\,]\,]$

(∂: a presupposition operator)

b. $\mathcal{A}lt_{(13)} = \{\lambda w.\mathbf{came}_w(\mathbf{Taro}), \lambda w.\mathbf{came}_w(\mathbf{Jiro}), \lambda w.\mathbf{came}_w(\mathbf{Hanako}), \lambda w.\mathbf{came}_w(\mathbf{Saki}), ...\}$

c. Intuitively: it is the case that Taro came. At the same time, it is presupposed that Taro's coming is less likely than { Hanako's coming, Jiro's coming, Saki's coming, ... }.

Note that *mo* also corresponds to the English additive *too/also* without any prominence on the NP that *mo* attaches to. With a focus on the NP, *mo* retains the *even* interpretation (Nakanishi 2004). This study exclusively examines cases where *mo* attaches to a focused element, i.e., *mo* as *even*.

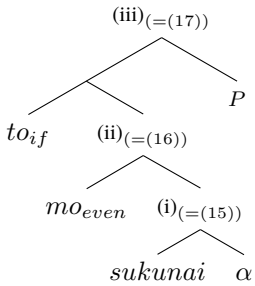
3.2. Deriving *at least*

Now, we are in a position to put the components all together. The logical form (LF) of a sentence with *sukunakutomo* is shown in (14).[6]

[6]In (14), I assume that *to* takes the higher scope than *mo*, but this would not represent the true compositionality of *sukunakutomo*, where *to* is located under the scope of *mo* (i.e. [[[*sukunaku*] *to*] *mo*]). See Section 5 for further discussion.

(14) *Sukunakutomo 10-nin kita.*

'At least 10 people came.'



The intuition for the sentence in (14) that I would like to capture is something like this: "what is true when taking the various alternatives in the current situation into account, and considering the case where the number of visitors is small is '10 people came'."

Let me begin with (14-i) step by step. In (14-i), assume that *sukunai* takes a contextually determined (unpronounced) scalar anaphor α; here, $\alpha = n$-people came.[7]

(15) a. $[\![\, sukunai \,]\!]^{w,c} = \lambda I_{\langle d,t\rangle}.\textsc{max}_d(I) = \mathbf{d}_\Delta$

b. $[\![\, \alpha : n\text{-people came} \,]\!]^{w,c} = \lambda d.\lambda w.\exists x.[\, people(x) \wedge \mathbf{came}_w(x) \wedge |x| = d \,]$

c. $[\![\, sukunai \,]\!]^{w,c}([\![\, \alpha : n\text{-people came} \,]\!]^{w,c})$

$= \lambda I_{\langle d,t\rangle}.[\textsc{max}_d(I) = \mathbf{d}_\Delta]([\![\, n\text{-people came} \,]\!]^{w,c})$

$= \lambda w.\textsc{max}_d(\exists x.[people(x) \wedge \mathbf{came}_w(x) \wedge |x| = d]) = \mathbf{d}_\Delta$ (14-i)

(15c) means that the maximum number of people who came is significantly small. (15c) is then combine with *mo* in (14-ii), as in (16). In (16c), the alternatives are propositions that m-people came such that m is greater than or equal to the *sukunai*-amount, and $\prec_c = \prec_d$ ('less than'-relation).

(16) a. $[\![\, mo_{even} \,]\!]^{w,c} = \lambda w.\lambda p.p(w) \wedge \partial\,[\,\forall q \in \mathcal{A}lt_p[\, q \neq p \rightarrow p \prec_c q \,]\,]$

b. $[\![\, (15c) \,]\!]^{w,c} = \lambda w.\textsc{max}_d(\exists x.[people(x) \wedge \mathbf{came}_w(x) \wedge |x| = d]) = \mathbf{d}_\Delta$

c. $[\![\, mo_{even} \,]\!]^{w,c}([\![\, (15c) \,]\!]^{w,c})$

$= \lambda w.\textsc{max}_d(\exists x.[people(x) \wedge \mathbf{came}_w(x) \wedge |x| = d]) = \mathbf{d}_\Delta \wedge$

$\partial\,[\,\forall q \in \mathcal{A}lt_{(15c)}\,[\, q \neq [\textsc{max}_d(\exists x.[people(x) \wedge \mathbf{came}_w(x) \wedge |x| = d]) = \mathbf{d}_\Delta] \rightarrow$

$[\,[\textsc{max}_d(\exists x.[people(x) \wedge \mathbf{came}_w(x) \wedge |x| = d]) = \mathbf{d}_\Delta] \prec_d q \,]\,],$

where $\mathcal{A}lt_{(16)} = \{q : \lambda w.m\text{-people came in } w : m \succeq \mathbf{d}_\Delta\}$ (14-ii)

(16c) intuitively means that it is the case that the maximum number of people who came is significantly small, which is the least possible alternative in $\mathcal{A}lt$.

Finally, to_{if} first takes the antecedent proposition, namely (16c), and returns the *if*-clause. This then takes the consequent P, deriving the entire meaning of (14), (17).

[7]Concessive scalar expressions (e.g. *but*, *still*, etc.) generally require an unpronounced item which is supplied by uttered contexts. Refer to Ippolito (2004) for the concessive use of *still*.

(17) $to_{if}(\llbracket(16c)\rrbracket^{w,c})\,(P)$

$\rightsquigarrow \textsc{nec}_w[\,\llbracket(16c)\rrbracket\,][P]$,

where $P = \textbf{came}_w(\text{10-people})$ (14-iii)

(17) means that "if (16c) is the case, then it is the case that 10 people came." More intuitively: in the case where the number of people who came is 'small' and there is a possibility that the number of people who came exceeds 'small,' it is the case that 10 people came. That is, (17) is felicitous in a context such that (a) 10 people's coming is considered 'small' (by the speaker) and (b) 10 people's coming can be fulfilled by more than 10 people's coming.

How is the ignorance meaning produced from this semantics? I argue that the obligatory ignorance conveyed by *sukunakutomo* is a result of a pragmatic inference via a typical rule of conversation: [8]

i. The speaker asserted that Taro came.

ii. There are possible alternatives that she could have made, but she only asserted one of them.

iii. There must be a reason for her not asserting the remaining.

iv. The reason would be: e.g. she doesn't know the truth of other propositions, she doesn't want to mention other propositions for personal reasons, etc.

This line of analysis can capture that an ignorance inference of *sukunakutomo* is allowed to be interpreted not only as epistemic uncertainty (i.e. not knowing the truth of alternatives) but also as personal reasons (i.e. she does know the truth of alternatives, but just does not want to mention it).

The important point of the current analysis is that *sukunakutomo* encodes neither modal nor disjunction meanings at the level of semantics; what *sukunakutomo* semantically encodes is the concessive scalar meaning, and the modal-like meaning is generated at the level of pragmatics.

4. Analysis

This section explains the data that we found problematic in the previous accounts. First, in this analysis, since the modal meanings are not encoded in the semantics of *sukunakutomo*, the conditional example in (3) simply says that "if it is the case that Hanako had drunk three beers, which was considered to be little and the least alternative, then she would have been drunk," which correctly captures our intuition.

The current analysis also captures the correct interpretation for the negated example in (4). The meaning that the analysis predicts for (4) is as follows:

(18) *Hanako-wa biiru-o sukunakutomo san-hai non-da wake-de-wa-nai.* (=(4))

'It is not the case that Hanako had at least three beers.'

[8]The idea here is inspired by Tomioka's (2009) analysis of contrastive *wa* in Japanese. He argues that the anti-exhaustive (mainly, uncertainty) meaning of *wa* is not generated by the semantics of *wa* itself but by ignoring the truth of un-uttered alternatives. See Tomioka (2009, ex. (23)) for his explanation.

$$
\begin{aligned}
&[\![\,(4)\,]\!]^{w,c} \\
&= \neg\Big(\ \textsc{nec}_w\ \big[_{antecedent}\ \lambda w.\textsc{max}_d(\exists x.[beer(x) \wedge \textbf{drunk}_w(\mathbf{h},x) \wedge \mu_{amount}(x) = d]) = \mathbf{d}_\Delta \wedge \\
&\partial\big[\forall q \in \mathcal{A}lt_{(4)}\,[\,q \neq [\textsc{max}_d(\exists x.[beer(x) \wedge \textbf{drunk}_w(\mathbf{h},x) \wedge \mu_{amount}(x) = d]) = \mathbf{d}_\Delta] \rightarrow \\
&[\,\textsc{max}_d(\exists x.[beer(x) \wedge \textbf{drunk}_w(\mathbf{h},x) \wedge \mu_{amount}(x) = d]) = \mathbf{d}_\Delta] \prec_d q\,]\,\big]\,, \\
&\big[_{consequent}\ \lambda w.\textsc{max}_d(\,\exists x.[beer(x) \wedge \textbf{drunk}_w(\mathbf{h},x) \wedge \mu_{amount}(x) = d]\,) = 3\,\big]\ \Big),
\end{aligned}
$$

where $d =$ [the amount of beer that Hanako **did not** drink] and

$\mathcal{A}lt_{(4)} = \{\, q : \lambda w.$ Hanako did not drink m-amount of beer in $w : m \succeq \mathbf{d}_\Delta\}$

(18) means that "it is not the case that if the amount of beer that Hanako did not drink is small and is the least alternative, then Hanako had three beers." How is the negation here interpreted? I argue that a sentential negation in a conditional operates only at its consequent part, which is empirically motivated by the data below; in (19), the negation does not apply to both the antecedent and the consequent part.

(19) Ame-ga hut-tara, shiai-wa enki **toiu wake-de-wa-nai**.
rain-NOM fall-then game-TOP postpone that case-COP-TOP-not
'It is not the case that if it rains, the game is postponed.'

$\rightsquigarrow$ If it rains, the game is **not** postponed.

$\not\rightsquigarrow$ If it does **not** rain, the game is **not** postponed.

We can obtain the generalization (20) from this observation.

(20) $\neg$(If ϕ, then φ) $\rightsquigarrow$ If ϕ, then $\neg\varphi$.

Given this generalization, (18) is then interpreted as "it is the case that if the amount of beer that Hanako did not drink is small and is the least alternative, then Hanako did not have three beers." This amounts to describing the situation where Hanako had only one or two beers (i.e. the amount of beer that Hanako did not drink is more than or equal to three). That is, Hanako had *at most* two beers, cf. Figure 1.

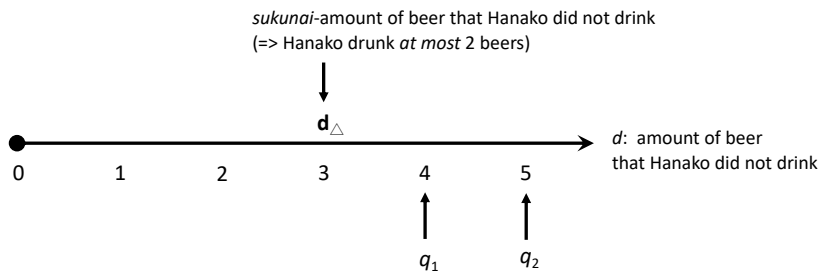


Figure 1: *It is not the case that Hanako had at least three beers.*

Finally, our analysis allows *sukunakutomo* to be felicitous in the concessive context in (7). Since this analysis assumes that the ignorance effect conveyed by *sukunakutomo* is a result of an ignorance inference of un-uttered alternatives, the reason for the speaker's not asserting the truth of alternatives is entirely up to her; in (7), she would be depressed and not want to talk about whether Mary won a gold medal or not.

6. Concluding remarks

To the best of my knowledge, this paper would be the first work that attempts to derive the meaning of superlative modifiers in a compositional way. This study supports the view that '*at least*' expression has only one denotation (Biezma 2013), but unlike English *at least*, Japanese *sukunakutomo* is morphologically broken down into *even*, a conditional, and *little*, which contributes to providing a strategy for deriving the epistemic and the concessive meanings.

There are a number of respects in which I will leave for a future work, which should be pointed out. First, as I have noted in fn.6, my analysis should say something more about the compositionality of *sukunakutomo*, since the analysis assumes that *to* takes the higher scope than *mo*, which does not represent the syntax of *sukunakutomo*. Here, we would have two options; one way is to justify that *to* (sometimes, or obligatorily) takes higher scope than *mo* in LF, and another way is to derive the meaning of *sukunakutomo* while keeping the syntactic relation between *to* and *mo*, [*mo*[*to*[...]]].

Second, it would be interesting to clarify why the Japanese *at least*-expression (namely, *sukunakutomo*) has no counterpart like *at most* in English. One may think that the counterpart would be *ookutomo* 'many-IF-EVEN,' but this expression seems to be more restrictive in usage than *sukunakutomo*, (21), which indicates that *ookutomo* is not the pure counterpart of *sukunakutomo*.[9]

(21) A: How old is she?

B: Shira-nai. *Sukunakutomo* 10-sai daroo.
know-NEG SUKUNAKUTOMO ten-years.old might
'I don't know, but she might be at least ten years old.'

B′: Shira-nai. #*Ookutomo* 10-sai daroo.
know-NEG OOKUTOMO ten-years.old might
'I don't know, but she might be at most ten years old.'

Finally, we should consider how the difference between *sukunakutomo* and contrastive *wa* can be explained under the current analysis. For example, Schwarz & Shimoyama (2010) report that *sukunakutomo* and *wa* differ in whether they are sensitive to negative-island, and Hirayama & Brasoveanu (2018) argue that *wa* is much more sensitive to QuDs (question under discussions, Roberts 1998) than *sukunakutomo*. I hope that in the future I will figure out what is going on here.

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[9]The speaker B′ in (21) should rather use *seizei* or *takadaka* 'at the most' to express the intended meaning.

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