Embedded negative polar questions in Japanese*
Explaining the puzzling distribution of embedded noncanonical negation via the speech act embedding complementizer *to*

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Abstract

There are at least two environments in Japanese and Korean where noncanonical negation has been identified in the literature. One type of noncanonical negation has been described in Yoon (2011, 2013) as similar to but contrasting in interesting ways with 'subordinate expletive negation' in, for example, Romance languages. Another type of noncanonical negation is found in negative polar questions that convey the speaker's positive epistemic bias (*e.g.*, Sudo, 2013; Ito & Oshima, 2016). The goal of this paper is to explain a puzzle about the distribution of what has been called 'subordinate expletive negation' in Japanese by identifying it as the negation in embedded positively biased negative polar questions. We will demonstrate how such negative polar questions can be embedded under non-question selecting predicates in Japanese by looking in detail at properties of the speech act embedding complementizer *to*, which contrasts with the English declarative complementizer *that*.

Keywords: noncanonical negation; expletive negation; noncanonical questions; negative polar questions; speech act embedding; quotative marker

1 Introduction: Two types of noncanonical negation

There are at least two environments in Japanese and Korean where noncanonical negation has been identified in the literature. The first type of noncanonical negation is found in (1) in Korean and (2) in Japanese.[1] According to Yoon (2011, 2013), the occurrence of the negation morphemes in these sentences exemplifies 'subordinate expletive negation', similar to, for example, *ne* in French in (3).[2] In each of these three examples, negation occurring in the clause embedded under the 'negative' verb *fear* does not contribute a propositional negation meaning.[3] We will use the descriptive term 'embedded noncanonical negation' to refer to the negation found in (1) and (2).

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[1]Original glosses from Yoon (2013) are used here. NFcomp = non-factive complementizer.

[2]Note that such negation is referred to as 'Evaluative Negation' in Yoon (2011, 2013).

[3]Both examples (1) and (2) have another reading where the negation morpheme *does* contribute a canonical propositional negation meaning (Yoon 2013: 137-8).

(1) John-un [Mary-ka oci-**anh**-ul-{ci/kka}] **kekcengha**-koiss-ta.
John-TOP Mary-NOM come-**NEG**-FUT-NFcomp **fear**-ASP-DECL
'John fears that Mary might come.' *Korean* (Yoon, 2013)

(2) John-wa [Mary-ga ko-**nai**-ka(-to)] **shinpaishi**-te iru.
John-TOP Mary-NOM come-**NEG**-NFcomp **fear**-ASP
'John fears/is worried that Mary might come.' *Japanese* (Yoon, 2013)

(3) Francine **craint** que Joëlle **ne** veuille partir malgré tout.
Francine **fears** that Joëlle **NE** want.SUBJ leave despite all
'Francine fears that Joëlle wants to leave after all.' *French*

The second type of noncanonical negation is found in polar questions such as (4) and (5). Under the interpretation that is relevant here, negative polar questions like these have been described as requiring the speaker's positive epistemic bias (e.g. Romero & Han, 2004; Sudo, 2013; Hara et al., 2014; Ito & Oshima, 2016; Rieser, 2017; Hirayama, 2018; Goodhue, 2019b). For instance, either of A's utterances in (5b)-(5c) is felicitous in the context in (5a), where A is biased toward Yoko's having ordered tea.[4]

(4) Suni-ka coffee-lul masi-ess-ci **anh**-ni?
Suni-NOM coffee-ACC drink-PST **NEG**-Q
'Didn't Suni drink coffee?' *Korean* (Romero & Han, 2004)

(5) *Japanese*

a. Context: A, B and Yoko have placed their orders at a café. While Yoko is away from the table, a waiter brings three cups of coffee. A thinks that she heard Yoko order tea earlier, and says to B:

b. Yoko-wa ocha-o chuumonshi-te **nai**$_{tc}$?
Yoko-TOP tea-ACC order-TE **NEG**$_2$.NPST
'Didn't Yoko order tea?'

c. Yoko-wa ocha-o chuumonshi-ta n ja **nai**$_{tc}$?
Yoko-TOP tea-ACC order-PST NO DE.WA **NEG**$_2$.NPST
'Isn't it the case that Yoko ordered tea?'

The negation in (5b) and (5c) is described by Ito & Oshima (2016) as 'tonally compressed', hence the subscript, *tc*, whereas regular negation *na'i* is marked with an apostrophe to indicate a lexical accent. To separate the two, we gloss *nai*$_{tc}$ as NEG$_2$, and *na'i* as NEG$_1$.[5] *Nai*$_{tc}$ behaves differently from regular propositional negation *na'i*. For example, it does not license strong negative polarity items, as observed by, for example, Aihara (2009) and Ito & Oshima (2016).[6]

(6) Yoko-wa **nani-mo** chuumonshi-te **na'i**?
Yoko-TOP what-MO order-TE **NEG**$_1$.NPST

[4]For discussions of the so-called *no da*-form (*e.g., n ja* in (5c)), see, for example, Ito & Oshima (2016) and Hirayama (2018).

[5]Yoon (2013, 137) also notes that the embedded noncanonical negation in Korean in examples such as (1) 'does not receive a prosodic emphasis and oftentimes emerges in a shortened form'.

[6]As noted in Yoon (2013:137), the embedded noncanonical negation in (1) and (2) above does not license strong NPIs. See also Han & Romero (2002), and Choi & Lee (2017).

'Has Yoko not ordered anything?'

(7) *Yoko-wa **nani-mo** chuumonshi-te **nai**$_{tc}$?
Yoko-TOP what-MO order-TE **NEG**$_2$.NPST
'Hasn't Yoko ordered anything?'

The goal of this paper is to show for Japanese that one type of noncanonical negation can be reduced to the other. Specifically, we will show that the embedded noncanonical negation in Japanese, analyzed in Yoon (2011, 2013) as subordinate expletive negation, is an instance of negation in embedded positively biased negative polar questions. Choi & Lee (2017) also draw a parallel between the embedded noncanonical negation and the noncanonical negation in positively biased negative polar questions. However, our accounts differ in many details, and unlike Choi and Lee, we don't believe that embedded noncanonical negation in Japanese and French should be given a unified account.[7] A secondary goal of this paper is to make progress toward a unified syntax and semantics for sentences with *to* embedding.

In what follows, we will first present in section 2 two empirical puzzles regarding the distribution of the embedded noncanonical negation as in (1) and (2). In section 3, we will demonstrate how certain properties of the Japanese grammar make embedding of positively biased negative polar questions possible, which in turn makes possible the reduction analysis of the two types of noncanonical negation (section 4). We will then present an analysis of the interpretation of positively biased negative polar questions and other speech act phrases when embedded under the so-called 'quotative' marker *to* (section 5). Section 6 returns to the puzzles from section 2, demonstrating that solutions to them fall out from our proposed analysis. Section 7 concludes.

2 Puzzles and challenges in the subordinate expletive negation view

2.1 Two puzzles in the distribution of the embedded noncanonical negation

As we briefly saw in section 1, Yoon (2011, 2013) has established connections between sentences like (1)/(2) in Korean/Japanese on the one hand, and the better-studied phenomenon of subordinate expletive negation in other languages, such as (3) in French (see, for example, Jespersen, 1917; Muller, 1978; Mari & Tahar, 2020a; Delfitto, 2020). In Yoon's analysis, the embedded noncanonical negation in question in Korean and Japanese (i) is a form of subordinate expletive negation; (ii) is at the same time a subjunctive mood marker; (iii) its interpretive contribution is 'undesirability or unlikelihood' (2011: 27); and (iv) in addition, the sequence *ka-to* 'Q-QUOT' in Japanese is assumed to be a non-factive complementizer and proposed to be yet another type of subjunctive mood marker (Yoon 2011: 190).[8] We will refer to this analysis as the unlikelihood

[7] A possible link between embedded noncanonical negation and the noncanonical negation in negative polar questions in Korean and Japanese is also suggested by Yoon (2011:54-58). The direction suggested there, however, is to extend the analysis of noncanonical embedded negation as subordinate expletive negation based on uncertainty or unlikelihood to the negation in negative polar questions.

[8] Mizuno (2021) has a similar line of approach, where a connection is suggested between (i) *ka*, which he calls the Modally Functioning Q-particle, (ii) the embedded noncanonical negation analyzed in Yoon (2011, 2013) as subordi-

analysis of the embedded noncanonical negation (Yoon 2013: 154, 157).[9]

Two empirical puzzles arise in this view. The first puzzle, which was noted in Yoon (2011), as well as in Choi & Lee (2017), is that we find expletive *anh* (Korean) or *nai* (Japanese) under embedding predicates such as *hope*, as in (8) and (9).[10] This is puzzling because predicates like *hope* do not belong to the group of typical negative or adversative predicates known to license expletive negation in languages like French.

(8) John-nun [Mary-ka oci-**anh**-ul-{ci/kka}] **kitayha**-koiss-ta.
John-TOP Mary-NOM come-**NEG**-FUT-NFcomp **hope**-ASP-DECL
'John hopes that Mary might come.' *Korean* (Yoon, 2013)

(9) John-wa [Mary-ga ko-**nai**-ka-to] **kitaishi**-te i-ru.
John-TOP Mary-NOM come-**NEG**-NFcomp **hope**-TE ASP-NPST
'John hopes that Mary might come.'[11] *Japanese* (Yoon, 2013)

Yoon concludes that since the licensing environments for subordinate expletive negation in Korean and Japanese are *extended* to include positive predicates such as *hope*, a new analysis of subordinate expletive negation is needed.

This leads us to the second puzzle. It is not the case that embedded noncanonical negation is simply found in *broader* environments in Japanese than in French and other languages where subordinate expletive negation is more frequently studied. It also cannot occur under typical negative or adversative predicates such as *avoid, deny, doubt, prevent, prohibit* and *refuse*.[12] This is shown in (10) with *sakeru* 'avoid'. In example (11), where the nominalizing 'complementizer' *no* is used, the expletive negation interpretation is not possible regardless of how one pronounces the negation, and we only have the true propositional negation interpretation. This contrasts with the French example in (12). The verb *éviter* 'avoid' is known to create an environment for expletive negation *ne* in its complement clause.

(10) *Watashi-wa [sono shirase-ga Yoko-no mimi-ni haira-**nai**-ka-to] sake-ta.
I-TOP that news-NOM Yoko-GEN ear-DAT enter-**NEG**.NPST-Q-TO avoid-PST
'I avoided that the news would not reach Yoko's ear.'

(11) Watashi-wa [sono shirase-ga Yoko-no mimi-ni haira-**nai**-no]-o sake-ta.
I-TOP that news-NOM Yoko-GEN ear-DAT enter-**NEG**.NPST-NML-ACC avoid-PST

nate expletive negation, and (iii) encoding of subjunctive moods.

[9]The choice of the name is based on the claim in Yoon (2013 fn. 6) that the embedded noncanonical negation, analyzed as subordinate expletive negation, denotes unlikelihood, and the non-factive complementizer (Q particle for us) denotes uncertainty. We will argue in sections 2.2 and 4.2 that, at least for the Japanese data, the parenthetical 'although it is unlikely to happen' that is often added at the end of English translations by Yoon (2011, 2013) is not well-supported empirically.

[10]Example (9) is seemingly ambiguous between the intended reading and the reading that is supposedly coming from embedding of an optative form: *-ka (naa)*, which may be related to the *ka na(a)* briefly discussed in section 4.1. This ambiguity can be avoided by using other matrix predicates such as *utagau* 'suspect'.

[11]Though *to* is presented as optional in Yoon (2013), it is in fact required in most cases where the embedded clause is selected by the main predicate as in (9), except with some interrogative-selecting predicates such as *tazuneru* 'ask'. See also Tomioka & Kim (2016).

[12]Choi & Lee (2017: 183) also observe that 'not all nonveridical predicates license expletive negation' in Korean and Japanese. The specific predicates used in their examples are *pwulkanungha-ta* in Korean and *dekina-i* in Japanese, which they translate as 'impossible' (though the Japanese example is ungrammatical for independent reasons).

'I avoided that the news would not reach Yoko's ear.'

(12) Nous tenterons d' **éviter** qu' il (**n'**) apprenne la nouvelle avant son départ.
we try.FUT to avoid that he NEG learn.SUBJ.PRES the news before his departure

'We will try to prevent him from learning the news before he leaves.'[13] *French*

2.2 Other challenges for the subordinate expletive negation view

Within the subordinate expletive negation view, Yoon (2011, 2013) specifically argues for the unlikelihood analysis, where the negation morpheme denotes either unlikelihood or undesirability, and what is described as a non-factive complementizer, *ka-to*, denotes uncertainty. Examples such as (13) and (14) below, however, pose a challenge to the unlikelihood analysis. In example (13), the proposition that it is better to book a flight early is neither unlikely nor undesirable for the attitude holder, Yoko. Likewise in example (14), the attitude holder Yoko's confidence that Ken's team will win is pretty high, and Ken's team's win is neither unlikely nor undesirable according to Yoko.

(13) Yoko-wa [hikooki-o hayame-ni yoyakushi-ta hoo-ga yoku-**nai**$_{tc}$ ka to]
Yoko-WA airplane-ACC early book-PST HOO-NOM good-NEG$_2$.NPST Q TO
omot-te i-ru.
think-TE ASP-NPST
'Yoko thinks that that it's probably better to book a flight early.'

(14) Yoko-wa [Ken-no chiimu-ga konkai-wa **zettai** katsu-n-ja **nai**$_{tc}$
Yoko-WA Ken-gen team-NOM this.time-WA absolutely win.NPST-NO-COP.WA NEG$_2$.NPST
ka to] {omotteiru/kitai-o hukuramaseteiru}.
KA TO think.NPST/hope-ACC increase.NPST
'Yoko thinks/is getting high hopes that Ken's team will win **for sure** this time.'

On the other hand, Choi & Lee (2017) propose a type of hybrid analysis, which relies on the notion of nonveridicality in licensing of the embedded noncanonical negation, while at the same time, a connection is made between such negation and the negation in positively biased negative polar questions. This latter aspect is shared in our reduction analysis to be proposed below. This hybrid analysis faces a few challenges that stem from both the reliance on nonveridicality as well as an attempt to unify Korean/Japanese and French. First, consider example (15), which features an embedded positively biased negative polar question in French, slightly modified from a naturally occurring example.

(15) J'ai commendé la taille S mais je **me** **demande** si ce **n**'est **pas** plutôt XS.
I.have ordered the size S but I to.me ask if it NE.is NEG rather XS
'I ordered size S but I wonder if it isn't more like XS.' *French*

What is relevant here is the fact that *ne…pas* is used in (15), and not just *ne*. This makes Choi &

[13] http://bdl.oqlf.gouv.qc.ca/bdl/gabarit_bdl.asp?t1=1&id=2467

Lee's claim that French embedded noncanonical negation *ne* is related to the negation in positively biased negative polar question *(ne)…pas* unconvincing.

Second, Choi & Lee's hybrid analysis requires French verbs *douter* 'to doubt' and *nier* 'to deny' to be negated in order to license subordinate expletive *ne* because if they are not, then they predict the meaning of the matrix sentence will be inconsistent with the pragmatics of the embedded positive bias (p. 193). However evidence contradicting this prediction can be found in Mari & Tahar (2020b, p. 26ff.), who show that expletive *ne* is perfectly felicitous when such predicates are not negated, and further argue that the presence or absence of matrix negation is irrelevant to the licensing of *ne*.

Furthermore, examples where *douter* is negated mean 'no doubt at all' (Choi & Lee, 2017, p. 178), which is a veridical expression according to Choi and Lee's own account of veridicality (p. 182 & 187), and so shouldn't license expletive negation according to the nonveridicality analysis, contrary to empirical fact.

Finally, Choi & Lee (2017) further relate subordinate expletive negation licensing predicates and neg-raising predicates. This aspect of their analysis faces a challenge because of examples such as (8) and (9) above, where the embedded noncanonical negation is allowed under the predicate *kitayha-/kitaishi-* 'hope', which is not a neg-raising predicate.

We will show in what follows that the embedded noncanonical negation in Japanese that is analyzed on a par with subordinate expletive negation in the unlikelihood analysis is in fact a case of negation in embedded negative polar questions with positive epistemic bias. This way we reduce one type of noncanonical negation to the other in our analysis of Japanese, which we think is a welcome result. In such a reduction analysis, the two puzzles and other challenges presented above are no longer puzzles or challenges, as we will see below. The reduction analysis also has an obvious advantage over the unlikelihood analysis in that, if the negation in examples such as (1)/(2) and (8)/(9) was a type of subordinate expletive negation/subjunctive mood marker as assumed in the unlikelihood analysis, the occurrence of the same morpheme in *unembedded* contexts would not immediately follow, and it would have to be treated as a different phenomenon. In order to show that one type of noncanonical negation can be reduced to the other, we need to first understand basic properties of (i) negative polar questions with positive epistemic bias in Japanese, and of (ii) embedding under the 'quotative' marker *to* in Japanese.

3 Steps toward a reduction analysis

This section introduces two key properties of the Japanese grammar that will make our reduction analysis of the two types of noncanonical negation possible. The first key property is that negative polar questions such as (5) convey the speaker's epistemic bias toward the positive proposition (section 3.1). The second key property is about the nature of embedding under the 'quotative' complementizer *to*. *To* signals the existence of a speech event or mental utterance event attributed to the matrix subject, and marks its sister constituent as a direct or indirect report of such events (section 3.2). It is then expected that a positively biased negative polar question that is led by *to* is embeddable, as long as the meaning of the embedding predicate is compatible with the biased question being attributed to the matrix subject.

3.1 Key property 1: Speaker's positive epistemic bias in negative polar questions

Positively biased negative polar questions in Japanese have been discussed in, for example, Sudo (2013); Hara, Kawahara & Feng (2014); Ito & Oshima (2016); Hirayama (2018); Oshima (2019), and Shimoyama, Goodhue & Hirotani (2019), among others. The negative polar question in (16b) can be felicitously uttered in context (16a), adapted from Ito & Oshima (2016). In this context, speaker B has prior positive epistemic bias that the orange that A is eating is sweet. Example (16b) in this context is roughly translatable by using a polar question with preposed negation in English, 'Isn't it sweet?'.[14]

(16) a. Context: A is eating an orange. B has already eaten one from the same bag and it was exceptionally sweet. B says to A: (16b)

b. Amak-u **nai**$_{tc}$? ↑ (*↓)
sweet-INF **NEG**$_2$.NPST
'Is**n't** it sweet?'
⇝ The speaker is biased toward the proposition that it's sweet. (positive epistemic bias)

The negation *nai*$_{tc}$ in (16b) is obligatorily 'tonally compressed', a term used by Ito & Oshima (2016: 4) to describe the 'total disappearance, as well as mere subdual/weakening, of pitch movements.' We should also note that example (16b) must have the rising intonation at the end as indicated by '↑', forcing it to be a question. See Ito & Oshima (2016) for more detailed descriptions of the prosodic properties of *nai*$_{tc}$ 'NEG$_2$' in comparison to regular negation *na'i* 'NEG$_1$'.[15]

We can show that example (16b) requires the speaker to be biased for the propositional core of the question by demonstrating its infelicity in a context in which the speaker has no prior epistemic bias. One such context is given in (17), again from Ito & Oshima (2016).

(17) Context: A eats a piece of orange and grimaces. B has no prior expectation about the quality of the oranges. B says to A: #(16b)

Here, speaker B's utterance of (16b) is infelicitous, confirming that (16b) requires prior positive epistemic bias on the part of the speaker. Example (18), on the other hand, features regular negation *na'i* 'NEG$_1$' and is felicitous in context (17), where there is contextual evidence that the orange is not sweet.

[14] In Ito and Oshima's (2016) original context, B has only heard that oranges this year are exceptionally sweet, and he has not eaten one yet. In this context, however, the English negative polar question 'Isn't it sweet?' sounds a bit odd, and a positive polar question 'Is it sweet?' would be preferred (a positive polar question would also work in Japanese in this context). We modified the context to (16a) so that we would have acceptable negative polar questions in both Japanese and English. In fact, example (16b) in Japanese may be more acceptable in the modified context than in the original context as well, but this requires more systematic study.

[15] We avoid using the verb form *ko-* (*kuru*) 'come' in these and later examples, which was used in examples (2)/(9) from Yoon (2013). Because the pitch accent is placed immediately before *nai*, as in *ko'-nai*, the distinction between NEG$_1$ and NEG$_2$ is blurred, as there is no tone to compress to begin with. This issue could be avoided by using the aspectual form, as in *ki'-te na'i* 'NEG$_1$' vs. *ki'-te nai* 'NEG$_2$' (see Ito & Oshima, 2016). More work is needed on the prosodic characterization of negation, relative to both matrix and embedded clauses.

(18) Amak-u **na'i**? ↑(↓)
sweet-INF **NEG**$_1$.NPST
'Is it **not** sweet?' ('It is not sweet.')

This shows that positive speaker bias is not a necessary component of all negative polar questions in Japanese, just those with tonally compressed negation. This suggests that tonal compression of negation plays a similar role to preposing of negation in several other languages discussed by Romero & Han (2004), including English as seen in the translations of Japanese examples here. Note also that unlike (16b), it is possible to utter (18) with falling intonation, in which case it is interpreted as a declarative statement 'it is not sweet.'

We note here that NEG$_2$ can optionally be followed by particle *ka* 'Q' as in (19b). With the particle *ka* present, the sentence-final intonation could be either rising or falling. With either intonation, the question could be a self-addressed one.

(19) a. Ken-ga hannin ja nai$_{tc}$? ↑/*↓
Ken-NOM culprit COP.WA NEG$_2$
'Isn't Ken the culprit?'
b. Ken-ga hannin ja nai$_{tc}$ ka? ↑/↓
Ken-NOM culprit COP.WA NEG$_2$ Q
'Isn't Ken the culprit?'

Recall from examples (6) and (7) in section 1 that the negation in a positively biased negative polar question does not license strong negative polarity items. We will add some more examples here to show the lack of negativity in the propositional core of this type of question. Goodhue (2018, 2019b,a) presents evidence that preposed negation in English polar questions such as *Did**n't** Jane eat?* is not interpreted in the propositional core of the question (Ladd, 1981) by investigating how not-at-issue contents (presuppositions and conventional implicatures) project out of questions. For instance, *again* presupposes that the proposition denoted by its complement has happened before.

(20) Did Jane eat **again**?
presupposes: Jane ate before

If *again*'s complement contains negation, then negation should be part of the presupposition.

(21) Did Jane **not** eat **again**?
can presuppose: Jane did not eat before

However, the presupposition projecting from the preposed negation question cannot contain negation.

(22) Did**n't** Jane eat **again**?
presupposes: Jane ate before
cannot presuppose: Jane did not eat before

This leads to the conclusion that *again* cannot scope above negation in (22). The explanation pur-

sued in Goodhue (2018) is that preposed negation scopes outside the propositional core.[16] Other tests supporting this conclusion deployed in Goodhue (2018) include projecting content (*also*, *as*-parentheticals), negation sensitivity (*until*- and *for*-adverbials), and polar particle responses to negative sentences.

Parallel observations hold in Japanese (reference retracted). By using *mata* 'again' and *mo* 'also', we can see that the special negation *nai*$_{tc}$ 'NEG$_2$', which occurs in positively biased negative polar questions, is also interpreted outside the propositional core of the question, as in the English case in (22) above.[17]

(23) Yoko, **mata** tabe-te **nai**$_{tc}$?
Yoko again eat-TE **NEG**$_2$.NPST
'Isn't Yoko eating again?'
presupposes: Yoko was eating before.
cannot presuppose: Yoko was not eating before.

(24) Yoko-**mo** tsukare-te **nai**$_{tc}$?
Yoko-also tired-TE **NEG**$_2$.NPST
'Isn't Yoko also tired?'
presupposes: Someone else is tired.
cannot presuppose: Someone else is not tired.

We have seen in this section some basic properties of negative polar questions like *Ama-ku na-i*$_{tc}$*?* 'Isn't it sweet?' in (16b). They convey the speaker's positive epistemic bias toward the propositional core of the question. Further, the negation morpheme *nai*$_{tc}$ 'NEG$_2$' is interpreted outside the propositional core of the question. In this sense, *nai*$_{tc}$ 'NEG$_2$' is considered to be non-canonical negation. Though this paper will not review different analyses proposed for positively biased negative polar questions in general, and will not depend on any particular way of deriving the positive bias, it should be noted that in analyses such as Krifka (2017) and Goodhue (2018, 2019b,a), this noncanonical negation is still interpreted as negation, but at the speech act level, separating it from analyses in which the negation is an expletive subjunctive marker, discourse particle, or is otherwise not interpreted as negating some constituent.[18]

[16]Following previous work (Hartung, 2006; Sailor, 2013; AnderBois, 2019; Goodhue, 2018), we assume that Ladd's (1981) ambiguity does not exist in American English, and in particular that there is no inner negation reading of questions with preposed negation.

[17]Support for positing a specialized negation morpheme in a syntactically high position also comes from the phenomenon of monophthongization, where *nai*$_{tc}$ goes to a more 'advanced' stage and is pronounced as *ne*, as in (i). This question only has the interpretation where the speaker is positively biased. See Hara, Kawahara & Feng (2014); Oshima (2019) and Sailor (2013).

(i) Tsuuka, sore ii-sugi ja **ne**?
rather it say-excess COP.WA NEG$_2$
'Well, isn't what you just said a bit too much?' (Rikudoo Sen'nin, *Naruto Shippuden*, episode 420)

[18]In analyses where negation in biased questions is either a discourse particle (e.g, Hartung 2009) or triggers the presence of a silent VERUM operator (e.g., Romero & Han 2004), the robust cross-linguistic pattern of negation showing up in such biased questions is left unexplained.

3.2 Key property 2: 'Quotative' marker TO and speech/thought act phrases

Even though particle *to*, as in (25) below, has been described most commonly as a declarative complementizer like *that* in English, its use and function as a 'quotative' marker has attracted attention more recently (Saito, 2012, 2015; Kratzer, 2013; Maier, 2014; Sauerland & Yatsushiro, 2014; Tomioka & Kim, 2015, 2016; Kim, 2018; Shimamura, 2018; Saito, 2019; Yoshida, 2019; Sode & Sugawara, to appear).

(25) Yoko-wa [[yoru-no aida-ni ame-ga hut-ta] **to**] {it/omot/kii/kakushinshi}-ta.
Yoko-TOP night-GEN period-DAT rain-NOM fall-PST TO say/think/hear/certain-PST
'Yoko {said/thought/heard/was certain} that it rained during the night.'

Unlike English *that*, *to* marks its sister constituent as a direct or indirect report of speech or thought (what we will call a 'mental utterance') attributed to the subject of the embedding clause.[19, 20] This can be more transparently observed in some of the non-Tokyo dialects of Japanese. Naturally occurring speech in (26) below from Okayama Japanese shows that the counterpart of *to* is the form *yuu-te* '(lit.) saying'. *Yuu-te* in the embedded clause is optional, similarly to the form *te* in the Kansai dialect of Japanese (see, for example, H. Saito 2018).

(26) Sore-o kii-ta sutaffu-san-tachi-mo [sugoi ee-yan **yuu-te**] yuu-te kure-te, ...
it-ACC hear-PAST staff-POL-PL-also very good-JAN say-TE say-TE BEN-TE
'Also the staff members who heard that (=my idea) told me that it was very good.'[21]

We can see that *to* embeds speech/thought act phrases more clearly by looking at cases in which non-declarative forms are embedded under *to*. For example, *to* can combine with an imperative form. (27) involves a direct report of speech (direct quotation), while (28) involves an indirect report of speech, both of which have an imperative verbal ending *-e*. (28) can be uttered on Thursday, the day before the deadline. See, for example, Kuno (1988); Oshima (2006b); Maier (2014, 2017); Kim (2018); Saito (2017, 2019); Yamada (2019); Sode & Sugawara (to appear).

(27) Jooshi-ga ["**watashi-ni yok-ka-go** made-ni shorui-o das-**e**" to]
boss-NOM I-DAT four-day-later till-DAT document-ACC submit-**IMP** TO
getsuyoo-ni ii-mashi-ta.
Monday-on say-POL-PST
'My boss said (to me) on Monday, "Submit the document **to me** by **four days from now**".'

(28) Jooshi-ga [[**kanojo-ni ashita** made-ni shorui-o das-**e**] to] getsuyoo-ni
boss-NOM she-DAT tomorrow till-DAT document-ACC submit-**IMP** TO Monday-on
ii-mashi-ta.
say-POL-PST
'My boss said (to me) on Monday, to submit the document **to her** by **tomorrow**.'

[19] *To* is described as the complementizer for 'paraphrases' or 'reports' of direct discourse in M. Saito (2012: 148).

[20] There are exceptions to the description that speech or thought is attributed to the embedding subject, for example, in the case of embedding under *kiku* 'hear'.

[21] `https://www.youtube.com/watch?v=HCkm1BVNzF8` (FUJII Kaze, ANNnewsCH, 5'50", 09/23/2020)

That example (28) does involve indirect report of speech can be shown also by the use of long-distance matrix *wh*-question formation. Example (30) contrasts with the ungrammatical (29) (Banfield, 1973; Kuno, 1988; Anand & Nevins, 2004; Oshima, 2006a; Maier, 2014).

(29) *Jooshi-wa [“watashi-ni **itsu** made-ni shorui-o das-**e**” to] getsuyoo-ni
boss-WA I-DAT when till-DAT document-ACC submit-**IMP** TO Monday-on
ii-mashi-ta ka?
say-POL-PST Q
(Intended) ‘By when did your boss say (to you) on Monday, “submit the document to me *t*?”

(30) Jooshi-wa [[kanojo-ni **itsu** made-ni shorui-o das-**e**] to] getsuyoo-ni
boss-NOM she-DAT when till-DAT document-ACC submit-**IMP** TO Monday-on
ii-mashi-ta ka?
say-POL-PST Q
‘By when did your boss say (to you) on Monday, to submit the document to her *t*?’

All the examples of *to*-embedding that we use in this paper are intended to involve *indirect* reports of speech or thought.

Furthermore, the use of *to* seems to be degraded in contexts where the attitude holder is unaware that they have the attitude described in the *to*-clause. This is shown in (31) and (32) below. One possible context for these sentences would be that even though Yoko in (31) or the speaker in (32) is a fan of the Canadiens, they are not big fans of those noisy parties in their neighbourhood when the team wins.

(31) Yoko-wa zibun-de-wa mattaku kizui-te-nai kedo, jitsuwa [[Canadiens-ga
Yoko-WA self-by-WA at.all realize-TE-ASP.NEG though in.fact Canadiens-NOM
makeru {{koto/no}-o/??to}] kitaishi-te ru-n-da to] omou yo.
lose.NPST KOTO/NO-ACC/TO hope-TE ASP.NPST-NO-COP.NPST TO think.NPST PRT
‘Though she hasn’t realized it at all herself, Yoko is in fact hoping that the Canadiens will lose, (I) think.’

(32) Zibun-de-wa sono toki mattaku kizuka-nakat-ta kedo, jitsu-wa [[Canadiens-ga
self-by-WA that moment at.all realize-NEG-PST though in.fact Canadiens-NOM
makeru {{koto/no}-o/??to}] kitaishi-te ta-n-da to] omou.
lose.NPST KOTO/NO-ACC/TO hope-TE ASP.PST-NO–COP.NPST TO think.NPST
‘Though (I) didn’t realize it at all myself at the time, (I) think (I) was in fact hoping that the Canadiens would lose.’

Though more careful studies are needed as the judgments are somewhat delicate, for the speakers who have this contrast, we could make sense of it from the nature of *to* – it attributes the content of its sister constituent to the embedding subject (Yoko in (31) and the speaker in (32)) as a verbal or mental utterance that they have authored, while the preceding part of the sentence claims the subject’s ignorance of the attitude expressed. English *that* imposes no such restriction because it does not require the clause it embeds to be an utterance of the embedding subject.[22]

[22]An informal judgment survey was conducted with eight native speakers of Japanese, who were asked to rate the acceptability of sentences (31) and (32) on the scale of 1 (not acceptable) to 4 (fully acceptable). The result was:

What is most relevant for our purposes is that *to* can embed a question speech/thought act phrase. We start our illustration with genuine interrogative embedding. Example (33a) is a case of embedded *wh*-question, and example (33b) is a case of embedded polar question. In both cases, the sentences are grammatical when they are embedded under 'know', a typical question-selecting verb, while they are ungrammatical when they are embedded under 'think' or 'hope', which are not question-selecting verbs. As we can see in the translations, the same pattern is observed in their English counterparts.

(33) a. Yoko-wa [**dare**-ga hannin **ka**] {shit/*omot/*kitaishi}-te iru.
Yoko-TOP who-NOM culprit Q know/think/hope-TE ASP.NPST
'Yoko {knows/*thinks/*hopes} who the culprit is.'

b. Yoko-wa [Ken-ga hannin {**ka/kadooka**}] {shit/*omot/*kitaishi}-te iru.
Yoko-TOP Ken-NOM culprit Q/whether know/think/hope-TE ASP.NPST
'Yoko {knows/*thinks/*hopes} whether Ken is the culprit.'

While *omou* 'think' or *kitaisuru* 'hope' does not embed interrogative clauses directly as we just saw, when *to* is used, a question speech/thought act can be embedded under these predicates, as shown in (34) (see, for example, Lahiri, 2002; Saito, 2015; Yoshida, 2019).

(34) Yoko-wa [[Ken-ga hannin **ka**] **to**] {omot/kitaishi}-te iru.
Yoko-TOP Ken-NOM culprit Q TO think/hope-TE ASP.NPST
'(Lit.) Yoko {thinks/hopes}, is Ken the culprit.'
'Yoko {thinks/is hopeful} that Ken might be the culprit.'

This supports the emerging description of the general function of *to*, that is, to combine with speech/thought act phrases and attribute the authorship to the embedding subject. These phrases house reports of speech or mental utterances. This aspect of *to* clearly distinguishes itself from the declarative complementizer *that* in English.[23]

As with the basic case of indirect report of speech/thought under *to* in (30) above, long-distance *wh*-question formation is fine with a simple polar question occurring under *to*, as in (35b) (reference retracted).

(35) a. Yoko-wa [[**natto**-ga kusat-te ru **ka**] **to**] shinpaishi-ta.
Yoko-TOP natto-NOM rotten-TE ASP.NPST Q TO worry-PST
'(Lit.) Yoko worried, did the natto go bad.'
'Yoko was anxious that the natto might have gone bad.'

(31) with *koto*: 4.0; *no*: 3.9; *to*: 2.2, and (32) with *koto*: 4.0; *no*: 4.0; *to*: 2.6. There seem to be various factors that could affect the (un)acceptability of *to*, which need to be investigated more fully in the future.

[23]Mizuno (2021) calls the particle *ka* in examples such as (34) a Modally Functioning Q-particle (MFQ), which is proposed to occur in the Mood head immediately below C, and to be the morphological exponent of the 'unsettledness presupposition' (Anand & Hacquard, 2013, 2014). It is claimed that MFQs can only appear with emotives and dubitatives. To show that MFQs can appear with dubitatives, the verb *utagau* in the sense of 'suspect' is used. However, the verb *utagau* in the sense of 'doubt' cannot occur with the so-called MFQ. We think this has to do with *to*'s function as a marker of direct or indirect report of speech or mental utterance. This aspect of *to*, which contrasts significantly with the English declarative complementizer *that*, is not taken into consideration in Mizuno (2021), which makes it hard to make sense out of data such as (31)/(32) above, where the attitude holder is unaware of their own attitude, as well as the incompatibilities of *to*-clauses with predicates like *hiteisuru* 'deny'. We will come back to this in section 6 (see Yamada, 2019) [references retracted].

b. Yoko-wa [[**nani**-ga kusat-te ru **ka**] **to**] shinpaishi-ta no?
Yoko-TOP what-NOM rotten-TE ASP.NPST Q TO worry-PST NO
'(Lit.) What did Yoko worry, did *t* go bad?'
'What did Yoko worry might have gone bad?'

We should note here that when we say that a 'question speech/thought act' led by *to* can be embedded under certain predicates, it is to be understood that the embedded constituent is syntactically in the interrogative form. As we will see in section 5, what the matrix predicate actually combines with is the attitude holder's bias arising from the relevant speech/thought act.

It is also possible for a question speech act phrase to combine with question-embedding predicates such as *tazuneru* 'ask, inquire', as shown in (36) (Saito, 2012; Hashimoto, 2015).

(36) Yoko-wa [[Ken-ga hannin **ka**] **to**] tazune-ta.
Yoko-TOP Ken-NOM culprit Q TO ask-PST
'Yoko asked whether Ken was the culprit.'

However, unlike those cases of genuine polar question embedding as in (33b) and (37), *kadooka* 'whether' cannot replace the question particle *ka* in cases of embedding under *to*, as we can see in the contrast between (36) above and (38) below.

(37) Yoko-wa [[Ken-ga hannin **ka/kadooka**] tazune-ta.
Yoko-TOP Ken-NOM culprit Q/whether ask-PST
'Yoko asked whether Ken was the culprit.'

(38) a. *Yoko-wa [[Ken-ga hannin **kadooka**] **to**] omot-te i-ru.
Yoko-TOP Ken-NOM culprit whether TO think-TE ASP-NPST
'(Lit.) Yoko thinks, whether Ken is the culprit.'
b. ??Yoko-wa [[Ken-ga hannin **kadooka**] **to**] tazune-ta.
Yoko-TOP Ken-NOM culprit whether TO inquire-PST
'(Lit.) Yoko asked, whether Ken is the culprit.'

Kadooka 'whether' is an interrogative complementizer that is specialized for genuine embedded polar interrogatives, as in (33b). The fact that we can only have the Q particle *ka*, but not *kadooka* 'whether' in cases of speech/thought act embedding as shown in the contrast between (34)/(36) and (38), suggests that this *ka* needs to be recognized as something different from the *ka* in (37), which is interchangeable with *kadooka* that resides in the C-position. In other words, *ka* is not always an overt realization of C[+Q] as assumed in Bhatt & Dayal (2020), but has a double life as a interrogative discourse particle in the sense of Bhatt & Dayal's *kyaa* in Hindi-Urdu.

Another property of *to* that separates it from English complementizer *that* is that *to*-led clauses can be selected by a matrix predicate as in (39a), exemplified by (25), (28) and subsequent examples above, but they can also occur unselected as in (39b), exemplified by (40). Similar examples can be found in Korean (41) and Turkish (42), where the *ko*-clause and the *diye*-clause are not selected by any matrix predicate (Oshima, 2015; Tomioka & Kim, 2016; Kim, 2018; Özyıldız, 2018, 2019). In these examples, as the English translations indicate, the unselected *to*/*ko*/*diye*-clauses themselves are interpreted as speech or thought, attributed to the embedding subject.

(39) a. Subj [[Speech Act] TO] Pred (Selected)

b. Subj [[Speech Act] TO] Obj Pred (Unselected)

(40) Hanako-wa [yuki-ga hurikomu ka to] mado-o shimeta.
Hanako-TOP snow-NOM fall.enter Q TO window-ACC closed
'Hanako closed the window, thinking that the snow might come in.'

(41) [Yongton-i chwungpwunha-nya-ko] halmeni-ka ton-ul na-eykey
allowance-NOM be.enough-Q-QUOT grandma-NOM money-ACC 1SG-DAT
cwu-ess-ta.
give-PST-DECL
'Grandma gave me money, saying/wondering if my allowance is enough.' *Korean* (Kim, 2018)

(42) Ali [anne-si gel-di mi diye] kapı-yı aç-tı.
Ali mother-3S.POSS arrive-PST.3S POLQ DIYE door-ACC open-PST.3S
'Ali opened the door, wondering whether his mother had arrived.' *Turkish* (Özyıldız, 2018)

It is also possible, in colloquial speech or writing, for a *to*-led clause to occur on its own with no full matrix clause. In this 'Insubordination'-type phenomenon (Evans, 2007; Mithun, 2008; Evans & Watanabe, 2016), we can see that the contribution of *to* is to mark its sister as speech or thought. The agent of speech or thought can be expressed as in (43), or can be determined by context as in (44), the speaker being one possibility (see, for example, Sharvit, 2008; Oshima, 2010; Saito, 2018, 2019).

(43) Sota-no chiimu-ga kats-u to, Yoko-san.
Sota-GEN team-NOM win-NPST TO Yoko-HON
'Sota's team will win, said Yoko.'

(44) Sota-no chiimu-ga kats-u daroo, to.
Sota-GEN team-NOM win-npst MOD TO
'Sota's team is likely to win, x says/thinks.'

These facts provide independent evidence that *to* combines with speech/thought act phrases, and this property of *to* will make our reduction analysis of noncanonical negation possible in the next section.

4 Reducing embedded noncanonical negation to the negation in embedded negative polar questions

In this section, we will see that once we put together the necessary descriptive pieces from above surrounding the phenomena of (i) positively biased negative polar questions (section 3.1), and (ii) speech/thought act embedding under *to* (section 3.2), we can subsume one type of noncanonical negation we introduced in section 1, *i.e.,* embedded noncanonical negation, under the other type of noncanonical negation, found in positively biased negative polar questions. We will see some immediate advantages of such a reduction analysis, and how it lends further support to the idea that *to* embeds speech act phrases.

4.1 Embeddability of positively-biased negative polar questions and the reduction analysis

We will see in this section that the phenomenon of embedded noncanonical negation in Japanese, analyzed by Yoon (2011, 2013) as subordinate expletive negation, provides further evidence that what is embedded under *to* is a speech/though act phrase, in particular, a positively biased negative polar question.

The following examples ((45) is repeated from (34)) illustrate embedding of a simple polar question + *to* under non-question-selecting predicates *omou* 'think' and *kitaisuru* 'hope'.

(45) Yoko-wa [[Ken-ga hannin **ka**] **to**] omot-te iru.
Yoko-TOP Ken-NOM culprit Q TO think-TE ASP.NPST
'(Lit.) Yoko thinks, is Ken the culprit.'
'Yoko thinks Ken *might* be the culprit.'

(46) [[Yuki-ga hur-u **ka**] **to**] kitaishi-ta kedo, kekkyoku hur-anakat-ta.
snow-NOM fall-NPST Q TO hope-PST though in.the.end fall-NEG-PST
'(Lit.) (I) was hopeful, will it snow, but in the end it didn't.'
'(I) was hopeful that it *might* snow, but in the end it didn't.'

The use of the epistemic modal 'might' in the English translations of (45) and (46) is intended to indicate that the propositions that the matrix predicates combine with in these examples are the attitude holder's bias toward the proposition *that Ken is the culprit* or *that it will snow*.[24] We can contrast example (45) with example (47) below to observe different degrees of strength in the attitude holder Yoko's belief. (45) has a hedging effect in comparison to (47), where *to*'s sister is a declarative clause.[25]

(47) Yoko-wa [[Ken-ga hannin **da**] **to**] omot-te i-ru.
Yoko-TOP Ken-NOM culprit COP.NPST TO think-TE ASP-NPST
'Yoko thinks that Ken is the culprit.

We think that the attitude holder's bias in examples like (45) or (46) has its origin in the embedded polar question. While positive polar questions like (49) can be used felicitously in neutral contexts like (48a) from Goodhue (2019b), they can also be used in contexts in which the speaker is confronted with evidence in favor of the positive answer like (48b), an example of positive evidential bias as discussed by e.g. Büring & Gunlogson (2000); Sudo (2013); Krifka (2015).[26]

[24]While we talk about the bias that simple positive polar questions could convey in certain contexts, the bias is less strongly felt than in positively biased negative polar questions. This may explain the observation in Mizuno (2021) that *shinjiru* 'believe' does not embed simple positive polar questions with *ka to* 'Q TO'. Compare that with the example with *omou* 'think' in (45), where a simple positive polar questions with *ka to* 'Q TO' is happily embedded. We will see below naturally occurring data where positively biased negative polar questions are embedded under *shinjiru* 'believe' in (55), and under *kakushinsuru* 'be certain' in (56), due to the attitude holder's stronger belief expressed in that construction. See also footnote 34.

[25]It is also noted in Kim & Tomioka (2014) and Kim (2018) that what they call Speaker-oriented embedded (polar) interrogatives give rise to speaker's bias toward a positive answer.

[26]Note that having '*no* (*ka*)' at the end of the question in (49) makes it usable only in the biased context. We leave for future exploration properties of the particle *no* in questions in relation to the so-called *no da*-construction.

(48) a. A has just walked in the front door, and she is looking for her roommate Yoko. She has no idea whether Yoko is home or not, but their mutual roommate B is, so A says to B: (49)

b. A and B are building a birdhouse in the basement. A thought that they were home alone because Yoko went out to the farmer's market earlier, but then she hears a noise upstairs, and says to B: (49)

(49) Yoko kaet-te ru (ka)?
Yoko return-TE ASP.NPST Q
'Is Yoko home?/Has Yoko returned?'

Positively biased negative polar questions can also be embedded under *to*, as shown in (50).

(50) Yoko-wa [[Ken-ga hannin ja nai$_{tc}$ **ka**] **to**] {omot/shinpaishi}-te i-ru.
Yoko-top Ken-nom culprit COP.WA NEG$_2$ Q TO think/worry-TE ASP-NPST
'(Lit.) Yoko thinks/is worried, isn't Ken the culprit.'
'Yoko thinks/is worried that there is a good possibility that Ken is the culprit.'[27]

Intuitively, the attitude holder's bias toward the positive answer of the embedded polar question in (50) is stronger than the bias conveyed by embedding simple positive polar questions in (45) and (46). At the same time, (50) still has a hedging effect compared to declaratives embedded under *to* as in (47). Given our use of *might* in the translations of (45) and (46), and our use of the unmodalized prejacent in (47), the contribution of the embedded negative polar question to the matrix attitude predicate in (50) is best translated via a modal expression stronger than *might*. We alternate between *good possibility* and *probably* in our translations according to what seems most natural. We will return to the issue of context dependency with respect to the strength of bias in section 4.2.

To ensure that we are not dealing with a direct report of speech or thought (*i.e.,* direct quotation) in (50), one can use the same test that we used with embedding of a simple polar question under *to* in (35) above. Like in (35), it can be shown that the embedded positively biased negative polar question in (51a) does not involve a direct report of speech/thought by the use of long-distance *wh*-question formation in (51b).

(51) a. Yoko-wa [[**natto**-ga kusat-te **nai**$_{tc}$ **ka**] **to**] shinpaishi-ta.
Yoko-TOP natto-NOM rotten-TE **NEG**$_2$ Q TO worry-PST
'Yoko worried that the natto had probably gone bad.'

b. Yoko-wa [[**nani**-ga kusat-te **nai**$_{tc}$ **ka**] **to**] shinpaishi-ta no?
Yoko-TOP what-NOM rotten-TE **NEG**$_2$ Q TO worry-PST Q
'(Lit.) What did Yoko worry, hasn't *t* gone bad?'
'What did Yoko worry *t* had probably gone bad?'

To summarize, with the two aspects of the Japanese grammar in place, that is, (i) positively biased negative polar question and (ii) speech act embedding under *to*, we can now see that example (50), as well as earlier examples such as (2) and (9), are straightforwardly analyzed as cases of embedded positively biased negative polar questions led by *to*.[28]

[27] With the matrix verb *omou* 'think', another natural translation is 'Yoko *suspects* that Ken is the culprit'.

[28] This fits with analyses of positively biased negative polar questions in English as crucially involving a high

4.2 Advantages of the reduction analysis over the unlikelihood analysis

We will now demonstrate that the proposed reduction analysis has immediate advantages over the unlikelihood analysis. We will return to the two puzzles we presented in section 2 later in section 6, and show that the puzzles fall out of the reduction analysis.

The embedded noncanonical negation, which was analyzed in the unlikelihood analysis as a special type of subordinate expletive negation that is at the same time a subjunctive mood marker, can now be reduced to the negation in positively biased negative polar questions. Note that the unlikelihood analysis contrasts with the reduction analysis in that the negation in *matrix* biased polar questions is not related to the *subordinate* expletive negation/subjunctive mood marker, requiring a separate analysis for the former. We note here as well that positively biased negative polar questions also occur freely in the unselected, 'Bare Quotative' constructions that we saw in (39b) above. This is shown in (52) below.

(52) [[Akanboo-ga nai-te **nai**$_{tc}$ ka] to] Ken-wa kaidan-o kake-agat-ta.
baby-NOM cry-TE NEG$_2$.NPST Q TO Ken-WA stairs-ACC run-ascend-PST
'Thinking that the baby is probably crying, Ken ran up the stairs.'

An analysis that treats embedded noncanonical negation as subordinate expletive negation/a subjunctive mood marker such as the unlikelihood analysis cannot explain (52) since there is no matrix predicate that 'licenses' the negation. On our account, a unified analysis is straightforward: both embedded negations are instances of the negation in positively biased negative polar questions.[29]

Similarly, we also note here that, in examples with a simple polar question under *to*, such as (45)/(46), as well as in examples with a positively biased negative polar question under *to*, such as (50), the question particle *ka* can be followed by another particle *na(a)*. (53) below is naturally occurring speech with two occurrences of positively biased negative polar questions followed by particle *na(a)*. Such questions ending with *ka na(a)* do occur *unembedded* as well, as discussed in von Fintel & Iatridou (2019, 2021).[30] Here again, the fact that the same form, NEG$_2$ + *ka na(a)*, occurs both embedded and unembedded, cannot be captured in the unlikelihood analysis, as it takes NEG$_2$ to be a case of *subordinate* expletive negation. In such an analysis, the sequence *ka-na(a)-to* would be treated as yet another non-factive complementizer, while unembedded *ka-na(a)* would have to receive an independent analysis.

(53) [Kono ni-shiai, mata ironna charenji-ga dekiru-n-ja **nai**$_{tc}$ **ka na** to]
this two-match again various challenge-NOM can.do-NO-COP.WA **NEG$_2$ KA NA** TO
omou-shi, [[renshuu-mo shitsu-ga takaku-naru-n-ja **nai**$_{tc}$ **ka na** to] yuu
think-and training-also quality-NOM high-become-NO-COP.WA **NEG$_2$ KA NA** TO SAY
kitai]-wa arimas-u.
hope-WA exist-NONPAST
'I think there's a good possibility that we will be able to try out various things once again

negation that interacts with speech act operators such as Krifka 2017; Goodhue 2018, 2019b,a, since *to* embeds speech acts.

[29]Thanks to Keir Moulton (p.c.) for bringing up this point.

[30]See also, for example, Suzuki (1990); Hirayama (2015); Suzuki (2015); Oguro (2017); Uegaki & Roelofsen (2018); Hara (2021).

in these two matches, and I hope and expect that there's a good possibility that the quality of our trainings will also get better.'[31]

We will now come back to the challenge we identified for the unlikelihood analysis in section 2.2 and demonstrate that they are no longer a challenge in the reduction analysis. As we noted at the beginning of section 2, the contribution of the negation morpheme in examples such as (2) and (9) is described in the unlikelihood analysis as 'undesirability or unlikelihood'. This characterization does not fit with data available to us, as we saw in section 2.2.[32] Here we add a few more examples that show that the relevant characterization is not 'undesirability or unlikelihood'. Example (54) from Choi & Lee (2017: 182) with *shinjiru* 'believe' can be uttered in contexts where that he is strong is neither undesirable nor unlikely to the speaker. (55) and (56) are naturally occurring data, where the matrix predicates are *shinjiru* 'believe' and *kakushinsuru* 'be certain', respectively. In both examples, the content of the relevant proposition is neither undesirable nor unlikely to the attitude holder, that is, the first person speaker/writer.

(54) [Hontoo-wa tsuyoi n ja **nai**$_{tc}$ ka to] **shinji**-te i-masu.
reality-WA strong.NPST NO COP.WA NEG$_2$ Q TO believe-TE ASP-POL.NPST
'(I) believe that (he) may be strong in fact.'

(55) Rettoo-kaizoo-to dooji-shinkoo-de shuto-kinoo-iten-o
archipelago-reform-with same.time-carry.out-in capital-function-relocation-ACC
jisshishi-te ire-ba tookyoo-ga ima-no yoona jootai-de-wa
implement-TE ASP-COND Tokyo-NOM now-GEN like state-COP-WA
nakat-ta-n-ja **nai**$_{tc}$ ka to **shinji**-te orimas-u.
NEG$_1$-PAST-NO-COP-WA NEG$_2$.NPST Q TO believe-TE ASP-NPST
'I believe that if relocation of some functions of the capital had been implemented simultaneously with the remodeling of the Japanese Archipelago, there is a good possibility that Tokyo wouldn't have been in its current state.' (OM66_00001, BCCWJ[33])

(56) ..., [shutaisha-dearu chuukoosei-tachi-no sanka-to, shokuin-no
..., main.player-COP secondary.school.student-PL-GEN participation-and staff-GEN
eichi-o kesshuus-aseru koto-niyotte, ittei-no kaiketsu-no hookoo-ga
wisdom-ACC collect-CAUS KOTO-by certain-GEN solution-GEN direction-NOM
umare-te kuru-no-de-wa **nai**$_{tc}$ ka to] **kakushinshi**-te iru.
arise-TE come-NO-COP-WA NEG$_2$.NPST Q TO be.certain-TE ASP
'I am certain that, by putting together the participation of the secondary school students, who are the main players in this, and the wisdom of the staff, there is a good possibility

[31] https://youtu.be/2MAqGmNHnDg (YOSHIDA Maya, JFATV Team Cam 6'21", 2020/11/09)

[32] Contexts with three varying degrees of likelihood, (i) higher than 80%, (ii) 50%, and (iii) lower than 20%, of Mary's coming to the party for (1)/(2) are discussed in Yoon (2013: 150-151), and it is claimed that these sentences are only felicitous in contexts (ii) and (iii), and that this supports the idea that the negation marks unlikelihood. Another possible interpretation of this pattern might be that there is a competition between embedded clauses with and without negation, as we saw in (50) vs. (47) above. Further, as we mentioned in footnote 15, one problem about the Japanese examples in (2)/(9) is that the negation *nai* cannot be disambiguated by prosody (na'i 'NEG$_1$' vs. nai$_{tc}$ 'NEG$_2$'), and it can very easily be interpreted as true negation, in which case the sentence 'John fears that Mary might *not* come' could be judged infelicitous in context (i).

[33] *The Balanced Corpus of Contemporary Written Japanese* (National Institute for Japanese Language and Linguistics)

that a clear direction for solutions will emerge.' (LBo3_00028, BCCWJ)

These examples above demonstrate that the strength of the belief (bias) held by the attitude holder could vary depending on linguistic materials in other parts of the sentence or the utterance context. This is expected in the reduction analysis, in which the embedded noncanonical negation is identified with the negation in embedded positively biased negative polar question. The variability in the strength of the attitude holder's bias as observed in the data above is expected due to pragmatic factors.[34]

Further support that the negation in question does not mark unlikelihood comes from the following example from Choi & Lee (2017: 190). B's response of agreement is to A's biased belief that Yuna missed the plane. It is pointed out in Choi & Lee (2017) that B's response of agreement with supporting pieces of evidence for the proposition that Yuna missed the plane would not be possible if the negation here marked 'unlikelihood'.

(57) A: [Yuna-ka pihayngki-lul nohci.ci-**anh**-ass-ul-kka] kekcengtoy-n-ta.
Yuna-NOM plane-ACC miss-NEG$_2$-PST-MOD-QCOMP worry-PRES-DECL
'(I) am worried that Yuna may have missed the plane.'

B: maca, nwun-ttaymwuney taypwupwunuy konghang pesu-ka wunhayngchwiso
right snow-because.of most.of airport bus-NOM cancel
toy-ess-tay.
be-PST-RCOMP
'You are right; most airport buses have been cancelled due to snow.'[35]

Similar observations are made for responses to *unembedded* positively biased negative polar questions in Japanese by Kuno (1973, 278-281) and Ito & Oshima (2016, (12)/(13)), for example. Such observations can be replicated in *embedded* positively biased negative polar questions and responses to them, as in (58)-(60). Just like the Korean example in (57) above from Choi & Lee (2017), the felicity of responses in (59a)/(60b), as well as the infelicity of responses in (59b)/(60a), would not be explained if the negation morpheme in (58) marked unlikelihood for the wine to be sweet.

[34]The verb *shinjiru* 'believe, have confidence in, trust' does not have the 'light' meaning that English *believe* has, which could be paraphrased by 'think', 'guess', 'assume', etc. Because of that, a slight mismatch may be felt in (i) between the hedging effect that arises in the embedded clause, and the matrix verb *shinjiru* 'believe'. However, natural sounding examples such as (55) and (56) show that there are pragmatic factors at play. One puzzle remains, however, with respect to the perceived contrast between (i) and (ii). Unlike (i), (ii) does not give rise to any unnaturalness. We speculate that the contrast has something to do with the questionhood of the embedded clause in (i), but leave the puzzle for future.

(i) ?Yoko-wa [[Ken-ga hannin ja nai$_{tc}$ ka] to] shinji-te ir-u.
Yoko-TOP Ken-NOM culprit COP.WA NEG$_2$ KA TO believe-TE ASP-NPST
'(Lit.) Yoko believes isn't Ken the culprit.'
'Yoko believes that there's a good possibility that Ken is the culprit.'

(ii) Yoko-wa [[Ken-ga hannin kamoshirenai] to] shinji-te ir-u.
Yoko-top Ken-nom culprit may TO believe-TE ASP-NPST
'Yoko believes that Ken **may** be the culprit.'

[35]RCOMP = reportative complementizer

(58) Yoko-wa [sono wain-ga amaku-**nai**$_{tc}$ ka to] {shinpaishi/kitaishi}-te i-ru.
Yoko-WA that wine-NOM sweet-NEG$_2$ Q TO {worry/hope}-TE ASP-NPST
'Yoko is {worried/hopeful} that there's a good possibility that the wine is sweet.'

(59) a. Un, sono-toori. Kanari amai-hazu-da-yo, raberu-ni yoruto.
yes exactly fairly sweet-supposed-COP-PRT label-DAT according.to
'Yes, she's right. It's supposed to be pretty sweet, according to the label.'
b. #Iya, chigau-yo. Kanari amai-hazu-da-yo, raberu-ni yoruto.
no wrong-PRT fairly sweet-supposed-COP-PRT label-DAT according.to
'No, she's wrong. It's supposed to be pretty sweet, according to the label.'

(60) a. #Un, sono-toori. Amaku-na'i-hazu-da-yo, raberu-ni yoruto.
yes exactly sweet-NEG$_1$-supposed-COP-PRT label-DAT according.to
'Yes, she's right. It's supposed to be not sweet, according to the label.'
b. Iya, chigau-yo. Amaku-na'i-hazu-da-yo, raberu-ni yoruto.
no wrong-PRT sweet-NEG$_1$-supposed-COP-PRT label-DAT according.to
'No, she's wrong. It's supposed to be not sweet, according to the label.'

4.3 Embedded positively biased negative polar questions as embedded speech act phrases

We saw in section 3.2 how *to* contrasts with English declarative complementizer *that* in that *to* combines with speech/thought act phrases. Having identified *embedded* positively biased negative polar questions in section 4.1 lends further support to this emerging generalization, as we can observe that a positively biased negative polar question led by *to* is indeed a speech act phrase, larger than genuine embedded interrogative clauses (CPs). Example (61) below shows that the positively biased negative polar question cannot be embedded directly under question-selecting predicates. This contrasts with a simple positive polar question as in (62), slightly modified from (37) above, where direct embedding under 'ask' and 'know' is permitted.

(61) *Yoko-wa [Ken-ga hannin ja nai$_{tc}$ ka/kadooka)] {tazuneta/shitteiru}.
Yoko-top Ken-nom culprit COP.WA NEG$_2$ Q/whether ask.PST/know.ASP.NPST
'(Lit.) Yoko asked/knows whether [isn't Ken the culprit].'
'(Intended) Yoko asked/knows whether Ken {is/might be} the culprit.'

(62) Yoko-wa [[Ken-ga hannin ka/kadooka] {tazuneta/shitteiru}.
Yoko-TOP Ken-NOM culprit Q/whether ask.PST/know.ASP.NPST
'Yoko asked/knows whether Ken was the culprit.'

Further, as we saw above with simple positive polar question embedding under *to* in (38) in section 3.2, embedding of a positively biased negative polar question under *to* also only works with *ka* 'Q', but not with *kadooka* 'whether'. This is shown in (63) below. *Kadooka* 'whether' is an polar interrogative complementizer specialized for *embedded* interrogatives. This pattern suggests that *ka* has two lives, one that is used interchangeably with *kadooka* in the embedded interrogative C-position, and one that presumably sits higher in the structure and functions as some sort of a discourse particle, as we noted with respect to example (38) (Bhatt & Dayal, 2020). The pattern lends support to the idea that when simple positive polar questions or positively

biased negative polar questions are embedded under *to*, they are housed in a speech act phrase, a syntactic projection larger than an interrogative CP.

(63) Yoko-wa [[Ken-ga hannin (ja nai$_{tc}$) {ka/*kadooka}] to] omot-te i-ru.
Yoko-TOP Ken-NOM culprit COP.WA NEG$_2$ Q/whether TO think-TE ASP-NPST
'(Lit.) Yoko thinks, is(n't) Ken the culprit.'
'(Intended) Yoko thinks that Ken {is/might be} the culprit.'

As a case of speech/thought act embedding, embedding of a positively biased negative polar question is expected to show other signs of embedded main clause phenomena, distinct from straight proposition embedding. One example of such a sign is the infelicity of negated matrix predicates. The following examples show that negated matrix predicates behave similarly in (i) embedding of a positively biased negative polar question and (ii) embedding of a clause with Verb Second (V2) in German, which is considered to be a typical main clause phenomenon.[36] In contrast to the genuine interrogative clause embedding in (64), when *shinpaisuru* 'worry' embeds a positively biased negative polar question, negating the verb sounds odd, as in (65).

(64) Yoko-wa [ame-ga hut-te ru kadooka] shinpaishi-te iru/shinpaishi-te
Yoko-TOP rain-NOM fall-TE ASP.NPST whether worried-TE ASP.NPST/not.worried-TE
i-na'i.
ASP-NEG$_1$
'Yoko is {worried/not worried} about whether it's raining.'

(65) Yoko-wa [ame-ga hut-te-**nai**$_{tc}$ ka to] shinpaishi-te iru/#shinpaishi-te i-na'i.
Yoko-TOP rain-NOM fall-TE-**NEG**$_2$.NPST Q TO worried-TE ASP/worried-TE ASP-NEG$_1$
'(Lit.) Yoko is {worried/#not worried} isn't it raining.'
'Yoko is {worried/#not worried} that there's a good possibility that it's raining.'

Other embedding verbs such as *omoitsuita* 'realized/occurred to' vs. #*omoitsukanakatta* 'did not realize/occur to'; *kitaishita* 'hoped/expected' vs. #*kitaishinakatta* 'did not hope/expect' show the same pattern as (65). The same pattern is found with embedded V2 in German.

(66) Ken sagte (#nicht) zu Yoko, [er bewundert Kim].
Ken said not to Yoko he admires Kim
'Ken {told/#didn't tell} Yoko, he admires Kim.' *German*

Demonstrating the embeddability of positively biased negative polar question in Japanese is particularly interesting as it is harder to find embedding of positively biased negative polar questions in English. Embedded interrogatives in standard English does not have the Subject-Aux inversion (T-to-C movement), therefore we do not get preposed negation. We do, however, find a comparable phenomenon, where a positive bias reading is found under the verb *wonder*, as in (67) and (68). (69) is a similar example in French, repeated from (15) earlier.[37]

(67) a. This is why I **wonder** if we have**n't** been contacted by aliens already. (Sailor, 2013)

[36] Thanks to Frank Sode (p.c.) for bringing this up to our attention.

[37] Rudin (2019) discusses the embeddability of rising declaratives in English and shows that apparent cases of embedded rising declaratives in fact involve quotation.

b. I ordered this [=green onions] last week of August, they are so big they look like leek. … Not ordering again, it makes me **wonder** if they are **not** GMO since they are so big.[38]

(68) a. Context: Hans is two years old and hates vegetables, it's really a struggle to get him to eat them. Hans's mother and father are talking about how to get Hans to eat his vegetables. Pretty much the only thing Hans will eat is peanut butter and jelly sandwiches.

b. Mother: we could put them in a peanut butter and jelly sandwich. I **wonder** if Hans would**n't** eat his vegetables (then). Goodhue (2018: 146-7)

(69) J'ai commandé la taille S mais je **me** **demande** si ce **n**'est **pas** plutôt XS.
I.have ordered the size S but I to.me ask if it neg.is neg rather XS
'I ordered size S but I wonder if it isn't more like XS.' *French*

Investigating exactly under what conditions such embedding becomes possible in English or French is left for future research.

5 How to interpret *to* embedding

Given our view that *to* embeds speech/thought act phrases, it must work differently from more well-studied complementizers like English *that*. Nevertheless, in examples like (70), the overall effect seems similar to familiar cases of clausal embedding under attitude predicates. Sticking to the speech/thought act embedding view, we could informally describe how we arrive at the interpretation of (70) roughly as in (71).

(70) Yoko-wa [[Ken-ga hannin da] to] omot-te iru.
Yoko-TOP Ken-NOM culprit COP.NPST TO think-TE ASP.NPST
'Yoko thinks that Ken is the culprit.'

(71) a. There is a mental utterance attributed to Yoko, which is reported via the declarative clause *Ken-ga hannin da* 'Ken is the culprit'.

b. The proposition asserted in that mental utterance, *that Ken is the culprit*, combines with the matrix predicate *omou* 'think'.

c. This leads to the interpretation: In every world that is compatible with what Yoko believes, Ken is the culprit.

We think (71) is roughly on the right track, but it needs to be fleshed out in a way that can explain other unique effects of *to*-clause embedding demonstrated above. For example, when the *to*-clause contains a polar question, it can still be embedded under a predicate that doesn't normally select interrogatives like *kitaisuru* 'hope' or *omou* 'think' as in (45), repeated in (72).

(72) Yoko-wa [[Ken-ga hannin **ka**] **to**] omot-te iru.
Yoko-TOP Ken-NOM culprit Q TO think-TE ASP.NPST

[38] `https://montreal.lufa.com/fr/marche#!p6721`, retrieved March 2020; for the record, the farm's response to this post confirms that their green onions are certified organic and not GMO (genetically modified organism).

'(Lit.) Yoko thinks, is Ken the culprit.'
'Yoko thinks Ken might be the culprit.'

Compared to (70), (72) has a hedging effect so that the embedding subject is less certain about the propositional core of the question, roughly translatable as "Yoko thinks that Ken might be the culprit."

Moreover, *to*-clause embedding under *kitaisuru* 'hope' as in (73) exhibits some effects distinguishing Japanese from clausal embedding under *hope* in English.

(73) Yoko-wa [[Ken-ga hannin da] to] kitaishi-te ir-u.
Yoko-top Ken-nom culprit COP.NPST TO hope-TE ASP-NPST
'Yoko hopes that Ken is the culprit.'

In the English translation, Yoko merely needs to believe that Ken being the culprit is a possibility, while with *to*-embedding in Japanese, the likelihood that Ken is the culprit must be much higher. This can be shown by evaluating the felicity of (73) in a context in which Yoko has no idea whether Ken is the culprit or not, but she hopes he is. In such a context, the English translation in (73) is a perfectly normal way to report this. But the Japanese sentence is not because it implies that Yoko takes the prejacent to be a stronger likelihood than her evidence would support if she had no idea either way. This descriptive generalization is further supported by the contrast in the minimal pair in (74). The use of *to*, as opposed to *koto*, requires a higher degree of confidence on the part of Yoko that the rain will stop, and it makes the continuation 'she's now almost given up' a mismatch.

(74) Yoko-wa [ame-ga yam-u {**koto**-o/??**to**}] kitaishi-te-wa i-ru-kedo, moo
Yoko-WA rain-NOM stop-NPST KOTO-ACC/TO hope-TE-WA ASP-NPST-though already
hotondo akirame-te i-ru.
almost give.up-TE ASP-NPST
'Though Yoko does hope that the rain will stop, she's now almost given up.'

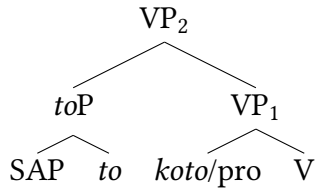
Another unique effect is that *to*-clauses can appear in sentences in which the matrix predicate does not select for a complement at all, such as in (40), repeated in (75).

(75) Hanako-wa [[yuki-ga hurikomu ka] to] mado-o shimeta.
Hanako-TOP snow-NOM fall.enter Q TO window-ACC closed
'Hanako closed the window, thinking that the snow might come in.'

In such cases, the embedded speech act is attributed to the embedding subject, and is understood as bearing some relation to the matrix clause.

Data like (72) through (75) suggests that *to*-clauses are not combined with matrix predicates in a standard way. In unselected cases like (75), it seems that they must be adjuncts. If *to*-clauses are adjuncts, it might also explain how it is possible for polar questions to combine with antirogative predicates like 'think' and 'hope', since they wouldn't technically be composing with them at all. Yamada (2019) further notes that *to*-clauses cannot serve as clausal subjects, and uses this to argue that they are always adjuncts. We agree and propose the schematic structure for *to*-clause embedding in (76), building on Kim 2018; Yamada 2019.

(76)



In (76), *to* combines with a speech act phrase (SAP) to produce a *to*-clause that adjoins to the VP. The verb combines with a complement (if it takes one). This could be any of the usual syntactic constituents, but we focus in (76) on clausal complements. Overt clausal complements take the form of a *koto*-clause. In cases in which there is a matrix attitude predicate that seems to "select" a *to*-clause like in (70), (72), or (73) above, we propose a silent pronoun that combines with V, and gets its content from the SAP embedded by the *to*-clause in the prior cotext.[39] This idea is bolstered by the fact that the position occupied by *pro* in (76) can also be realized as an overt proform, *soo* 'so' in some environments, such as in (77).

(77) [Yogen-no ko-wa ano ko-deat-te hoshii to] **soo** negaw-azu-ni-wa
prophecy-GEN child-WA that child-COP-TE want TO so wish-NEG-DAT-WA
or-e-n noo.
remain-can-NEG PRT
'(Lit.) (I) want the Child of Prophecy to be that kid, (I) can't help but hope so.'
'(I) can't help but hope that the Child of Prophecy is that kid.'[40]

Further support for this picture comes from example (78), where, in a sharp contrast to (77), using the nominalizing 'complementizer' *koto* makes the use of *soo* impossible, as the complement position is already filled.

(78) [Yogen-no ko-wa ano ko-dearu koto]-o (***soo***) negat-te iru.
prophecy-GEN child-WA that child-COP.NPST KOTO-ACC so wish-TE ASP.NPST
'I hope that the Child of Prophecy is that kid.'

Our semantics synthesizes various ideas in the prior literature. We use an event semantics for attitude predicates, taking eventualities of attitudes to have content in the form of a set of possible worlds compatible with the attitude (Hacquard, 2010).[41] For a verb like *omou* 'think', every world provided by the attitude's content must be one in which the prejacent is true, as in (79).

(79) $[\![\text{omou}]\!] = \lambda p.\lambda x.\lambda e.\lambda w.\ \text{believe}(e, w)\ \&\ \text{exp}(e, x)\ \&\ \forall w' \in \text{content}(e, w)[p(w') = 1]$

Meanwhile, we take *to* to be a function that takes a SAP as input ('*S*'), and acts as a speech report verb, as in (80) (building on Kim's (2018, p. 65) proposal for unselected cases). We assume that utterance events can be verbal or mental, and that their content is identical to the meaning of the utterance, following Maier (2017).

[39] Yamada (2019) also proposes that V combines with a pronoun in such cases, but unlike ours, his account doesn't provide the pronoun with any content.

[40] Gama-no Fukasaku, *Naruto Shippuden*, episode 153

[41] See also related proposals such as Kratzer (2006, 2013); Hacquard (2006); Moulton (2009, 2015); Elliott (2020).

(80) $[\![\text{to}]\!] = \lambda S.\lambda x.\lambda e.\lambda w.\ \exists e'[\text{utterance}(e', w)\ \&\ \text{agent}(e', x)\ \&\ \text{content}(e', w) = S\ \&\ e' \circ e]$

A crucial component of (80) is that it introduces an existentially bound event e' that is the event of the embedded speech act. The final conjunct specifies how e' relates to the matrix event e. We follow Kim (2018) in taking the two events to overlap temporally '$\circ$'.[42] That plus the semantics of the *to*-clause and the matrix clause, as well as the fact that the agent of the embedded speech report is the subject of the matrix clause, is enough to ensure the relatedness of the two events needed here.[43]

In selected cases, the matrix attitude predicate takes *pro* as its complement. We take *pro* to be a propositional pronoun that gets its content from the SAP embedded by *to* (cf. the use of silent propositional anaphora in the focus literature, e.g. Rooth 1992, and the treatment of *yes/no* response particles as propositional anaphora in Krifka 2013; Roelofsen & Farkas 2015; Goodhue & Wagner 2018). For embedded assertions, the content picked up by *pro* is the proposition asserted.

Once *to* combines with its SAP and the attitude predicate combines with *pro* or the *koto*-clause, the two resulting meanings at the *to*P and VP_1 nodes will be of the same type, $\langle e\langle v\langle st\rangle\rangle\rangle$. Thus, they can be combined via predicate modification. Once combined with the matrix subject, and with the event existentially closed, they result in a proposition like the following for (70):

(81) $\lambda w.\ \exists e[\text{believe}(e, w)\ \&\ \text{exp}(e, \textit{yoko})\ \&\ \forall w' \in \text{content}(e, w)[\textit{Ken is the culprit in } w']$
$\&\ \exists e'[\text{utterance}(e', w)\ \&\ \text{agent}(e', \textit{yoko})\ \&\ \text{content}(e', w)\ =\ [\![[_{SAP}\ \text{Ken-ga hannin da}]]\!]$
$\&\ e' \circ e]]$

Here is the predicted interpretation for the unselected case in (75):

(82) $\lambda w.\ \exists e[\text{closing}(e, w)\ \&\ \text{agent}(e, \textit{yoko})\ \&\ \text{patient}(e, \textit{the window})$
$\&\ \exists e'[\text{utterance}(e', w)\ \&\ \text{agent}(e', \textit{yoko})\ \&\ \text{content}(e', w) = [\![[_{SAP}\ \text{yuki-ga hurikomu ka?}]]\!]$
$\&\ e' \circ e]]$

So far we have not given an interpretation for SAPs, instead leaving them unanalyzed in denota-

[42] Definition of temporal overlap '$\circ$' (Kim, 2018, p. 64):

(i) $\forall e, e' \in D_v[e \circ e' \Leftrightarrow \exists e''[\tau(e'') \subseteq \tau(e)\ \&\ \tau(e'') \subseteq \tau(e')]]$

[43] Any complete analysis of the complementizer *to* will likely require the relation between the two events to be stronger than mere temporal overlap. Consider the following example (cf. ex. (22) from Kim & Tomioka 2014, p. 282):

(i) ??Yoko-wa [[kyoo shokuba-de yatta koto-wa tadashikatta (no) ka] to] saba-o oobun-ni
Yoko-WA today work.place-at do.PST thing-WA right.PST NO Q TO mackerel-ACC oven-in
ireta.
put.in.PST
'Yoko put the mackerel in the oven, (while) wondering whether she did the right thing at work today.'

In (i), the matrix event and the mental utterance event overlap temporally. And yet (i) is odd. Intuitively this is because the two events do not relate in any way beyond their temporal overlap. This shows that *to* must require the two events to bear a stronger relationship than mere temporal overlap. One possibility is that the speech act event embedded by *to* needs to be a subevent of the matrix event. See also Tomioka & Kim (2016), who argue that temporal overlap is not enough in unselected cases, and who further complicate the picture by noting contrasts between unselected *to*-clauses and bare questions not embedded by *to*. These issues go beyond the scope of this paper, and we leave them to future work.

tion brackets in (81) and (82). Nor have we specified the semantic type of the speech act variable '*S*'. While these are important issues, we will not settle them here as it isn't relevant for our purposes exactly which theory of speech acts one adopts. All that matters is that speech acts are contentful events that can be attributed to an agent.[44]

To calculate the semantics for (73), we need a semantics for *kitaisuru* 'hope'. The following is based on the semantics for emotive doxastics in Anand & Hacquard 2013 (see also Heim 1992; Villalta 2008; Portner & Rubinstein 2013; Portner 2018).[45]

(83) $[\![\text{kitaisuru}]\!] = \lambda p.\lambda x.\lambda e.\lambda w.\ \text{hope}(e, w)\ \&\ \text{exp}(e, x)$
$\&\ \exists w' \in \text{content}(e, w)[p(w') = 1]$ doxastic requirement
$\&\ p >_{DES_{x,w}} \neg p$ preference requirement

The content of a hoping event, like a believing event, is a set of doxastically accessible worlds. Thus the doxastic requirement in (83) is that the prejacent p is doxastically possible. The preference requirement in (83) is that p is preferred to $\neg p$ by x in w.[46] The predicted interpretation for (73) is as follows:

(84) $\lambda w.\ \exists e[\text{hope}(e, w)\ \&\ \text{exp}(e, yoko)$
$\&\ \exists w' \in \text{content}(e, w)[\textit{Ken is the culprit in } w']$ doxastic requirement
$\&\ \textit{that Ken is the culprit} >_{DES_{x,w}} \neg\ \textit{that Ken is the culprit}$ preference requirement
$\&\ \exists e'[\text{utterance}(e', w)\ \&\ \text{agent}(e', yoko)\ \&\ \text{content}(e', w) = [\![[_{SAP}\ \text{Ken-ga hannin da}]]\!]$
$\&\ e' \circ e]]$

Recall the asymmetry between the Japanese (73) and the English translation of it, that the prejacent merely needs to be doxastically possible in English, but that Yoko must believe it to be a stronger likelihood than that in Japanese. Anand & Hacquard's semantics in (83) doesn't capture this fact about Japanese, since it merely requires the prejacent to be doxastically possible. However, there are two reasons we should not rush to revise the semantics for *kitaisuru* 'hope'. First, if we change the complementizer in (73) from *to* to *koto*, then the doxastic requirement for the prejacent weakens to something indistinguishable from English, a fact further confirmed by the minimal pair in (74). This suggests that the weak doxastic requirement in the semantics in (83) is on the right track for Japanese after all.[47] Second, the contribution of *to* in (84) can account for

[44]We are inclined to think of speech acts as functions from contexts to contexts, as in approaches formulated in e.g. Farkas & Bruce 2010 or Krifka 2017, but again, other theories of speech acts could work just as well for our purposes.

[45]Anand & Hacquard's (2013) semantics includes a uncertainty presupposition that we leave out to streamline exposition, though it becomes relevant in fn. 48.

[46]Definition of $>_{DES_{x,w}}$ (Anand & Hacquard, 2013, p. 20):

(i) $\forall w, w', w'' \in \text{content}(e, w)[w' >_{DES_{x,w}} w'' \Leftrightarrow w' \text{ is more desirable to } x \text{ in } w \text{ than } w'']$

(ii) $\forall p, q \subseteq W[p >_{DES_{x,w}} q \Leftrightarrow \forall w'' \in q[\exists w' \in p[w' >_{DES_{x,w}} w'']]\ \&\ \exists w' \in p[\forall w'' \in q[w'' \not>_{DES_{x,w}} w']]]$

[47]One might wonder if the strengthened doxastic commitment seen in Japanese *hope* embedding can be explained by Portner & Rubinstein's (2013) observation that *hope* conveys an "intellectual" as opposed to "glandular" desire, requiring the subject to commit to defending the preference expressed. However this won't be sufficient. One reason is that Portner & Rubinstein demonstrate that this fact holds in languages like English and French, so it can't be what distinguishes Japanese from English in (73) (indeed, Portner & Rubinstein seem to predict, probably correctly, this

the asymmetry. Since *to* attributes an utterance of "Ken is the culprit" to Yoko, and utterances have sincerity conditions (Searle, 1969), Yoko needs to have some reason to feel more confident about the prejacent than mere doxastic possibility. This in turn swamps the doxastic requirement of (83), making the Japanese (73) doxastically stronger than its English translation.[48]

Now consider (72), in which *to* embeds a polar question under the anti-rogative predicate *omou* 'think', and the result is a hedging effect, roughly translatable as "Yoko thinks that Ken might be the culprit." This hedging makes intuitive sense. If Yoko mentally utters "Is Ken the culprit?" instead of "Ken is the culprit", we would expect the former to express Yoko's weaker attitude toward the proposition *that Ken is the culprit.* Sentences like (70) and (72) might even be in direct competition with one another, so that adding *ka* becomes a standard means of introducing a hedge. Consider the naturally occurring example in (85).

(85) …, [aru shu sooshita shakaitekina sumai to yuu gainen-o dashite iku
some kind that.way social living.space TO YUU concept-ACC put.forward go
hitsuyoo-ga aru **ka to**] omoimasu.
need-NOM exist Q TO think.POL
'(Lit.) …, (I) think [is there a need to put forward some such concept as social living space].'
'I think there's probably a need to put forward some such concept as social living space.'
(OM68_00001, The National Diet transcript, BCCWJ)

Suppose that the propositional content that *pro* picks up from a polar question is just the propositional core, *that Ken is the culprit.* This would be attractive since it unifies the content that *pro* picks up from two different kinds of speech acts. Moreover, the response particle literature argues that this is the content that *yes/no* responses pick up when answering polar questions (Krifka, 2013; Roelofsen & Farkas, 2015; Goodhue & Wagner, 2018). Then the predicted interpretation of (72) would be as follows:

(86) $\lambda w.\ \exists e[\text{believe}(e, w)\ \&\ \text{exp}(e, yoko)\ \&\ \forall w' \in \text{content}(e, w)[\textit{Ken is the culprit in } w']$
$\&\ \exists e'[\text{utterance}(e', w)\ \&\ \text{agent}(e', yoko)\ \&\ \text{content}(e', w) = [\![[_{SAP}\ \text{Ken-ga hannin ka?}]]\!]$
$\&\ e' \circ e]]$

implication for any use of a predicate meaning *hope* in any language). Another reason is that we have demonstrated, internally to Japanese, that *hope+to* conveys that the subject has a stronger doxastic commitment to the truth of the prejacent than *hope+koto*. So this strengthened commitment must be about the nature of *to* embedding rather than *hope*, and it seems to be about the strength of the doxastic commitment, rather than a commitment to defend the preference.

[48] There is another asymmetry between *hope+koto* vs. *hope+to*: *hope+koto* cannot embed an epistemic necessity modal, just like the Romance data discussed by Anand & Hacquard (2013). But *hope+to* **can** embed an epistemic necessity modal. This fact might also be due to the special nature of *to*-clause embedding, however more work is needed. On Anand & Hacquard's view, Romance *hope* allows epistemic possibility modals but not necessity modals because it provides an information state for such modals to quantify over, and then requires that information state not to be settled with respect to the prejacent. The ban on epistemic necessity modals under *hope+koto* in Japanese suggests that the uncertainty presupposition is present in *kitaisuru* as well (*pace* Mizuno 2021, who claims that it is contributed by the Q particle *ka*). It seems that in the event of a clash between a necessity modal in the *to*-clause and *kitaisuru*'s uncertainty requirement, the *to*-clause somehow takes precedence, conveying that 'the matrix subject thinks that *p* must be true, and also that *p* is desirable'. These facts will become relevant just below when discussing the interpretation of examples in which the *to*-clause embeds a polar question and is "selected" by the matrix verb.

(86) is not quite the right interpretation for (72) since it requires that all of the doxastically accessible worlds are ones in which Ken is the culprit, while the sentence intuitively conveys that only some of those worlds are ones in which Ken is the culprit. One possible solution to this is to say that the *to*-clause somehow takes precedence over the main clause. That is, while the main clause conveys that Yoko believes that Ken is the culprit, the *to*-clause conveys that Yoko has mentally uttered the question "Is Ken the culprit?", and the latter, being clearly weaker, diminishes the strength of Yoko's belief arising from the global sentence. This would relate to the discussion in footnote 48 about embedding epistemic necessity modals under *kitaisuru*. The idea is roughly that *pro*'s propositional content has as its original source the speech act embedded by *to*, and so if that speech act conveys something weaker or stronger than would normally be implied by the matrix predicate, the strength of the speech act itself takes precedence. We don't yet know how to spell out this idea that one clause "takes precedence" over another, but something along these lines may need to be worked out to resolve both of these issues.

In the meantime, we will instead propose that *pro* does not pick up the propositional core of the embedded polar question, but instead picks up the speaker's bias. For an example like (72), the idea is that the matrix subject's mental utterance of the question is motivated by positive evidential bias of the sort discussed in the literature on biased questions (Büring & Gunlogson, 2000; Romero & Han, 2004; Sudo, 2013; Krifka, 2015; Goodhue, 2018). This bias can be expressed as a modalized proposition, here *that Ken might be the culprit*. Following Yalcin (2007); Hacquard (2010); Anand & Hacquard (2013), when a modal is embedded under a representational attitude, the worlds made accessible by the attitude serve as the domain for the modal. Assuming that *might* imposes existential quantification on that domain, the interpretation of (72) is as follows:

(87) $\lambda w.\ \exists e[\text{believe}(e, w)\ \&\ \text{exp}(e, yoko)$
$\&\ \forall w' \in \text{content}(e, w)[\exists w'' \in \text{content}(e, w)[\textit{Ken is the culprit in } w'']]$
$\&\ \exists e'[\text{utterance}(e', w)\ \&\ \text{agent}(e', yoko)\ \&\ \text{content}(e', w) = [\![[_{SAP}\ \text{Ken-ga hannin ka?}]]\!]$
$\&\ e' \circ e]]$

(87) includes a vacuous layer of quantification in that the universal quantifier imposed by the attitude verb *omou* 'think' is not binding anything (Hacquard, 2010). Therefore, (87) is equivalent to (88):

(88) $\lambda w.\ \exists e[\text{believe}(e, w)\ \&\ \text{exp}(e, yoko)$
$\&\ \exists w'' \in \text{content}(e, w)[\textit{Ken is the culprit in } w'']$
$\&\ \exists e'[\text{utterance}(e', w)\ \&\ \text{agent}(e', yoko)\ \&\ \text{content}(e', w) = [\![[_{SAP}\ \text{Ken-ga hannin ka?}]]\!]$
$\&\ e' \circ e]]$

This is the desired interpretation for (72).

Finally, consider an embedded positively biased negative polar question:

(89) Yoko-wa [[Ken-ga hannin ja nai$_{tc}$ **ka**] **to**] omot-te i-ru.
Yoko-top Ken-nom culprit COP.WA NEG$_2$ Q TO think-TE ASP-NPST
'(Lit.) Yoko thinks, isn't Ken the culprit.'
'Yoko thinks that there is a good possibility that Ken is the culprit.'

Intuitively, (89) conveys that Yoko's commitment to the proposition *that Ken is the culprit* is weaker than in (70), but stronger than in (72). This makes intuitive sense, since a positively biased

negative polar question conveys a stronger bias than a positive polar question, but is nevertheless weaker than a full assertion. We will cash out these strength distinctions via the graded modality of Kratzer 1981, 1991, modeling the bias of the embedded negative polar question in (89) via the English modal *good possibility* (the graded distinction could just as well be cast in terms of a probability semantics for modals, as in Lassiter 2017). The interpretation of (89) then requires that there is a world w'' among the doxastically accessible worlds such that the propositional core of the question holds in all of the accessible worlds more optimal than w''.[49]

(90) $\lambda w.\ \exists e[\text{believe}(e, w)\ \&\ \text{exp}(e, \textit{yoko})$
$\&\ \forall w' \in \text{content}(e, w)$
$[\exists w'' \in \text{content}(e, w)[\forall w''' \in \text{content}(e, w)[w''' \leq_{g(w)} w'' \rightarrow \textit{Ken is the culprit in } w''']]]$
$\&\ \exists e'[\text{utterance}(e', w)\ \&\ \text{agent}(e', \textit{yoko})\ \&\ \text{content}(e', w) = [\![[_{SAP}\ \text{Ken-ga hannin ja nai}_{tc}\ \text{ka?}]]\!]\ \&\ e' \circ e]]$

Again, the first universal quantifier in (90) contributed by the attitude predicate quantifies vacuously, and so (90) is equivalent to (91):

(91) $\lambda w.\ \exists e[\text{believe}(e, w)\ \&\ \text{exp}(e, \textit{yoko})$
$\&\ \exists w'' \in \text{content}(e, w)[\forall w''' \in \text{content}(e, w)[w''' \leq_{g(w)} w'' \rightarrow \textit{Ken is the culprit in } w''']]$
$\&\ \exists e'[\text{utterance}(e', w)\ \&\ \text{agent}(e', \textit{yoko})\ \&\ \text{content}(e', w) = [\![[_{SAP}\ \text{Ken-ga hannin ja nai}_{tc}\ \text{ka?}]]\!]\ \&\ e' \circ e]]$

This is the desired interpretation for (89).[50]

6 The puzzles are no longer puzzles

We can now go back to the two puzzles we introduced in section 2. If the first type of noncanonical negation as in (92), repeated from (2), was an instance of subordinate expletive negation as found in, for example, Romance languages, then examples like (93), repeated from (9), are not expected. This is because *hope* does not belong to the group of typical negative or adversative predicates that allows the occurrence of subordinate expletive negation.[51] This led to the proposal in Yoon (2011, 2013) that we need a new, 'extended' environment for licensing of expletive negation in Korean and Japanese, to include non-adversative predicates.

[49]Following Kratzer (1991), the context c provides the function g, which takes the world of evaluation w as input, and produces the ordering source necessary to induce an ordering on the accessible worlds (being lower on the ordering means being more optimal):

(i) $\forall w, w' \in \text{content}(e, w)[w \leq_{g(w)} w' \Leftrightarrow \{p \in g(w) \mid w \in p\} \supseteq \{p \in g(w) \mid w' \in p\}]$.

[50]Our use of modals in the interpretation of these embedded polar questions raises the question of how examples like (72) and (89) compare intuitively to examples in which the *to*-clause contains overt modals. This may turn out to be another reason to explore the idea that the *to*-clause takes interpretational precedence over the matrix clause. In the conclusion, we briefly discuss the kind of empirical investigation that will be needed in order to develop a more complete analysis of *to* embedding.

[51]With respect to the use of subjunctive mood, however, French seems to be an outlier in that *espérer* 'hope' selects indicative and not subjunctive mood (Portner and Rubinstein 2018).

(92) John-wa [Mary-ga ko-**nai**-ka(-to)] **shinpaishi**-te iru.
John-TOP Mary-NOM come-**NEG**-NFcomp **fear**-ASP
'John fears/is worried that Mary might come.' *Japanese* (Yoon, 2013)

(93) John-wa [Mary-ga ko-**nai**-ka-to] **kitaishi**-te iru.
John-TOP Mary-NOM come-**NEG**-NFcomp **hope**-ASP
'John hopes that Mary might come.' *Japanese* (Yoon, 2013)

The unexpected occurrence of such negation under non-adversative predicates is no longer a puzzle for Japanese in our analysis, since the negation is not subordinate expletive negation and therefore does not need to be licensed by an adversative predicate. In our reduction analysis, the negation is part of a positively biased negative polar question. As we saw above, such a speech/thought act phrase can be embedded under *to*, which marks its sister as a direct or indirect report of speech or mental utterance. Then, the constituent [speech/thought act phrase + *to*] is naturally expected to combine with predicates that are compatible with such content, including non-adversative predicates such as *omou* 'think', *kitaisuru* 'hope', *teiansuru* 'suggest', *shinjiru* 'believe', and *kakushinsuru* 'be certain'. They are speech verbs (including manner of speech verbs) and propositional attitude predicates.

The second puzzle we noted in section 2 was that subordinate expletive negation does not occur under some negative or adversative predicates such as *hiteisuru* 'deny', *kyohisuru* 'refuse', *sakeru* 'avoid, prevent' and *kinjiru* 'prohibit', typical expletive negation licensing environments in languages that are said to have subordinate expletive negation. Again, we can show that this unexpected non-occurrence of subordinate expletive negation is no longer a puzzle in the reduction analysis, where the negation in question is analyzed as negation in a speech/thought act phrase housing a positively biased negative polar question.

As we saw in section 3.2 above, *to* always embeds speech/thought act phrases. Other nominalizing 'complementizers' in the language, *no* or *koto*, cannot combine with speech/thought act phrases directly. Then, for positively biased negative polar questions to be embedded at all, the matrix predicates must be of the kind that are compatible with *to* to begin with. What that means is that, since the function of *to* is to introduce, in its sister constituent, a direct or indirect report of speech or mental utterance attributed to the matrix subject, predicates that are not compatible with such content are not 'selected' by *to*-led clauses and are therefore expected not to co-occur with them. This is exemplified in (94) with the matrix predicate *hiteisuru* 'deny'. If we used *to*, the speech or mental utterance that Sota is still asleep is attributed to the matrix subject *Yoko*. The matrix predicate *hiteisuru* 'deny', however, combines with that same subject to convey that Yoko

denies that Sota is still asleep. These two meanings are inconsistent.[52, 53]

(94) Yoko-wa [[Sota-ga mada ne-te iru] {*to/koto-o/no-o}] hiteishi-ta.
Yoko-TOP Sota-NOM still sleep-TE ASP.NPST TO/KOTO-ACC/NO-ACC deny-PST
'Yoko denied that Sota was still asleep.'

Given this, it is not surprising that positively biased negative polar questions cannot be embedded under *hiteisuru* 'deny', as in (95). Similarly to what we just saw with (94), *to* attributes the speech/thought act 'Isn't Sota still asleep?' to the matrix subject, Yoko. This means that Yoko is biased toward the proposition that Sota is still asleep, and that is not compatible with the matrix predicate here, *hiteisuru* 'deny'.[54]

(95) *Yoko-wa [[Sota-ga mada ne-te iru-n ja nai$_{tc}$ ka] to] hiteishi-ta.
Yoko-TOP Sota-NOM still sleep-TE ASP.NPST-NO DE.WA NEG$_{tc}$ Q TO deny-PST
'(Lit.) Yoko denied, isn't Sota still asleep.'

This explains why embedded noncanonical negation cannot occur with negative or adversative predicates such as *hiteisuru* 'deny' and *kyoshisuru* 'refuse'. Though it is standard to talk about predicates selecting their complement types, one could also describe *to*-led embedded clauses as *selecting upward* those predicates that are compatible with the notion of reported speech or thought, such as *iu* 'say', *omou* 'think', *kitaisuru* 'hope', *shinpaisuru* 'worry/fear', *tazuneru* 'ask', *jimonsuru* 'ask oneself/wonder', and so on.

An interesting interpretive contrast emerges in sentences with another negative predicate *utagau* 'doubt'. Unlike *hiteisuru* 'deny' in (94), *utagau* 'doubt' can combine not only with *koto/no* as in (96a), but also with *to*, as in (96b). In the latter case, the verb *utagau* is interpreted as 'suspect'.[55]

(96) a. Yoko-wa [[Sota-ga mada neteiru] {**koto/no**}-o] **utagat**-ta.
Yoko-TOP Sota-NOM still asleep KOTO/NO-ACC **doubt**-PST
'Yoko doubted that Sota was still asleep.'

[52]The judgment pattern, **to/koto/no*, remains the same if we negate the matrix verb *hiteisuru* 'deny', even though one might expect that adding negation would save the *to*-embedding. We find the same pattern with embedded Verb Second in German, as in (i) (Bernhard Schwarz (p.c.)).

(i) #Yoko bezweifelt (nicht), Sota schläft noch.
Yoko doubts not Sota sleeps still
'Yoko {doubts/doesn't doubt}, Sota still sleeps.' *German*

This makes sense given the observation in section 4.3 that main clause phenomena cannot be embedded under negated predicates. That said, more work is needed, as *to*-clauses that embed imperatives can sometimes be embedded under negated predicates in Japanese.

[53]Thanks to Michela Ippolito, Ivona Kučerová and Frank Sode (p.c.) for drawing our attention to connections to embedded Verb Second and embedded epistemic modals (Gärtner, 2002; Truckenbrodt, 2006; Anand & Hacquard, 2013; Ippolito, 2018; Sode & Truckenbrodt, 2018).

[54]Example (95) differs from (94) in that the other 'complementizers' *koto, no* would also be bad here. This is caused independently by the interrogative shape of the embedded clause. See also (99) below.

[55]Yamada (2019) has also noted this type of meaning contrast with the verb *utagau* (and *ibukashimu* with a similar meaning), as well as a data point similar to (97) below.

b. Yoko-wa [[Sota-ga mada neteiru] **to**] **utagat**-ta.
Yoko-TOP Sota-NOM still asleep TO **suspect**-PST
'Yoko suspected that Sota was still asleep.'

How does this interpretive shift arise? We think that the key lies in the property of *to* that signals its complement to be a report of speech or mental utterance attributed to the matrix subject. One might view the core meaning of the predicate *utagau* to be characterized as uncertainty. When it combines with a *koto/no*-led clause as in (96a), this gives rise to the interpretation of *doubting* that Sota is still asleep. When *utagau* combines with a *to*-led clause as in (96b), on the other hand, *to* attributes the thought that Sota is still asleep to the matrix subject, Yoko. In this case, the core meaning of uncertainty of the predicate *utagau* leads to Yoko's distancing herself from the proposition that Sota is still asleep with a meaning best translated as 'suspect'.[56]

Two more notes should be added here about (94) and (95). First, while (94) with *to* cannot mean that Yoko denied that Sota was still asleep, it is possible to interpret *to*'s sister constituent as a report of Yoko's speech or mental utterance, in which case, the example as it stands sounds as if the thing that Yoko is denying is left unexpressed. We can fill in that information as in (97) and save the sentence by adding what Yoko is denying in the form of a KOTO-clause.

(97) Yoko-wa [Sota-wa mada neteiru to] [kare-ga ookii oto-de ongaku-o kake-te
Yoko-TOP Sota-TOP still asleep TO he-NOM large volume-with music-ACC play-TE
iru koto]-o hiteishi-ta.
ASP.NPST KOTO-ACC deny-PST
'Yoko denied that Sota is playing loud music, saying/thinking that Sota is still asleep.'

Second, the embedded *to*-clauses in examples such as (94) and (95) can be saved by using the grammaticalized verb of saying *yuu* (Shimamura, 2018; Saito, 2019) as in (98) and (99). The layer of *yuu koto/no* 'the thing that says' makes it possible for the embedded speech/thought act event to not get attributed to the matrix subject, hence no discourse inconsistency arises.

(98) Yoko-wa [[[Sota-ga mada neteiru] **to**] **yuu** {**koto/no**}]-o hiteishi-ta.
Yoko-TOP Sota-NOM still asleep TO SAY KOTO/NO-ACC deny-PST
'Yoko denied (the thing/claim that says) that Sota was still asleep.'

(99) Yoko-wa [[[Sota-ga mada neteiru-n-ja nai$_{tc}$ ka] **to**] **yuu** {**koto/no**}]-o
Yoko-TOP Sota-NOM still asleep-NO-DE.WA NEG$_{tc}$ Q TO SAY NO/KOTO-ACC
hiteishi-ta.
denPST
'Yoko denied (the thing that says) that there's a good possibility that Sota was still asleep.'

We have shown in this section that the two puzzles that arise if the embedded noncanonical negation was analyzed as subordinate expletive negation are no longer puzzles in the reduction analysis. The way in which the puzzles are solved in the reduction analysis in turn provides further support to the assumption that *to* embeds speech/thought act phrases.

[56]This way of viewing the shift in the meaning of *utagau* 'doubt/suspect' was suggested by Elizabeth Bogal-Allbritten (p.c.), to whom we are grateful, as well as to Keir Moulton for subsequent discussions.

7 Conclusion

This paper started out by looking at two types of noncanonical negation in Japanese: (i) embedded noncanonical negation and (ii) negation in positively biased negative polar questions. We presented basic descriptive properties of positively biased negative polar questions, as well as of speech/thought act phrase embedding under the 'quotative' *to*. By putting these two descriptive pieces together, we showed that it is possible to embed positively biased negative polar questions in Japanese. This led to our reduction analysis of (i) and (ii) above: what has been analyzed as special subordinate expletive negation in Yoon (2011, 2013) is traced back to the negation in embedded positively biased negative polar questions. Under the reduction analysis, the apparent puzzles regarding the type of embedding predicates in the expletive negation view are dissolved: *to*-led clauses house speech or thought, and only those matrix predicates that are compatible with such content are 'selected'. This is why predicates such as *omou* 'think', *kitaisuru* 'hope', and *shinpaisuru* 'worry' co-occur with the embedded negation in question, but typical expletive negation licensors such as *hiteisuru* 'deny', *kyohisuru* 'refuse', and *sakeru* 'avoid' do not.

As pointed out in section 2.2, our reduction analysis shares one aspect with Choi & Lee 2017, where a connection is made between embedded noncanonical negation and the negation in positively biased negative polar questions. According to their proposal, by the principle of 'presumption of innocence', a subordinate clause which contains negation and the question complementizer (*-kka* in Korean and *ka* in Japanese) 'is considered to be true, since its truth value cannot be proven due to nonveridicality originated from Qcomp [question complementizer] as well as MOD [modal '*-ul*'] (p. 189)'. We think that, as far as the Japanese data are concerned, we can rely on the proposals by Krifka (2017) and Goodhue (2018, 2019b,a), where the derivation of the positive bias in matrix negative polar questions is made more explicit. In these proposals, the correspondence between negation, its structural height, and epistemic bias is explained, which is a welcome result given that such correspondence is observed crosslinguistically.

Looking ahead, more empirical work on clausal subordination is needed, addressing basic questions such as how other 'complementizers' of the nominalizing type (*koto*, *no*) work, and also how embedded main clause phenomena work in general (M.-J. Kim, 2009; S-S. Kim, 2010; Anand & Hacquard, 2013, 2014; Bogal-Allbritten & Moulton, 2017; Yeom, 2018; Lee, 2019; Bogal-Allbritten et al., 2021). As is made clear in various places in section 5, our analysis of *to*-clause embedding has several limitations that will require future work. We believe that a complete analysis will only be possible after a broader exploration of the empirical facts, not just of *to* embedding, but also of *koto* and *no* embedding, relative to many different classes of embedding predicates, as well as many different kinds of embedded clauses (speech acts and clause types, with and without modals). That said, we also believe that our analysis makes some progress, not just in helping us to understand embedded noncanonical negation, but also in providing a syntax and semantics for sentences with *to* embedding that unifies cases of 'selected' and 'unselected' embedding.

Abbreviations

ACC = accusative, ASP = aspect, COP = copula, DAT = dative, DECL = declarative, FUT = future, GEN = genitive, NEG = negation, NOM = nominative, NPST = nonpast, PST = past, PL = plural, SG = singular, SUBJ = subjunctive, TOP = topic

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