OPERATING ON PRESUPPOSITIONS: 'SEKKAKU' REVISITED*

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1 Introduction

Sekkaku in Japanese is a sentential adverb that does not have a direct English translation. Interestingly, there are peculiar restrictions on its distribution. Generally, it is ungrammatical in matrix contexts, as the sheer badness of the following examples demonstrates.

(1) *sekkaku Taroo-ga kita yo
SEKKAKU Taro-NOM came YO

(2) *sekkaku Taroo-ga kita no?
SEKKAKU Taro-NOM came Q

Rather, *sekkaku* appears in a specific kind of subordinate clause which includes the following ones.

(3) Reason clauses headed by *-node, -kara, -nara, -shi*, etc.

(4) Concessive clauses headed by *-kedo*, *-noni*, *-nimokakawarazu*

Typically, with a reason clause containing *sekkaku*, the matrix clause expresses a 'positive' proposition, while with a concessive clause containing *sekkaku*, the matrix clause expresses a 'negative' proposition, as in the following examples.

(5) Taroo-ga sekkaku kuru-{kara, nara, shi}, ai-ni ik-oo yo
Taro-NOM SEKKAKU come-{because, given.that, since}, meet-to go-HORT YO
'{Because, Given that, Since} Taro is coming, I'll go see him'

(6) Taroo-ga sekkaku kita-{kedo, noni}, Hanako-wa in-akatta
Taro-NOM SEKKAKU came-even.though, Hanako-TOP was-NEG
'Even though Taro came, Hanako wasn't there'

*We thank the audience of FAJL 5. **is there anybody in particular?**

It follows from (5) that seeing Taro is good, whereas from (6), it follows that Hanako's absence was bad or unfortunate.

Interestingly, *sekkaku* is not licensed in all embedded clauses. For instance, it cannot be licensed by conditionals (*-tara, -reba*), disjunction (*-ka*) or conjunction (*-te*), as demonstrated by the following examples.

(7) *omae-ga sekkaku keeki tsukur-{tara, eba}, mochiron taberu yo
you-NOM SEKKAKU cake make-if, of.course eat YO

(8) *omae-ga sekkaku kuru-ka, boku-ga iku yo
you-NOM SEKKAKU come-or, I-NOM go YO

(9) *omae-ga sekkaku ki-te, Taroo-ga kaetta
you-NOM SEKKAKU come-and, Taroo-NOM went.home

The generalization that we espouse here is that *sekkaku* is licensed in clauses that are presupposed to be part of the Common Ground. Note that the examples above alone already do some work toward understanding the distribution of *sekkaku*: since the content modified by *sekkaku* must be presupposed, (8) is out as a presupposition that the addressee will come is required for grammaticality, which makes the disjunction infelicitous as it does not carry this presupposition. (9) is impossible because of a general prohibition against asserting content that is already common knowledge. (7) is out for a similar reason to the disjunction case, but it should be noted that conditionals of the above form in Japanese cannot be interpreted as factual conditionals such as the following (Iatridou, 1991).

(10) If you can indeed afford the camera, why don't you buy it now?

An additional piece of support for our generalization comes from the fact that the *noda* construction saves the conditional case, as already noticed by McCready (2007). The *noda* construction is a kind of cleft construction inducing a clausal presupposition (cf. Hiraiwa and Ishihara, 2002, Davis, 2009). As in the following, the conditional example in (7) becomes grammatical with *noda* in the embedded clause.

(11) omae-ga sekkaku keeki tsukuru **nodat**-tara, mochiron taberu yo
you-NOM SEKKAKU cake make NODA-if, of.course eat YO
'Given the fact that you made this cake, I will of course eat it'

(12) omae-ga sekkaku keeki tsukuru **nodear**-eba, mochiron taberu yo
you-NOM SEKKAKU cake make NODA-if, of.course eat YO
'Given the fact that you made this cake, I will of course eat it'

These are obligatorily interpreted as factual conditionals.

Generally, the content in the scope of *noda* is required to be Common Ground. The intuition that all conversational participants know this content is strong, although accommodation is possible, as with other kinds of presupposition. Therefore, mere speaker presupposition is insufficient to license *sekkaku*, as shown by (13), which is originally due to McCready (2007:426). In the most natural interpretation of this sentence, the *because*-clause is presupposed by the speaker to be true and uncontroversial but the hearer does not need to share this knowledge when the utterance is made.[1]

[1]We unify all examples under the Hepburn system of Japanese romanization for consistency, regardless of the system used in the original source (for examples from the literature).

(13) # ashita mochi-o sekkaku tsukuru kara, kite yo
tomorrow rice.cake-ACC SEKKAKU make because come-IMP YO
'Tomorrow I will go to the trouble of making a rice cake so come over'

Again, adding *noda* helps this example, as shown below, but it is required in this case that the hearer already shares this piece of information at the time of utterance.

(14) ashita mochi-o sekkaku tsukuru nda-kara, kite yo
tomorrow rice.cake-ACC SEKKAKU make NODA-because come-IMP YO
'Tomorrow I will go to the trouble of making a rice cake so come over'

This paper is not the first attempt to analyze *sekkaku* in formal semantics/pragmatics, and its main goal is to improve on the previous analysis by McCready (2007). We argue that his analysis has some empirical flaws; in particular, it does not straightforwardly capture the distributional restrictions we have just observed. To this end, we will simply analyze *sekkaku* as an operator on a presupposed proposition. More specifically, we claim that *sekkaku* takes a sentence meaning ϕ with a presupposition p, and asserts (i) that ϕ is unusual or unexpected, and (ii) that there is a (substantially) good action that can be performed in p-worlds without much difficulty, but is hard to perform in $\neg p$-worlds. Clearly, the above peculiar distribution of *sekakku* naturally follows from this semantics.

The organization of the paper is as follows. In the next section, we discuss the proposal by McCready (2007) in some detail and point out its empirical flaws. Our novel account is presented in Section 3. Section 4 contains conclusions and two further issues.

2 Previous Account

McCready (2007) gives the following semantics to *sekkaku p*.[2]

(15) a. Presupposition: $\exists q\,[(p > q) \wedge \mathbf{good}(q)] \wedge \exists e\,[(\tau(e) = t) \wedge (t \leq n) \wedge \mathit{Desc}(e,p)] \wedge p(w_0)$
b. Assertion: $p \wedge \mathbf{good}(p) \wedge \forall e \forall x\,[\mathit{Desc}(p,e) \wedge \mathit{Agent}(x,e) \rightarrow \mathit{Intend}(x, \mathit{realize}(e))]$

Essentially, under this analysis, *sekkaku p* presupposes (i) that p normally leads to the truth of some other positive proposition q ($p > q \wedge \mathbf{good}(q)$), and (ii) that the event described by p actually happened in the past ($\exists e\,[(\tau(e) = t) \wedge (t \leq n) \wedge \mathit{Desc}(e,p)] \wedge p(w_0)$), and asserts (i) that p, (ii) that p is positive, and (iii) that if p is a description of an agentive event, then the event was realized through the intention of the agent.

In Section 1, we looked at the positivity and negativity of the matrix clause, but in the above semantics, the second clause of the assertion says that that p is positive. It is motivated by the contrast between the following two sentences taken from McCready (2007:420).

(16) sekkaku gohan tsukutta noni (tabenai no?)
SEKKAKU food made NONI (eat-no Q?)
'Even though I went to the trouble of making food, which was a good thing (aren't you going to eat it?)'

[2] Actually the third clause of the presupposition (that $p(w_0)$) was left out somehow in the published version of McCready (2007).

(17) # sekkaku ashi-o otta kara yasume yo
SEKKAKU leg-ACC broke because rest-IMP YO
'Since you went to the trouble of/were lucky enough to break your leg, have a rest'

That is, McCready accounts for the infelicity of the latter example by the clash between the asserted positivity of your breaking your leg, and the world knowledge that it is not positive.

Also the third clause of the assertion is conditionalized, as *p* need not describe an agentive event, as shown below.

(18) sekkaku kuri-ga ochi-teiru kara hiro'oo yo
SEKKAKU chestnuts-NOM fallen-down because pick.up-HORT YO
'Since fortunately some chestnuts have fallen down here, let's pick them up'
(McCready, 2007:421)

(19) omae sekkaku eigo-no neitibu na-nda kara, nihon-de eigo oshie-reba?
you SEKKAKU Englih-GEN native be-NODA because, Japan-LOC English teach-if
'Because you are lucky enough to be a native English speaker, why don't you teach English in Japan?'

In both cases, the embedded clause meaning *p* does not describe an agentive event, but the sentences are fine. The above semantics just states that if *p* describes an agentive event, it has to be one intended by the agent.

However, there are several problems with this account. Firstly, as McCready (2007) himself acknowledges, the restrictions on the distribution of *sekkaku* we saw in Section 1 do not directly follow from this analysis and have to be independently stipulated. In particular, under this analysis *sekkaku* simply operates on an at-issue content, and its presupposition is not mentioned at all. This we think is a significant flaw, as our simple generalization that *sekkaku* appears in presupposed clauses seems to capture the restrictions correctly. Our intuition is that its distribution should be accounted for solely by its semantics, and must not be just stipulated.

Secondly, the presupposition of *sekkaku* requiring a *p*-event in the past is too strong, and there are examples in which *p* is not true in the past. There are two sub-cases, modalized sentences and unsettled futurates, which we look at in turn. McCready (2007) assumes that modalized sentences do not license *sekkaku*, raising the following example.

(20) *ashita mochi-o sekkaku tsukuru kamoshirenai kara, kite yo
tomorrow rice.cake-ACC SEKKAKU make might because, come-IMP YO
'Tomorrow, I might go to the trouble of making a rice cake, so come over'
(McCready, 2007:424)

However, although the above sentence is certainly infelicitous, his characterization is not entirely correct and there are counterexamples containing a modal such as the following. Their felicity presumably has to do with the presence of *no da*, which indicates that the badness of examples like the above has to do with information status rather than the actuality (or settledness) of some particular eventuality.

(21) sekkaku takarakuji atatteru kamoshirenai-nda-kara, chanto kakuninshina yo
SEKKAKU lottery win might-NODA-because, carefully make.sure-IMP YO
'Because you might have been very fortunate and won the lottery, you should make it sure more carefully'

(22) sekkaku ashita-nara mochi-o tsuku-reru-nda kara, tsukurina yo
SEKKAKU tomorrow-FOC rice.cake-ACC make-can-NODA because, make-IMP YO
'Because tomorrow is the only day you can make rice cakes, you'd better do so'

Furthermore, McCready claims that *sekkaku* is incompatible with unsettled futurates, raising the following example.

(23) #ashita mochi-o sekkaku tsukuru kara, kite yo
tomorrow rice.cake-ACC SEKKAKU make because, come-IMP YO
'Tomorrow I will go to the trouble of making a rice cake, so come over'
(McCready, 2007:426)

Recall that in Section 1, we attributed the infelicity of the above example to the speaker presupposition. We also showed there that adding *noda* saves the example. Thus, it seems that futurate itself is not a problem. Below are some futurate examples that are felicitous.

(24) ashita mochi-o sekkaku tsukuru nda-kara, kite yo
tomorrow rice.cake-ACC SEKKAKU make NODA-because come-IMP YO
'Tomorrow I will go to the trouble of making a rice cake so come over'

(25) ashita sekkaku hajimete Tokyoo iku-nda kara, shitashirabe shitok-oo yo
tomorrow SEKKAKU for.the.first.time Tokyo go-NODA because, preparation do-HORT YO
'Because we are going to Tokyo tomorrow for the first time, we'd better plan what to do in advance'

However, a caveat is in order here. McCready also notes without giving a concrete example that if the futurate sentences are understood as past decisions about future events, *sekkaku* can modify them. Thus, he does not predict that all futurate examples containing *sekkaku* are infelicitous. In fact, he could say that the above examples are such cases. However, it is not clear from his statement what distinguishes examples that can and cannot have this reading, and in the end many, or even most, examples might be able to support it. In particular, it is not clear whether this is the fact that distinguishes the infelicitous (23) and the felicitous (24).

Our novel account presented in the next section maintains the positive aspects of the McCready analysis and at the same time, overcomes those problems. It also captures the distributional restrictions on *sekkaku* we saw in Section 1.

3 New Account

3.1 Decision/Game Theory

We will formalize the intuitive meaning of *sekkaku* in decision/game theoretic terms, so we will introduce some basic notions in this section. Today many applications of decision theory to linguistics, especially pragmatics, can be found in the literature (Parikh, 1992, van Rooy, 2001, 2003, 2004, Benz et al., 2006, Davis, 2009). In particular, it helps us formalize the non-truth-conditional aspects of meaning such as the notion of positive and negative consequences.

In (Bayesian) decision theory, each conversational participant faces a decision problem in which she must choose the best action from a finite set of alternatives. We define a decision problem as follows.

(26) A **decision problem** for an agent i is a quadruple $\langle W, P, U, A\rangle$ where

- W is a set of possible worlds
- $P : W \rightarrow [0,1]$ is a discrete probability function (i.e. $\sum_{w \in W} P(w) = 1$)
- $U : A \times W \rightarrow \mathbb{R}$ is a utility function
- A is a finite set of alternative actions for i

In a decision problem, each action in A is associated with its expected utility defined as follows.

(27) In a decision problem $d = \langle W, P, U, A\rangle$, the **expected utility** $EU_d(a)$ of action $a \in A$ in d is defined as $\sum_{w \in W} P(w) \times U(a, w)$.

The problem that agent i faces is to choose the action that has the largest expected utility in the current decision problem ($argmax_{a \in A} EU_d(a)$).

3.2 Meaning of 'Sekkaku'

Using the above notions, we claim what *sekkaku* does is roughly the following. We assume that it is anaphoric to an actual decision problem $\langle CG, P, U, A\rangle$, where CG is a Stalnakerian Common Ground at the current point in the conversation, i.e. the intersection of the set of propositions that the conversational participants all take to be true (and mutually believe that the others know them to be true) at the current time. By an actual decision problem we mean one that is tied to the actual circumstances, what is actually the case, or, at least, could be the case according to the knowledge of the conversational participants, i.e. what is compatible with CG. *Sekkaku* then compares the actual decision problem with a counterfactual decision problem. To this end, we define $CG \star q$ to be the set of counterfactual worlds that are closest to worlds in CG in which q is true. The $\star$-operator is based on a proposal by Asher and McCready (2007), simplified to operate on worlds (as opposed to world-assignment pairs, as in the original formulation: we do not concern ourselves with assignments here) in a way somewhat similar to the analysis of counterfactuals of Lewis (1973).

(28) Let $S(p)(W)$ be the smallest sphere around a set of worlds W such that some elements in $S(p)(W)$ verify p. Then $W \star p = \{w : w \in S(p)(W) \wedge w \vDash p\}$.

Furthermore, we propose that *sekkaku* operates on a presupposed clause. Below, we denote the presupposition of 'ϕ-Con' by p (where 'Con' is the conjunction under which *sekkaku* is embedded). Also, let $c = \langle CG, P, U, A\rangle$ be the decision problem that *sekkaku* is anaphoric to, and let $c' = \langle CG \star (\neg p), P', U, A\rangle$, which is a counterfactual decision problem with a set of worlds $CG \star (\neg p)$ and a new probability function P'. P' is simply defined here as $P(q|\neg p)$ for all q, so the probability of each proposition is just the initial probability of that proposition in c conditionalized on $\neg p$. Referring to the counterfactual decision problem c', *sekkaku* adds two propositions to the assertion as in (29). Note that the presupposition p itself is implicit in the following representation, but it is used to construct the counterfactual decision problem c'.

(29) $$||\textit{sekkaku } \phi \text{ Con}||^c = ||\text{Con}||^c \left(\begin{array}{l} ||\phi||^c \\ \text{and} \\ ||\phi||^c \text{ is unusual (i.e. } |CG \star (\neg ||\phi||^c)| > |CG|) \\ \text{and} \\ \exists a \in A : \begin{array}{l} EU_c(a) \text{ is high and} \\ EU_c(a) \succ EU_{c'}(a) \end{array} \end{array} \right)$$

In words, *sekkaku* ϕ asserts that ϕ, ϕ is unusual, and there is a good action that has a much higher expected utility in the actual decision problem c than in the counterfactual decision problem c'.

It should be emphasized that the semantic contribution of *sekkaku* under our account is assertive in that intuitively what *sekkaku* does is to strengthen the reasoning in the case of reason clauses, and the opposition of the two clauses in the case of concessive clauses. This is achieved by having the two additional propositions interact with the subordinator.

At the same time it is a good side of our account that it explains the distributional restrictions rather straightforwardly. That is, *sekkaku* operates on the presupposition p, and makes an assertion about the closest counterfactual decision problem c' in which p is false, namely, there is a good action in the current decision problem c that is harder to achieve in c'. Therefore, it can only occur in a presupposed context.

Lastly, we need to say something about $\succ$ here. What counts as a better action in this context? Infinitesimal changes in utilities should not license *sekkaku*. For instance, the conditions above would be, in principle, satisfied by an increase in utility of 0.000000001 between c and c', which difference is presumably not substantially relevant to the average speaker, even if she is trying to maximize utility in her actions. We therefore assume that we are dealing with a notion of 'significantly better': this can be achieved by relativizing $\succ$ to a contextual standard. The strategy is to define a metric on difference in expected utilities: we measure the interval between $EU_{c}(a)$ and $EU_{c'}(a)$ and compare it to a contextually set interval s, the standard. Anything larger than s counts as significantly different. Thus if $EU(a) \succ_s EU(b)$, the utility of a is significantly better than the utility of b. For example, we might suppose that in a particular context any difference in utilities less than 2 units is basically irrelevant; in this case, the standard will be set to $s = 2$.[3] The general strategy follows Kennedy (2007) for gradable adjectives, and the specific application is from McCready (2008), who gives a definition of *very* using this method.

3.3 Explaining the Examples

Let us see now that the proposed semantics assigns the intuitively correct meanings with two concrete examples. Below is a reason clause with *sekkaku*.

(30) Taroo-ga sekkaku kuru-shi, ai-ni ike ba?
Taro-NOM SEKKAKU come-since, meet-to go COND

The presupposition here is that Taro is coming, and hence the predicted meaning can be paraphrased as:

(31) Because Taro is coming, which is unusual and makes a good action available that is hard to perform otherwise, you'd better go meet him

Because of the meaning of the connective, the matrix clause expresses a positive suggestion here, namely, something that leads to the good action.

Here is a concessive case.

(32) Taroo-ga sekkaku kita-noni, Hanako-wa inakatta
Taro-NOM SEKKAKU came-CONC, Hanako-TOP not.was

[3]The actual implementation of all this depends in large part on what numbers one chooses to assign as utility values. Since preferences are invariant under positive affine transformations, the intervals set as the standard must be taken to covary with such transformations on utility values.

Again the embedded clause is presupposed to be true, and the predicted meaning is:

(33) Even though Taro came, which is unusual and could make a good action available that is hard to perform otherwise, Hanako wasn't there

In this case, the decision problem at stake is one of Hanako's at the relevant past time, but the knowledge state is that of the current time, as it is known that Taro came, which Hanako might have not known. Just as in the previous case, because of the concessive meaning of the connective, the matrix clause expresses a situation in which the good action was not achieved, which is negative.

3.4 Differences from McCready (2007)

Now let us compare our novel analysis with McCready's, whose denotation is repeated here.

(34) $||$ sekkaku $||(p)$

a. Presupposition: $\exists q\,[(p > q) \wedge \mathbf{good}(q)] \wedge \exists e\,[(\tau(e) = t) \wedge (t \leq n) \wedge \mathit{Desc}(e,p)] \wedge p(w_0)$

b. Assertion: $p \wedge \mathbf{good}(p) \wedge \forall e \forall x\,[\mathit{Desc}(p,e) \wedge \mathit{Agent}(x,e) \rightarrow \mathit{Intend}(x, \mathit{realize}(e))]$

Although p is presupposed to be true in (34), it just follows under our account from the presupposition that p is true. Furthermore, we predict that this depends on the presupposition of the connective, and we will see below that there is a connective that licenses *sekkaku* but does not give rise to the inference that p is true. Therefore, this is another empirical inadequacy of the previous account that is not problematic for ours.

The implied proposition q in (34) corresponds to the good action in our semantics. McCready analyzed it as presuppositional, but under our account it is part of the assertion, because it interacts with the meaning of the connective. We believe that this is intuitively true, as explained above. That is, intuitively, that there is a good action made available by p is part of the reason in the case of reason clauses, not just a presupposed fact.

Thirdly, we do not explicitly state the intentionality and the positivity of p, unlike McCready, but claim that they are pragmatically inferred. That is, if p leads to a good action, it is usually intended. As McCready observes, intentionality is not a strict requirement and non-agentive states can be modified by *sekkaku*, as we have already seen in Section 2. Furthermore, non-intended events, not just states, are compatible with *sekkaku*, as shown below.

(35) sekkaku kimi-ni kooshite battari dekuwashita kedo, kyoo-wa nomini iku
SEKKAKU you-DAT like.this suddenly ran.into though, today-TOP drinking go
jikan-ga nai naa
time-NOM not.be PRT
'Even though I was lucky enough to run into you like this, it's unfortunate that I don't have time to drink with you today'

(36) sekkaku saifu hirotta noni, sonomama kooban-ni todoken no?
SEKKAKU wallet found even.though, straight police.station-DAT deliver Q
'You were lucky enough to find someone's wallet, but are you really bringing it straight to the police station?'

Also we predict that if p is a proposition that does not lead to any good action, modification with *sekkaku* is infelicitous, even if p is of low probability. This explains McCready's bad examples repeated here.

(37) #sekkaku saifu otoshita-noni, daremo okane kashitekure-nakatta
SEKKAKU wallet dropped-CONC, nobody money lend-NEG

(38) #ashita mochi-o sekkaku tsukuru kamoshirenai kara, kite yo
tomorrow rice.cake-ACC SEKKAKU make might because, come-IMP YO

(39) #sekkaku ashi-o otta kara yasume yo
SEKKAKU leg-ACC broke because, rest-IMP YO

Also, the positivity of *p* does not seem to be a requirement either. But given our semantics, the positivity of *p* is generally expected, since *p* has to be a proposition that makes a very good action more likely than in ¬*p*-worlds, which automatically renders *p* itself positive in some sense as well. Nonetheless, *p* can be neutral, as demonstrated by the example below.

(40) sekkaku kariforunia-ni shutchoo-de kiteru-nda-kara, kariforunia-rooru
SEKKAKU California-to business.trip-for came-NODA-because, California-roll
tabeyoo yo
eat-HORT YO
'Because we went to a trouble of coming all the way to California on a business trip, let's try California rolls'

This sentence doesn't necessarily imply that being on a business trip to California is inherently positive. For example, this is felicitous in a situation where the speaker hates overseas business trips in general.

3.5 Concessive Clauses with '-Temo'

In the examples so far, the relevant presupposition that *sekkaku* operates on has been a factive one that *p* is true. However, not all subordinators give rise to the factive presupposition. For example, with the concessive connective *-temo* 'even if', the embedded clause is just presupposed to be possible. That is *p-temo* does not presuppose that *p* is true, but that *p* is possible. Thus, the following example is fine even if it is not known that it will be sunny tomorrow, but crucially it is infelicitous if it is known that it will not be sunny.

(41) ashita hare-temo dokomo ik-anai no?
tomorrow be.sunny-CONC nowhere go-NEG Q
'Are you not going out even if it is sunny tomorrow?'

As expected from our account, *-temo* clauses license *sekkaku*.

(42) ashita sekkaku hare-temo dokomo ik-anai no?
tomorrow SEKKAKU be.sunny-CONC nowhere go-NEG Q
'Are you not going out even if we are lucky enough to have a sunny day tomorrow?'

In this case the possibility modal in the presupposition is circumstantial, but it can also be deontic as in the following example.

(43) sekkaku omise-o morat-temo umaikoto keiei shi-tsuzuke-rareru no ka wakar-anai
SEKKAKU shop-ACC receive-CONC well run do-continue-can NML Q know-NEG
shi...
so
'Even if I was fortunate enough to be able to take over the shop, I don't really know if I could keep running it right, so...'

(43) presupposes that the speaker is allowed to take over the shop, not that she will. Therefore, under our account, its meaning is paraphrased as below, which complies with the intuition.

(44) Even if I am able to take over the shop, which is an unusual situation and at the same time makes a good action more readily available than in situations where I am not allowed to, I don't really know if I could keep running it right, so...

That is, the counterfactual decision problem is one in which the speaker is not allowed to take over the shop, and there is a substantially good action made available in the worlds in which she is allowed to.

The above examples demonstrate that the presupposition that *sekkaku* operates on does not have to be factive. This is another improvement from the previous account, where it was assumed to be always factive and hence problematic for these cases.

4 Conclusions and Further Issues

We claimed in this paper that *sekkaku* operates on presupposed clauses, and its distribution follows from this meaning without further ado. In particular it does not always modify the presupposition of the embedded clause *p*, and with the concessive connective *-temo*, it operates on $\Diamond p$.

A theoretical consequence of this analysis is that in the standard conception of presuppositions, presupposition triggers generate presuppositions from at-issue content and send them off to the dimension of presuppositions, but no operator has been known so far that does the opposite. *Sekkaku* is an example of such an operator, because it takes a presupposition and makes at-issue content out of it. We are not aware of any other operators in natural language that belong to this class, but this new class of lexical items should be recognized.

In the remainder of this paper, we address two remaining problems.

4.1 How to Operate on Presuppositions Compositionally

We presented our semantics in (29) in a non-compositional fashion. Structurally, it is uncontroversial that *sekkaku* is contained in the embedded sentence, so let us assume that it takes the embedded clause as its argument. A problem arises here regarding how it will know whether the embedded clause is presupposed. Recall that the presupposition is triggered by the subordinator, and it is not always the case that the embedded clause is presupposed to be true. That is, as we saw in Section 3.5, the presupposition that *-temo* gives rise to is that the embedded clause is possible.

It should be noted here that clauses whose subparts are presupposed are not sufficient to license *sekkaku*, as shown below, and the embedded clauses as a whole must be presupposed.

(45) *moshi sekkaku Hanako-ga omae-ga kyoo paatii-ni kiteiru no-o shitte-tara,
if SEKKAKU Hanako-NOM you-NOM today party-to be NML-ACC know-if,
kitto aitu-mo kuru daroo
perhaps she-too come EVD

Here the complement of *shir-* 'know' is presupposed to be true, but *sekkaku*, which is outside of it, is not allowed to operate on this presupposition. Thus, *sekkaku* must be able to distinguish whether its argument is presupposed as a whole.

A related problem is that *sekkaku* is not licensed in all presupposed clauses and it requires the presence of a particular kind of subordinator. Thus, the following example is out despite the fact that the embedded clause that *sekkaku* operates on is presupposed to be true.

(46) *Hanako-wa Taroo-ga sekkaku kuru no-o shitteiru
Hanako-TOP Taro-NOM SEKKAKU come NML-ACC know

Our semantics would give this example the following meaning: Hanako knows that it is unusual that Taro comes and there is a good action made available by this, but the above sentence is simply ungrammatical.

What we learn from these data is that the licensing condition of *sekkaku* cannot be local as it needs to check whether *sekkaku* is in the scope of a subordinator that triggers a presupposition. We leave for future work how such a licensing condition can be compositionally implemented.

4.2 Relative Clauses

Another remaining problem is that relative clauses also license *sekkaku* as shown below.

(47) Taroo-ga sekkaku kattekureta hon-ga nakunatta
Taro-NOM SEKKAKU bought.for.me book-NOM gone
'I lost the book that Taro went to trouble of buying for me'

In this case, the matrix clause has to be negative. For example, the following example is utterly infelicitous.

(48) #Hanako-wa Taroo-ga sekkaku kattekureta hon-o daijinishiteiru
Hanako-TOP Taro-NOM SEKKAKU bought.for.her book-ACC treat.with.care

It seems that complex NPs containing *sekkaku* are generally definites and hence presuppositional, which complies with our analysis that *sekkaku* operates on a presupposition. The problem, however, is that nothing inherent in relative clauses *per se* forces the negative reading of the matrix clause. Recall that in our analysis, the positivity/negativity of the matrix clause follows from the interaction with the meaning of the subordinator. Given this, it seems to us to be reasonable to treat relative clause cases differently from the subordinator cases that we looked at above.

A related use is the nominal modifier use of *sekkaku*. At first glance it may appear that the matrix must be negative too. Consider the following examples.

(49) Hanako-wa sekkaku-no kikai-o mudanishita
Hanako-TOP SEKKAKU-GEN opportunity-ACC wasted
'Hakako wasted the rare opportunity'

(50) #Hanako-wa sekkaku-no kikai-o umaku riyooshita
Hanako-TOP SEKKAKU-GEN opportunity well exploited
'Hanako took advantage of the rare opportunity'

However, there are good examples with positive matrix clauses.

(51) sekkaku-no santakuruuzu-da kara umi-ni ik-oo ze
SEKKAKU-GEN Santa.Cruz-COP because ocean-to go-HORT PRT
'We went to trouble of coming all the way to Santa Cruz, so let's go to the beach, dude!'

It appears that (49) and (50) are similar to relative clause cases and require a negative matrix clause, while (51) is similar to subordinator cases and *sekkaku* is operating on the presupposition. In fact, when the matrix clause is positive, the same kind of subordinator as the adverbial cases is always required.

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