Annotation of Japanese Discourse Relations Focusing on Concessive Inferences

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Abstract

In this study, we focus on the inference presupposed in the concessive discourse relation and present the discourse relation annotation for the Japanese connectives 'nagara' and 'tsutsu', both of which have two usages: SYNCHRONOUS and CONCESSION, just like English *while*. We also present the annotation for 'tokorode', which is ambiguous in three ways: TEMPORAL, LOCATION, and CONCESSION. While corpora containing concessive discourse relations already exist, the distinctive feature of our study is that it aims to identify the concessive inferential relations by writing out the implicit presupposed inferences. In this paper, we report on the annotation methodology and its results, as well as the characteristics of concession that became apparent during annotation.

Keywords: annotation, discourse relations, concessive conjunctions, Japanese

1. Introduction

The proper recognition and classification of discourse relations in text and speech are crucial aspects of natural language understanding. This has been one of the fundamental challenges in computational linguistics as well as in linguistic semantics and pragmatics. One of the factors contributing to the difficulty is that a single conjunction (or connectives) may be polysemous and can express multiple discourse relationships.

In this study, we present the annotation of Japanese conjunctions, namely *nagara* (ながら), *tsutsu* (つつ), and *tokorode* (ところで), which may or may not be interpreted as concessive conjuctions depending on the context in which they appear. In performing the annotation of polysemous conjuctions, we pay special attention to the hidden inferences of concessive discourse relations. Language resources of this kind are crucial for advancing linguistics-oriented research in NLP, and this study represents an effort to explore discourse relations in Japanese. We publicly release all annotation results at `https://github.com/kmineshima/JDTB-logic`.

2. Background and Related Work

2.1. Concession and presupposed inference

By the term *concession* we mean a discourse relation that is often described as the "denial of expectation" (Kehler, 2002; Izutsu, 2008; Winterstein, 2012). It is worth noting that there are two distinct categories of concessive relations, as exemplified in the following sentences, taken from Izutsu (2008) (37):

(1) **Direct type**
<u>Although</u> John is poor, he is happy.

(2) **Indirect type**
The car is stylish and spacious, <u>but</u> it is expensive.

The distinction between the direct and indirect types of concession is based on the nature of the *presupposed inferences*. In the direct type, as illustrated in (1), there is an implicit inference: "If John is poor, then normally he is not happy." This presupposed inference is schematically represented as "If P, then normally $\neg Q$." On the other hand, the indirect type is characterized by the presupposition: "If P then R; if Q then $\neg R$", where the third proposition, R, is introduced. In the case of (2), this can be paraphrased as: "If the car is stylish and spacious, then we would buy it; but if it is expensive, then we would not buy it."

Concessive constructions and their presupposed inferences have been extensively discussed in the literature, including analyses of French (Anscombre and Ducrot, 1977), English (König, 1985; Winter and Rimon, 1994; Iten, 1998; Winterstein, 2012; Toosarvandani, 2014), and Japanese discouse structures (Sakahara, 1985; Noya, 2003; Izutsu, 2008). However, to the best of our knowledge, there is no prior corpus study that has attempted to annotate concessive discourse relations with an emphasis on presupposed inference. In this paper, we aim to annotate and analyze such relations in Japanese, specifically from the perspective of presupposed inference.

2.2. 'nagara' and 'tsutsu'

The conjunctions *nagara* and *tsutsu* both have two distinct uses[1]: Synchronous and Concession[2] (Japanese Descriptive Grammar Research Group, 2008; Muraki, 2019).

Typically, the conjunctions *nagara* and *tsutsu* are interpreted as Synchronous when the sentence involves dynamic predicates like "eat" and "run", and as Concession when static predicates such as "think" and "narrow" are involved. However, it is essential to note that the type of predicate alone does not always determine whether it is Synchronous or Concession. The interpretation is significantly influenced by the semantic relationship with the main clause and the contextual factors, as demonstrated in the following examples (excerpted from Section 3.4 of Japanese Descriptive Grammar Research Group (2008))

(3) a. [Arg1 さびしいと思い] ながら [Arg2 毎日 を過ごした]。 (Synchronous)
'While [Arg1 feeling lonely] , [Arg2 I spent every day] .'

b. [Arg1 さびしいと思い] ながら [Arg2 それ を口にしなかった]。 (Concession)
'While [Arg1 feeling lonely] , [Arg2 I did not voice it] .'

(4) a. [Arg1 3時間、 英語を勉強し] ながら、 [Arg2 音楽を聞いた]。 (Synchronous)
'While [Arg1 studying English for three hours] , [Arg2 I listened to music] .'

b. [Arg1 12年間も英語を勉強し] ながら、 [Arg2 日常会話もろくにできない]。 (Concession)
'Even though [Arg1 I've studied English for 12 years] , [Arg2 I still can't properly hold everyday conversations] .'

Hence, in certain instances, it becomes challenging to distinguish between a scenario characterized as Synchronous or Concession, as exemplified below (cf. Muraki (2019) (31)).

(5) [Arg1 加藤文太郎は秋の海を見] ながら、 [Arg2 思いは日本海に飛んでいた]。
'While [Arg1 Katō Buntarō was looking at the autumn sea] , [Arg2 his thoughts were drifting to the Sea of Japan] .'

2.3. 'tokorode'

The conjunction *tokorode* has three uses: Location, Temporal, and Concession (Takubo, 2018)

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[1]Other more idiomatic uses of *nagara* are omitted here, cf. Muraki (2019).

[2]The actual term they use is "逆接", which may translate as "contradictiory conjunction". We use Concession instead following the PDTB terminology (Prasad et al., 2008; Webber et al., 2019).

(51).

(6) a. [Arg1 彼が住んでいた] ところで [Arg2 立 ち退き騒動があった]。 (Location)
'[Arg2 There was an eviction riot] where [Arg1 he lived] .'

b. [Arg1 新郎新婦が入場した] ところで [Arg2 音楽が始まる]。 (Temporal)
'[Arg2 The music begins] when [Arg1 the bride and groom enter] .'

c. [Arg1 木村が来た] ところで [Arg2 情勢に 変化はない]。 (Concession)
'[Arg2 The situation will not change] even if [Arg1 Kimura came] .'

Unlike the Concession use of *nagara* and *tsutsu*, the Concession use of *tokorode* is hypothetical as indicated by the translation "even if" (not "even though"). Despite such difference, *tokorode* is in the same situation as *nagara* and *tsutsu* in that interpretation of the conjunction is polysemous. This study aims to elucidate the factors that influence or correlate with the interpretation of polysemous conjunctions. Particular attention is paid to the factors that lead to the Concession interpretation.

2.4. Annotated Corpus of Discourse Relations

One of the prominent studies on English discourse relations corpora is the Penn Discourse Treebank (PDTB) (Prasad et al., 2008, 2014). In PDTB-3 (Webber et al., 2019), a distinction is made between explicit and non-explicit discourse relations. For explicit discourse relations, each conjunctive expression is assigned a discourse relation unit (Arg1, Arg2) and a discourse relation label.

(7) The documents also said that although [Arg2 the 64-year-old Mr. Cray has been working on the project for more than six years] , [Arg1 the Cray-3 machine is at least another year away from a fully operational prototype] . [wsj 0018] (Prasad et al., 2008, 2014) (104) (Concession[3])

There are two similar but distinct labels Concession and Contrast, both of which fall under the Comparison relation. It has been noted that the distinction between Concession and Contrast is often not straightforward (Webber et al., 2019), which indicates that it is not always easy to identify Concession.

In the case of Japanese, there is a corpus called the Kyoto University Web Document Leads Corpus (Hangyo et al., 2012; Kawahara et al., 2014;

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[3]Comparison.Concession.Arg1-as-denier, to be more precise.

Kishimoto et al., 2020)[4], which consists of the first three sentences taken from the internet web pages. Discourse relation tags are assigned following the PDTB policy. These tags distinguish between CONCESSION and CONTRAST. However, the criteria for distinguishing between them is not always clear, especially when a single conjunctive expression, such as *ga* (が), serves both CONCESSION and CONTRAST functions.

Moreover, discourse units (Arg1, Arg2) are determined through automatic recognition and do not always correspond to the correct linguistic clause units as shown below.

(8) [Arg1 このイルミネーションをプロのカメラマンに頼んで] [Arg2 写真におさめる家庭もあるとか]   (Kishimoto et al., 2020)(14)
[Arg1 This illumination, hire a professional photographer] [Arg2 there are even families that take pictures]   (PURPOSE)

As the English translation indicates, the discourse units do not match the syntactic structure of the sentence, ignoring the relative clause construction. Instead, the annotation should look like the following with the correct syntactic structure.

(9) [Arg1 このイルミネーションをプロのカメラマンに頼んで] [Arg2 写真におさめる] 家庭もあるとか
There are even families that [Arg1 hire a professional photographer] [Arg2 to take pictures of this illumination]   (PURPOSE)

To address this issue, we used an existing treebank that contains detailed syntactic information. This approach helps mitigate the difficulties associated with identifying discourse units and assigning linguistically valid discourse relation labels.

3. Annotation Methodology

3.1. Data Used

All sentences used in this study were extracted from the Kainoki Treebank (Kainoki (2022)), which comprises 102,875 Japanese trees. An example of the trees is shown in Figure 1.

The Kainoki Treebank provides both part-of-speech tags and syntactic structures. As a result, it is possible not only to extract sentences containing the strings "ながら" (*nagara*), "つつ" (*tsutsu*), and "ところで" (*tokorode*), but also to identify the two discourse units (Arg1 and Arg2) that these conjunctions take, even in complex sentences that include embedded clauses. For instance, in the example in Figure 1, Arg1 and Arg2 are "事務能力を発揮し" ([the woman] *exhibiting her clerical skills*) and "一

家の中心となって" (*working as the centerpiece of the family*), respectively. Arg1 is governed by the IP node directly above "つつ" (*tsutsu*), while Arg2 is governed by the IP node that directly dominates the *tsutsu* clause.

3.2. Discourse Relation Labels

Sentences containing the expressions "ながら" (*nagara*), "つつ" (*tsutsu*), and "ところで" (*tokorode*) numbered 1325, 239, and 108 sentences, respectively.[5] Annotations were carried out by 11 people for *nagara* and *tsutsu* and 5 people for *tokorode*, including the authors. All are with expertise in Japanese language. Two annotators independently labeled each triple of the form (Arg1, Conn, Arg2), where "Conn" is the target conjunction. The annotators referred to the context before and after the target clauses as needed, using the Kainoki Treebank web interface.[6]

For *nagara* and *tsutsu*, we use the following labels.

Concession This label is used when there is a "denial of expectation," that is, when Arg2 can be interpreted to deny the expectation raised by Arg1. See (3a) and (4a) as examples. The expressions *nagaramo* (ながらも) and *tsutsumo* (つつも) are always used to express a concessive interpretation. Based on this test, the instructions specify that when *nagara* and *tsutsu* can be replaced with *nagaramo* and *tsutsumo*, respectively, without changing the meaning of the sentence, the CONCESSION label should be used.

Synchronous This label is used when the CONCESSION interpretation is impossible and there is a temporal overlap between the events described by Arg1 and Arg2. See (3b) and (4b) as examples. The instructions specify that when *nagara* and *tsutsu* can be replaced with *nagaramo* and *tsutsumo* in a way that changes the meaning of the sentence, the SYNCHRONOUS label should be used.

Idiom This label is used for idiomatic expressions such as "残念ながら" (*regrettably*).

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[5]In the Kainoki Treebank, the conjunction *tokorode* (ところで) is tokenized into *tokoro* (ところ) and *de* (で). This form is lexically distinguished from a single expression *tokorode* (ところで) that means *by the way* in English. In regard to *tokoro*, it is further distinguished by its part of speech tag into formal noun (labeled as FN) and common noun (labeled as N). The class under consideration here pertains to instances where its part of speech tag is a common noun (N), and the total count of such instances was 108.

ID@Kainoki_185_essay_Hepburn_no_shoogai_to_nihongo2

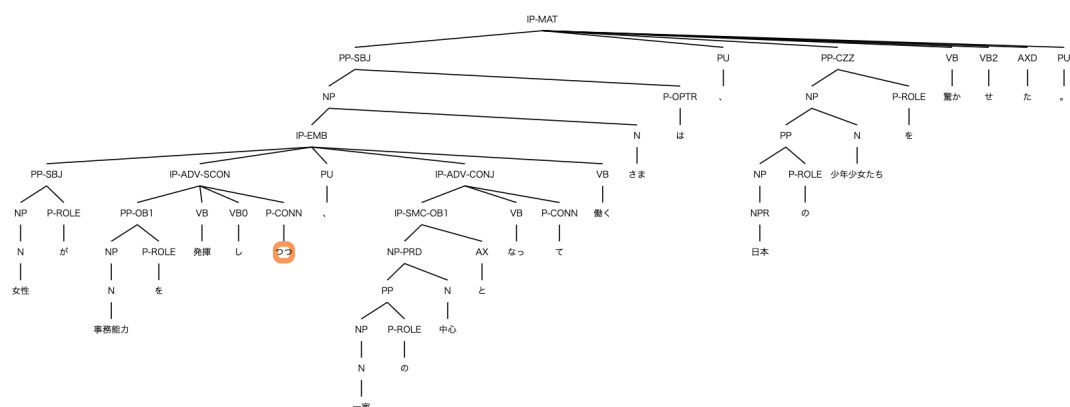女性 が 事務能力 を 発揮 し つつ 、 一家 の 中心 と なっ て 働く さま は 、 日本 の 少年少女たち を 驚か せ た 。

Figure 1: An example tree in Kainoki Treebank

Furthermore, there are cases where one of the arguments is missing, as follows.

(10) [Arg1 窓の外を見] ながら。
"While [Arg1 looking at outside of the window].

Such cases are excluded from annotation and marked as "N/A."

For *tokorode*, we use two other labels, Location and Temporal, in addition to the Concession label (see Section 2.3).

Location This label is used when *tokorode* is referring to the place where the event described in Arg2 took place. See (6a) as an example.

Temporal This label is used when *tokorode* is referring to the time when the event described in Arg2 took place. See (6b) as an example.

Concession This label is used when *tokorode* can be replaced with *temo* (even if) without changing the meaning of the sentence. See (6c) as an example.

In order to identify Concession more accurately and consistently, we asked the annotators to write out the **Presupposed Inference** (cf. Section 2.1). The following is an example of a presupposed inference for the concessive use of *tsutsu* (つつ).[7]

(11) [Arg1 たばこは体によくないと分かり] つつ
[Arg2 なかなかやめられない。]
(480_textbook_djg_intermediate;page_543)[8]
'Even though [Arg1 one knows smoking is bad for the health], [Arg2 it's hard to quit.]'

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[7]The presupposed inferences were all annotated in Japanese, but here, only the English translation are provided.

[8]For examples in the Kainoki treebank, we indicate their IDs.

Presupposed Inference: If one knows smoking is bad for the health, they should be able to quit easily (they are expected to be able to quit).

In this way, we tried to keep the annotations as consistent as possible among the annotators. This additional task of writing out presuppositional inferences, despite being somewhat difficult at times, eventually revealed interesting cases in which it was not clear what specific inferences were being presupposed, leading to a reconsideration of the nature of concessions in human language.

4. Annotation Results and Discussion

The number of cases for each classification label is shown in Table 1. If the judgment labels of the two annotators differed, a third annotator checked and determined the label. In cases where a decision still could not be made, they were classified as "A/B." The inter-rator agreement between the two annotators was calculated using Kappa coefficient and was 0.72 for *nagara*, 0.46 for *tsutsu*, and 0.75 for *tokorode*, respectively.[9]

4.1. Characteristics of Concession

The use of *nagara* and *tsutsu* to indicate Concession typically depends on whether the predicate is dynamic or static, although there are exceptions

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[9]It is not clear why the Kappa value for *tsutsu* is lower than those for *nagara* and *tokorode*. The low kappa value for *tsutsu* may be attributed to the complexity of the annotation instructions compared to those for 'nagara' and 'tokorode', which possibly led to confusion among the annotators. Specifically, there were instances where annotators mistakenly categorized examples as 'CONCESSION (indirect type)' that should have been identified as 'SYNCHRONOUS'.

Expressoins	Classification Labels	Counts
nagara	A. CONCESSION	146
	B. SYNCHRONOUS	1,046
	C. IDIOM	37
	A/B	68
	N/A	28
tsutsu	A. CONCESSION	29
	B. SYNCHRONOUS	209
	A/B	1
tokorode	A. CONCESSION	27
	B. TEMPORAL	14
	C. LOCATION	49
	N/A	18

Table 1: Annotation results

(Section 2.2). In this section, we further examine whether there are common tendencies observed in the items labeled as CONCESSION in our annotation. Specifically, we focused on the following linguistic features.

State aspect (ASP) Those with aspect markings in Arg1 that indicate stative aspect such as "(て)いる" (is/are), "(て)ある" (has/have), and "(て)おく" (have done).

Negation (NEG) Those with negation in Arg2.

Modal (MOD) Those with modal expressions in Arg2 such as "はず" (should) and "べき" (must).

Conjunctions (CNJ) Those with other conjunctions in Arg2 such as "しかし" (however) and "一方" (on the other hand).

Focus particles (FOC) Those with focus particles in Arg2 such as "も" (also), "は" (as for) and "さえ" (even).

Questions (QUE) Those whose Arg2 is a question.

Imperatives (IMP) When Arg2 is an imperative sentence.

We counted the number of occurrences of *nagara*, *tsutsu*, and *tokorode* to see if there is any correlation between the discourse labels and the linguitic features above. Each of these occurrences was automatically extracted and counted from the Kainoki Treebank [10]. The results are summarized in Table 2.

These feature labels are not exclusive. We also counted the number of cases in which multiple labels overlap in a single sentence for each pattern

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[10]For example, in the case of a sentence containing *nagara* with characteristics of aspect (ASP), it can be extracted using the search interface on the Kainoki Tree-bank website with the search query "P-CONN < (ながら, おき|い|あり)".

of overlap. As a result, we did not find a single case of overlap in "つつ(tsutsu)". In "ながら(while)", we found a total of 23 cases of overlap, with the notable ones being ASP-NEG in four cases, and NEG-FOC and ASP-QUE in three cases. And, in "ところで(tokorode)", a total of 16 cases of label overlap were found, with the NEG-FOC pattern being the most frequent (11 cases).

Below, we discuss a few points found in Table 2 that we believe are worth noting from a linguistic perspective. We do not discuss *tsutsu* much, since it is less clear if there is any prominent characteristic to point out, which could be due to the small total number.

First, we can confirm that "ながら" (nagara) is likely to be interpreted as concession when the predicate of Arg1 represents a static state, e.g., "tabe**tei**-nagara" (be eating *nagara*) instead of "tabe-nagara" (eat *nagara*). While there are 31 out of 146 cases that have a static predicate for those that are labeled as CONCESSION, there are only 3 out of 1046 cases when Arg2 does not have a static predicate [11]). This tendency was not observed for "ところで(tokorode)".

A significant characteristic shared by "ながら" (nagara) and "ところで" (tokorode) becomes clear to see the cases where negation appears in Arg2. For those that are labeled CONCESSION, 21 out of 146 "ながら" (nagara) sentences and 16 out of 27 "ところで" (tokorode) sentences have negation in Arg2. On the other hand, only 13 out of 1046 "ながら" (nagara) sentences and 1 out of 63 "ところで" (tokorode) sentences have negation in Arg2 when the label is <u>not</u> CONCESSION. Thus, there seems to be correlation between the interpretation of CONCESSION and whether Arg2 has negation.

It is also noteworthy that in cases involving questions (QUE), almost all of them were rhetorical questions and not information-seeking questions. Rhetorical questions are said to be interrogative utterances that (i) do not expect an answer, (ii) have the feel of an assertion, but (iii) can optionally be answered (Biezma and Rawlins, 2017).

(12) が、[Arg1 直接お逢いしてみた] ところで、[Arg2 手紙以上のことがどうしてあの方に向って私に云えただろう？] (361_aozora_Hori-1969)
But, [Arg2 how could I have said more to him

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[11]In this study, we did not count verbs like "思う" (think) and "知る" (know), which do not typically represent dynamic actions but instead denote thoughts or cognition. However, it is worth considering that these verbs can also indicate a static state without the need for the "(て)いる ((te)iru)" form. It may be necessary to investigate tendencies related to these verbs in terms of either CONCESSION or SYNCHRONOUS. Further research is needed to explore the specific types of verbs in more detail.

Table 2: Linguistic features of the annotation results

Expressions	Classification Labels	Total Number	ASP	NEG	MOD	CNJ	FOC	QUE	IMP
Nagara	A. CONCESSION	146	31	21	3	8	3	6	0
	B. SYNCHRONOUS	1046	3	13	7	4	6	2	1
	C. IDIOM	37	0	0	1	1	0	0	0
	A/B	68	1	2	2	2	0	0	0
Tsutsu	A. CONCESSION	29	0	1	1	1	0	0	0
	B. SYNCHRONOUS	209	0	1	0	0	0	0	0
	A/B	1	0	0	0	0	0	0	0
Tokorode	A. CONCESSION	27	0	16	8	0	11	2	0
	B. TEMPORAL	14	0	1	1	0	1	0	1
	C. LOCATION	49	2	0	0	0	0	2	0

than I did in the letter] <u>even if</u> [Arg1 I had met him in person] ?

It would be interesting to see what exactly is the linguistic mechanism that underlies the correlation between the type of questions and concession (or the discourse relation more generally).

Finally, for "ところで(tokorode)", there seems to be a tendency for it to be interpreted as concession when Arg2 has FOC, various discourse related focus particles such as "も(mo)" (also), "は(wa)" (as for), "さえ(sae)" (even), etc. This tendency is not so significant for "ながら(nagara)" and "つつ(tsutsu)". In any case, there is no clear explanation of why these linguistics factors affect or correlate with the interpretation of polysemous conjunctions. Further linguistics investigation is left for future research.

4.2. Presupposed Inference and Indirect Concessives

4.2.1. Concession: Direct type

It is often not easy to identify the presupposed inference in a concessive construction. Even in the case of the direct type reading where "if P then normally $\neg Q$" is presupposed, there can be various ways to verbalize the inference which differ in meaning. Below are typical examples where the two annotators successfully identified the presupposed inference for *nagara*, *tsutsu*, and *torokode*.

'nagara' (CONCESSION: direct type)

(13) [Arg1 学があり] ながら [Arg2 運命の手に翻弄されてきた] 男、という印象を全体から感じる。 (301_aozora_Doyle-1892)
'I get the impression of a man [Arg2 who has been tossed about by the hand of fate], despite [Arg1 being educated].'
Presupposed Inference: If one is educated, they should not be tossed about by the hand of fate.

(14) 自分は [Arg1 我子] ながら [Arg2 少し怖くなった。] (171_aozora_Natsume-1908)
'Even though [Arg1 he's my own child], [Arg2 I became a little scared].'

Presupposed Inference: Normally, one wouldn't be scared of their own child.

(15) 分は [Arg1 子供] ながら、[Arg2 この爺さんの年はいくつなんだろうと思った。]
(237_aozora_Natsume-1908)
'Even though [Arg1 I was just a child], [Arg2 I wondered how old this old man might be].'
Presupposed Inference: If you're a child, you typically don't think about the age of others, including old men.

'tsutsu' (CONCESSION: direct type)

(16) [Arg1 押し流され] つつも、[Arg2 見事、対岸の樹木の幹に、すがりつく事が出来たのである。] (220_aozora_Dazai-2-1940)
'Despite [Arg1 being swept away], [Arg2 he impressively managed to cling to the trunk of a tree on the opposite shore].'
Presupposed Inference: If one is swept away, it would typically be difficult to cling to the trunk of a tree on the opposite shore.

(17) [Arg1 あと二、三日と思い] つつ [Arg2 ずるずると居着いてしまっていたのだ。]
(6_book_excerpt-26)
'Even though [Arg1 I thought it would only be another two or three days], [Arg2 I ended up staying much longer].'
Presupposed Inference: If one thinks it's just another two or three days, they typically wouldn't end up staying on and on.

(18) ヘプバーンは [Arg1 ファーラーが気難しいことは認め] つつも [Arg2 二人の仲はうまくいっていると主張していた。]
(287_wikipedia_Audrey_Hepburn)
'[Arg1 Hepburn acknowledged that Farrow was difficult at times], <u>but</u> [Arg2 she insisted that their relationship was going well].'
Presupposed Inference: If Hepburn admits that Farrow is difficult, she wouldn't claim that the relationship is going well.

'tokorode' (CONCESSION: direct type)

(19) [Arg1 あれこれ考えた] ところで [Arg2 理にか
なった結論に到達することはあるまい]
(102_aozora_Harada-1960)
'Even if one thinks it over and over, it's un-
likely they will reach a logical conclusion.'
Presupposed Inference: If one thinks it
through thoroughly, they might reach a logi-
cal conclusion.

(20) [Arg1 助けを呼んだ] ところで [Arg2 助かるわ
けのものではない] (177_aozora_Togawa-
1937-1) 'Even if [Arg1 I called for help],
[Arg2 it doesn't mean I would be saved].'
Presupposed Inference: If I call for help,
I might be saved.

(21) [Arg1 いくら怒ってみた] ところで [Arg2 状
況が大きく変わるものではない。]
(1185_fiction_onna_to_senso)
'no matter [Arg1 how much I get angry],
[Arg2 it won't significantly change the situ-
ation].'
Presupposed Inference: If I get angry, the
situation might change.

It is noted that in each of (13), (14) and (15), the
main predicate in Arg1 is a static predicate (e.g.,
being educated and *being a child*), which strongly
prefers an interpretation of concession. In the case
of (19), (20), and (21), the negation contained in
Arg2 strongly suggests a concessive relation.

4.2.2. Concession: Indirect type

For the examples labelled as CONCESSION, an ad-
ditional analysis was conducted by the authors to
determine whether or not they are instances of the
indirect type in the sense described in Section 2.1.
There were few examples that clearly fit into the
indirect type. The following is one such example.

(22) アイヌの崇拝する山の中には、大昔洪水
の時、[...] [Arg1 狭い] ながらも [Arg2 乾いた]
場所があって、それで先祖の人が助かっ
たので [...] (205_aozora_Chiri-1955-7)
'Among the mountains revered by the Ainu,
in ancient times during the great flood, [...]
there was a [Arg1 small] but [Arg2 dry] area
at the summit of that mountain, and it was
there that their ancestors were saved [...]'

In this case, it is unlikely that the assumption "if it is
narrow, then it is usually not dry" is implicit. There-
fore, the direct type of inference "If P, then normally
$\neg Q$" is not presupposed. Instead, it should be inter-
preted as an indirect type, taking into account an
implicit third proposition, such as "It's narrow, so
they wouldn't have been saved, but it was dry, so
they were saved."

Another example that conveys a sense of oppo-
sition, yet poses challenges in formulating a direct
type of inference is the following.

(23) [Arg1 なにか話さねばと思い] ながら、
[Arg2 また疲労に似た憂鬱を感じていた。
] (159_aozora_Umezaki-1966)
'While [Arg1 thinking that I should say some-
thing], [Arg2 I was once again feeling a
fatigue-like melancholy.]'

It is generally expected that if you believe you
should say something, it is better to do so. However,
this assumption does not align with the presuppo-
sition of the direct type ("If P, then normally $\neg Q$").
The conflict in this case is intuitively associated with
a modal aspect. Arg1 seems to convey a sense
of obligation derived from the modal *should*, which
indicates the situation where you are required to
say something. However, Arg2 only expresses the
feeling of fatigue. To accurately interpret the en-
tire sentence, Arg2 can be understood as "I felt
a melancholy similar to fatigue, *therefore I could
not say anything*." The proposition in italics that is
inferred from the context contradicts the expecta-
tion raised by Arg1. This represents the underlying
structure of the presupposed inference of the indi-
rect concessives in this case.

4.3. Other Difficult Cases of Articulating Presupposed Inferences

We have defined the CONCESSION relation as one in
which there exists a presupposed inference, either
in the direct form "If P then (normally) $\neg Q$" or in
the indirect form "If P then R and if Q then $\neg R$"
(Section 2.1). However, when examining annotated
examples, we encountered cases for which it was
challenging to assign the correct label, and there
were instances that initially seem to be CONCESSION
but posed difficulties when trying to articulate the
presupposed inferences. These instances are of
particular interest.

4.3.1. Types of Modality in the Presupposed Inferences

The task of writing out presupposed inferences re-
vealed some cases where it is essential to interpret
a hidden modality that is not mentioned in the text.
For example, in the following case, by mechanically
applying the template "If P, then $\neg Q$" will result in
an inference like (24a). However, in this context, it
is more appropriate to have an inference like (24b)
with a deontic modality (*should*) rather than with a
stereotypical modality (*usually*) in (24a).

(24) [Arg1 遺家族とあれば一層保護を加うべ
き任にあり] ながら、[Arg2 色と慾の二筋
道をかける] など実に言語道断です。
(454_aozora_Oda-1976-2)
'While [Arg1 there is a duty to provide even

more protection if there are bereaved families] , [Arg2 running both lanes of lust and desire] is truly outrageous.'

a. If there is a duty to provide even more protection, one usually <u>doesn't</u> pursue both paths of lust and <u>desire</u>.

b. If there is a duty to provide even more protection, one <u>should not</u> pursue both paths of lust and desire.

Such examples suggest that we are flexible in interpreting contextual background and supplementing it with appropriate modalities as needed when understanding discourse relations.[12]

4.3.2. Binary Classification of SYNCHRONOUS and CONCESSION

SYNCHRONOUS and CONCESSION interpretations are not mutually exclusive; there are cases where the sentence can be interpreted in both ways at the same time. For example, in the case below, it is SYNCHRONOUS in that the two events of running away and shouting happened simultaneously. At the same time, it is CONCESSION too, since the conjunction is "ながらも" (nagara mo) with *mo* attached, instead of "ながら" (nagara), which indicates that it must be interpreted as CONCESSION.

(25) [Arg1 逃げていき] ながらも、 [Arg2 「ひゃあ！」と叫んだ。] (421_aozora_Harada-1960)
'<u>While</u> [Arg1 running away] , [Arg2 he/she still shouted, "Hyaa!"] '

While the typical use of *nagara* is either CONCESSION or SYNCHRONOUS, the temporal interpretation (whether it is synchronous or asynchronous) and the inferential interpretation (whether it is concessive or not) are independent. This results in a greater variety of interpretations, such as "Synchronous & Concession." This perspective, also mentioned in Muraki (2019), suggests that the binary classification of SYNCHRONOUS and CONCESSION is not adequate and that there is a need for independent classification for temporal and inferential discourse relations.

4.3.3. Contrast

Concession often accompanies a sense of contrast, and distinguishing between the two is not always straightforward (Section 2.4). In PDTB-3, criteria

have been established for labeling CONCESSION and CONTRAST, and in cases where both CONCESSION and CONTRAST apply, priority is given to the former (Webber et al., 2019).

During our annotation process, we also observed the difficulty of distinguishing between concession and contrast. For example, by applying the template of the direct type of concession to the following case to write out the presupposed inference, we get an inference like in (26a). However, "おだてる(odateru)" (*flatter*) carries a nuance of flattering someone not out of genuine respect but rather with some ulterior motive, to make the other person feel good through excessive praise. This nuance makes the presupposition inappropriate.

(26) 「本 土 の 人 っ て、 [Arg1 沖 縄 を お だ て]ながら、 [Arg2 ほ ん と う は お 人 好 し の バ カ だ と 思 っ て る で し ょ]」 (494_fiction_onna_to_senso)
'People in the mainland, <u>while</u> [Arg1 flattering Okinawa] , [Arg2 probably really think they are naive fools, don't they?] '

a. If the main land people flatter Okinawa, they usually do not really think the Okinawa people are naive fools.

b. (On the surface) the main land people flatter Okinawa, but actually, they think the Okinawa people are naive fools (in their minds).

If we consider this case to be a contrast, we can see a contrasting relationship between "on the surface" vs. "actually/in their minds" and "flattering" vs. "thinking they are naive fools" as in (26b). Thus, although there may be some overlaps between contrast and concession, they must be kept distinct from the perspective of presupposed inferences. Otherwise, we will end up having an inappropriate inference if we cannot identify the correct discourse relation.

4.3.4. Additive

Another type that should be distinguished from CONCESSION is the additive use of conjunction.

(27) [Arg1 行 政 が 作 る 防 災 マ ッ プ を 参 考 に し]つ つ も、 [Arg2 普 段 か ら 地 域 の 地 形 的 特 性 を 把 握 し て、 非 常 時 の 対 策 を 考 え る 必 要 が あ る] (27_news_KAHOKU_184;K201406140A0T10XX00001)
'<u>while</u> [Arg1 it's essential to refer to the disaster prevention maps created by the administration] , [Arg2 it's also necessary to regularly understand the geographical characteristics of the area and consider emergency measures.] '

a. If one refers to the disaster prevention maps created by the administration, then **usually** there's no need to

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[12]The precise mechanism that determines modal flavor is still open to investigation. We think "べき(beki)" (*should*) in Arg1 is a contributing factor, but as the reviewer points out, "言語道断(gongodoodan)" (*outrageous*) may also play a role. The influence of context on modal interpretation is a topic for future work.

regularly understand the geographical characteristics of the area and consider emergency measures.

b. One should refer to the disaster prevention maps created by the administration, **and not just that, but also** regularly understand the geographical characteristics of the area and consider emergency measures.

In this example, the presupposition in (27a), which is derived from the template alone, seems inappropriate, and it is more natural to interpret it as having an additive meaning, as in (27b).

Regarding the relationship between concession and additive, it is known that in English, clauses connected by the conjunction *but* can be followed by the additive expression *too*, and that the presupposition of *too* interacts with the meaning of *but* (Winterstein, 2012). Our annotation also involed such cases where the concession meaning and the additive meaning overlap. However, our annotation, especially the task of writing out presupposed inferences, revealed that the two interpretations, concession and additive, must be kept distinct.

5. Conclusion

This study focused on the polysemous conjunctions *nagara*, *tsutsu*, and *tokorode*, and annotated their discourse relations. In particular, we payed a special attention to presupposed inference to identify the CONCESSION use. Through the annotation, this study clarified the nature of CONCESSION and various factors that affect the interpretation of polysemous conjunctions that may or may not be interpreted as CONCESSION.

Our corpus is designed not only for linguistics research but also has good potential for NLP applications. For example, Sato et al. (2023) uses our corpus to explore whether concessive interpretation is related to sentiment polarity and textual entailment. Furthermore, it provides a reliable dataset for assessing the language comprehension abilities of deep learning models in NLP, suitable for both quantitative and qualitative analyses.

Our future work will encompass the annotation of diverse conjunctive expressions, including *ga* (but) and *noni* (although) with various meanings of concession. This will serves as a bridge between Japanese linguistics and discourse annotation, making a contribution to the establishment of a linguistically valid corpus for Japanese discourse relations.

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